MONASH University
Accident Research Centre

IDENTIFY TRAINING NEEDS AND DEVELOP AND PILOT A TRAINING PROGRAM FOR RETURNING MOTORCYCLE RIDERS

STAGE 1 FINAL REPORT

by

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September 2010

MONASH UNIVERSITY ACCIDENT RESEARCH CENTRE
REPORT DOCUMENTATION PAGE

Report No.	Date	ISBN	ISSN	Pages
Final Report	September 2010		1835-4815 (online)	218

Title and sub-title:
Identify training needs and develop and pilot a training program for returning motorcycle riders

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Sponsoring Organisation(s):
This project was funded by VicRoads

Abstract:
Stage 1 of this project was designed to i) identify the skill and knowledge deficiencies, and attitudinal and development needs of returned riders; ii) determine whether current motorcycle rider training programs address returned riders' development needs; and iii) assess the need for development of a new training program designed specifically for returned riders. The aims of Stages 2-6 of the project were to develop and pilot a training program for returned riders if the Stage 1 research identified that a new training program is warranted. This report presents the results of objectives 1 and 2 of the Stage 1 research.

The Stage 1 methods comprised a literature review of current knowledge in the field and a review of motorcycle rider training; focus groups with motorcycle rider trainers; a nation-wide online survey of 2,000 motorcycle riders; and an assessment of motorcycle riders' skills and performance on the road and in an interactive motorcycle rider training simulator.

In terms of returned riders' crash profile and potential contributing crash factors there is a need to address: the different types of risks encountered when riding in rural and urban environments; the higher level of risk associated with recreational riding compared to riding for commuting or work purposes and the link between motives for recreational riding and crash risk; and crash prevention measures, particularly in single-vehicle crash scenarios.

In terms of riding skills and performance there is a need to address: unintentional errors; basic riding skills (including braking, lane position, buffering, and following distance); higher order cognitive skills (including hazard perception and responding, with particular emphasis on responding); the potential for misplaced confidence in riding ability and performance and implications for crash involvement.

In terms of riding behaviours and motivations for riding there is a need to address: the role of speed in motorcycle crashes (in the context of motives associated with recreational riding and riding for pleasure and excitement, and their link with crash risk); the role of unrealistic optimism and misplaced confidence, including implications for crash involvement.

The literature review found that current motorcycle rider training programs do not adequately address the development needs identified here for returned riders.

Key Words:
Motorcycle, returning/returned rider,
training

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Preface

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Ethics Statement

Ethics approval for this project was granted by the Monash University Human Research Ethics Committee on June 23 2009 (Project Number CF09/1646 – 2009000986).

Contents

Figures

Tables

EXECUTIVE SUMMARY

This project comprised six stages. Stage 1 of the project was designed to i) identify the skill and knowledge deficiencies, and attitudinal and development needs of returned riders; ii) determine whether current motorcycle rider training programs address returned riders' development needs; and iii) assess the need for development of a new training program designed specifically for returned riders. The aims of Stages 2-6 of the project were to develop and pilot a training program for returned riders if the Stage 1 research identified that a new training program is warranted. This report presents the results of objectives 1 and 2 of the Stage 1 research.

Five different methods were employed to address the Stage 1 objectives: i) a literature review of current knowledge in the field and reviews of motorcycle rider training currently on offer; ii) focus groups with nine experienced motorcycle rider trainers to gauge perspectives on riders' skills, behaviours and attitudes, and training experience; iii) a nation-wide online survey of the riding behaviours and crash patterns of 2,000 motorcycle riders; iv) an assessment of motorcycle riders' skills and performance on the road; and v) an evaluation of rider performance using an interactive motorcycle rider training simulator.

DEVELOPMENT NEEDS IDENTIFIED FOR RETURNED RIDERS

In terms of returned riders' **crash profile and potential contributing crash factors** there is a need to address: the different types of risks encountered when riding in rural and urban environments; the higher level of risk associated with recreational riding compared to riding for commuting or work purposes and the link between motives for recreational riding and crash risk; crash prevention measures, particularly in single-vehicle crash scenarios.

In terms of **riding skills and performance** there is a need to address: unintentional errors - being alert to fatigue and avoiding lapses in concentration that might arise from fatigue and or complacency; basic riding skills (including braking, lane position, buffering, and following distance); higher order cognitive skills (including hazard perception and responding, with particular emphasis on responding tasks); the potential for misplaced confidence in riding ability and performance and implications for crash involvement.

In terms of **riding behaviours and motivations for riding** there is a need to address: the role of speed in motorcycle crashes (in the context of motives associated with recreational riding; pleasure and excitement and their link with crash risk); the role of unrealistic optimism and misplaced confidence, including implications for crash involvement.

CAN CURRENT TRAINING ADDRESS RETURNED RIDERS' DEVELOPMENT NEEDS?

The literature review of motorcycle rider training programs and their effectiveness concluded that current programs for motorcycle riders do not adequately address the development needs identified here for returned riders. These programs: include insufficient emphasis on higher order cognitive skills and little or no emphasis on the role of attitudes, motivations and risk taking behaviours in riding performance and crash involvement; tend to improve confidence rather than self-assessment of limitations; are too short; and are conducted on the training range rather than on-road in real traffic conditions .

1.0 INTRODUCTION

1.1 BACKGROUND

Motorcycle (including scooter) riding is becoming increasingly popular as both a mode of transport and a recreational activity within Victoria. However, motorcyclists are over-represented in road trauma statistics.

Over recent years, an increase in the number of riders returning to riding after a significant break has been observed. 'Returned riders' comprise part of the population of what is referred to in the literature as 'older' riders - aged over 30 (or 25 in some reports). While the numbers of older riders in crashes have increased, older riders have lower crash rates when measured in terms of licences held (Haworth, Mulvihill and Symmons, 2002) and in terms of distance travelled (Australian Transport Safety Bureau, 2008) compared to younger riders aged 16-24 years who continue to be over-represented in casualty crash rates. Older riders aged 30-54 are the fastest growing group involved in serious crashes.

Older riders can be categorised into three groups:

- Riders who have held licences and ridden for many years
- Riders who have held licences for many years but have only returned to riding recently
- Riders who have only obtained a licence recently

The increase in the number of older rider crashes may reflect an increase in the number of older riders taking up riding for the first time (novices) or an increase in the number of these riders returning to riding after a substantial break (returned riders). Limited previous research has suggested that the pattern of riding by returned riders may be contributing to the changing crash trend. Returned riders commonly ride motorcycles with a high engine capacity (e.g., over 750CC) and own a motorcycle that is of a larger capacity than they did in the past (Haworth, Mulvihill & Symmons, 2002). In addition, research has shown that compared to new and continuing riders, returned riders were more likely to ride in rural areas, were more likely to use their motorcycles for touring/weekend riding, were less likely to have undertaken training (Haworth et al. 2002; Mulvihill and Haworth, 2006) and were more severely injured in crashes (Mulvihill and Haworth, 2006). Research has demonstrated that an increased crash risk is associated with both recreational riding compared to riding for commuting/general transport, and riding unfamiliar bikes (Haworth, Smith, Brumen and Pronk, 1997).

VicRoads is seeking to develop a training program targeted specifically at returned riders. The aim of the training program would be to update and improve the skills of returned riders to reduce their likelihood of being involved in a crash. If the crash profile of returned riders is different from that of novice riders, there is potential to isolate a range of skill deficiencies and development needs which can be built into a training course to tackle the problems specific to this group.

1.2 AIMS OF THE PROJECT

The aims of the project were to:

1. Assess the need for a returned rider training program
2. Develop and pilot an appropriate returned rider training program.

The project consisted of six key stages:

1. Identify skill and knowledge deficiencies, and attitudinal and development needs of returned riders;

2. Develop a base level curriculum;

3. Market research and consultation with returned riders and key stakeholders;

4. Develop a detailed training curriculum including preparation of teaching materials;

5. Pilot test and evaluate pilot curriculum; and

6. Finalise/modify program as required.

1.3 STRUCTURE OF THE PROJECT

This report presents the results of Stage 1 of the project.

Five different methods were used to address the Stage 1 objectives:

- a literature review of current knowledge in the area and reviews of motorcycle rider training (Chapter 2);

- focus groups with experienced motorcycle rider trainers to gauge perspectives on riders' skills, behaviours and attitudes, and training experience (Chapter 3);

- a nationwide survey of the riding behaviours and crash patterns of motorcycle riders (Chapters 4-8);

- an assessment of 45 motorcycle riders' skills and performance on the road and in a motorcycle rider training simulator (Chapters 9-10).

Within each of the five methods, the performance of returned riders was compared with that of new and continuing riders in order to: i) provide a benchmark of performance against which returned riders could be compared; and ii) assess whether any identified development needs were specific to returned riders and would warrant development of a new training program designed specifically for them. As part of the survey, comparisons were also made between returned riders who had crashed and returned riders who had never crashed. The purpose of this comparison was to assess whether there is an over-representation of factors within the former group that might be contributing to their crash involvement and which might be amenable to modification through training.

2.0 LITERATURE REVIEW

2.1 OVERVIEW

This chapter presents a literature review addressing the first stage of the project: identify skill and knowledge deficiencies, and attitudinal and development needs of returned riders. Section 2.4 compares the crash risk and crash involvement of returned and other riders. Section 3.0 examines differences between returned and other riders and possible explanations for the differences including i) riding patterns and experience; ii) the role of skill and knowledge deficiencies and iii) the role of risk taking behaviours influenced by attitudinal and motivational factors.

Section 4 reviews evidence for the effectiveness of existing motorcycle rider training programs and the types of driver and rider training most likely to be effective in reducing motorcyclists' crash involvement.

2.2 METHOD

An extensive search of national and international road safety research, transport and road links websites and research databases was conducted. The following databases were accessed as part of the search:

- Transportation Research Board (TRB or TRIS)
- Australian Transport Index (ATRI);
- Web of Knowledge
- Transport
- Proquest
- PsychInfo

2.3 SCOPE AND LIMITATIONS

The literature search identified only four studies on returned riders, all of which used a questionnaire to examine riding patterns; crash involvement patterns and characteristics. While self-report surveys and are not as objective as other methods such as in-depth crash analyses, returned riders cannot be separated reliably in the mass crash data or the licensing data, making it difficult to determine differences between the groups using these sources. The limited available research on returned riders most likely reflects difficulties in identifying them in retrospective data sources and the fact that the large number of riders taking up riding after a significant break is a relatively recent pattern.

2.4 DEFINITIONS

Returned riders, by definition, were at some time licensed, active riders who ceased riding for a time and have since decided to take up riding again. The amount of initial riding, the inactive intervening period and the time since taking up riding again have not been defined clearly or consistently in published research. For example, Haworth et al (2002) defined returned riders as riders who "obtained their licence more than 7 years ago, rode regularly, then didn't ride much for a while and now have taken up riding again". Mulvihill and Haworth (2006) defined returned riders as those who had obtained a licence more than 7 years ago and agreed with the statement "I have held a licence for many years but have only returned to riding recently", while Jamson and

Chorlton's (2005) definition included those who returned to riding at least five years ago after having taken a break of 10 years or more.

Inconsistency in the definition of returned riders makes it difficult to make comparisons between studies. It is also important to consider the extent to which the findings of research conducted elsewhere are relevant to Victorian motorcyclists, given potential differences between jurisdictions in their age and experience profiles (both in car driving and motorcycle riding). These issues should be borne in mind when assessing the development needs of returned riders.

2.5 COMPARING THE CRASH RISKS OF RETURNED AND OTHER RIDERS

2.5.1 Crash risk

Despite the concern raised in the introduction that returned riders are a comparatively high risk group, the few studies conducted to date have shown that their crash risk is lower than that of other riders.

Sexton, Baughan, Elliot and Maycock (2004) found that for all sizes of machine except one (900-1000ccs), the group of riders who had taken a break were less likely to be accident-involved than those who had not taken a break. However, when adjusted for age and annual mileage (riders who take a break tend to be older and to have a lower annual mileage); riders aged 56-60 who had taken a break had a somewhat higher accident rate than those who had ridden continuously.

However, as Sexton et al (2004) point out, any effects of taking a break are likely to fade over time as experience is gained after taking a break. Respondents in the Sexton et al study reported that, on average, their last long break was 7 years ago. As many of the 'break' riders would have built up considerable experience after their break, the analysis may not reflect the effect of taking a recent break. However, further analysis of riders returned from a long break (12 months or more) within the two year period preceding the study showed no strong evidence that these riders have a higher mileage-adjusted accident rate than riders who have not taken a long break. Even when the analysis was re-run for riders of motorcycles over 500cc, riders of the larger motorcycles who return to riding after a break tend to be at a lower risk than those who have not taken a break.

Similarly, Mulvihill and Haworth (2006) found that the crash risk of returned riders was significantly lower than that of continuing and new riders even after adjusting for the lower distance ridden in an average week by returned riders. Perhaps the returned riders in this study were avoiding riding in more hazardous conditions given that they did not ride as far or as often as other riders.

It is possible that a finer grained analysis of the accident liability of returned riders very soon after their break and/or after a much longer break might find an effect. However, the above studies did not contain enough data to examine these questions. Clearly, for very long breaks, or for riders with very little pre-break experience and training, the returned rider is in many respects a novice. He or she is likely to have an elevated accident liability as a result – at least in comparison with other riders of the same age. In general, however, the limited number of returned rider studies have found that returning to riding after a long break is not an important risk factor. More detailed research is needed to verify this conclusion.

2.5.2 Crash involvement

Mulvihill and Haworth (2006) found that the proportion of returned riders who were involved in a crash in the last five years was significantly lower than for new and continuing riders (23.8% versus 30.4% versus 35.1%). Haworth et al (2002) found no difference in the proportion of crash involved returned riders and other riders. However the numbers of crash involved riders in their study (less

than 10 percent of all riders) were too small to make reliable comparisons. Similarly, Jamson and Chorlton (2009) found that returned riders were the least accident involved group when crash involvement was measured during the last three years (returned = 18%; continuing = 53%, new = 29%).

The Jamson and Chorlton (2009) data should be treated with caution as it does not account for exposure. Evidence suggests that returned riders ride less often and less distance than new and continuing riders and that as the number of kilometres ridden increases then the likelihood of being involved in a accident increases (e.g. Sexton et al., 2004; Haworth et al., 2002; Mulvihill & Haworth, 2006).

Only one study has compared the severity of injury in crashes between returned and other riders. Mulvihill and Haworth (2006) found that returned riders were more likely to be seriously injured (treated in a hospital emergency department or admitted to hospital) than continuing and new riders (45% returned versus 37.8% continuing versus 19.2% new riders). This pattern may reflect that they ride more often in rural areas where the purpose of riding is for leisure with higher speed travel more likely. The survey found that riders who rode only in rural areas were much more likely to be seriously injured in crashes compared to riders who rode in other environments.

2.6 AN EXAMINATION OF DIFFERENCES BETWEEN RETURNED AND OTHER RIDERS

2.6.1 Overview

Crash risk depends on factors such as a rider's age, gender, experience, riding patterns, characteristics of the motorcycle and exposure. The assessment of risk is complicated by interactions between these and other factors.

Elliot, Baughan and Sexton (2007) note that variables such as age and experience provide limited useful information about how to improve rider safety. However, few studies provide insight into factors which mediate the relationship between the rider or rider behaviours and the rider's accident liability. As is true for car driver research, the small number of these studies has confirmed that the motorcyclists' information processing abilities and riding skills, motivation and attitudes play a much larger role in accident causation than non-human factors associated with the vehicle or road environment.

Unfortunately, the limited number of studies investigating human factors research in motorcycling has focussed on motorcyclists as a homogeneous group rather than on specific sub-groups such as those returning to riding.

2.6.2 Age and inexperience

Many studies have demonstrated a clear relationship between age and crash risk for motorcyclists – younger riders are more likely to be involved in crashes than older riders (Kraus, Riggins & Franti, 1975; Bragg, Dawson & Jonah, 1980; Hurt, Oullet & Thom, 1981; Broughton, 1988; Chesham, Rutter & Quinne, 1993; Rutter, Quine & Chesham, 1995; Lin, 1998; Noordzij & Vis, 1998; Mullin, Jackson, Langley & Norton, 2000, Haworth, Mulvihill & Symmons, 2002, Chesham, Rutter & Quinne, 1993; Lin, Chang, Pai & Keyl, 2003; Lin, Chang & Huang, 2003; Sexton, Baughan, Elliot, & Maycock, 2004; Taylor & Lockwood, 1990, Harrison & Christie, 2005; Elliot, Baughan & Sexton, 2007; ATSB, 2008) and inexperienced riders are more likely to crash than experienced riders (Hull, 1981; Cooper, 1987; Lin, Chang & Huang, 2003; Lin, Chang, Pai & Keyl, 2003; Kraus, Anderson, Zador, Williams, Arzemanian, Weichang, et al., 1991; McGhee, Gullan & Miller, 1987; Sexton et al., 2004; ACEM, 2004; Taylor & Lockwood, 1990).

However, age and experience are highly correlated, and the extent to which crash risk is influenced by exposure, age, or riding experience (including the amount, type and recency of experience) has not been well established. The limited number of studies that have separated the effects of age and experience concluded that youth may be more important than inexperience. For example, Noorzdij and Vis (1998)) found that the accident rate per million vehicle kilometres travelled was 1.5 times higher for younger than for older riders with equally limited riding experience. A New Zealand study (Mullin, Jackson, Langley & Norton, 2000) found no evidence for an effect of experience in terms of years riding a motorcycle after adjusting for age. As age increased, accident risk decreased such that riders aged 25 years or more had a 50% lower risk than those aged 15 - 19 years. Haworth et al (2002) found that the crash involvement rate among fully licensed riders aged under 30 was twice that of newly licensed riders aged over 30, while Sexton et al (2004) found that the effect of experience on motorcyclists' accident liability, though significant, was relatively weak in comparison to that of age.

Since most returned riders fit into the 'older' rider category (i.e. aged over 25), they may not share some of the higher crash risk associated with young riders aged 18-25. The mean age of returned riders was between 45 and 50 in previous research (Haworth et al, 2002; Mulvihill and Haworth, 2006; Jamson and Chorlton, 2009), with returned riders being significantly older than both new and continuing riders. Haworth et al. (2002) and Mulvihill and Haworth (2006) found that increasing age is protective against crash involvement. In Haworth et al, the crash involvement rate of licence holders aged over 30 was lower than that of younger licence holders and it decreased with age. However, part of the difference in crash involvement rates between young and older riders may reflect the survey finding that distance ridden per week and frequency of riding decreased with age group among riders aged over 30. Exposure was even lower among returned riders who were found to ride less distance and less frequently than continuing and new riders in both Haworth et al. (2002) and Mulvihill and Haworth (2006).

However, experienced riders are less likely to be involved in crashes than inexperienced riders, despite the fact that crash risk increases with exposure. Previous studies suggest that riders who ride infrequently are at a greater risk of crashing (e.g., Harrison and Christie, 2003). Haworth et al (2002) found that among riders who rode less than three days per week, the percentage who had been involved in a crash was lower for continuing riders (3.1%) than for returned (8.7%) and new (8.0%) riders.

Compared to new and continuing riders, returned riders comprised a larger proportion of riders aged over 40 in Jamson and Chorlton (2009) and aged over 50 in the surveys by Haworth et al (2002) and Mulvihill and Haworth (2006). These findings suggest that older riders are less likely to be taking up riding for the first time (i.e. newly licensed riders) and that a lack of recent riding experience may be more important in this group than a lack of experience per se. However, this assumption has not been tested empirically.

Car driving experience

As a motorcycle is often a secondary mode of transport, most riders already possess a full driver licence and experience driving a car. It is estimated that over 90% of Victorian motorcycle licence holders also have car licences with most obtaining the car licence first (Safe Roads, 2006).

By virtue of their older age, returned riders generally have more car driving experience than new riders. A number of studies have examined whether experience as a car driver improves the safety of novice motorcycle riders. One reason for this could be that driving skills learned as a car driver can be used in motorcycle riding. Another reason may be that older age results in increased maturity, which has a greater positive impact on road safety than experience (Haworth, Mulvihill & Symmons, 2005).

After controlling for exposure, Taylor and Lockwood (1990) found that driving a car reduced the frequency of motorcycle crashes for riders until they reach their early thirties, with the magnitude of the reduction being greatest for young riders. For older riders, the effect was reversed and its magnitude smaller. They comment that this may be because the skills required for driving safely on the road are developed whilst driving a car and these skills are also useful when riding a motorcycle. But the effect was found to vary with age, rather than riding experience, and so it is possible that young riders who also drive a car may represent a different, and perhaps more mature, group than those who do not. Socioeconomic status may also affect access to other vehicles.

In a New Zealand study, Mullin (1997) found no reduction in risk of involvement in a motorcycle crash associated with driving other vehicles regularly over some years or in the previous year. There was a possible association with a small increase in risk among motorcyclists driving another vehicle more than three days per week in the last year. However, after adjustment for a range of factors (including socioeconomic status) the association disappeared.

Lui, Hosking, Bayly, Mulvihill & Lenne (2008) found that hazard perception skills acquired in the driving domain can be transferred to motorcycle riding as measured in a 'motorcycle' simulator. Experienced motorcycle riders who were experienced car drivers displayed faster response times and superior visual search strategies when compared to experienced motorcycle riders who were inexperienced car drivers.

Thus, while there is some evidence to suggest that car driving experience is important among novice motorcyclists, it is not clear whether, and to what extent, it is beneficial for returned riders. Haworth, Mulvihill and Rowden (2006) asserted that older riders may have more car driving experience (and possibly earlier riding experience in the case of returned riders) and arguably a lower propensity to take risks. Alternatively, they may have acquired a range of bad habits and preconceived ideas which may inhibit learning or increase risk taking propensity.

Riding experience before a break

Returned motorcyclists are relying on skills that were formed some years ago and while no literature has been identified relating to the retention of riding skills after a break from the activity, perceptual and motor skills can be lost over time if there is no intervening practice period (e.g., Carron, 1971; Naylor, Brigg & Reed, 1968; Sauer, Hockey & Wastell, 2000).

However, it is well known that re-learning a skill occurs more quickly than learning it for the first time. Thus, one might expect that returned riders, following a period of prolonged inactive riding, will master riding skills more quickly than riders who are taking it up for the first time. However the implications for safety are potentially more complex in motorcycling. Anecdotal evidence suggests that the changing nature of the road traffic system, increased traffic volumes, differences in training programs, differences in the style and size of motorcycles and the purpose of riding has made the task of motorcycling very different now compared to what it was like several decades ago (personal communication, rider trainer focus groups, 2009). Research has not yet examined how these changes impact on 'relearning' for returned motorcyclists and what the implications are for safety.

2.6.3 Riding patterns

Research shows that motorcyclists today engage in more leisure riding than in the past, and that leisure riding is much more common among returned than other riders (Jamson and Chorlton, 2009; Haworth et al., 2002; Mulvihill and Haworth; 2006).

Haworth, Smith, Brumen and Pronk (1997) demonstrated that the crash risk associated with recreational riding is at least double that of commuting or general transport. Mulvihill and Haworth

(2006) found that the motorcycle was most commonly being used for recreational purposes at the time of the crash, although no differences in purpose of riding were identified between crash involved returned and other riders.

It is possible that the pattern of riding by returned riders places them at greater risk of crashing than other riders, although there has not been enough detailed research to test this hypothesis. In the UK, enforcement agencies have reported increases in the number of motorcycle gatherings and organised "ride-outs" in rural areas and are concerned that these are increasingly attended by returned riders who might engage in activities beyond their motorcycling skill capabilities (Jamson et al., 2005). Mulvihill and Haworth (2006) found that returned riders were more likely to ride in mostly rural and only some urban areas than new and continuing riders while Haworth et al (2002) found that returned and continuing riders rode more often in rural areas than new riders.

In New South Wales in 2000, older riders were involved in crashes further from home and more commonly on main roads and highways (with presumably higher travel speeds and the potential for more severe injury) than younger riders (RTA, 2000 cited in Christie & Newland, 2001). Similarly, Mulvihill and Haworth (2006) found that returned riders were more likely to be severely injured in crashes and that riding in rural environments resulted in more serious injuries and hospital admissions than riding in urban environments.

Lin, Chang & Huang (2003) and Lin, Chang, Pai et al. (2003) found that accidents in rural areas are more likely to be the result of the motorcyclists' poor handling skills and risk taking compared to urban accidents where drivers are more likely to be at fault. Given the tendency for returned riders to ride more often for leisure and in higher speed rural areas, it is possible that the skills required for negotiating these environments are more critical for returned than for other riders. However, the limited amount of research in this area did not find that returned riders were involved in a greater proportion of high-speed rural crashes where the purpose of riding is for leisure (Haworth et al.; Mulvihill and Haworth, 2006).

Mulvihill and Haworth (2006) and Haworth et al. (2002) found that during the last 12 months returned riders were more likely to not ride at all and less likely to ride three or more days per week and less than 50 km per week compared to other riders. Previous research has shown that riders who ride less than three days per week (Haworth & Smith, 1998) and riders who ride infrequently (Harrison and Christie, 2003) are at a greater risk of crashing than those who ride more often. However, this is somewhat of a paradox as increased exposure places riders at a high risk as well (Mulvhill and Haworth, 2006).

Compared to new and continuing riders, the returned riders in Mulvhill and Haworth (2006) and Jamson et al (2005) were more likely to report only riding during the warmer months, while in Haworth et al (2002) returned riders rode more often during the summer than continuing riders but less often than new riders. Sexton et al (2004) found that riders who ride all year round, including in the wet and dark, were at a much higher crash risk than those who ride only in the summer, even when the effects of annual mileage, age, experience, training and motorcycle size had been corrected for. This finding may account, in part, for the lower crash risk found for returned riders in Sexton et al. (2004) and Mulvihill and Haworth (2006).

2.6.4 Motorcycle size

A potentially important influence on accident involvement is the size (i.e. engine size) of the motorcycle being ridden. The general increase in size of motorcycles purchased concurrent with an increase in older rider fatalities over the past decade has raised the question of whether older (and possibly returned) riders are having more crashes because they are riding larger capacity machines. However, even if an apparent relation between crash involvement and engine size exists, this does

not imply a causal link between the two because other factors such as type of use, exposure, and rider age and experience are all associated with the size of the motorcycle ridden as well as with accident involvement (Sexton et al., 2004).

An early study by Mayhew and Simpson (1989) examined the relationship between motorcycle engine size and safety. They concluded that the relationship between motorcycle engine size and collision involvement remains inconclusive, due largely to difficulties in obtaining adequate measures of amount of riding. However, the evidence overall showed that size was not a risk factor for accident involvement.

In the UK, Broughton (1998) reported a strong relationship between engine size and the rate of fatalities per million kilometres, with the rate for motorcycles over 250cc being twice the average rate, and the rate for motorcycles over 500cc being about 40% higher than the average. In contrast, for non-fatal crashes, engine capacity was related to the rate of injury accidents per million kilometres; motorcycles with a capacity greater than 125cc had a much lower risk than those of up to 125cc. However this study did not take into account rider experience and age. Taylor and Lockwood (1990) adjusted for annual mileage, age, and experience and found that, on open roads, motorcycles with higher engine capacities (greater than 500cc) tend to be involved in fewer damage only accidents than motorcycles with engine sizes less than 500cc.

In the US, the mean engine size of motorcycles involved in fatal crashes increased from 769cc in 1990 to 1015cc in 2004 (Shankar & Varghese, 2006).

An in-depth examination by the TNO Road Vehicles Research Institute in the Netherlands (TNO, 1997 cited in Sexton et al, 2004) of the above studies and others concluded that 'there is no scientific evidence that engine size is a major factor in motorcycle accidents; engine size does not emerge as a risk factor'. Taken together, the evidence reviewed by TNO indicates that (a) accident risk per year increases with engine size (mainly because larger motorcycles have a higher annual mileage), (b) accident risk per mile does not increase with engine size, and (c) risk of fatality per mile may increase with engine size.

Lynam, Broughton, Minton & Tunbridge (2001) found that although riders of larger machines were generally more experienced, they were more likely to use the greater power, travel at excess speed and consequently lose control. ROspa found that riders of more powerful motorcycles are associated with a higher proportion of accidents and casualties on non-built up roads, at night, on bends or while overtaking, and crashes due to speeding or other reckless behaviour. The increased crash involvement among older riders might not be attributable to the motorcycle per se but to the riding style of riders who choose to buy the larger capacity motorcycles.

Sexton et al (2004) included non-fatal accidents only and found that there is a tendency for bigger-engine motorcycles to have a lower mileage-adjusted accident rate than smaller motorcycles. However, it is important to note that the division between smaller and larger engines referred to is below and above 125cc.

Taken together, where the effect of engine size appears to be important, the results of previous studies suggest that smaller sized motorcycles tend to have a greater number of minor accidents per year, but for higher severity accidents the reverse is true. However, the literature does not provide any evidence for a clear causal relationship between these factors nor has it investigated whether such a link, if it exists, is implicated in the crashes of returned riders.

2.6.5 Experience with the motorcycle

Haworth, Smith, Brumen and Pronk (1997) found that inexperience with the particular motorcycle is associated with increased crash risk. This raises the question of whether returned riders are

buying larger capacity machines with which they have had little or no prior experience. Haworth et al (2002) examined whether the motorcycle ridden differs from past motorcycles to provide an indication of riskiness of riding. They found no difference in the proportion of continuing and returned riders who reported owning a larger capacity motorcycle now compared to in the past. However, just over 40 percent of these riders currently own a motorcycle with a larger capacity than any of the motorcycles they previously owned. Mulvihill and Haworth (2006) found that while only 6% of motorcyclists reported less than 1,000 kilometres experience with the crash involved motorcycle, returned riders were twice as likely to report this level of inexperience as continuing riders.

Jamson and Chorlton (2009) found that returned riders and long term riders were half as likely to own motorcycles with engine capacities less than 500 cc compared to new riders. They also found little differences between returned and long term riders with respect to engine size suggesting that those riders who had taken a significant break currently ride machines comparable to those being ridden by long-term riders.

Jamson and Chorlton (2009) found that new riders favoured lower-powered mopeds or scooters (40% of the sample) whilst long-term and returned riders tend towards higher-powered supersports motorcycles, modest powered traditional motorcycles and large, but relatively low powered sport tourers.

The tendency to own a larger engine motorcycle seems to depend very much upon the individual's wealth and the way in which they use their machine. Jamson and Chorlton (2009) found that those riding the higher engine motorcycles tend to be male, long-term or returned riders who are of a higher socioeconomic class and earn a higher income and ride mostly for leisure purposes. Whereas the new rider valued the economic and convenience benefits of the motorcycle, the older long-term and returned riders seemed to base their decisions on the leisure and status symbol of the motorcycle. Compared to continuing riders, returned riders were more likely to identify themselves with the current images surrounding their machine and motorcycling. The long-term rider still based their purchasing decisions on a motorcycle's appropriateness for "engaging in a leisure activity" but did not rank the importance of image as highly. Motorcycle maintenance appears in the rankings instead.

Whilst it is true that older motorcyclists are purchasing larger motorcycles than they did in the past, there is no evidence that returned riders are doing so more often than more continuing riders, nor is there any conclusive evidence of a link between returned riders' crash involvement and inexperience with the motorcycle.

2.6.6 Training

There was little in the published literature about the amount and type of training undertaken by returned riders and their effect on crash risk. Returned riders are generally less likely to have undertaken training than other riders (Haworth et al., 2002; Mulvihill and Haworth, 2006). This finding reflects in part, the higher number of recently licensed riders who undertake training than in the past. Returned riders are somewhat more likely to have completed an advanced rather than a refresher course compared to other riders.

2.6.7 Skills and knowledge

Christie and Newland (2001) speculate that the increase in crashes of older riders may reflect the return to riding by returned riders who lack currency and competence in important riding skills such as obstacle avoidance, curve riding and braking.

The literature search failed to identify any studies that have examined returned riders' skills and whether and to what extent skill deficiencies have contributed to their crashes. Mulvihill and Haworth (2006) examined returned riders' self-perceived riding skills and likelihood of being involved in an accident whilst riding on a public road in the next 12 months. Continuing, returned and new riders were more likely to report that they were "about the same" or "better" than other riders their age and sex at controlling the motorcycle. Continuing riders were more likely to say they are much better and better than other motorcycle riders at controlling the motorcycle than returned riders. Returned riders were in turn more likely to say they are much better and better than other motorcycle riders at controlling the motorcycle than new riders. The same pattern of results was obtained in terms of riders' perceived ability to get out of hazardous situations safely compared to other motorcycle riders their age and sex.

These findings may reflect the fact that continuing riders are more experienced than other riders (they rode further and more often and have held a licence longer than returned and new riders) and so perceive their riding skills to be better as well. However, a detailed analysis of the relationship between crash involvement and self-perceived riding style and rider attitudes (Symmons, Mulvihill & Haworth, 2007) suggests that some riders may be overconfident in their assessment of their own abilities. Symmons et al (2007) found that crash involved riders were more likely to perceive their riding skills as being better than their peers and that crash involvement could be predicted by perceived above average motorcycle control skills, a perceived increased likelihood of being involved in a crash in the future, a more tolerant riding style, a greater perceived ability to avoid hazardous situations, and a "safer" (rather than risky) riding style. However, it is not possible to determine the extent to which the riders' perceptions of their own skills reflect objective descriptions of the crash and their own abilities. Further, as the Symmons et al (2007) analyses did not examine whether these findings differ according to crash involved rider type, it is not possible to determine whether returned riders are a high risk group in terms of risk taking propensities.

Contributing factors in crashes

The literature search failed to identify any studies that have examined the role of potential skill deficiencies and other contributing factors in the crashes of returned riders. Mulvihill and Haworth (2006) addressed this topic but using self-report data only.

Although returned riders did not nominate inexperience or inexperience related factors as contributing to their crash/es, returned riders were twice as likely to report having less than 1,000 kilometres experience on the crash involved motorcycle than continuing riders (8.5% versus 4.4% respectively). They were also more likely than continuing riders to report riding on the road on which the crash occurred just once (22% versus 13%). However, these figures should be interpreted with caution as the numbers were low.

When asked whether road surface or visibility factors were contributors in their crashes, returned riders were more likely than other riders to nominate slippery surface and heavy rain.

Riders were asked to indicate the likely contributing factors to their crashes and whether the crash could have been avoided. In 32% of crashes, riders considered that there was no contribution on their part to the crash. In 35% of crashes, riders considered that they had not noticed something until it was too late. Ten percent reported that they were going too fast; and similar percentages (about 8 percent) reported being distracted; not being able to handle the motorcycle, and not knowing what to do in the situation. New riders were more likely to nominate at least one contributor on their part to the crash, followed by returned and then continuing riders. Returned riders were more likely than other riders to nominate no contributor on their part to the crash (38% returned; 33% continuing and 32% new); to nominate being distracted (19% returned; 6% each continuing and new) and to report at least one contributing factor on the part of the other driver.

Fifty percent of riders believed there was nothing they could have done to avoid the crash. A further 15% reported that they could have avoided the crash if they had better observation skills and abilities, and about 13% said they could have slowed down earlier. About 8% and 7% reported that the crash could have been avoided if they had better cornering skills and abilities and better braking skills and abilities, respectively. Returned riders were less likely to report that there was nothing they could have done to avoid the crash than continuing riders but were more likely to choose this option than new riders (41% returned; 58% continuing; 28% new). Returned riders were more likely to report that the crash could have been avoided if they had slowed down earlier (22% returned; 12% continuing; 14% new) and were less likely to nominate that the crash could have been avoided if they had better cornering skills and abilities than other riders (13% returned, 15% continuing;16% new).

Riders were also asked about the extent to which they thought they were to blame for the crash. Forty-seven percent of all riders said they were "not at all to blame" for the crash, 18% said "a little", 17% said "entirely", 12% said "a lot" and 7% said "about half". Returned riders were less likely to say they were not at all to blame than new riders, but were more likely to select this option than continuing riders (42% returned; 52% continuing; 32% new). Similarly, returned riders were more likely to report that they were 'quite a lot' and 'entirely' to blame for their crash (12% quite a lot, 22% entirely) than continuing riders (9% quite a lot, 12% entirely) but were less likely to choose this option than new riders (20% quite a lot, 28% entirely).

In summary, self-report information about returned riders crashes suggest that, compared to other riders they are:

- More likely to nominate slippery road surface and heavy rain
- Less likely to nominate at least one contributing factor on their part
- More likely to nominate at least one contributing factor on the part of the other driver
- More likely to report that the crash could have been avoided if they had slowed down earlier
- Less likely to nominate deficiencies in cornering skills and abilities
- More likely to nominate being distracted as one of the main contributors on their part.

2.6.8 Risk taking

Risk taking is a component of driving style or driving behaviour that is associated with increased crash involvement (Haworth, Mulvihill and Symmons, 2005). It relates to attitudinal and motivational factors (what the rider is willing to do) rather than skill (what the rider can do).

Risk taking behaviour and crash risk

It is well established that risk taking behaviours are related to motorcycle crashes. Riding behaviours that have been found to increase crash risk include riding too fast (e.g., Waller and Carroll, 1980; Lin et al. 2003; Wells, 1986), drink riding (e.g., Fell and Nash, 1989; Lin et al., 2003; ACEM, 2004), unlicensed riding (Haworth, Smith, Brumen and Pronk, 1997; Haworth et al., 2000; Preusser, Williams & Ulmer, 1995), and riding in an unsafe manner (Sexton et al., 2004; Elliot et al., 2007; Lin et al., 2003; Lin et al., 2004) including a willingness to break the law (Rutter, Quinne & Chesham, 1995). Among these factors, excessive speed (e.g. Clarke, Ward, Bartl & Truman, 2004; Stephan, Symmons, Hillard, Bohensky, Muir & Lenne, 2008) and inappropriate speed (e.g., Clarke et al., 2004; Haworth et al., 1997; Stephan et al., 2008) are the most frequently cited factors

contributing to motorcycle crashes in the literature with evidence suggesting that motorcyclists travel faster than car drivers (Horswill & Helman, 2001).

Evidence for the important role of speed in risk taking behaviours is found in self-report survey studies. Mulvihill and Haworth (2006) asked riders how often they engaged in a list of behaviours (derived from the Motorcycle Rider Behaviour Questionnaire (MRBQ)) which have previously been linked to increased crash risk for motorcyclists. They found that 'speed related' risky behaviours or intentions occurred more frequently than 'non-speed' related risky riding behaviours or intentions. Jamson et al (2005) reported essentially similar results in a survey of older riders in the UK. Non-speed related behaviours include riding between two lanes of traffic, attempting to do a wheel spin, pulling away too quickly and allowing the front wheel to come off the road, and riding while intoxicated. Speeding related behaviours include exceeding the speed limit on freeways and country roads, disregarding the speed limit late at night or early in the morning, opening up the throttle and 'going for it' on country roads, and riding fast to keep up with a group.

The Mulvihill and Haworth (2006) study is the only known study to examine risk taking propensity in returned riders. They found that returned riders reported frequently engaging in the above speed and non-speed related risky behaviours more often than newly licensed riders but less often than continuing riders. As for all riders, returned riders reported engaging in speed behaviours in much higher proportions than non-speed behaviours. For all riders, exceeding the speed limit on freeways and country roads were the most popular behaviours with 16% of returned riders reporting speeding on the freeway and 20% reporting speeding on country roads (versus 20% and 14% on freeways for continuing and new, respectively and 26% and 13% on country roads for continuing and new riders, respectively).

Some of these group differences may reflect the survey finding that continuing and returned riders are, on average, more experienced than new riders. As such, they may believe they have more confidence in their ability to take risks without serious consequence. This hypothesis would seem to fit with the finding that continuing riders also perceived their riding skills to be better than other motorcycle riders their age and sex. However, the analyses did not compare ratings between crash and non-crashed involved returned riders so it is not possible to verify whether these risk taking behaviours are over-represented in the crash involved group or if they are associated with a higher crash risk.

The importance of age and experience in risk taking

Some studies have examined the relationship between risk taking and motorcycle rider age and experience in crash risk. These studies have found that young and inexperienced riders have a higher crash risk than older and more experienced riders and that an increased propensity to engage in risk taking behaviours in the former group accounts for some of this difference (Chesham et al., 1993; Rutter & Quine, 1996). The limited number of studies that have separated the effects of age and experience concluded that being young may have a greater influence on risk taking behaviour than being inexperienced.

Rutter, Quine and Chesham (1995) conducted a longitudinal study of 4,000 motorcyclists in the UK to determine whether crashes involving young, inexperienced riders are associated with particular patterns of behaviour. They found that youth played a much greater role than inexperience in predicting self-reported crash involvement. and that a willingness to break the law and generally ride in an unsafe manner (i.e., speeding, breaking traffic laws, breaking the Highway Code, riding too close) were the best predictors of crash involvement. Young, inexperienced riders showed a greater willingness to break the law and generally ride in an unsafe manner than older and more experienced riders. Rutter and Quine argue that beliefs about riding play a mediating role between age and behaviour such that youth produces particular beliefs which in turn produce particular behaviours.

Amongst young people, the influence of experience may be less important than a general willingness to engage in high risk behaviours (Rutter & Quine, 1996; Sexton et al. (2004; Elliot et al. 2007). As noted by Watson et al (2007) the findings that youthfulness, more than inexperience, is related to crashes are also supported by the evidence which links youthfulness with risk taking generally (e.g., Eby and Molnar, 1998; Fergusson, Swain-Campbell & Horwood, 2003; Jessor, Turbin and Costa, 1997; Jonah and Dawson, 1988) and with wider developmental factors such as moral and cognitive maturity. These findings are consistent with studies of sensation seeking which show that sensation seeking peeks around the late teens and dissipates with age. In terms of risk taking behaviour, Watson et al (2007) have suggested that being young has a greater independent effect on crashes amongst riders rather than drivers. The social dynamics of motorcycling could mean that perceived peer pressure to engage in risk behaviours is greater and the physical dynamics of the motorcycle allow more 'stunt' type behaviours than are possible in a car.

In a survey of motorcyclists in the UK, Jamson et al (2005) found that young riders were more likely to intend to engage in speed-related behaviours than older riders. Age was a significant predictor of riders' intentions to exceed the speed limit on a motorway, "really go for it" and ride faster than felt safe. Those who were more likely to intend to speed were also more likely to be male, ride larger machines, have less experience and score high on sensation seeking. Jamson et al (2005) did not examine differences between new and other riders in terms of their intentions to engage in risky riding behaviours. Whilst new riders were younger on average than continuing and returned riders, it is not known what proportion of the younger riders was new (and thus inexperienced).

These explanations go some way to accounting for the link between risk taking behaviour and crash risk in young motorcyclists. The evidence suggests that inexperience is important, but it appears to be less of a factor than youth. Does this mean that risk taking is less of a problem among older riders or is further research required to examine this hypothesis? Unfortunately, little is known about the role of inexperience in risk taking behaviour and crash risk among older motorcyclists, including those who have recently returned to riding. Mulvihill and Haworth's (2006) finding that older returned motorcyclists are less likely to report engaging in risky riding behaviours than older continuing motorcyclists suggests that inexperience may result in safer rather than riskier riding behaviours among older riders. However, as their analyses did not compare differences between crashed and non-crashed rider groups, it is not possible to determine whether the behaviours of returned riders were, in fact, associated with a lower crash risk than those of the more experienced, long-term riders.

The role of psychological and social factors in risk taking and crash risk

Attitudes and motivations

Attitudes and motivations are important in understanding crash risk because they have been shown to be good predictors of both self-reported safe and risky riding behaviours and intentions to engage in safe and risky riding behaviours (Watson et al., 2007). However, little is known about the attitudes and motivations that influence returned riders' behaviour and the extent to which these behaviours are associated with crash risk. The literature search identified only three detailed studies concerning factors associated with motorcyclist behaviour and risk, two of which were focussed on a broad sample of motorcyclists rather than specific sub-groups such as those returning to riding.

Symmons, Mulvihill & Haworth (2007) examined the relationship between motorcyclists' crash involvement as a function of self-perceived riding style and rider attitudes in the sample of older Australian motorcyclists conducted by Mulvihill and Haworth (2006).

Symmons et al (2007) analysed a subset of questions from a self-assessed riding skill scale (Sexton et al., 2004) and a self-perceived riding style scale (Guppy et al., 1989). The questions were

designed to quantify the riders' behaviour and to provide some understanding of the psychological antecedents of motorcycle crashes.

The riding style scale (Guppy et al., 1989) asked riders to rate their own riding style on 12, 7-point semantic differential scales anchored at the ends:

attentive-inattentive	nervous-confident	slow-fast
careful-careless	patient-impatient	tolerant-intolerant
decisive-indecisive	responsible-irresponsible	placid-irritable
experienced-inexperienced	safe-risky	considerate-selfish

This scale has proved to be a useful predictor of car driver accidents (e.g., Maycock and Forsyth, 1997, cited in Sexton et al. 2004) and represents a modification of the original car driving scale for application to the motorcycle riding context, following Sexton et al. (2004).

Using a subset of questions from the self-assessed riding skill scale (Sexton et al., 2004), riders were asked whether they believed that they were better riders than other riders of their age and gender at controlling the motorcycle, spotting hazards, getting out of hazardous situations safely, anticipating what other road users are going to do, and at avoiding hazardous situations. They were also asked how likely they thought they would be involved in an on-road crash within the next 12 months, compared to other riders of similar age and gender. Each item ranged on a five-point Likert scale denoted as "much better"/"much less likely to be involved in an accident" at one end through to "much worse"/"much more likely to be involved in an accident" at the other end.

It was found that crash involved riders rated themselves as significantly more careless, confident, irresponsible, risky, fast and intolerant than riders who had not crashed in the previous five years. Logistic regression analysis found that crash involvement could be predicted by perceived above average motorcycle control skills, increased perceived likelihood of being involved in a crash in the future, a more tolerant riding style, a greater perceived ability to avoid hazardous situations, and a "safer" (rather than risky) riding style. Given the tendency for crash involved riders to exhibit a pattern of riding style consistent with increased crash risk, the findings may reflect an increased, and probably misplaced, level of confidence in riding ability. Symmons et al (2007) concluded that insight training (increasing self-awareness of one's own driving abilities and limitations) may be an effective training intervention to deflate potentially unjustified feelings of self-confidence. The role of insight training in addressing riders' development needs is discussed in Chapter 4.

Using a large sample of UK motorcyclists, Elliot et al (2007) developed a reliable, self-report instrument to measure motorcyclists' behaviour (a Motorcycle Rider Behaviour Questionnaire – MRBQ) and assessed which of the MRBQ behaviour types predict motorcyclists' crash risk. Factor analysis identified that motorcyclists' behaviour could be classified into five distinct factors: traffic errors, speed violations, stunts, safety equipment and control errors. After controlling for the effects of age, exposure and riding experience, they found that the reported frequency of traffic errors (slips, lapses and mistakes mostly associated with failures of hazard perception or observational skills) predicted the risk of a motorcyclist being involved in crashes in which they were not to blame as well as crashes in which the motorcyclist accepted some degree of blame.

Control errors (mainly to do with difficulties of control associated with high speed or errors in speed selection) and speed violations were significant predictors of crash liability in "blame" crashes.

Although the results showed that speed violations were significantly related to "blame crash risk" the findings indicate that traffic errors rather than violations were the main predictors of crash risk. This finding is the opposite to that found for car drivers and probably reflects that motorcycles are inherently more demanding to control than are cars and making an error when riding is likely to have more severe consequences than making an error when driving.

Given the importance of traffic errors in motorcyclist crash risk, the results suggest that training programs that improve traffic skills such as hazard perception (e.g. McKenna & Horswill, 1999) and control skills associated with cornering and speed would be effective at improving safety. However, Elliot et al note that since speed violations were significant predictors of crashes for "blame crashes" then interventions to tackle violational behaviour cannot be overlooked. Furthermore, they point out that traffic errors leading to crashes may occur in a violational context such that a careless, inattentive riding style and excessive speed increase the likelihood of making an error.

Sexton, Baughan, Elliot and Maycock (2004) found that self-reported riding style, getting pleasure from motorcycling, and a liking for speed were identified as predictors of errors that were themselves predictors of crashes. Such relationships lend support to the view that an important part of the motorcycle safety problem stems directly from the motivations that lead people to ride motorcycles in the first place. Improved skills (hazard perception, speed selection, control) should enable riders to cope better with demanding situations, but a more sedate riding style would reduce the need for such skills.

Elliot et al (2007) strongly recommend that road safety interventions focus on reducing violational behaviour (e.g. speed violations) in addition to improving perceptual and control skills. Certainly, attempting to improve control skills without a concomitant attempt to improve insights into risk and self-limitations may increase rather than decrease crash risk. The importance of focussing on insight into risk and self-limitations in motorcycle rider training programs is addressed in Chapter 4.

An Australian study by Watson, Tunnicliff, White, Schonfeld and Wishart (2007) sought to identify the psychological and social factors influencing motorcycle rider behaviour in order to develop a Rider Risk Assessment Measure (RRAM) to recognize high risk riders by assessing their intentions and self-reported behaviours. The psychological and social factors underpinning six behaviours identified in focus group research as influencing the safety or riskiness of motorcycle riding were examined. While their results did not identify a significant correlation between measures of intentions and behaviour comprising the RRAM and self-reported crash involvement, they did identify various psychosocial factors that influence safe and risky rider intentions and behaviour.

Behaviours were classified into 'safer' behavioural intentions (i.e. handle the motorcycle skilfully, maintain 100% awareness, not ride impaired) and 'riskier' behavioural intentions which represented more volitional risk-taking (i.e. bend the road rules, push the limits, perform stunts or ride at extreme speeds). The construct of perceived behavioural control significantly predicted all three safer intentions, while attitude and, sensation seeking in particular, were significant predictors of the three riskier intentions. Perceived behavioural control refers to an individual's perceived ease or difficulty of performing a particular behaviour. It takes account of behaviours that are subject to factors over and above an individual's motivation to perform the behaviour; that is factors which may be outside the volitional control of the individual.

In terms of self-reported behaviours, a similar pattern to the intention results was found. Intentions were found to predict all six behaviours. Sensation seeking and rider aggression predicted all six behaviours, particularly the volitional risky behaviours of "ride while impaired" and "perform stunts and/or ride at extreme speeds".

Watson et al (2007) provide some very useful implications of their research for motorcycle safety training. First, as their results showed that safe and risky riding behaviours do not form a continuum (i.e. they were predicted by different psychosocial factors); different strategies may need to be adopted for addressing each type of behaviour. Many riders who engage in high risk riding behaviours consider themselves 'safe' and it is possible that riders who report safe riding intentions also report risky riding intentions.

Since perceived behavioural control (factors conducted over and above a motivation to engage in a particular behaviour) predicted the three safe riding behaviours (most of which are linked to rider skill) training must focus on the cognitive and physical skills necessary to improve a rider's ability to stay safe on the road. However the finding that perceived behavioural control was also positively associated with the risky riding intention to *push my limits* may be indicative of overconfidence, leading to a greater intention to *push my limits.* This view was supported by the focus group research which showed that the majority of riders enjoy pushing their limits and that most riders perceived that this could be done safely despite admitting that their risk of crashing is raised under these conditions. These findings highlight the potential for rider skills training to lead to overconfidence in riding ability resulting in a discrepancy between their perceived and actual limits. As mentioned previously in this report, the importance of focussing on insight into risk and self-limitations in motorcycle rider training programs is critical.

Unrealistic optimism

The tendency to over-rate one's own abilities and chances of positive outcomes compared to those of others refers to the psychological construct of unrealistic optimism (Weinstein, 1989). Drivers have been found to incorrectly rate themselves as more skilful, safer and slower, and less likely to have an accident than the average driver - a finding that has been observed to a greater extent in young novice drivers (Svenson, 1981; McKenna, 1993; Horswill, Waylen & Tofield, 2002) and also in both young and older motorcyclists (Rutter & Quinne; 1996; Symmons et al., 2007).

Studies of unrealistic optimism in motorcyclists have found that young, inexperienced motorcyclists display higher levels of unrealistic optimism than older and generally more experienced riders (e.g. Rowden & Watson, 2008) despite demonstrating poorer performance on hazard perception and responding tasks (e.g., see Liu, Hosking, Bayly, Mulvihill & Lenne, 2008; Haworth, Symmons and Kowodlo, 2000).

Rutter, Quine and Albery (1998) found that, on average, motorcyclists believed themselves to be less at risk than other riders of an accident needing hospital treatment in the next year. However, in contrast to the studies cited above, unrealistic optimism was reduced by 'relative realism' – riders who were young and inexperienced (and riders who reported risky behaviours on the road) saw themselves as more at risk than other riders. However, a higher perception of risk was not found to result in safer self-reported behaviour – the reverse was true.

Mulvihill and Haworth (2006) found similar results to those of Rutter et al (1998). New riders were significantly less likely to report that they were *better* than their peer riders at controlling the motorcycle compared to returned and continuing riders (new = 22%, returned = 25%, continuing = 35%). A generally similar pattern of results was obtained for the self rated skill of getting out of hazardous situations safely (*better*: new = 25%, returned = 26%, continuing = 38%). The tendency for new and returned riders to report a lower level of confidence in their riding abilities possibly reflects the survey finding that they are less experienced than other riders and more likely to report

difficulties with these skills prior to their crashes. However, the proportion of returned and new riders reporting high levels of confidence in their skills is still quite high.

In the absence of objective information about the riding skills and abilities and crash involvement patterns of these riders (the analyses did not compare ratings between those who had and had notcrashed within the different rider types), it is not possible to determine whether riders' perceptions of own ability is indicative of unrealistic optimism and if the level of confidence represents overconfidence to the degree that it contributes to increased risk taking.

In a survey of older motorcyclists in the UK, Jamson, Chorlton and Connor (2005) found that older riders tended to believe they were less at risk of an accident than all other road users (except car drivers). Consistent with Mulvihill and Haworth (2006), comparisons of risk measures suggested that long-term and returned riders showed higher signs of confidence than new riders. However, despite having a more realistic perception of the risks involved in motorcycling, new riders tended to be involved in more accidents than older and generally more experienced riders (20% new riders, 8%, continuing and 10% returned).

The tendency for newly licensed riders to report lower levels of confidence than experienced riders in Mulvihill and Haworth (2006) and Jamson et al. (2005) disagrees with the findings of other studies and most likely reflects a difference in the age of newly licensed riders between the studies. The average age of newly licensed motorcyclists in Mulvihill and Haworth (2006) and Jamson et al. (2005) (i.e., 39 and 33 years respectively) was much higher than in previous studies. It is possible that the tendency to rate oneself as overconfident in riding ability despite higher crash involvement or evidence of relatively poorer riding skills is more common among younger than older inexperienced riders. If that is true, then unrealistic optimism may be more a feature of youth than inexperience and potentially less prevalent among returned and other older riders. However, this conclusion should be treated with caution in the absence of more detailed research on unrealistic optimism and safety among older and returned riders.

2.6.9 Summary

In summary, the limited numbers of studies on returned riders have shown that, compared to new and continuing riders, they:

- Have a lower crash risk and lower crash involvement
- Are more likely to be older
- Are more likely to be severely injured in crashes and to ride only in rural areas
- Are more likely to ride for leisure rather than for commuting/general transport
- Ride less frequently and less distance following a return to riding
- Are less likely to have undertaken training and more likely to report that their last training course was an advanced course
- Are more likely than new riders but less likely than continuing riders to say they are better at controlling the motorcycle and getting out of hazardous situations safely compared to other motorcycle riders their age and gender.

In terms of self-reported crash contributing factors, compared to other riders, returned riders are:

  - More likely to nominate slippery road surface and heavy rain

- Less likely to nominate at least one contributing factor on their part
- More likely to nominate at least one contributing factor on the part of the other driver
- More likely to report that the crash could have been avoided if they had slowed down earlier
- Less likely to nominate deficiencies in cornering skills and abilities
- More likely to nominate being distracted as one of the main contributors on their part.

In terms of risk taking behaviours, returned riders:

- Reported frequently engaging in risk taking behaviours, particularly exceeding the speed limit on freeways and country roads more often than newly licensed riders but less often than continuing riders.

There is limited available evidence about a number of other factors identified in this review that may contribute to returned riders' crash involvement and crash risk. These include: prior car and motorcycle riding experience and the impact of previously learnt skills on current riding practices and safety; riding patterns and exposure, motorcycle size and level of experience with the motorcycle, training, and the influence of attitudes and motivations on behaviour and crash risk, including the role of unrealistic optimism. It is also likely that other factors are important, but these were not identified in the current review.

Other study methods detailed later in this report have been used to address some of these questions to provide a more complete picture of returned riders' development and training needs.

2.7 THE ROLE AND EFFECTIVENESS OF RIDER TRAINING

This chapter reviews the evidence for the effectiveness of current motorcycle rider training programs and includes recommendations for their improvement based on international best practice and research in driver and rider training. Current motorcycle rider training programs generally refer to courses spanning from novice/beginner through to refresher and advanced that are (for the most part) operational in current licensing and training systems nationally and/or internationally.

2.7.1 Effectiveness of existing rider training

The over-representation of motorcyclists in crashes has continued to focus attention on the role that motorcycle rider training can play in increasing safety, particularly for inexperienced motorcyclists. However, empirical evaluations of training have shown little evidence to demonstrate improvements in safety when measured in terms of crash reductions. Early reviews of training found that voluntary motorcycle training programs do not reduce crash risk whilst compulsory training through licensing programs produced a weak but consistent reduction in crashes (TOI, 2003; Haworth & Mulvihill, 2005). Simpson and Mayhew (1990) found that formally trained riders had the same risk of being involved in a crash as riders who did not receive instruction. Some studies have even found that formally trained riders were more liable to accident involvement than riders who were not formally trained (Chesham, Rutter & Quine, 1990). More recently, Savolainen and Mannering (2007) found that individuals who took beginning rider training courses were more likely to be involved in an accident than those who did not and that those who took the beginning course more than once were much more likely to be involved in an accident.

In their review of motorcycle licensing and training, Haworth and Mulvihill (2005) concluded that the lack of scientific evidence from training evaluations makes it difficult to identify best practice in terms of frequency and duration of training, learning aids, training venues and assessment techniques. However, a range of potential shortcomings may account for the apparent lack of efficacy of existing training programs. These include issues such as program content and delivery methods, the influence of the licensing system, and evaluation limitations (e.g. self-selection bias, lack of statistical power, and exposure differences such as distance travelled).

In terms of content, early programs have focused largely on training vehicle control skills due to time constraints and the need to prepare the rider with a reasonable skill-base at the end of the program. Bartl et al (2002) suggest that going beyond the teaching of basic skills to focus on important, high level risk awareness issues (using delivery techniques such as group discussions, self analysis, accident analysis and reflection, the use of personal experiences etc) requires specific coaching skills from trainers, which many do not have. Coaching involves assessing and meeting the unique needs of an individual rather than applying a common one size fits all approach that typically characterises current training programs (see page 41 for more details of coaching techniques).

Given these constraints, training programs have been limited in their focus on higher order cognitive skills related to situation awareness and the anticipation, detection and assessment of hazards as well as on attitudinal and motivational factors associated with increased risk taking behaviours and crash risk (Haworth, Mulvihill & Symmons, 2005; Chesham, Rutter & Quine, 1993; Crick & McKenna, 1991; Haworth, Smith & Kowadlo; 1999; Reeder, Chalmers & Langley, 1996; Simpson & Mayhew, 1990).

Most evaluations of rider training programs have examined their impact on the safety of newly licensed, inexperienced motorcyclists, or have not specified who the specific target population is, if any. This makes it difficult to determine the effectiveness of programs designed for, or undertaken by, returned riders. However, the increase in the number of older riders taking up riding again is a relatively recent phenomenon and returned riders are less likely to undertake training than new and ongoing riders (Haworth et al., 2002; Mulvihill & Haworth, 2006). As such, it is not surprising that the literature search failed to identify any evaluations of training programs undertaken by returned riders.

Haworth et al. (2006) assert that recent changes in the demographics of riders lead one to question whether the results of earlier evaluations of rider training remain valid (and therefore applicable to older, returned riders). In the past, most riders undertaking training were young, with little car driving experience. Thus, the published evaluations generally relate to a different age profile of trainees to that now presenting to training. In addition, a larger proportion of older returned riders reported that their most recent training course was an advanced course rather than the learner or licence courses typically undertaken by newly licensed riders and evaluated in the literature (Haworth et al., 2002; Mulvihill & Haworth, 2006).

Haworth et al. (2006) examined the influence of training on crash involvement for a sample of older Australian riders aged over 25 (see Mulvihill & Haworth (2006) with particular reference to when training was last undertaken (if at all). They found no clear relationship between undertaking a training course since 1996, before 1996 and not at all and involvement in crashes overall or in single vehicle crashes (where the rider is more likely to be at fault). The only significant finding was an increase in the risk of involvement in a multi-vehicle crash for riders trained since 1996 compared to other riders. While these results provide support for earlier evidence that training has little safety benefit, it may be that the time periods used were not appropriate. Perhaps training does have an effect on crash risk but only for 6-12 months, rather than the period of up to 10 years as used in the Haworth et al. (2006) study.

Higher order cognitive skills

In relation to higher-order cognitive skills, rider training programs have generally neglected the important skill of hazard perception: the ability to identify potentially dangerous traffic situations (Haworth et al., 2005; Hosking et al., 2008). In relation to driver training, research has shown that hazard perception training in novices leads to improved performance on hazard perception tests (McKenna & Crick, 1991; Mills, Grayson & Sexton, 2002; Mills, Hall, McDonald & Rolls 1998), although it is not yet known whether these drivers become safer drivers and have fewer crashes (McMahon & O'Reilly, 2000). No published research has examined whether hazard perception training by motorcyclists leads to improved performance on hazard perception tests or, indeed, whether it leads to increased safety on the road.

More recent motorcycle training courses state that they teach "roadcraft" and there is often an implicit assumption that roadcraft equates to hazard perception and responding. But roadcraft is rarely clearly defined. Allardice (2002) defines roadcraft as "riding 'nous', the ability to recognise and react to surrounding influences and your environment". Current on-road advanced courses incorporate hazard perception, positioning (eg 'see and be seen') and motorcycle control in traffic as fundamental aspects of training for riding on public roads. While current training places a greater emphasis on the importance of roadcraft and hazard perception than traditional training programs, no formal evaluations of the effectiveness of current training programs were identified in this review. The lack of a good test of hazard perception and responding by motorcycle riders has also prevented research to evaluate the effectiveness of motorcycle training programs and products in enhancing these skills.

Attitudes and motivations

The literature search identified the important role of social and psychological factors in predicting riders' intentions to engage in (and to self-report engaging in) risky riding behaviours. However, both driver and rider training programs have been criticised for their failure to address attitudinal and motivational factors in risk taking behaviours.

In relation to traditional motorcycle rider training programs, Chesham et al. (1993) concluded that "training courses concentrate on riding technique and pay little attention to why safe riding is important. That is, they offer little by way of cognitive underpinning for the behaviours they promote." (p.428). More recently, on-road motorcycle rider training programs have started to incorporate discussions on higher-level risk awareness, such as recognising personal limitations, understanding how the characteristics of the motorcycle and of the rider can affect riding style and road safety, taking into account peer pressure when riding in groups etc (Bartl et al., 2002). Evaluations of training programs have shown some promise in improving attitudes and motivations associated with risk taking behaviours and crash risk in young, novice drivers (See Section 4.2.2). However, no evaluations of such training approaches have been conducted in relation to motorcycle safety.

Unrealistic optimism

Another possible reason for the lack of efficacy of training (apart from issues of content and delivery methods, and evaluation deficiencies) is that it contributes to the development of over-confidence in drivers and riders. This may be due, in part, to the increased confidence felt by many riders/drivers who have completed training, despite minimal improvements in rider skill. Such riders may therefore take more risks in situations where they lack the skills to safely avoid a crash. As described previously in this report, the tendency for humans to over-rate their own abilities and chances of positive outcomes compared to those of other people refers to the psychological construct of unrealistic optimism (Weinstein, 1989). The literature search identified the presence of unrealistic optimism in young, inexperienced motorcyclists but its presence in older riders with varying levels of experience is not reliably known.

In the area of novice driver training, Gregersen (1996) and Katila, Keskinen & Hataaka (1996) argued that overconfidence has been found to contribute to increased crash rates for participants following driver skid training focussing on advanced driving skills. Recent reviews of both driver and rider training now recognise the potential importance of overconfidence in crash risk and recommend that training practitioners develop techniques to limit overly inflating the confidence of novice and other riders (e.g. Symmons et al. 2007; Watson et al. 2007; Broughton, 2005; Elliot et al., 2003), Rowden & Watson, 2008). Whilst skill development is undeniably a necessary part of safe motorcycling, it is not sufficient in its own right to protect riders against injury unless accompanied by a realistic appreciation of the associated risks (Rowden & Watson, 2008; Symmons et al. 2007) Haworth & Mulvihill, 2005; Broughton, 2005; Elliot, Baughan, Broughton, Chinn, Grayson, Knowles, Smith & Simpson, 2003).

Duration of training programs

Most motorcycle rider training programs have durations of 16 hours or less, and many are one-day courses. Rider behaviour cannot be dramatically altered in such a short time frame, regardless of method (Christie, 2001). In addition, according to Goldenbeld and Hatakka (1999),

> …it is very likely that the effects of such (short) courses will only be short-lived if the newly-learned or improved skills are insufficiently practised or applied during driving after the course… an important part of those skills actually learned and practised are only applicable during emergency conditions that rarely occur.

While this quote refers to driving there is no reason to assume that the same cannot be said of motorcycling, albeit most likely to a lesser extent given the additional and more challenging tasks involved in riding compared to driving. Notwithstanding these differences, it would seem that there is a need for programs to be extended over a longer period involving several training sessions in order to maintain their effectiveness. Unfortunately, however, the research does not offer clear guidelines as to the optimal length or staging of such training (Senserrick & Whelan, 2003). Haworth and Smith (1999) concluded that four days were needed to deliver a training program that would allow novice riders to reach a level where they would be considered to be competent to ride unsupervised.

Summary

In addition to issues such as program length and delivery methods, the influence of the licensing system, and evaluation limitations (e.g. self-selection bias, lack of statistical power, and exposure differences such as distance travelled); the lack of effectiveness of current motorcycle rider training programs can be attributed to the following:

- A relative lack of attention to higher order cognitive skills including those associated with hazard anticipation, recognition and assessment.
- A tendency to improve confidence rather than improve self-assessment of limitations
- Difficulties in dealing with attitudes and motivations, especially in light of research findings indicating that motives associated with risky riding behaviours are, for some riders, an intrinsic part of why they ride.

Current motorcycle rider training programs would benefit from a greater emphasis on the training of higher order cognitive skills as well as insight into the attitudes and motivations that influence risk taking behaviour and crash risk.

2.7.2 Training approaches to improve motorcycle safety

This section examines the types of training most likely to improve motorcycle safety given the potential shortcomings identified in current training approaches (Section 4.1 above). It draws on the research evidence from current driver training programs with a particular focus on the role of insight training in reducing crash risk, and outlines some theoretical assertions for using a learner-centred approach to teaching and learning.

Higher order cognitive skills training

Hazard perception training using simulation has led to improved performance on hazard perception tests in car drivers, although it is not yet known whether these drivers become safer drivers on the road. There has been very little research on the types of hazard perception training most likely to be effective for motorcyclists, although simulation is likely to be promising, particularly for very inexperienced riders. The literature provides little evidence based guidance on the types of hazard perception training most likely to be effective.

Attitudes and motivations leading to risk taking

Research in traffic psychology shows not only the importance of performance factors (i.e. what the driver can do), but also the importance of motivational and attitudinal factors (i.e. what the driver is willing to do) (Rothengatter, 1997). Risk taking is a component of riding style that relates to motivational and attitudinal factors rather than skill, but the ability to perform skilfully is determined by the rider's style of riding and propensity to take risks.

Insight training has shown promise in addressing the role of attitudinal and motivational development needs in young novice drivers, although its efficacy in reducing crashes is not yet known. Given that insight training has not been formally introduced as part of standard motorcycle rider education and training programs, its potential safety benefits for motorcyclists are not yet known.

Insight-training and hierarchical levels of driver/rider behaviour

Insight training aims to create a more realistic perception of risky behaviours in the driving or riding environment. Rather than teaching drivers or riders how to control a vehicle in different driving situations, insight training focuses on calibrating participants' perceptions of their own skill with objective reality (i.e. increasing self-awareness of one's own driving abilities and limitations) (Rowden & Watson, 2008).

In the context of insight training for motorcyclists, Bartl et al (2002) suggest that high level risk awareness training should focus on:

- Personal motives for motorcycling (and their effect on safety)
- Why this choice of motorcycle (and what this says about the rider)
- Peer pressure when riding in groups
- Analysis of classic accident situations, based on and involving the personal experiences of participants.

The role of insight training in safety is best understood within the context of Hatakka, Keskinen, Gregersen, Glad and Hernetkoski's (2002) *Hierarchical Levels of Driver Behaviour*. Although this makes reference to cars and car driving, the same principles can be used for motorcycles and motorcycling.

- **Goals for life and skills for living** (importance of cars and driving on personal development; skills for self-control)

- **Goals and context of driving** (purpose, environment, social context, company)

- **Mastering traffic situations** (adapting to demands of present situation)

- **Vehicle manoeuvring** (controlling speed, direction and position)

The bottom two levels in the hierarchy (skills for vehicle manoeuvring and mastery of traffic situations) are used under the guidance of the higher level goals and motives. The second level in the hierarchy refers to the rider's motivations for riding and how these relate to choices about where and when riding occurs; who it occurs with and the social context in which it takes place (e.g., company, peer pressure/showing off) and the combined influence of these factors on risk taking and safety. The top level of the hierarchy asks how personal motives for riding meet the rider's broader personal developmental needs and considers approaches to contain and control these needs without compromising safety. In the training context, high level risk-awareness must place particular emphasis on the top two levels of Hataaka et al.'s (2002) Hierarchical Levels of Driver Behaviour since it is the rider's attitudes and motivations which have the greatest influence on behaviour and performance.

Through group discussion; self-reflection and self-evaluation techniques with respect to participants' own riding experiences, the rider is given tools to know the limits of his/her skills without ignoring or attempting to remove the goal of obtaining enjoyment from riding. Coaches should not (and cannot) be expected to be able to change attitudes and behaviour during such a short time-frame. The focus should rather be to improve the participants' awareness of both their typical riding habits and situations (Level 2) and typical living habits (Level 1) which can affect their ability to ride safely. The provision of tools to reflect on their own riding habits and hence improve their riding style and skills should address those risk increasing factors associated with the top two levels of the hierarchy and their impact on the bottom two levels of the hierarchy.

Most of the pre-test training, such as that undertaken before riding a motorcycle on a public road, is focused on the lower two levels, that of motorcycle control and reading/reacting to the traffic situation. Post-test training, such as Bike Safe (discussed in Section 4.2.4 below) or similar assisted ride programs, concentrate on the reading of other traffic and riding accordingly, focusing mainly on the second lowest level of the hierarchy. It is the training schemes that focus on these levels that can increase the vulnerability of riders by raising the perceived skill levels of riders. While these skills are essential for safe riding, training programs must temper the riding skills component with a heavy emphasis on the 'goals and context of riding'.

Effectiveness of insight training

As noted earlier, insight training has shown promise in addressing the role of attitudinal and motivational development needs in young novice drivers, although its efficacy in reducing crashes is not yet known. Given that insight training has not been formally introduced as part of standard motorcycle rider education and training programs, its potential safety benefits for motorcyclists, including returned motorcyclists, are not yet known.

An early evaluation of insight training with novice drivers was reported by Gregersen (1996). The study contrasted two groups. Both were briefed on basic theory of driving on icy roads, and on braking and avoidance manoeuvring. However, in addition, one group received skid training on a closed driving practice area – the 'skill group'. The other group drove on the same circuit but did not receive any skill guidance in order to demonstrate that even if they knew the basic theory, they could not rely on this in a critical situation – the 'insight group'. Surveys and course participation

one week after training showed that the skill group estimated their skills to be at a higher level than the insight group, even though they did not differ on actual skills. These findings suggested insight-trained drivers were less likely to report overconfidence in their driving ability; a positive attitudinal change, although the study did not include a control group.

Nyberg and Engström (1999) reported some positive attitudinal outcomes of the *Swedish Insight Program* for novice drivers (mostly in relation to seat-belt use); however, they failed to find differences among test and control groups in attitudes relating to vehicle following distances, and speed and road conditions.

While Keskinen, Hatakka, Katila, Laapotti & Peräaho (1999) found little evidence of an effect during the first year following an insight training program, differences were reported in the long term. For the four-year period following introduction of the program, they found a 25% decrease in crashes in slippery road conditions for 18-20 year-old males and a 50% decrease for males aged over 20 years. An 18% decrease was found for 18-20 year-old females. Despite a downward trend in crashes in Finland in general during the analysis period, crash reductions in the 2-4 years following the program were more marked than for the general crash trend suggesting that the program was effective in improving road safety.

In Australia, Senserrick & Swinburne (2001) evaluated the Skilled Drivers/AAMI insight training program for 18-25 year-old recently-licensed Provisional drivers. Whilst they found some evidence of positive change in driver road safety attitudes, behaviours and risk perceptions, the effect of the program on crash involvement was unable to be measured due to the study's small sample size.

Chapter 3 identified that a number of more enduring personality characteristics including sensation seeking and aggression were important predictors of intentions to engage in and participation in, risky riding behaviours. While insight training may be helpful in addressing the motorcyclists' awareness of personal and social factors on their behaviour, it is unlikely to impact on changing pervasive personality characteristics (Watson et al (2007). Bartl et al (2002) also note that, given the short timeframe in which to conduct training, trainers should not be expected to be able to change attitudes and behaviour. Rather, the training should be designed to improve the participants' awareness of both their typical riding habits (and situations) and typical living habits which can affect their ability to ride safely. Understanding oneself is a crucial factor in anticipating potential problems when driving. In this regard, Bartl et al (2002) suggest that the participants' own driving/riding experiences should be discussed and referred to constantly.

Given the success of insight training for car drivers, and the link between attitudinal and motivational factors and crash risk identified earlier in this report, it is imperative that insight training be included as part of any safety program for motorcyclists.

Learner-centred approaches to training

Rowden, Watson & Haworth, 2007 argue that the lack of success of rider training programs may reflect an inability to facilitate effective levels of learning in trainees. The question of how people learn and what enhances and motivates learning has been addressed within the broader adult education literature, but not in relation to motorcycle safety training.

In recent years there has been an overwhelming shift towards learner-centred (or student-focused) approaches to teaching and training within the broader adult education literature (Rowden et al (2007). In contrast to traditional training approaches in which the learner is construed as a passive recipient of information, the learner-centred approach focuses on the importance of students actively processing and constructing information for themselves. This creates a more intensive learning experience and increases the chances of participants continuing to learn for themselves beyond the formal period of learning.

In the context of learner-centred approaches, Phillips (2005) distinguishes between deep and shallow learning:

"Successful learning is about taking responsibility, and many writers contrast what goes on in 'deep' as opposed to 'shallow' learning. The latter is about "lazy" learning – when the student makes notes without much thought and regurgitates them in test. Deep learning, on the other hand, happens when students think actively about what they learn, for example by discussing and disputing it; when they deliberately seek out information as opposed to being "spoon fed"; when they reflect on what they have learnt, challenge it and integrate it into other contexts". The deep approach to learning has been consistently shown to result in higher quality learning outcomes (Prosser & Trigwell, 1999).

A learner-centred approach to training delivery for drivers and riders has been advocated by the European Nations. The European Nations' review of rider and driver training (EU Advanced Project), by Bartl et al (2002) provide a number of recommendations for applying the learner centred approach to motorcycle rider training, as discussed below.

Many current training programs follow a fixed program or system which is imposed on the participants. Courses should focus more on the specific needs of each participant and how to encourage them to improve their driving style and behaviour. This can only be achieved by developing methods to encourage participants to reflect on their strengths and weaknesses (self-reflection) and to provide motivation to change. For this to be achieved, trainers need stronger coaching skills and should receive specific training for this purpose.

Course providers and trainers should be aware that being an exemplary driver/rider is not sufficient to be a good post-licence trainer. Trainers require a range of teaching skills to help the participant help themselves. Being told what to do will not have a lasting effect on the majority of participants unless they are incredibly motivated. Participants must be convinced that it is in their personal interests to adopt a different riding style.

Whereas theoretical presentations may become tedious for participants, more participant centred discussion (on personal experiences including an examination of the motives for motorcycling) can be far more stimulating and insightful if led well by the trainer. The key is not so much what participants are taught, but how they are taught it. Participants must be motivated in a lively learning environment and it is important to keep communication simple and clear. Self-evaluation should be encouraged to stimulate participants to continue learning after they have completed the course.

With the exception of a study by Rowden et al. (2007), the literature search identified no published studies that specifically investigated the possible strengths and/or weaknesses of the learner-centred approach as a motorcycle safety countermeasure. Using focus groups, Rowden et al. (2007) examined whether pre-licence rider training was consistent with established adult learning principles based on a sample of 40 novice riders who completed training through the Queensland Government's Q-Ride Program.

Consistent with adult learning principles, Rowden et al. (2007) concluded that i) trainees demonstrate a range of individual learning needs that were able to be identified and addressed effectively by the trainers and ii) trainers appear to adopt a learner-centred approach as evidenced by trainee's reported experiences of learning as an engaging and fulfilling experience; iii) while much information from training does transpose to actual on-road riding following licensing, the most salient information is that which is personally encountered and reinforced in the on-road environment.

However, the authors outline a number of limitations of this study which make it difficult to validate the effectiveness of a learner-centred approach to training. First, it is possible that sampling bias existed and only people who viewed their training more favourably or were interested in the topic attended. Second, as participants were sampled from only one training organisation, it is possible that the practices and learning experiences of other training providers and their participants differ from the one under investigation in their study. Third, although participants shared their perceptions of training, the qualitative method cannot measure actual levels of learning (i.e. participants can only report what they have learnt and not what they do not know or have not learnt).

The role of coaching/mentoring in training

In their recommendations for post-licence rider training in Europe, Bartl et al (2002) argue that the role of the trainer is central to implementation of an effective learner-centred approach to safety. They suggest that going beyond the teaching of basic skills to focus on important, high level risk awareness issues (such as group discussions, self analysis, accident analysis and reflection, and the use of personal experiences etc) all require specific coaching skills from trainers, which many do not have.

As noted by Bartl et al (2002) coaching represents a new approach for most driver and rider trainers:

> …coaching techniques appear to be particularly suited for application in the driver / rider training world. Coaching can be used for motivating participants, planning, problem-solving, assessments, personal development and group work. To a certain extent, the introduction of coaching methods amongst trainers (who are not familiar with them) represents a paradigm shift, in that its principles seem to conflict with the "tell" culture teaching methods which they have learned and copied from the past. However, in the same way as environmental driving is to conventional driving, these techniques can be learned.
>
> The introduction of quality coaching would take driver training to a higher level, in that it recognises the need to stimulate the sense of responsibility and awareness of the trainee, and to build upon the trainee's motivations (needs), and that imposing a driving style or structure on an individual is, to a large extent, trying to flog a dead horse. Despite the challenges for many trainers and training companies, it is a recipe for success in terms of delivering quality services, provided it is mastered and audited properly. (Bartl et al, 2002, 216-217)

In essence, coaching is about assessing and meeting the unique needs of an individual, not applying a common training program to "tell" them what to do or not to do. This often requires specific training in coaching skills and techniques to learn how to observe behaviour/performance and provide useful and relevant feedback that the person being coached is likely to accept and apply (Bartl et al, 2002).

A review of on-road rider training programs (Christie, 2007), argued that on-road rider assistance programs appear to adopt a coaching or mentoring style because their intent is not traditional instruction but rather cooperative learning/development between and among adults, consistent with adult learning principles. A summary of the nature and effectiveness of on-road rider assistance and support programs is given below.

On-road rider assistance and support programs

Christie's (2007) review noted that, although there is no single definition to describe on-road rider assistance and support programs, they generally:

- Concentrate on everyday on-road, in traffic riding rather than off-road operation.

- Have a safe riding focus.
- Assume that riders are legally licensed and possess basic riding skills.
- Expect riders to attend/participate on their own street-legal motorcycles (or scooters).
- Do not provide or address advanced riding skills, other than those related to rider safety.
- Provide formal/informal mentoring and feedback from expert/experienced riders/instructors to riders about how they could modify/improve their riding skills to enhance their safety.
- Provide formal or informal referral of riders to rider training for riders who may seek or require this.

A number of on-road rider assistance programs are operational in Australia and other comparable jurisdictions including the UK, USA and Canada. These include:

- BikeSafe (UK)
- The Edge/The Edge44 (UK)
- Yarra Ranges Instructed Rides (Victoria)
- Honda Australia Rider Training (HART) Road Skills (Victoria, Tasmania, ACT and Queensland)
- Street Skills (Alberta, Canada)
- Motorcycle Mentorship Program (MMP) (US Air Force, Army, Navy and Marine Corps).

As noted by Christie (2007), existing on-road rider assistance and support programs are not homogenous in content and vary in their complexity and sophistication. This lack of consistency or uniformity makes it difficult to directly compare and contrast the existing programs available.

The literature identified only one published evaluation of rider assistance programs: BikeSafe (UK). Bikesafe is known as an assessed ride program rather than rider training, and is complemented by educational and referral information, which provides feedback to riders on riding skills and safety. A key feature of the Bikesafe program is that it allows motorcycle riders, particularly those new to riding or returning to it in their 30s and 40s, to have their riding assessed over local road routes by police and sometimes other accredited motorcyclists. The usual format includes:

- Pre-ride: brief covering the route to be ridden and safety/assessment issues (usually delivered by the assessing motorcycle police rider).
- Riding of a typical route mapped out by police: the police rider follows the assessed rider and observes his/her riding behaviour.
- Debrief of assessed rider and provision of feedback: a standardised summary form is usually used.

The original Bikesafe 2000 program, introduced in 1997, is credited by its developers with contributing to a 15% reduction in killed and seriously injured motorcyclists in the North Yorkshire police district in 1997-1998 whilst national motorcycle fatalities and injuries increased by about 8% during the same period (Bikesafe, 2007). A more recent formal evaluation (n=378) of the Scottish

Bikesafe program (Bikesafe Scotland) was completed, which utilised a before and after survey of self reported riding behaviour. The results showed that the program was well received and encouraged more defensive riding behaviour (Ormston, Dudleston, Pearson & Stradling, 2003). However, while the participants indicated that they rode slower (i.e. below the posted speed limit) in built up areas following program participation, there was some indication that course attendees may ride faster on roads outside of built-up areas.

The available literature suggests that the intent of on-road rider assistance programs is to adopt a learner centred approach using coaching and mentoring techniques rather than the "tell" culture teaching methods characteristic of traditional training approaches. The limited available descriptions and evaluations of on-road rider assistance programs make it difficult to assess whether the learner-centred approach is applied in practice. Notwithstanding these limitations, there are a number of reasons to support the adoption of a learner centred approach in current motorcycle rider training programs. First, the adoption of a learning centred approach is based on sound theoretical principles. Second, it has been very effective in other fields of learning. Third, in light of the shortcomings identified in traditional driver and rider training approaches, it has been recommended by the European Nations whose theoretical approach represents current international 'best thinking' in motorcycle rider training and safety.

2.7.3 Summary

Hazard perception training using simulation has led to improved performance on hazard perception tests in car drivers, although it is not yet known whether these drivers become safer drivers on the road. There has been very little research on the types of hazard perception training most likely to be effective for riders, although simulation is likely to be promising, particularly for very inexperienced riders or those who lack recent riding experience. The literature provides little evidence based guidance on the types of hazard perception training likely to be effective in an on-road training context for motorcyclists.

Insight training has shown promise in addressing the role of attitudinal and motivational development needs in young novice drivers, although its efficacy in reducing crashes is not yet known. The potential safety benefits of insight training for returned motorcyclists are not known because i) the approach has not been included as part of standard motorcycle rider education and training programs and or ii) if it has been included, there are no publicly available evaluations of its effect on crash risk. However, the potential for insight training to reduce crash risk is high and should be included as part of any training program for motorcyclists.

While insight training may be helpful in addressing the motorcyclists' awareness of personal and social factors on their behaviour, it is unlikely to impact on changing pervasive personality characteristics. Given the short timeframe in which to conduct training, trainers should not be expected to be able to change attitudes and behaviour. Rather, the training should be designed to improve the participants' awareness of both their typical riding habits (and situations) and typical living habits which can affect their ability to ride safely. Understanding oneself is a crucial factor in anticipating potential problems when driving or riding. In this context, rider training needs to take account of the higher levels in Hattaaka et al's (2002) hierarchy of driving behaviour, placing emphasis on the rider's goals and motives connected with riding and, for example, skills for dealing with social pressures.

In recent years there has been an overwhelming shift towards learner-centred (or student-focused) approaches to teaching and training within the broader adult education literature. In contrast to traditional training approaches in which the learner is construed as a passive recipient of information, the learner-centred approach focuses on the importance of students actively processing and constructing information for themselves. This creates a more intensive learning experience and

increases the chances of participants continuing to learn for themselves beyond the formal training period. The learner-centred approach has not been evaluated with respect to motorcycle safety training but has lead to high quality learning outcomes in other fields and is recommended by the European Nations for inclusion in current motorcycle safety training programs.

The role of the trainer is central to implementation of an effective learner-centred approach to training. Going beyond the teaching of basic skills to focus on important, high level risk awareness issues requires specific coaching skills from trainers, which many do not have. Coaching is about assessing and meeting the unique needs of an individual, rather than applying a common training program to "tell" them what to do or not to do. This often requires specific training in coaching skills and techniques to learn how to observe behaviour/performance and provide useful and relevant feedback that the person being coached is likely to accept and apply.

A review of on-road rider training programs (Christie, 2007) argued that such programs appear to adopt a coaching or mentoring style. The literature review conducted for this project identified only one published evaluation of rider assistance programs: BikeSafe (UK). The evaluation found that, while participants indicated that they rode slower (i.e. below the posted speed limit) in built up areas following program participation, there was some indication that course attendees rode faster on roads outside of built-up areas.

There are a number of reasons to support the adoption of a learner centred approach in current motorcycle rider training programs. First, the adoption of this approach is based on sound theoretical principles. Second, it has been very effective in other fields of learning. Third, in light of the shortcomings identified in traditional driver and rider training approaches, it has been recommended by the European Nations whose theoretical approach represents current international 'best thinking' in motorcycle rider training and safety.

2.8 REFERENCES

ACEM (2004). MAIDS: *In-depth investigations of accidents involving powered two-wheelers.* Brussels: Association des Constructeurs Europeens de Motocycles.

Allardice, G. (2002). *The Biker's Bible. Fun and survival on road-going motorcycles.* Wellington, NZ: Grant Sheehan, Phantom House Books.

Australian Transport Safety Bureau. (2008). *Fatal and serious road crashes involving motorcyclists. Monograph 20.* Canberra: Australian Transport Safety Bureau.

Bragg, W.E., Dawson, N.E., & Jonah, B.A. (1980). *Profile of accident involved motorcyclist in Canada.* Proceedings of the International Motorcycle Safety Conference. Washington, 1980.

Broughton, J. (1988). *The relation between motorcycle size and accident risk. Research Report 169.* Crowthorne, Berkshire: Transport and Road Research Laboratory.

Broughton, P. (2005). Designing power two wheeler training to match rider goals. In Dorn, L. (Ed.). Driver Behaviour and Training – Volume II. UK: Ashgate.

Carron, A. V. (1971). Effect of ability level on retention of a balance skill after two years. *Perceptual and Motor Skills, 33* (2), 527-529.

Chesham, D.J., Rutter, D.R., & Quine, L. (1993). Motorcycling safety research: A review of the social and behavioural literature. *Social Science Medicine, 37,* 419-429.

Christie, R. (2001). *The effectiveness of driver training as a road safety measure: A review of the literature.* Report produced for the Royal Automobile Association of Victoria (RACV).

Christie, R. (2007). *Development of a motorcycle on-road rider assistance program. Stage 1: Critically review current rider assistance programs and develop a model for delivery.* Unpublished confidential report to VicRoads.

Christie, R. & Newland, R. (2001). Motorcyclist fatality and motorcycle sales patterns in Australia. Proceedings of the 2001 Road Safety, Research, Policing and Education Conference, Melbourne, 18-20 November 2001.

Clarke, D., Ward, P., Bartl, C. & Truman, W. (2004). *In-depth study of motorcycle accidents.* Road Safety Research Report No. 54. London: Department for Transport.

Elliot, M., Baughan, C., Broughton, J., Chinn, B., Grayson, G., Knowles, J., Smith, L. & Simpson, H. (2003). *Motorcycle safety: a scoping study*. TRL Report TRL 581. Crowthorne: Transport Research Laboratory.

Elliot, M., Baughan, C., & Sexton, B. (2007). Errors and violations in relation to motorcyclists' crash risk. *Accident Analysis and Prevention, 39,* 491-499.

Fergusson, D., Swain-Campbell, N. & Horwood, J. (2003). Risky driving behaviour in young people: prevalence, personal characteristics and traffic accidents. *Australian and New Zealand Journal of Public Health, 27*(3), 337-342.

Gregersen, N.P. (1996). Young drivers' overestimation of their own skill – An experiment on the relation between training strategy and skill. *Accident Analysis and Prevention, 39,* 243-250.

Goldenbeld, C. & Hatakka, M. (1999). Voluntary advanced driver training. In S Seigrist (Ed). *Driver Training, Testing and Licensing – Towards Theory-based Management of Young Drivers' Injury Risk in Road Traffic. Results of EU Project GADGET, Work Package 3.* Berne: Schweizererische Beratungsstelle fur Unfaliverhutung BFU.

Hatakka, M.E., Keskinen, N.P., Gregersen, A., Glad & Hernetkoski, K. (2002). From control of the vehicle to personal self-control: Broadening perspectives to driver education. *Transportation Research Part F. Traffic Psychology and Behaviour, 5* (3), 201-215.

Harrison, W. & Christie, R. (2005). Exposure study of motorcyclists in New South Wales. *Accident Analysis and Prevention, 37,* 441-451.

Harrison, W. & Christie, R. (2005). Exposure study of motorcyclists in New South Wales. *Accident Analysis and Prevention, 37,* 441-451.

Haworth, N., Symmons, M., & Kowadlo, N. (2000). *Hazard perception by inexperienced motorcyclists. (Report No. 179).* Melbourne: Monash University Accident Research Centre.

Haworth, N. & Mulvihill, C. (2005). *Review of motorcycle training and training. Report No. 240.* Melbourne: Monash University Accident Research Centre.

Haworth, N., Mulvihill, C., & Rowden, P. (2006). *Teaching old dogs new tricks? Training and older motorcyclists.* Paper presented at the Road safety Research, Policing and Education Conference. 26-28 October, Gold Coast, Australia (pp 315-320)

Haworth, N., Mulvihill, C. & Symmons, M. (2002). *Motorcycling After 30. (Report 192).* Melbourne: Monash University Accident Research Centre.

Haworth, N., Mulvihill, C., & Symmons, M. (2005). Hazard perception and responding by motorcyclists – Background and literature review. Report No. 235. Melbourne: Monash University Accident Research Centre.

Haworth, N., & Smith, R. (1999). *Single training course and test for the motorcycle licence.* Report prepared for VicRoads. Melbourne: Monash University Accident Research Centre.

Haworth, N. & Smith, R. (1998). *Estimating risk factors for motorcycle crashes*. Road Safety Research, Policing & Education Conference, Wellington, New Zealand, Vol 1. 1998. pp 156-60.

Haworth, N., Smith, R., Brumen, I., and Pronk, N. (1997). *Case control study of motorcycle crashes* (CR174). Canberra: Federal Office of Road Safety.

Horswill, M.S., & Helman, S. (2001). A comparative approach to differential accident liability: Motorcyclists versus car drivers. In Grayson, G.B. (Ed), *Behavioural Research in Road Safety: Eleventh Seminar.* London: Department of Environment, Transport, and the Regions.

Horswill, M.S., Waylen, A.E. and Tofield, M.I. (2002). Drivers' illusions of superiority for hazard perception and vehicle control skill. In Marçal, S. (Ed.), *Behavioural Research in Road Safety: Twelfth Seminar.* London: Department of Environment, Transport, and the Regions.

Hull, M. (1981). Age, driving experience and engine capacity and their effect on motorcycle accidents. *Traffic Research Circular, 17*, Traffic Research Section, Ministry of Transport, Wellington, New Zealand.

Hurt, H.H., Ouellet, J.V., & Thom, D.R. (1981). *Motorcycle accident cause factors and identification of countermeasures. Volume 1: Technical Report.* Washington, D.C.: US Department of Transportation, National Highway Traffic Safety Administration. HS-5-01160.

Jamson, S. & Chorlton, K. (in press). *The changing nature of motorcycling: Patterns of use and rider characteristics.* Transportation Research Part F, doi: 10.1016/j.trf.2009.04.002.

Jamson, S., Chorlton, K. & Connor, M. (2005). *The older motorcyclist.* Road Safety Research Report No. 55. London: Department for Transport.

Jessor, R. Turbin, M.S. & Costa, F.M. (1997). Predicting developmental change in risky driving: the transition to young adulthood. *Applied Developmental Science, 1* (1), 4-16.

Jonah, B.A. & Dawson, N.E. (1988). Youth and risk: age differences in risky driving, risk perception and risk utility. *Alcohol, Drugs and Driving, 3* (3-4), 13-29.

Katila, A., Keskinen, E. & Hataaka, M. (1996). Conflicting goals of skid training. *Accident Analysis and Prevention, 28,* 785-789.

Keskinen, E., Hatakka, Katila, M., Laapotti, S., & Peräaho, M. (1999). Driver training in Finland. *IATSS Research, 23*, 78-84.

Kraus, J.F., Anderson, C., Zador, P., Williams, A., Arzemanian, S., Weichang, L., et al. (1991). Motorcycle licensure, ownership, and injury crash involvement. *American Journal of Public Health, 81 (2),* 172-176.

Kraus, J.F., Riggins, R.S. & Franti, C.E. (1975). Some epidemiologic features of motorcycle collision injuries – Introduction, methods and factors associated with incidence. *American Journal of Epidemiology 102* (1), 74-98.

Lin, M. (1998). Risk factors for motorcycle crashes in an urban and rural area: A cohort study. *Dissertation Abstracts International: Section B: The Sciences & Engineering, 59*, 5-B, 2155.

Lin, M., Chang, S., Pai, L.& Keyl, P. (2003). A longitudinal study of risk factors for motorcycle crashes among junior college students in Taiwan. *Accident Analysis and Prevention 35*, 243-252.

Liu, C., Hosking, S., Bayly, M., Mulvihill, C. & Lenne, M. (2008). Hazard perception and responding by experienced and inexperienced motorcyclists. In: *Proceedings Australasian Road Safety Research Policing and Education Conference, 2008, 9-12 November, 2008, Adelaide, South Australia.*

Mulvihill, C. & Haworth, N. (2006). *Crashes of older riders: Characteristics and implications for countermeasures.* Unpublished Report to the Motor Accidents Authority of New South Wales by Monash University Accident Research Centre.

Mullin, B. (1997). *Risk factors for motorcycle injury: The role of age, gender, experience, training and alcohol*. Ph.D. thesis submitted to the University of Auckland.

Mullin, B., Jackson, R., Langley, J., & Norton, R. (2000). Increasing age and experience: are both protective against motorcycle injury? A case control study. *Injury Prevention, 6,* 32-35.

McMahon, K., & O´Reilly, D. (2000). Evaluation of road safety education and novice driver safety measures in Great Britain. *The ICTCT-workshop of 2000 in Corfu.* www.ictct.org/workshops/00-Corfu/McMahon.pdf

McKenna, F.P., & Crick, J.L. (1991). *Hazard perception in drivers. A methodology for testing and training.* Transport Research Laboratory, Department of Transport.

McKenna, F. P. (1993). It won't happen to me: Unrealistic optimism or illusion of control? *British Journal of Psychology, 84*, 39-50.

Mills, K.L., Hall, R.D., McDonald, M., & Rolls, G.W.P. (1998). *The effects of hazard perception training on the development of novice driver skills.* Report to Department Environment, Transport & Regions (http://www.roads.detr.gov.uk/roadsafety/hazard).

Naylor, J. C., Brigg, G. E. & Reed, W.G. (1968). Task coherence, training time and retention interval effects on skill retention. *Journal of Applied Psychology, 52* (5), 386-393.

Ormston, R., Dudleston, A., Pearson, S. & Stradling, S. (2003). *Evaluation of Bikesafe Scotland. Research Findings No. 169/2003.* Edinburgh: Development Department Research Program, Scottish Executive Social Research.

Preusser, D. F., Williams, A.F. & Ulmer, R.G. (1995). Analysis of fatal motorcycle crashes: crash typing. *Accident Analysis and Prevention, 27* (6), 845-851.

Prosser, M. & Trigwell, K. (1999). *Understanding learning and teaching. The experience in higher education.* Buckingham UK: Open University Press.

Personal Communication, (2009).VicRoads Novice Driver Trial.

Rutter, D.R., Quine, L. & Albery, I.P. (1998). Perceptions of risk in motorcyclists: Unrealistic optimism, relative realism and predictions of behaviour. *British Journal of Psychology, 89*, 681-696.

Rutter, D.R., & Quine, L. (1996). Age and experience in motorcycling safety. *Accident Analysis and Prevention, 28* (1), 15-21.

Rutter, D.R., Quine, L. & Chesham, D.J. (1995). Predicting safe riding behaviour and accidents: Demography, beliefs, and behaviour in motorcycling safety. *Psychology and Health, 10,* 369-386.

Rowden, P., Watson, B. & Haworth, N. (2007). What can riders tell us about motorcycle rider training. A view from the other side of the fence. In *Proceedings Australasian Road Safety Research Policing and Education Conference, 2008, 9-12 November, 2008, Melbourne, Victoria.*

Rowden , P. & Watson, B. (2008). *Motorcycle rider training and perceptions of skill*. In: *Proceedings Australasian Road Safety Research Policing and Education Conference, 2008, 9-12 November, 2008, Adelaide, South Australia.*

Sauer, J., Hockey, G.R. J. & Wastell, D.G. (2000). Effects of training on short- and long-term skill retention in a complex multiple task environment. *Ergonomics, 43* (12), 2043-2064.

Senserrick, T. & Swinburne, G. (2001). *Evaluation of an insight driver-training program for young drivers. Report No. 186*. Melbourne: Monash University Accident Research Centre.

Senserrick, T., & Whelan, M. (2003). *Graduated driver licensing: Effectiveness of systems and individual components.* (Report No. 209). Melbourne: Monash University Accident Research Centre.

Sexton, B., Baughan, C., Elliot, M. & Maycock, G. (2004). *The accident risk of motorcyclists. TRL Report.* TRL 607. Crowthorne: Department for Transport.

Stephan, K., Symmons, M., Hillard, P., Bohensky, M., Muir, C. & Lenne, M. (2008). *Characteristics of fatal motorcycle crashes involving excessive and/or inappropriate speed.* Unpublished Report to VicRoads by Monash University Accident Research Centre.

Svenson, O. (1981). Are we less risky and more skilful than our fellow drivers? *Acta Psychologica, 47,* 143-148.

Symmons, M., Mulvihill, C. & Haworth, N. (2007). *Motorcycle crash involvement as a function of self-assessed riding style and riding attitudes.* Paper presented at the Road safety Research, Policing and Education Conference. 17-19 October, Melbourne, Australia.

Taylor, M.C., & Lockwood, C.R. (1990). *Factors affecting the accident liability of motorcyclists - A multivariate analysis of survey data (RR270).* Crowthorne, Berkshire: Transport and Road Research Laboratory.

Watson, B., Tunnicliff, D., White, K., Schonfeld, C. & Wishart, D. (2007). *Psychological and social factors influencing motorcycle rider intentions and behaviour.* ATSB: ATSB Research Grant Report 2007-04.

Weinstein, (1989). Optimism biases about personal risks. *Science, 246,* 1232-1233.

3.0 FOCUS GROUPS WITH TRAINING PROVIDERS

3.1 INTRODUCTION

Focus groups were conducted to examine experienced motorcycle riding instructors' perspectives on a range of issues considered important to the study of returned rider safety. On the basis of previous research in the area, and in accordance with the study's aims, participants were asked to discuss five key topics based on their experience in training returned riders and any personal/social experiences with returned riders:

- Perceived differences between returned and other riders in terms of: riding skills, riding patterns and reasons for riding, riding behaviour; and participation in, and attitudes towards training.

- Perspectives on why returned riders might differ from other riders and the implications of any identified differences for safety.

- Perspectives on the period of lapsed riding that might result in a decline in skill, and the influence of other likely modifying variables including age on returned and pre-break level of riding experience and skill.

- Perspectives on the effectiveness of current training approaches for returned riders and suggestions for improvement.

- Suggestions for encouraging the uptake of training by returned riders.

3.2 METHOD

3.2.1 Participants

Two focus groups were held with a total of nine male rider training instructors. Each instructor was involved in one focus group only. The total years of uninterrupted riding experience ranged from six to 37 years, with a mean of 21.4 years. Participants had an average of just over eight years of experience in training, ranging from four to 18 years. On average, about 10 percent of their training time involved training returned riders. Participants came from a range of providers including Honda Australia Rider Training, Motorcycle Motion, Stay Up Upright, and Armstrongs.

Instructors were recruited by means of fliers posted on noticeboards at VicRoads' approved motorcycle rider training providers in metropolitan Melbourne.

3.2.2 Procedure

The first focus group was held at Monash University Accident Research Centre, Clayton and comprised five participants. The second focus group was held at Armstrong's Driver Training Centre in Thomastown with four participants. It was necessary to hold two focus groups due to difficulties in scheduling all participants at the same time. Each focus group lasted about three hours and followed the same general format listed below:

- Introduction: Participants were given a brief overview of the project and informed of the aims. As the length of the break and the time since returning to riding is likely to have varied among the returning riders presenting to training, no definition of a returned rider was offered to guide discussion. In this context it was important to gain as much information on the topic as possible, particularly given the lack of systematic research about who should be defined as a returned rider.
- Guided discussion: The discussion generally followed the format listed in the Introduction, but was flexible and free-flowing.
- Conclusion: Participants were thanked and paid for their participation.

The first focus group involved three members of the research team, and the second was facilitated by two of those three. Both sessions were audio recorded.

3.3 RESULTS AND DISCUSSION

The key themes deriving from both focus groups were extracted for each key topic. These are summarised below.

3.3.1 Perceived differences between returned and other riders

Riding skills

There was a strong perception among all trainers that, after a break from riding, returned riders present to training with deficiencies in basic riding skills in areas including braking, steering, countersteering, and appropriate posture. Most trainers commented that returned riders' theoretical knowledge and understanding of higher-order cognitive skills including hazard perception and roadcraft is better than that of novice riders (reportedly due to their greater level of car driving experience) but they have difficulty translating this knowledge into their riding practice.

For the most part, returned riders' skill deficiencies were perceived by the majority of instructors to stem from the period of inactive riding. Most trainers commented that skills decline without use and all were of the opinion that training is a critical step for improving returned riders' safety.

However, most trainers felt that returned riders generally bring poorly learned riding skills or bad habits to the training task and are often reluctant to accept new information and to change their behaviour. Some of the trainers perceived that poorly learnt riding skills and bad habits reflect a lack of training or appropriate training during the period when returned riders were novices.

About half of the trainers argued that one of the biggest challenges for trainers is to break bad riding habits by encouraging returned riders to understand that their previously applied skills or behaviours are potentially unsafe. In particular, the majority of trainers argued strongly that it is much more difficult to unlearn skills than to learn them from scratch. As such, returned riders seem to have more difficulty learning and are more difficult to train than novice riders. Some trainers pointed out that returned riders would learn (or re-learn) skills more quickly and effectively if they adopted a flexible and positive approach to training and learning.

A minority of instructors felt that returned riders often take on the mindset of a driver during their initial return to riding and fail to appreciate the high level of cognitive demand that goes with safe riding. These trainers believe it is important for riders to undertake refresher training before they return to riding, although it was pointed out by several instructors that most returned riders enrol in training only after they realise their skills may not be up to standard.

Riding patterns and reasons for riding

In general, there was no consensus that returned riders ride more or less frequently or more or less often for recreation than other riders. Some trainers noted that it was common for riders to have stopped riding due to family and other commitments and to return to riding for the purpose of recreation. A small number of trainers commented that returned riders ride for a range of reasons that also apply to novice and experienced riders, including financial considerations (cheaper fuel and parking expenses) and recreation.

Riding behaviour

Apart from knowledge of returned riders' general attitude towards safety within a training context (see next key topic below), few instructors had observed any notable behavioural differences between returned and other riders, either in training or in their social interactions. This finding may be influenced by the fact that riders are unlikely to demonstrate intentionally 'undesirable' behaviours during training and few instructors said they had ridden socially with returned riders.

Participation in, and attitudes towards, training

Returned riders comprise the smallest proportion of enrolments in training. As discussed earlier, the majority of trainers were of the strongly held opinion that returned riders tend to have more negative attitudes towards training than other riders. Returned riders were also felt to be more reluctant to accept the advice and assistance of the instructor, a finding that was reportedly more pronounced among males. Some of the trainers noted that this general attitude is more common among those who enrol in training because someone else has encouraged (or insisted) them to do so (such as a partner), as opposed to those who enrol because they are self-motivated to improve their skills. However, these trainers pointed out that such an attitude generally changes at the conclusion of the course when riders are surprised by how much they discover they did not know about safe riding prior to undertaking the course.

In contrast to the majority view, one instructor pointed out that a negative approach to training is not just specific to returned riders and depends on the personality of the rider. This trainer noted that some returned riders display very positive attitudes towards training and make important progress by the end of the course.

3.3.2 Possible reasons for differences between returned and other riders and implications for safety

Besides the potential impact on safety of a period of lapsed riding; skill differences between returned and other riders were deemed by most instructors to stem from returned riders' more negative attitudes towards training and safety in general.. When asked about possible reasons behind returned riders' reluctance to undertake training, the most common themes were: shame (e.g. 'I don't want my peers to think I need training or that I am a 'bad' rider); over-confidence (e.g., 'I've ridden before and already learnt to ride so my skills are better than novice riders'); fear ('I'm scared that the trainer will see how bad I am and this will threaten my confidence') and a general lack of awareness of the importance of safety issues associated with riding and riding skill (e.g., 'I haven't crashed before so clearly I'm a good rider ').

A reluctance to undertake training as a result of shame or over-confidence was perceived by some trainers to be motivated by a desire to return to riding primarily for recreation. Most riders who return for recreation have a wish to recapture some of the feelings associated with their youth, including the desire to be carefree and confident, to exert their prowess, and to have fun. Another strong theme held by the majority of trainers was that returned riders perceive training as a threat to their ego because training is like asking for help that they believe they do not need. This belief was thought to be particularly threatening for returned riders who are (much) older than their instructors.

Some riders pointed out that a reluctance to undertake training for reasons of fear appeared to stem in part from a misperception that current training is the same as 'traditional training' approaches that were common when returned riders were novices. Unlike current training approaches, traditional training was more likely to adopt an authoritarian style where the rider was given less involvement in their own learning and little room to make mistakes and learn from them.

A general lack of safety awareness among returned riders was thought by some trainers to stem, at least in part, from returned riders' failure to undertake (appropriate) training during the period when they were learning to ride. During this period most riders were self-taught because training was either unavailable or covered the teaching of only very basic vehicle control skills. In comparison, novice riders tend to display higher levels of awareness of safety issues as a result of having completed basic learner and licence training.

A small number of trainers pointed out a mismatch between the rider's attitudes toward safety on the one hand and their level of skill on the other hand – returned riders display poorer riding skills than other riders, yet they are less likely to be aware of their deficiencies and to recognise the contribution that training could make to improving their safety. Most trainers perceived that this mismatch makes it particularly difficult to encourage returned riders to undertake training.

The majority of trainers felt that returned riders often mistakenly believe that they do not need training because their previously learnt skills will be enough to ensure their safety. This strongly held perception was thought to be a concern for safety, particularly for those riders who have learned to ride incorrectly and may be unaware that their riding habits could be putting them at increased risk. As noted previously, novice riders are reportedly much easier to train because they do not bring 'bad habits' to the training task and are more inclined to accept and apply the advice and assistance from their instructor.

Some trainers identified riding powerful motorcycles as an issue that could threaten returned riders' safety. Unlike novices, returned riders already in possession of a dormant motorcycle licence are not subject to restrictions on the weight and power of the motorcycle. The trainers felt that this issue is of concern, particularly since many returned riders can now afford to buy more expensive (and, by inference, more powerful) motorcycles despite their limited riding experience.

Some trainers identified skill and attitudinal differences between returned and other riders as a result of changes in traffic conditions and a faster paced lifestyle between when returned riders first started riding and following their initial return to riding. They suggested that returned riders might have difficulty coping with changing traffic conditions (increased traffic volumes) and greater societal demands in general. Some trainers also cited use of an older motorcycle with relatively poor performance capability; and use of a new motorcycle with which the rider has little safe riding experience as possible risk factors for returned riders.

3.3.3 Effect of lapsed riding; age and pre-break riding experience on safety

Trainers were asked to consider the effect of the period of lapsed riding on riding ability and safety, given the paucity of research on this issue. The general consensus was that after six months of lapsed riding skills can start to deteriorate even among very experienced riders. A small number of instructors felt that for those returning to riding aged in their fifties and sixties in particular; the decline in motor skills and reflexes characteristic of aging makes it unlikely that older riders will return to their previous level of ability.

However, a minority of instructors commented that fear of crashing is more common among older than younger riders, and consequently any skill deficiencies in older riders may be offset by a high level of motivation to maximise safety and reduce risk taking. This view disagrees with the earlier consensus among trainers that returned riders generally have a lower level of safety awareness than

novice riders. One possibility is that the latter issue is more characteristic of older (aged over 60) rather than younger (aged in their 40s) returned riders, although this question was not raised during discussion.

The majority of trainers thought that the amount and type of riding experience prior to the period of lapsed riding may impact on riders' safety during their return to riding. Some trainers suggested that very experienced and well trained riders might be expected to perform better than those with less experience and no formal training if other influential variables, including age and risk taking propensity, are held constant. However, this viewpoint was reportedly based on an intuitive feeling rather than the trainers own experiences and observations.

A minority of trainers felt that being proficient in tasks that require a high level of both physical and mental skill and concentration (such as skiing) during periods of inactive riding may lessen the potentially negative impact of lapsed riding on safety following a return to riding. This issue was felt to be more important among those who return to riding aged in their fifties and sixties when increased reaction time and reductions in flexibility and agility make riding more demanding than for younger riders with more riding experience.

3.3.4 Current training approaches and suggestions for improvements

All trainers expressed a firmly held belief that the current training and licensing system is inadequate for promoting the safety of returned (and other) riders. With respect to the licensing system, most instructors argued that returned riders should be subject to a zero blood alcohol restriction during the initial (unspecified) period following their return. Some trainers suggested that a form of graduated licensing should also be considered, although apart from alcohol restrictions no suggestions were made as to the type of restrictions that should be applied and whether returned riders should face the same restrictions as novices.

With respect to training, the majority of instructors argued that on-road training should be included as part of standard courses for all riders because range training does not provide realistic preparation for on-road riding skills, including riding at speeds above 25 km/h and interacting with other traffic and complex traffic situations.

The majority of trainers also felt that current refresher courses are too short to cover all of the skills necessary for safe riding. Increasing the length of refresher courses was recommended although the trainers were concerned that participants may be put off by long courses, particularly in light of their reluctance to participate in current training programs.

3.3.5 Suggestions for encouraging the uptake of training by returned riders

The majority of trainers were of the firm belief that returned riders' negative attitudes towards training and learning in general are the biggest impediments to increasing their participation in training. Training needs to be marketed so that it is attractive to returned riders, and it needs to be perceived as important and relevant to them. Making refresher training mandatory might go some way to promoting its importance but the trainers felt that it would be difficult to develop and maintain an appropriate system for ensuring that those who need training actually get it.

Encouraging the uptake of training through incentives was felt to be ineffective because returned riders were perceived by most instructors to belong to a higher socioeconomic bracket than novice riders.

3.4 SUMMARY AND CONCLUSIONS

In summary, the majority of trainers perceive that returned riders are a high risk group and potentially less safe than other riders as a result of their:

- Poor basic riding skills
- Low level of participation in training following a return to riding and/or during the period when they were first learning to ride
- Reluctance to learn (or re-learn) as a result of negative attitudes towards training that stem from shame, over-confidence, and fear
- Tendency to apply poorly learnt skills and/or bad habits developed during their pre-break riding experiences, some of which may stem from inappropriate or no training during this period.

Current training approaches for returned riders were perceived by the majority of trainers to be ineffective for promoting safe riding due to their:

- Reliance on range riding training that does not provide preparation for riding on road, including at speeds above 25 km/h and in complex traffic environments
- Short duration.

The majority of trainers strongly believed that returned riders' negative attitudes towards training and learning in general are the biggest impediments to increasing their participation in training. It was argued that training needs to be:

- marketed so that it is attractive to returned riders
- perceived as important and relevant to returned riders.
- mandatory.

4.0 MOTORCYCLE RIDER SURVEY: INTRODUCTION & METHOD

4.1 INTRODUCTION

This project includes a number of experimental techniques designed to identify differences between returned, continuing and new riders. The on-road study and the simulator study (see chapters 9 and 10 respectively) provide specific, controlled, quantitative data, but are limited in their scope. As a complementary method, a questionnaire was administered in order to collect a wider range of data, particularly about riders who have been involved in an on-road crash. The survey was undertaken to explore potential contributors to crash risk for the different rider types including attitudes, personal characteristics, self-reported riding behaviours, and level of experience and training.

This chapter outlines the method and content of the survey. Chapters 5-7 provide the results, segregated for convenience into an overall picture of the results, followed by an examination of the crash profiles of the different rider groups and then a comparison between crashed and never-crashed returned riders. Chapter 8 provides explanations for the results and makes comparisons with previous research.

4.2 ON-LINE PLACEMENT

The questionnaire was administered online to provide a broader reach and more efficient means of data collection than is possible using a mail out survey. It was built and hosted on the Survey Monkey server but accessed via the Monash University Accident Research Centre's (MUARC) website.

There can be some concern about the potential to discourage or miss segments of the target population by using an online survey – the lack of convenient internet access and computer and internet illiteracy chief among them. However, these concerns are becoming less prevalent as internet and computer access steadily increases. According to the 2008-09 Multipurpose Household Survey (MPHS), 72% of Australian households had home internet access and 78% of households had access to a computer. Between 1998 and 2008-09, household access to the internet at home more than quadrupled from 16% to 72%, while access to computers increased from 44% to 78% (Australian Bureau of Statistics, 2009). Further, the Survey Monkey system, like other commercial providers, builds their technologies to maximise ease of access. However, advertising for the questionnaire (both on-line and in magazines and other hard copy formats) provided a telephone contact for potential respondents to request a paper copy of the questionnaire via the post. A total of 71 respondents requested a paper copy of the survey (less than 2% of the number who visited the website), 37 of whom returned their survey by the cut off date.

Those who attempted the survey online and had difficulties were assisted as far as possible using a telephone or email contact. Seven persons reported difficulties with the survey, which were reported and resolved within the first week of the survey's opening. It is not known how many had difficulties with the survey but did not report them. Following these problems, an additional note on how to avoid difficulties completing the survey was posted on-line after which no further problems were reported.

Before gaining access to the survey proper, potential respondents who arrived at the MUARC home page were asked whether they were licensed to ride on the road and whether they had ridden on a public road in Australia in the last five years. If riders answered 'no' to one or both of these questions they were transferred to a page that explained that they were ineligible to participate. Those who answered in the affirmative were taken to an online explanatory statement about the questionnaire and its aims, and had to then accept the provisions of the survey before being given access to the first question.

The survey, along with the other methods used in this project, was approved by the Monash University Human Research Ethics Committee at its meeting on June 8, 2009. Following a small pilot test, some minor changes were made to the questionnaire which was posted online on July 16 2009. The survey closed on October 27 2009. No complaints pertaining to ethical issues were received.

4.3 QUESTIONNAIRE CONTENT

The questionnaire was designed to tap variables likely to return differences between rider types and to explore and quantify the interacting influences that likely determine motorcyclist crash (and casualty) liabilities. It consisted of eight sections (See Appendix 1) that addressed:

1. Rider licence and training experience
2. Riding patterns and experiences during the previous month and previous year
3. Motorcycle ownership
4. The rider's most recent crash
5. The rider's worst crash (if their most recent crash was not their most serious)
6. Demographic information
7. Riding infringements
8. Rider attitudes and behaviours.

Logic built into the online survey allowed those riders who had never been involved in an on-road crash to skip sections 4 and 5, and those for whom their most recent crash was their most serious skipped section 5.

The content of the questionnaire was influenced by, but did not completely replicate, a number of previous motorcycle rider questionnaires, including:

- The Motorcycling After 30 Rider Questionnaire developed by Haworth et al. (2002) to examine Victorian licence holders aged over 30 years
- The Motorcycle Accident Questionnaire and Site Inspection Form developed by Haworth, et al. (1997) for their Case Control Study of motorcycle crashes in Victoria
- The 'Motorcycle Rider Behaviour Questionnaire' (MRBQ) developed by Sexton, et al. (2004) designed to quantify riders' behaviour and attitudes
- The 'Motorcycle Rider Motivations Questionnaire' (MRMQ) developed by Sexton, et al. (2004) designed to quantify riders' behaviour and attitudes.

Most questions could be answered by checking a box or circle (circles indicated that only a single response was allowed, while squares indicated that more than one item could be chosen). Some questions required a short answer to be typed in, such as year of birth, and others included text boxes for optional inclusion of extra information.

4.4 PUBLICISING THE SURVEY

In order to provide the best opportunity to ensure that as many riders as possible in the relevant population would read the advertisement, riders were informed about the survey through three main avenues:

- An article in the Royal Automobile Club of Victoria (RACV) magazine
- Advertisements placed in popular motorcycling magazines
- Links or other information about the survey sent via email or placed on websites likely to be visited by riders.

4.4.1 RACV advertisement

A quarter-page advertisement was published in The Royal Automobile Club of Victoria (RACV) monthly magazine – Royal Auto on September 21st 2009 (See Appendix 2). Royal Auto is, Victoria's highest circulating magazine with a total readership of approximately 1.4 million (Roy Morgan, September, 2009).

4.4.2 Motorcycling magazine advertisements

Two quarter-page advertisements were published in the Australian Motorcycle News Magazine (AMCN) in consecutive issues July 22nd and August 5th 2009 (See Appendix 3). A half-page advertisement was published in Two Wheels Magazine on July 22nd 2009 (see Appendix 4). These magazines were chosen because they are Australia's biggest selling and most widely read motorcycle publications with a current total readership of around 318,000 per issue. AMCN is released fortnightly with a current readership of 224,000 per month. Two Wheels is released monthly and sells, on average, 94,000 copies per issue. Circulation surveys show that 58% of AMCN readers and 46% of Two Wheels readers own a motorcycle. While the readership of the two magazines probably overlaps, no estimate of the extent of overlap was available.

4.4.3 Email and website links

A one-page media release was developed for submission to motorcycling clubs and committees and other magazines or newsletters (See Appendix 5) and an email was sent out to riders on the national Honda Customer Service Database (approximately 10,000 riders) and Motorcycling Australia members (approximately 25,000 members) (Appendix 6).

A number of stakeholders established links for distribution and publicity by forwarding emails to their members/customers or posting the media release on notice boards, websites and in newsletters. These included: The Victorian Motorcycle Advisory Council, Ulysses Club; Motorcycling Australia; Honda Australia, and a number of other smaller stakeholders including RoadSafe in Gippsland.

4.4.4 Most successful publicity methods

At the end of the survey respondents were asked how they found out about it. The options to choose from were randomly re-ordered for each respondent to negate the effect of "non-thoughtful" responses. Respondents could choose more than one option. Accounting for 44 percent of responses, the most successful method was magazine advertising, followed by publicity through a club or group (25%). Word of mouth and finding out about the survey online were cited in 17% and 12% of answers respectively. Together these four options accounted for 98% of respondents. The remaining 2% was, in descending order of popularity, a direct email message from HART, "other" and then "poster".

4.5 RESPONSE RATES

A response rate for internet surveys cannot be readily determined because the number of people who become aware of the survey but decide not to complete it is unknown. Placing a counter on the website allows the number of times the site was accessed to be compared with the number of

responses received, but this is problematic because a person may find out about the survey but not access the site, or they may access it more than once from different computers before undertaking the survey.

A total of 2,929 unique page views for the introductory page were recorded for the survey. The selection criteria were described on this page and only those meeting the required criteria were encouraged to progress to the explanatory statement. A total of 2,630 unique page views were recorded for the explanatory statement. Thus the 2,116 riders who completed the survey represent 80% of those who decided they met the eligibility criteria.

4.6 DENOMINATORS

A total of 2,116 riders undertook the survey. However not all of them answered each question. The denominator for many of the analyses reported here will vary both above and below this number. Some respondents were not presented with all of the questions; such as those skipped over if the rider had never had a crash. Also, as dictated by ethics guidelines for research involving humans, respondents have the choice to simply not answer particular questions, regardless of their reason(s). The denominator may exceed the number of respondents in cases in which more than one option can be chosen. For example, the recruitment question allowed respondents to choose up to seven means by which they had heard about the questionnaire.

4.7 RIDER LICENCE

The first question in the survey sought the year(s) the respondent had obtained their learner, probationary of full rider qualification(s) (note that the question referred to probationary or restricted or provisional and full or open in order to retain relevance to multiple jurisdictions. For brevity in this report the intermediate qualification will be referred to as probationary and the "full" licence term will be used).

A total of 1,819, 1,461 and 1,870 respondents indicated that they had qualified for learner, probationary and full licences respectively by specifying the year of qualification (note that many respondents possessed more than one qualification). The earliest learner permit and probationary licence were both obtained in 1949, with the earliest full licence obtained in 1943. The latest for all three was 2009. The mode (i.e. most common) year was 2008 for both learner and probationary and 2009 for full licence. The median (i.e. midpoint) year was 1990 for learner, 1993 for probationary and 1986 for full licence respectively.

4.8 RIDER TYPE

The second question in the survey was used to classify respondents as returned riders, new riders or continuing riders. The question was presented in the following manner (information in square parentheses was not in the questionnaire):

I got my licence/permit to ride on the road:

- Only in the last five years [new rider]
- More than five years ago and have ridden every year since then [continuing rider]
- More than five years ago, rode for a while, then stopped riding for at least a year, then took it up again within the last three years [returned rider]

A total of 2,058 respondents (97% of all 2,116 respondents) answered this question. Almost half (49%) of those who answered indicated they were continuing riders, while 27% were new riders

and 24% were returned riders. Only 58 respondents (less than 3% of all respondents) failed to answer this question.

Figure 4.1 shows the licence makeup of each rider group. Within each rider type the majority of respondents had a full licence. As expected, essentially all continuing and returned riders were fully licensed (99 and 95% respectively). Of the new rider group two-thirds were fully licensed and 22% had a probationary licence. These differences were statistically significant ($\chi^2(4)=422$; $p<0.001$).

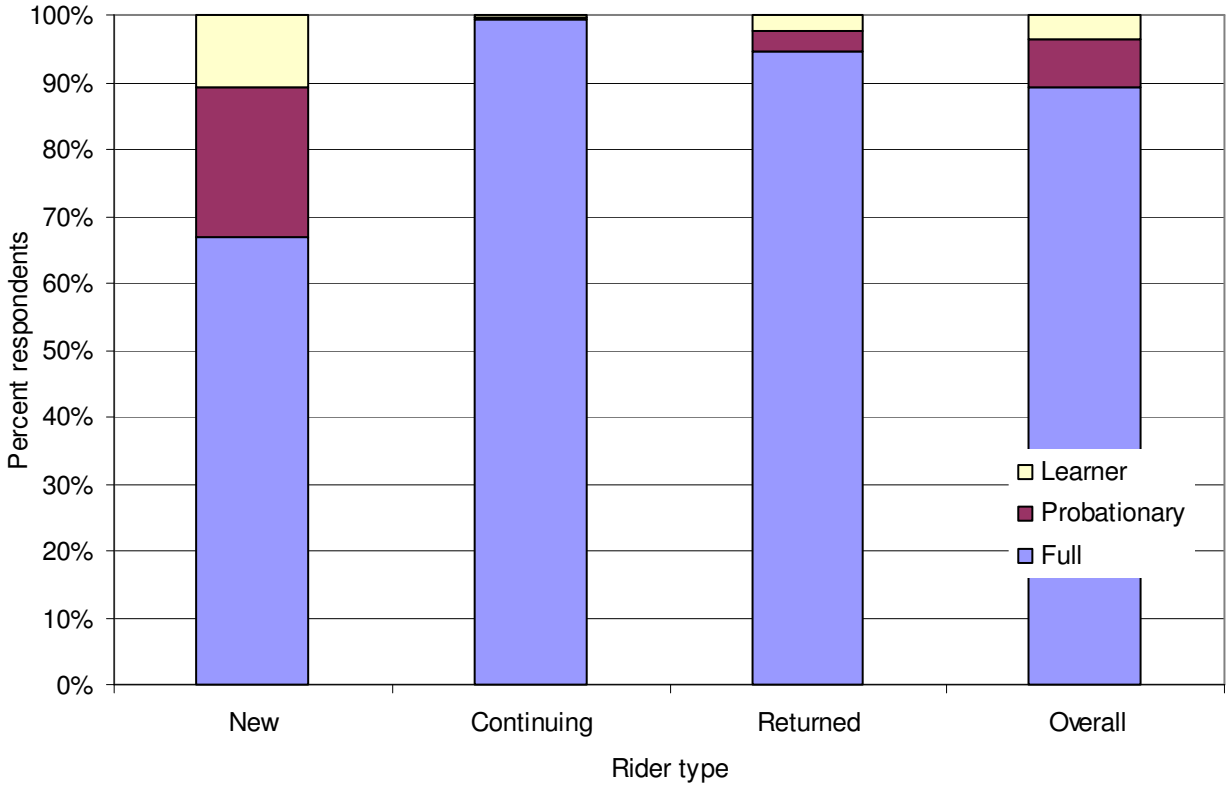


Figure 4.1 Licence type breakdown of each rider type group

5.0 MOTORCYCLE RIDER SURVEY: GENERAL RESULTS

5.1 OVERVIEW

This chapter provides an overview of riders' demographic information; training experience; riding patterns and reasons for riding, In most cases comparisons are made on the basis of rider type as well as for riders overall.

5.2 RIDER DEMOGRAPHICS

5.2.1 Gender

Overall 1,887 respondents provided their gender when asked. Most respondents (90% of those who answered or 1703 cases) were male. A greater number of respondents (229 individuals, or 11% of the total of 2116 respondents) declined to answer than there were female respondents (184, or 9% of the total, 10% of those who provided an answer).

A total of 1,841 respondents answered both the gender and rider type question. Accounting for 20% of these, the largest relative percent of women were found in the new rider group. In both the continuing and returned rider groups women accounted for 6% of the constituent riders. These differences were statistically significant ($\chi^2(2)=81$; $p<0.001$).

5.2.2 Age

The questionnaire asked for the year in which the respondent was born, from which age was later calculated. The age range of the 1,902 respondents who answered this question was 17 to 84 years, with an average of 47 years and standard deviation 12 years; 214 respondents (10% of the total) did not answer. While the difference was not large, male respondents (M=47 year SD=12 years) were significantly older than female respondents (M=44 years SD=10 years; $t(1880)=3.5$; $p<0.001$).

Table 5.1 contains a range of descriptive statistics for age overall and age for each rider group. The difference between the rider groups in terms of age is statistically significant ($F(2,1,853)=325$; $p<0.001$). Post hoc tests established that the age of new riders was significantly lower than that for continuing and returned riders but the two latter groups did not differ.

Table 5.1 Descriptive statistics for rider age according to rider group (all values are in years).

Statistic	New	Continuing	Returned	Overall
Mean	36	51	50	47
Median	35	51	50	48
Mode	26	50	48	50
Standard deviation	12	10	10	12
Minimum	17	20	24	17
Maximum	71	84	76	84

Figure 5.1 shows that, as might be expected, there were fewer new riders as age increases. The profile of both continuing and returned riders peaks in the age range mid 40s to mid 50s and then declines.

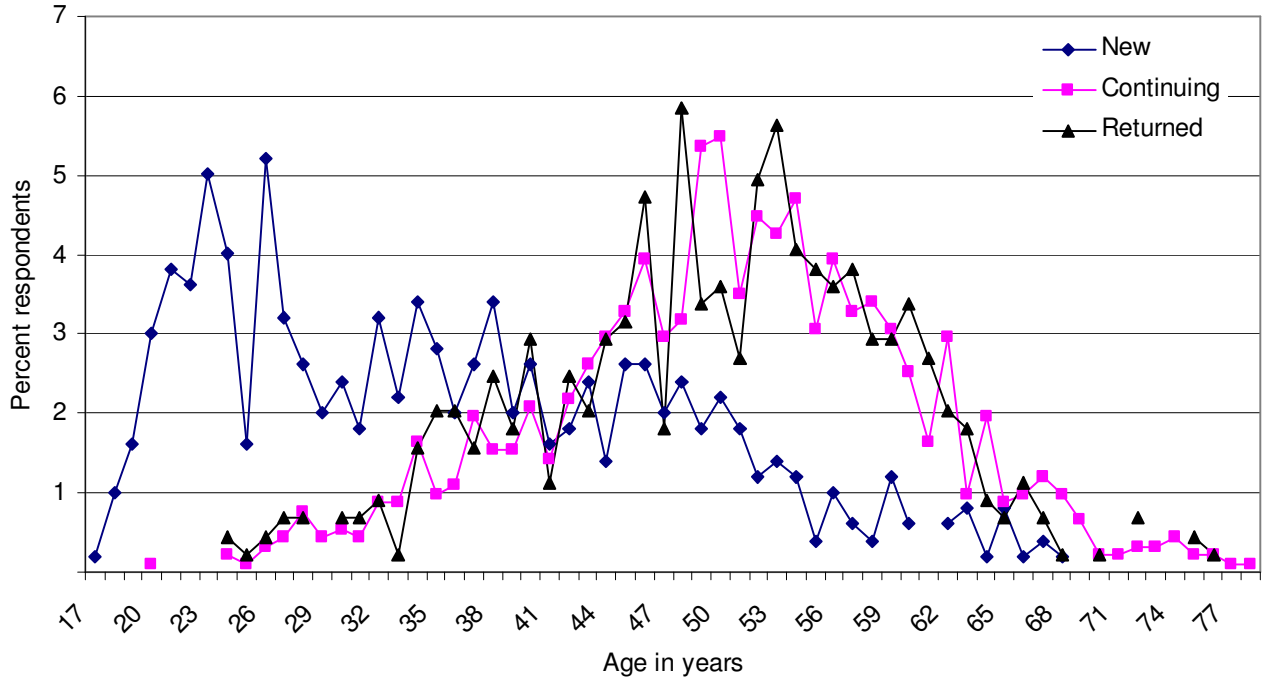


Figure 5.1 Age profile as a function of rider type.

5.2.3 Other demographic details

Most respondents (1,898 respondents or 90% of all respondents) reported their marital status. Sixty-nine percent of those riders said they had a partner (married or defacto), 19% were single and 12% were separated (and not currently with a partner). Ranging between 9% and 14%, respondents in each rider group were approximately equally likely to be separated. However, new riders were much more likely to be single than continuing and returned riders (41%, 13% and 10% respectively), and much less likely to be married (50%, 75% and 76% respectively). These differences are statistically significant ($\chi^2(4)=195$; $p<0.001$) and probably reflect the difference in age profiles and the increased likelihood of getting married at a later age.

A total of 1,856 respondents provided both their rider type and the highest level of education they had achieved. Sixty-one percent of those respondents indicated that they had started or completed a technical college or university qualification, 11% had completed year 12 as their highest qualification, and 19% started but did not finish secondary school (see Table 5.2). On a relative basis there are some differences between the groups such that new and returned riders were more likely than continuing riders to have started or finished a tertiary qualification, new and continuing riders were more likely than returned riders to have completed year 12, and continuing and returned riders were more likely to have left secondary school without completing year 12. The differences between the groups in terms of highest level of education were statistically significant ($\chi^2(8)=17$; $p<0.05$).

Table 5.2 Highest level of education as a function of rider group.

Education	New	Continuing	Returned	Overall
Primary	0%	0%	1%	0%
Secondary	16%	20%	20%	19%
Completed year 12	11%	12%	7%	11%
Tertiary	64%	58%	63%	61%
Other	9%	10%	9%	9%
	100%	100%	100%	100%

The questionnaire asked about present job situation, allowing respondents to choose more than one option. Overall, more than three-quarters (77%) said they worked full time, 11% part time, 6% were carers, 4% were students, and 2% indicated they were "homemakers" (see Table 5.3). The principal differences between the rider groups were the full time and student categories. Full time employment accounted for 85% of returned riders, 78% of continuing riders and 69% of new riders; and new riders were more likely to be students than either of the other two rider types.

Table 5.3 Employment status of riders as a function of rider group.

Employment	New		Continuing		Returned		Overall	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
FT	354	69%	655	78%	388	85%	1,378	77%
PT	65	13%	99	12%	35	8%	202	11%
Carer	27	5%	61	7%	20	4%	112	6%
Student	56	11%	12	1%	6	1%	75	4%
Homemaker	14	3%	12	1%	6	1%	33	2%
Total	516	100%	839	100%	455	100%	1,800	100%

When asked about annual income, 224 respondents (11% of all respondents) did not answer the question at all and 165 (8% of all respondents) chose "prefer not to say". Of the remaining 1,688 respondents, overall a third each earned $50,001-$80,000 and more than $80,000, 24% earned $20,000-$50,000, and 9% earned less than $20,000 (see Table 5.4). Comparing rider types, new riders were more likely than either of the other two groups to have an income of less than $20,000 and $20,000-$50,000, possibly reflecting both their age and their over-representation in the student group. Returned riders were more likely than the other two groups to be earning in the highest income bracket. These differences were statistically significant ($\chi^2(6)=48$; $p<0.001$).

Table 5.4 Income as a function of rider group.

Income	New	Continuing	Returned	Overall
<$20,000	14%	7%	6%	9%
$20,000-$50,000	30%	24%	18%	24%
$50,001-$80,000	30%	34%	37%	34%
>$80,000	26%	34%	40%	33%
Total	100%	100%	100%	100%

Respondents were asked for their residential post code, which was then re-classified into states. Half (52%) of those who answered this question were Victorian, 19% were from New South Wales, 10% from Queensland, 9% from Western Australia, 4% from the ACT, 3% from South Australia, 2% from Tasmania, and less than 1% were from Northern Territory. The profile across rider types was similar except for a large proportion of new riders responding from WA (17% of new riders, 7% of continuing riders and 5% of returned riders). This difference was not balanced by a large

difference in any other state. The differences across states were statistically significant ($\chi^2(14)=66$; $p<0.001$). While the motorcycle magazine recruiting and various online mentions of the survey were national, the Royal Auto magazine is published in Victoria only.

5.3 TRAINING

Overall only 44 percent of respondents had undertaken formal motorcycle rider training. Sixty-two percent of new riders had undertaken a course compared with 39% of continuing riders and 33% of returned riders, and the differences were significant.

Respondents were asked whether they had ever undertaken a formal rider training course in the categories of a Learner course, a Licence course, and Off-road course, a Refresher course, or some other kind of formal training course (See Table 5.5). A pull-down option of yes or no was provided for each category. Despite the option to choose "no", some respondents elected not to answer the question at all, and for these it is not possible to determine whether a skip represented a "no" answer. Across the three rider groups completion rates for this question ranged from a low of 39% to a high of 94%. The average completion rate was 66%.

Overall, 63% of the new rider group indicated that they had completed a formal course of some description (versus 37% who had said they had not completed a course – those who did not answer at all were not included in the calculation); 38% of continuing riders had completed a course and 33% of returned riders had completed a course. In all, 1,746 respondents answered yes or no regarding a learner course, 1,648 answered regarding a licence course, 1,139 for the off-road course, 1,296 for refresher courses, and 1,177 said they had or not undertaken some other type of course; these response rates ranged from 54% to 83% of the total sample. Table 5.5 lists the course types and the percentage of each rider group who had completed each type of course (of those who answered the question).

In all, 1,746 respondents answered yes or no regarding a learner course, 1,648 answered regarding a licence course, 1,139 for the off-road course, 1,296 for refresher courses, and 1,177 said they had or had not undertaken some other type of course; these response rates ranged from 54% to 83% of the total sample.

Table 5.5 Course participation as a function of rider type.

Course type	New	Continuing	Returned	Overall
Learner	89%	42%	42%	56%
Licence	87%	42%	45%	55%
Off-road	11%	14%	9%	12%
Refresher	22%	37%	30%	32%
Other	45%	52%	35%	46%

The most commonly undertaken courses were learner and licence courses, cited by 56% and 55% of all respondents respectively. Not surprisingly, most new riders said they had undertaken a learner and a licence course (89% and 87% respectively), with just less than half of both the continuing and the returned rider groups responding similarly.

Continuing riders were most likely to have completed a refresher course, followed by returned then new riders (37%, 30% and 22% of each group's response respectively). It is interesting to note that continuing rather than returned riders were most likely to be undertaking refresher training.

Around half of both the new and continuing rider groups (45% and 52% respectively) versus 35% of the returned riders had completed an "other" course. A myriad of responses was provided in the

text field for "other", but on the whole they seem to be mostly advanced on-road courses. The differences in participation between rider groups was significant for each type of course except off-road (learner – $\chi^2(2)=324$; $p<0.001$, licence – $\chi^2(2)=269$; $p<0.001$, refresher – $\chi^2(2)=19$; $p<0.001$, other – $\chi^2(2)=24$; $p<0.001$).

Respondents were also asked about the length of the formal course they had undertaken. As shown in Figure 5.2, learner courses and off-road courses were most likely to be more than a full day in duration; licence and refresher courses most likely took between half and a full day to complete; and 'other' courses were approximately equally likely to require half to one day as more than a full day. Few courses were of less than a half day in duration.

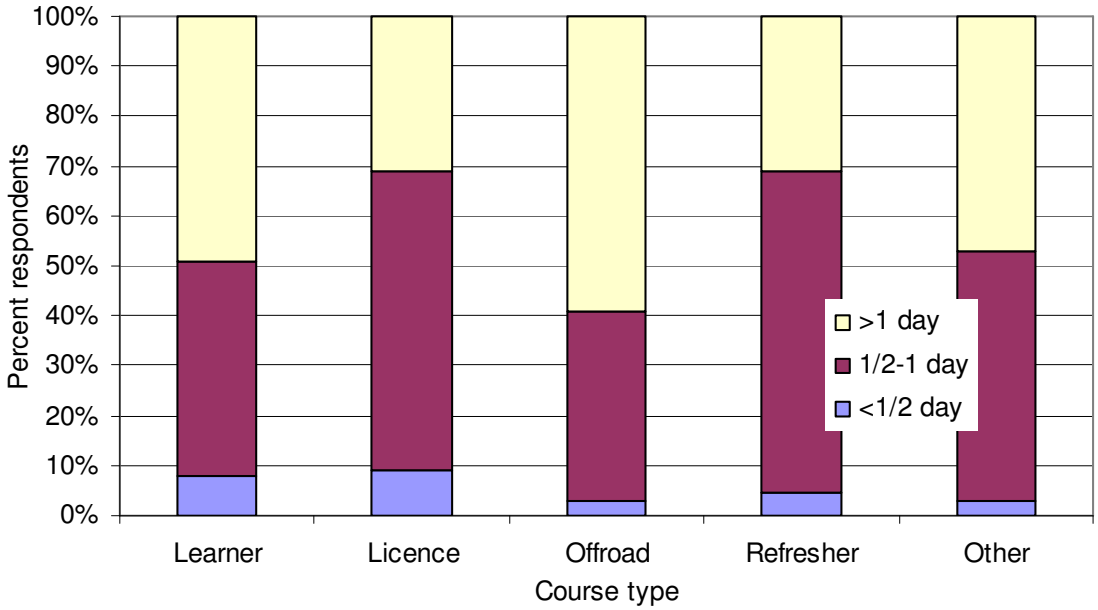


Figure 5.2 Course duration as a function of course type.

Respondents were asked for the year in which they had undertaken their most recent course. Around a third of courses undertaken by new riders were in each of 2009 (not a full year depending on when the survey was undertaken by the respondent) and 2008, with 85% of courses for this group undertaken in the three-year period 2007-2009. Figure 5.3 shows a cumulative addition of courses undertaken by continuing and returned riders across the period 1989-2009. Around half of the courses undertaken by continuing and returned riders were in the periods 2002-2009 and 2007-2009 respectively, suggesting a higher degree of currency for returned riders. The period back to the year 2000 accounts for 64% and 77% of the most recent courses for continuing and returned riders respectively.

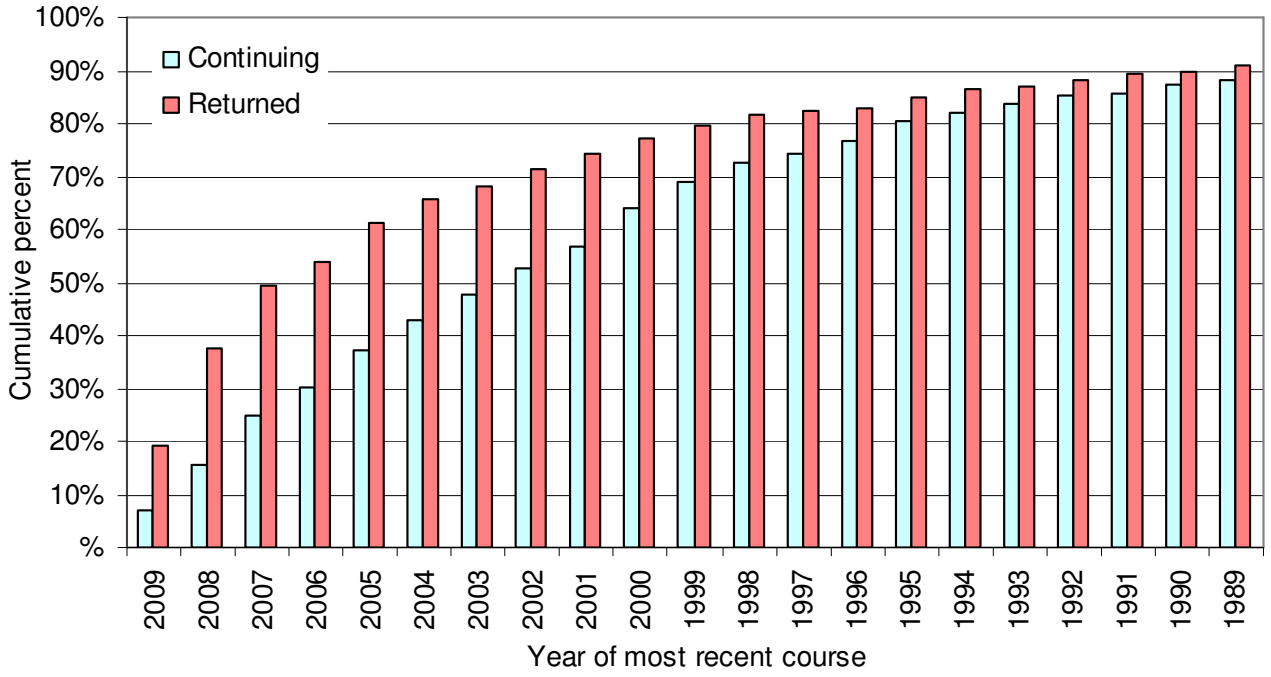


Figure 5.3 Cumulative distribution of most recent course undertaken by continuing and returned riders.

5.4 RECENT RIDING

5.4.1 Ridden this month

Asking respondents how much riding they have done is problematic for a number of reasons. The longer the period in question and the less recent it is the less accurate the respondent's memory will be. Additionally, because motorcycle riding is seasonal, asking riders to average their riding over a year to provide a monthly (or similar) exposure is likely to be inaccurate and may encourage unintentional exaggeration. Accurate exposure information at a participant level would need to be collected prospectively using a diary, or a GPS-enabled data logger. Both are beyond the scope of the current project.

In this survey riders were first asked whether they had ridden on a public road during the last month. Those who answered in the affirmative were then asked a series of questions about their riding experiences during the last month. Those who answered in the negative were skipped over these questions and asked whether they had ridden on a public road during the last year. Those who had done so, and those who had ridden in the previous month, were asked about their riding over the previous 12 months. Those who answered that they had not ridden in the last year were skipped to the next section.

Most riders (95% of the 2,093 who answered this question) had ridden in the last month. A further 101 had ridden in the last year but not during the previous month. Given that those who had not ridden in the last month were a small proportion of the overall sample and the previous month's riding is likely to provide the most accurate data due to the reliance on memory, the current analyses focus on riding in the last month.

At the end of the survey respondents were asked whether they planned to ride on a public road during the next 12 months. Almost all respondents (99% of the 1,827 respondents who answered this question) answered that they did indeed plan to ride, while 21 riders answered that they did not.

Clearly respondents to the current survey were and are in the main active riders. There were, however, some differences when comparing between rider groups (see Table 5.6). The differences for 'ridden this month' and 'plan to ride' were small but statistically significant ($\chi^2(2)=6$; $p<0.05$, and $\chi^2(2)=7$; $p<0.05$), while those for 'ridden this year' were larger but not statistically significant ($\chi^2(2)=4$; $p>0.05$).

Table 5.6 Recent and future riding by each rider type.

	New	Continuing	Returned	Overall
Ridden this month	94%	96%	93%	95%
Ridden this year	77%	89%	71%	80%
Plan to ride	98%	100%	98%	99%

5.4.2 Distance travelled and frequency of riding

Those who had ridden during the previous month were asked to indicate how far they thought they had ridden in that month. As shown in Figure 5.4, around half of each of the three rider groups said they rode more than 500km, with the next most common difference across groups, ranging from 24% of new riders to 31% of continuing riders, being the 201-500km distance category. The differences across the groups just failed to reach statistical significance ($\chi^2(8)=15$; $p=0.05$).

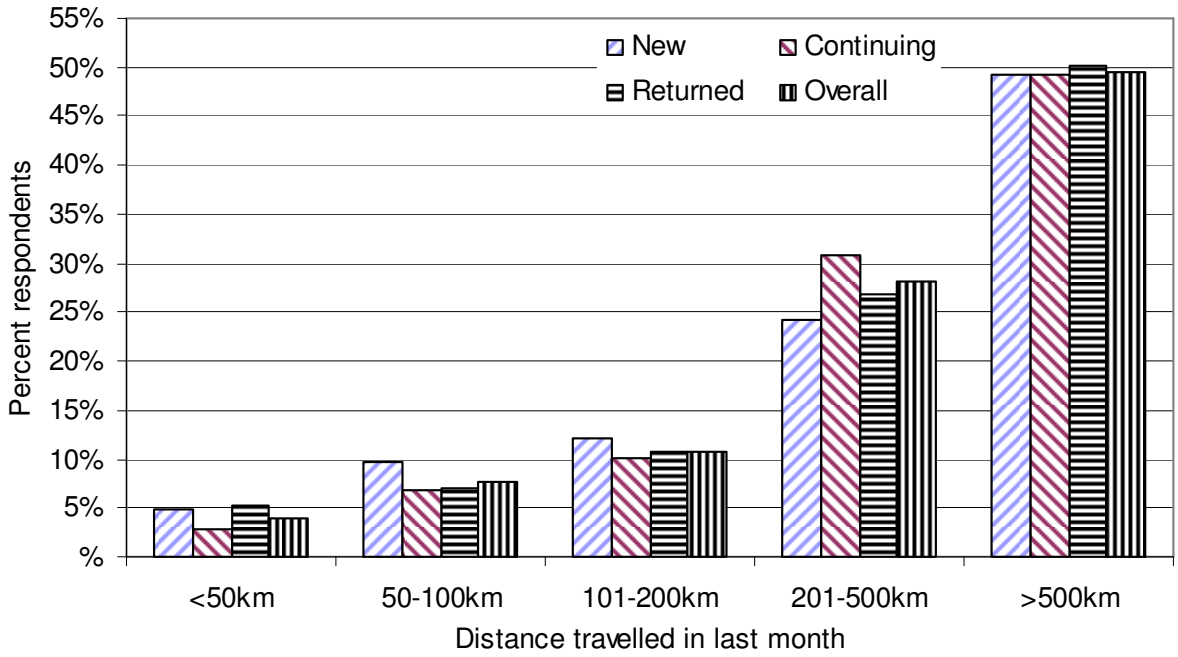


Figure 5.4 Distance travelled in last month by rider group

Given the seemingly high monthly distance travelled a check of sorts can be carried out using a question asked in the "ridden in the last year" section of the survey. Here riders were asked how far they had ridden in the last year (note that riders who had completed the section about riding in the last month would have also been presented with the questions dealing with riding in the previous year). A total of 1886 riders answered this question. Their answers are summarised in Table 5.7.

Table 5.7 Distance travelled in last year by rider group

Annual distance	New	Continuing	Returned	Overall
<1000km	13%	5%	10%	8%
1,001-5,000km	28%	28%	35%	30%
5,001-10,000km	27%	32%	30%	30%
10,001-20,000	26%	25%	20%	24%
>20,000km	5%	10%	5%	7%
Total	100%	100%	100%	100%

As shown in Table 5.7, just under one third of riders each reported riding between 1,000 and 5,000 kms and between 5001 and 10,000 km in the last year. About a quarter of riders reported riding between 10,001 and 20,000 kms during this period.

Across all rider groups respondents were least likely to have ridden less than 1,000km or more than 20,000km. New riders are equally likely to have ridden at each of the middle distances. Continuing riders were most likely to have ridden 5001-10,000km. In contrast returned riders were most likely to have ridden 1001-5000km. The differences between the groups was statistically significant ($\chi^2(8)=54$; $p<0.001$).

In an open-ended question riders were also asked how many trips they had taken in the last month. Riders were told that riding to and from work would count as two separate trips, while riding for work all day as a courier would count as one trip. With a mean of 26 (SD=27), new riders undertook the largest number of trips in the previous month, followed by continuing riders (M=21, SD=23) and then returned riders (M=17, SD=20). The differences between the groups was statistically significant ($F(2,1849)=19$; $p<0.001$), and post-hoc testing indicated that each group was significantly different to both other groups.

As evidenced by the relatively large standard deviations, there was substantial variability in the self-reported number of trips in the most recent month. The maximum number for new riders was 200 and the maximum for continuing riders was 210 – more than six trips on average per day. The maximum for returned riders was 100 trips. Earlier responses indicated that respondents to this survey are active riders, and specifying that they should consider the previous month only for this set of questions should mean a lightened memory load, accordingly it is possible that these results are accurate, despite what would seem to be rather high numbers.

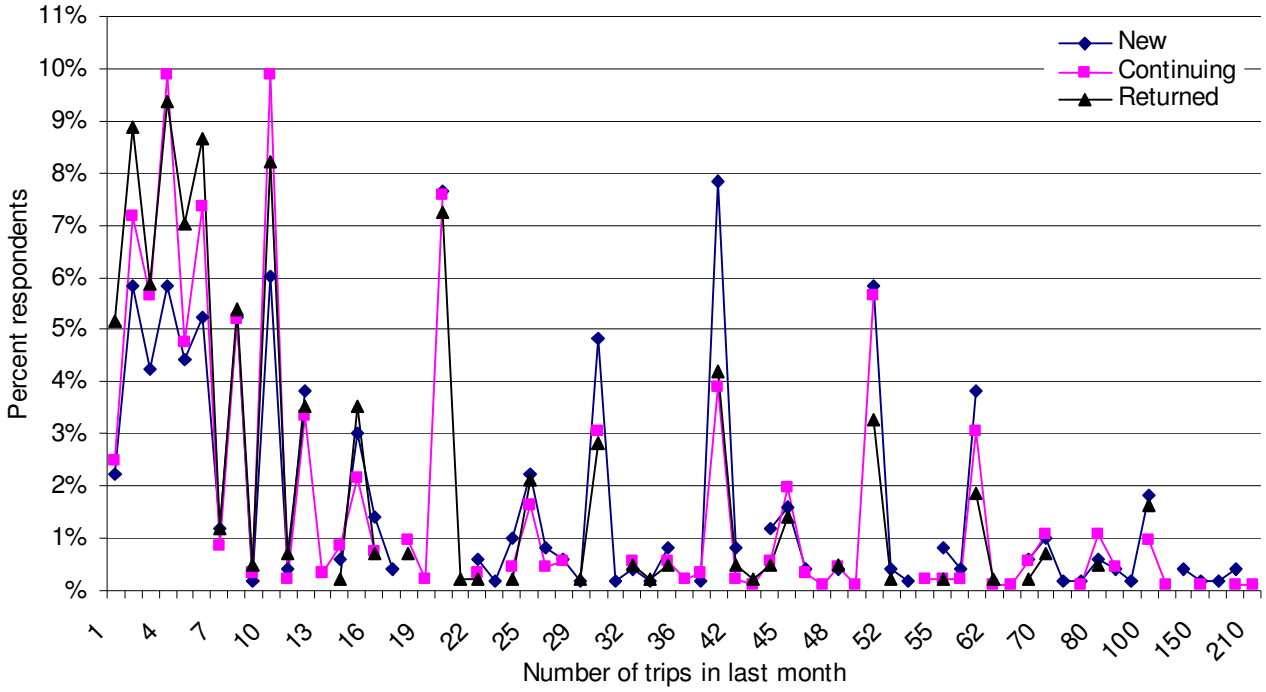


Figure 5.5 Rider-type profile of number of trips undertaken in previous month.

In case the high number of trips represents an exaggeration, responses were categorised with a maximum of 51+ trips. As shown in Figure 5.6, the largest percentage of respondents for all three groups was 1-10 trips, with 40%, 54% and 60% of new, continuing and returned riders falling into this category respectively. The differences between rider groups when the number of trips are categorised in this way was statistically significant ($\chi^2(10)=52$; $p<0.001$).

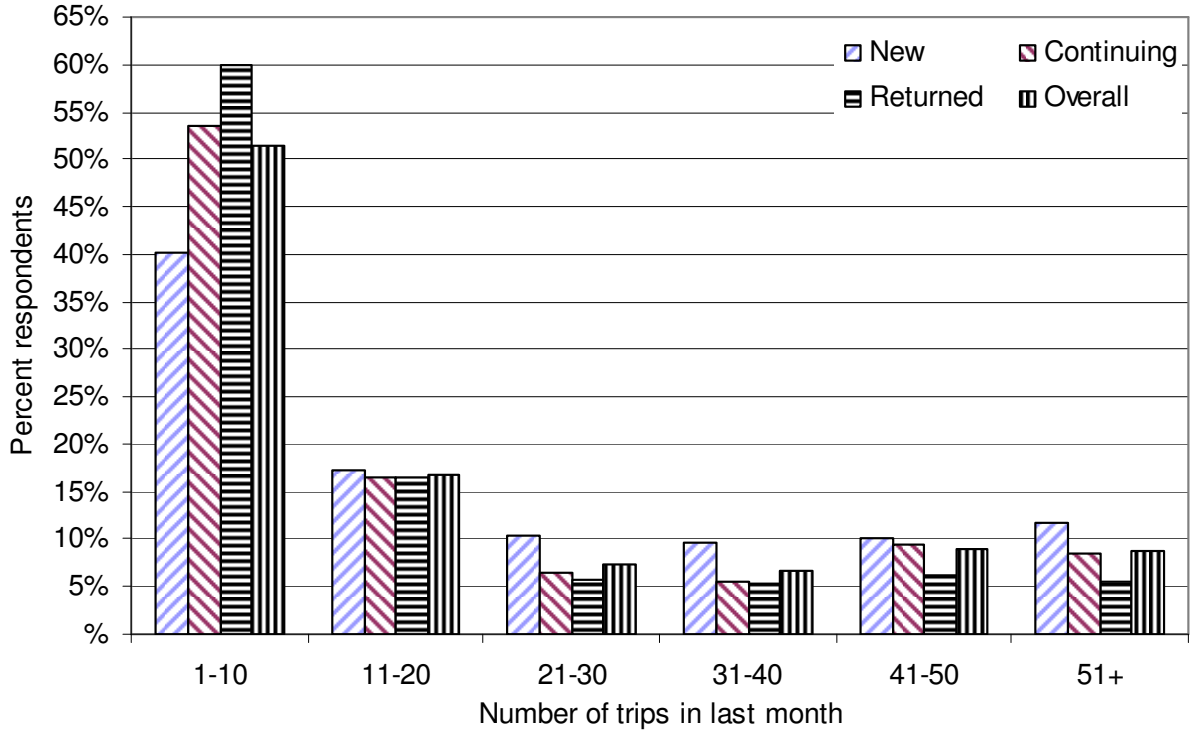


Figure 5.6 Grouped number of separate trips taken by rider group

In the "riding in the last year" section of the questionnaire, respondents were asked how often they rode, on average, during that period. The responses of the 1884 riders who answered this question are summarised in Table 5.8. New riders were most likely to have ridden daily while both continuing and returned riders were most likely to have ridden weekly. The differences between rider groups was statistically significant ($\chi^2(6)=67$; $p<0.001$).

Table 5.8 Frequency of riding in last year by rider group

Riding frequency	New	Continuing	Returned	Overall
Daily	47%	32%	25%	34%
Weekly	40%	49%	50%	47%
Monthly	9%	15%	16%	14%
Less than monthly	4%	4%	8%	5%
Total	100%	100%	100%	100%

5.4.3 Purpose and location of riding

Respondents were asked for what purpose they rode in the previous month, and allowed to select more than one option. The 3,183 answers – 913 from new riders, 1,589 from continuing riders and 681 from returned riders – were combined. As shown in Table 5.9, at around half of their responses members of all three groups were most likely to have ridden for on-road recreational purposes during the last month, followed by commuting. Together the on-road recreation and commuting options accounted for 87% of responses for both new and returned riders, and 83% of responses for continuing riders.

Table 5.9 Trip purpose during the last month (more than one option allowed).

Purpose	New	Continuing	Returned	Overall
Commuting	38%	32%	31%	33%
On-road recreation	49%	52%	56%	52%
Off-road recreation	5%	6%	5%	6%
Work	2%	3%	1%	2%
Other	6%	7%	7%	7%
Total	100%	100%	100%	100%

The principal change in responses when riders were asked what was the most common purpose for their riding over the last year was that new riders now were more likely to answer commuting (see Table 5.10) rather than recreation.

Table 5.10 Trip purpose during the last year (more than one option allowed).

Purpose	New	Continuing	Returned	Overall
Commuting	50%	33%	31%	37%
Recreation	45%	60%	65%	57%
Work	2%	2%	1%	2%
Other	3%	5%	3%	4%
Total	100%	100%	100%	100%

When asked to indicate where they mostly rode during the last month, respondents were required to choose one of "mostly in built-up/urban areas", "mostly outside built-up/urban areas", or "mostly off-road/bush/etc". Overall the split between urban and non-urban was close to the middle (50% urban, 48% non-urban, and 2% off-road) – see Figure 5.7. New riders were more likely than the

other groups to ride in urban areas (66%, 45% and 43% of the new, continuing and returned rider groups respectively), which fits with their increased propensity to ride for commuting purposes. Continuing and returned riders were more similar to each other. The differences across the groups were statistically significant ($\chi^2(4)=67$; $p<0.001$).

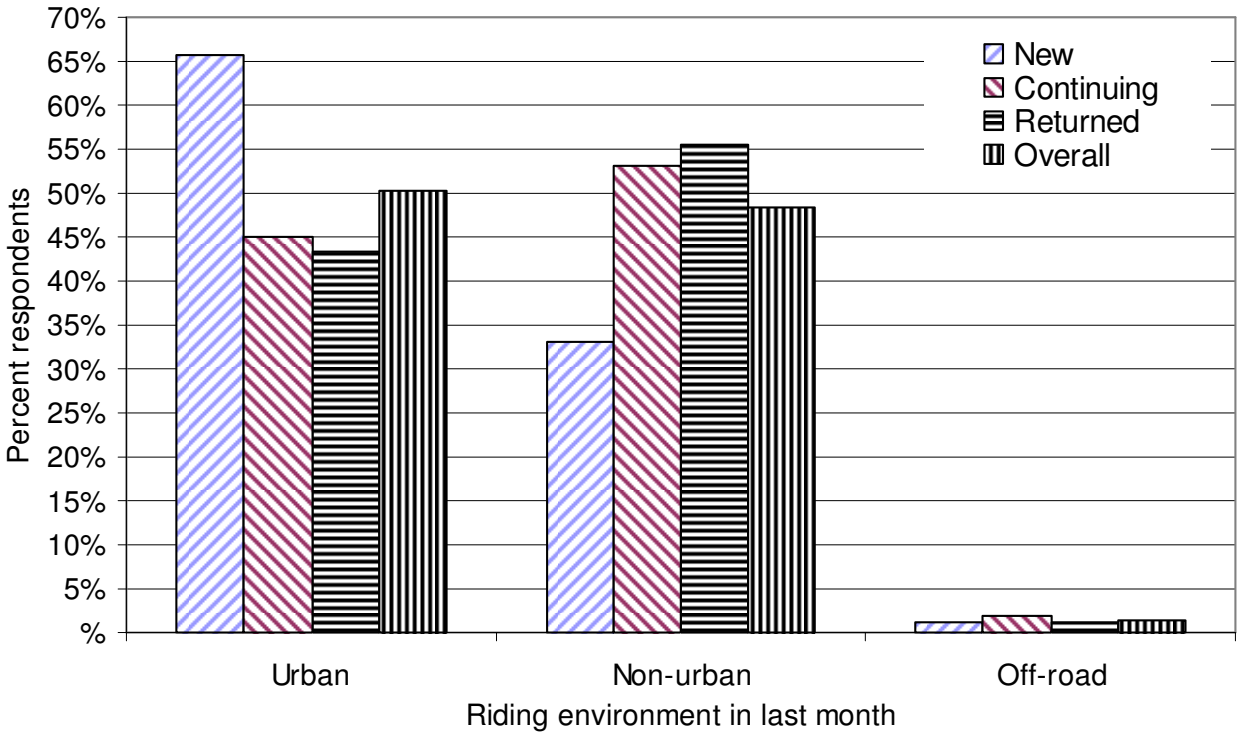


Figure 5.7 Urban vs non-urban riding in the last month

Riders were also asked what percentage of riding in the last month was with a group of other riders. Overall, 60% of riders rode with a group less than 10% of the time, and almost three-quarters rode with groups for less than half the time. There was no significant difference between rider types and how much group riding they did.

Riders were also asked whether their riding over the previous month had been "average" for them. Across the groups more than half agreed that it had been average (58% of new riders, 60% of continuing riders, 53% of returned riders). Less than 10% (average 6%) said that their riding had been more than usual and 35%-38% of each riding group said that it had been less than usual. With the preponderance of distance travelled exceeding 500km per month and the high number of trips undertaken, this suggests that the sample of riders who responded to this survey were very active riders, or perhaps prone to exaggeration.

Within the annual riding section of the survey riders were asked to indicate which part of the year they were most likely to ride in: October to March, April to September, or all year round. Across all three groups between 79% and 86% of respondents indicated they rode all year round. Respondents were also asked how far they *drove* during the last year. Both new and returned riders were most likely to drive 1,001-10,000km, while continuing riders were equally likely to drive this distance of 10,001-50,000km (see Table 5.11). The differences between the groups were statistically significant ($\chi^2(6)=45$; $p<0.001$).

Table 5.11 Annual distance driving (not riding).

Driving distance	New	Continuing	Returned	Overall
<1,000km	16%	7%	10%	10%
1,001-10,000km	50%	45%	47%	47%
10,001-50,000km	32%	44%	40%	40%
>50,000km	2%	4%	3%	3%
Total	100%	100%	100%	100%

5.4.4 Near misses

Finally, riders were asked how many "near misses or close calls" they had had in the last month while riding on the road. All responses were included in the analyses, including zero near misses. This question was answered by 85% of respondents (1806 individuals). New riders reported the highest number of near misses with an average of 2.6 for the last month (SD=6.9), followed by continuing riders with 1.8 (SD=6.5) and then returned riders with 1.1 near misses (SD=2.1). The difference between the groups was statistically significant ($F(2,1803)=6$; $p<0.005$). However, as indicated by the relatively high standard deviations, there were some very high responses: the maximums were 99, 150 and 20 for new, continuing and returned riders respectively. It is unlikely that any rider will have specifically remembered even 20 individual near miss occasions. That said, these responses may not be wildly inaccurate, just a realistic estimation of the hazards of riding a motorcycle, particularly given the high number of trips and kilometres ridden by the current respondents. However, the lower numbers are unlikely to be specifically remembered events.

Given the wide variation in the number of near misses reported for the previous month, responses were grouped, with 6+ accounting for all high numbers – see Figure 5.8. Overall half of the riders who had ridden in the previous month reported no near misses. Eighteen percent of all three groups reported one near miss. New riders were most likely to report two near misses (17% versus 11% for both continuing and returned groups). The differences across the groups were statistically significant ($\chi^2(12)=36$; $p<0.001$). Respondents were provided with a free text field and invited to describe their most recent near miss. Over half of all respondents (54% or 1,137 riders) entered descriptions in this field, ranging from a single word (e.g. "wombat") through to a paragraph. Classifying this wealth of data is beyond the scope of the current project.

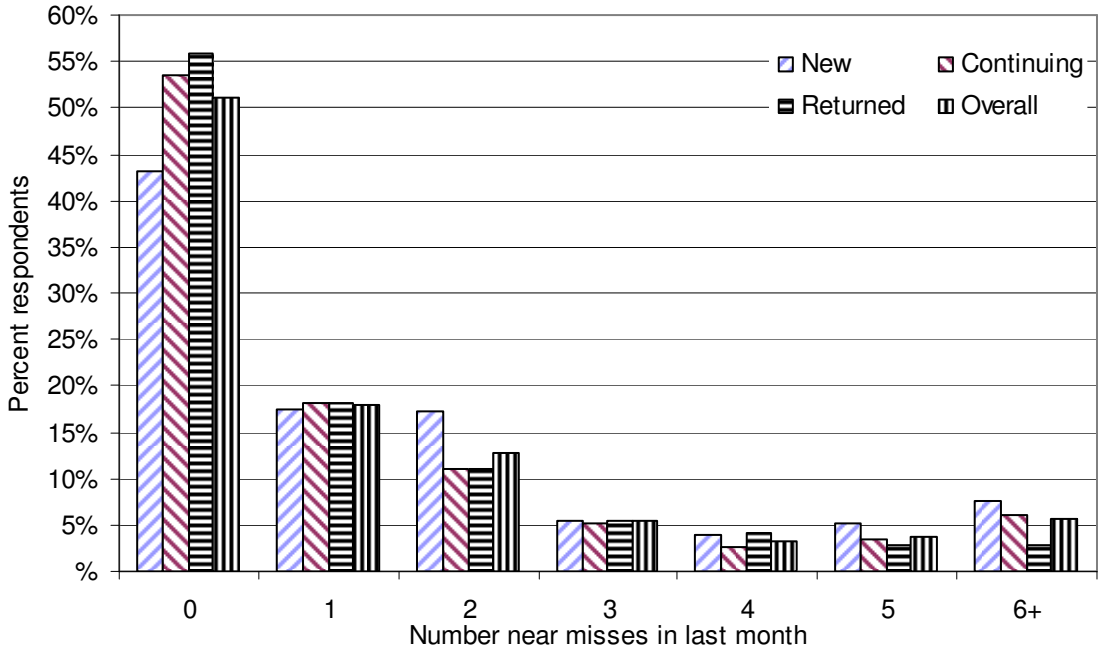


Figure 5.8 Number of near misses by rider group for last month.

5.5 SUMMARY

5.5.1 Response rates and demographics

A total of 2,116 riders completed the survey. These responses comprised 80% of the 2,630 unique page views that were recorded for the on-line explanatory statement.

Almost half (49%) of those who responded to the survey question about rider type were continuing riders, 27% were new riders and 24% were returned riders.

Respondents ranged in age from 17 to 84 years, with an average of 47 years and standard deviation of 12 years. Male respondents (M=47 years, SD=12 years) were significantly older, on average, than female respondents (M=44 years, SD=10 years). The mean age of new riders was lower than that for returned and continuing and riders but the two latter groups did not differ (36 years versus 50 and 51 years respectively). The profile of both continuing and returned riders peaked in the age range mid 40s to mid 50s and then declined.

Almost 70% of those who answered a question about marital status said they had a partner (married or defacto), 19% were single and 12% were separated (and not currently with a partner). New riders were much more likely to be single than continuing and returned riders (41%, 13% and 10% respectively).

Eighty percent of respondents indicated that they had started or completed a technical college or university qualification or had at least completed year 12 as their highest qualification. New and returned riders were more likely than continuing riders to have started or finished a tertiary qualification, new and continuing were more likely than returned riders to have completed year 12, and continuing and returned riders were more likely to have left secondary school without completing year 12.

More than three-quarters (77%) said they worked full time. Returned riders were more likely to be in full time employment than continuing and new riders (and new riders were more likely to be students than continuing and returned riders. A third earned $50,001-$80,000 and another third more than $80,000, while a quarter of respondents earned $20,000-$50,000. New riders were more likely than continuing and returned riders to have an income of less than $50,000 and returned riders were more likely than continuing and new riders to be earning in the highest income bracket.

Half (52%) of all respondents lived in Victoria. The next most common location was New South Wales which accounted for 19% of all respondents. Ten percent of respondents were from Queensland, 9% from Western Australia, 4% from the ACT, 3% from South Australia, 2% from Tasmania, and less than 1% were from the Northern Territory. The higher proportion of responses from Victorians most likely reflects the advertisement placed in the Royal Auto magazine which is published in Victoria only and distributed to 1.4 million readers. The profile across rider types was similar except for a large proportion of new riders responding from Western Australia.

5.5.2 Training

Overall only 44 percent of respondents had undertaken a formal motorcycle rider training course. Sixty-two percent of new riders had undertaken a course compared with 39% of continuing riders and 33% of returned riders, and the differences were significant.

The type of courses most commonly undertaken were learner and licence courses, cited by 56% and 55% of all respondents. New riders were much more likely to have undertaken learner and licence courses than continuing and returned riders and continuing riders were more likely to have completed a refresher course than both returned and new riders.

5.5.3 Amount of riding

Respondents to the current survey were active riders. Most (95%) had ridden in the last month; 80% had ridden in the last year and 99% said they intended to ride in the next 12 months. Returned riders were less likely than new and continuing riders to indicate that they had ridden during the past month and continuing riders were more likely than new and returned riders to indicate that they planned to ride within the next 12 months.

Just over 20% of riders reported riding 200 km or less in the past month; 27% reported riding 2001-500km and almost 50% reported riding more than 500km over the past month. There were no differences between the rider groups in terms of distance travelled in the past month. Just under one third of riders each reported riding between 1,000 and 5,000 kms and between 5001 and 10,000 km in the last year. About a quarter of riders reported riding between 10,001 and 20,000 kms during this period. Continuing riders were most likely to have ridden 5,001-10,000 km while returned riders were most likely to have ridden 1,001-5,000 kms.

Most riders reported taking 1-10 trips per month (52%); 16% took 11-20 trips; 6% took between 31-40 trips; 9% between 41-50 trips, and 8% took more than 51 trips. New riders undertook the largest number of trips in the previous month followed by continuing and then returned riders.

5.5.4 Purpose and location of riding

The largest proportion of respondents reported riding weekly during the past year (47%). Just over a third rode daily; 14% rode monthly and 5% rode less than monthly. New riders were most likely to have ridden daily while both continuing and returned riders were most likely to have ridden weekly. Returned riders were more likely to have ridden less than monthly than both new and continuing riders.

Just over half of the riders rode for on-road recreational purposes during the last month; 33% rode for commuting purposes; 6% for off-road recreation; 2% for work and 7% for other purposes. Similar statistics were obtained for riding purposes in the last year. New riders were more likely to ride for commuting purposes whereas returned riders were more likely than others to ride for recreational purposes.

Overall the split between urban and non-urban was close to the middle (50% urban, 48% non-urban, and 2% off-road). New riders were more likely than both continuing and returned riders to ride in urban areas, which fits with their greater propensity to ride for commuting purposes.

5.5.5 Group riding

Overall, 60% of riders rode with a group less than 10% of the time, and almost three-quarters rode with groups for less than half the time. There were no differences between the rider groups in terms of amount of group riding.

5.5.6 Timing of riding

Between 79% and 86% of respondents indicated they rode all year round and the proportions of year round riding were similar for continuing, returned and new riders.

5.5.7 Near misses

Half of the riders who had ridden in the previous month reported no near misses. Eighteen percent reported one near miss; 13% reported two near misses; 3% reported three and four near misses, and 6% reported more than six near misses. New riders reported the highest number of near misses with an average of 2.6 compared to 1.8 for continuing riders and 1.1 for returned riders.

In summary, compared to new and continuing riders, returned riders:

- were more likely to be in full time employment
- were more likely to be earning in the highest income bracket ($80,000 or more)
- were less likely to have completed year 12
- were less likely to have completed training
- were less likely to have completed an 'other' course (most other courses were advanced)
- rode less frequently over the past month as measured by the number of trips taken
- rode less distance over the past year (i.e. were most likely to have ridden 1001-5000 km and less likely to have ridden between 10,001-20,000 km)
- were more likely to ride less than monthly
- were less likely to have ridden at all in the past month
- were more likely to ride for recreational purposes over the last month and year
- reported a lower number of close calls while riding in the previous month.

Compared to continuing and returned riders, new riders were:

- more likely to be single
- more likely to be students
- less likely to have left secondary school without completing year 12
- more likely to have an income of less than $20,000 and between $20,000-$50,000
- more likely to have completed training
- more likely to have completed a learner and a licence course
- more likely to have undertaken their last training course within the three year period prior to the survey
- less likely to have completed a refresher course
- more likely to ride daily and less likely to ride only weekly or monthly over the past year
- more likely to ride more frequently over the past month as measured by the number of trips taken
- more likely to ride for commuting during the last month and year
- less likely to ride for recreational purposes over the last month and year
- more likely to ride in urban areas
- more likely to report a higher number of close calls while riding in the previous month.

Compared to new and returned riders, continuing riders were:

- less likely to have started or finished a tertiary qualification
- more likely to have completed a refresher course
- more likely to have ridden in the past month
- more likely to have ridden 20,000 km or more in the past year and less likely to have ridden less than 1,000 km in the past year
- more likely to report planning to ride on a public road during the next 12 months
- more likely to drive 10,001 km and more per annum.

6.0 MOTORCYCLE RIDER SURVEY: CRASH PROFILES

6.1 BACKGROUND

A large section of the questionnaire sought information about crashes that riders had been involved in, asking firstly "have you ever had a motorcycle accident while riding on a public road?" Those who had never had an on-road crash were skipped over this section. To best capitalise on memory, details for only two crashes were sought – the most recent crash and the most serious crash, in that order. Those who indicated that their most recent crash was also their most severe crash only provided details about that one crash.

Of the 2,116 respondents, 1,226 (58% all respondents, or 63% of those who answered the question) said they had crashed at some stage, 708 (34% of all or 37% of those who answered the question) answered that they had not had a crash, and 182 (9% of all) did not answer the question.

Figure 6.1 displays the crash profile of the three rider groups. Note that this figure is for illustrative purposes – it does not take into account the number of riders, which would be required to assess relative risk.

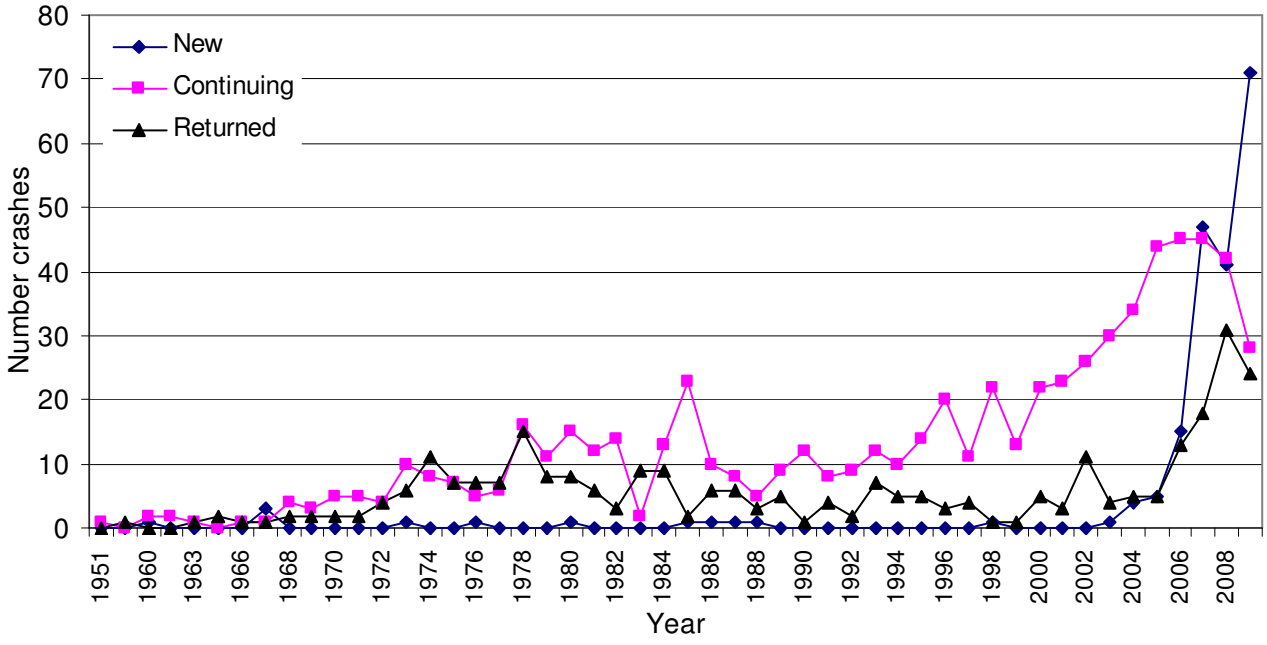


Figure 6.1 Crash profiles of new, continuing and returned riders.

A total of 1,886 answered both the question about whether they had ever been involved in a crash and the question that determined rider type. Of this group, 1,190 said that they had crashed before, and 696 said they had not crashed – 63% and 37% of the 1,886 respondents respectively.

6.2 RIDER TYPE AND AGE

To make comparisons on crash based variables between rider types, the rider type at the time of the crash must be known. In the current survey rider type was determined on the basis of the last five years of activity, rather than at the time of each crash. Thus, for the following analyses, only crashes that occurred within the last five years were included (an approach consistent with previous surveys). Of those who had crashed, 22% said that their most recent crash had not been their most serious crash (8% of new riders, 27% of continuing riders and 19% of returned riders – all of whom

had therefore had at least two crashes). The analyses described here are based on the most recent crash (rather than the most serious).

Table 6.1 contains the number of crashes reported for each rider group for the five-year period 2005-2009. The table also indicates that limiting crashes to the last five years takes account of 91% of new rider crashes, 31% of continuing rider crashes and 32% of returned rider crashes. Of the five-year crash count, 38% belong to the new rider group, 43% to the continuing riders, and 19% to the returned rider group. The differences between rider groups in terms of the number of crashes across the last five years was statistically significant ($\chi^2(8)=77$; $p<0.001$). The proportion of new riders who were involved in a crash in the last five years was significantly higher than that for continuing and returned riders and there was no difference between the latter two groups (33% versus 21% and 19% respectively) ($\chi^2(2)=36.3$; $p<0.001$).

Table 6.1 Crashes for previous five years by rider group.

	New	Continuing	Returned	Total
2005	5	45	5	55
2006	15	46	14	75
2007	47	46	18	111
2008	42	42	31	115
2009	72	29	24	125
5 yr total	181	208	92	481
% of all group crashes	91%	31%	32%	41%
% of 5 year total	38%	43%	19%	100%
% of crashes in group	33%	21%	19%	23%

An analysis of crash occurrence as a function of age group in ten-year blocks is presented in Figure 6.2 below.

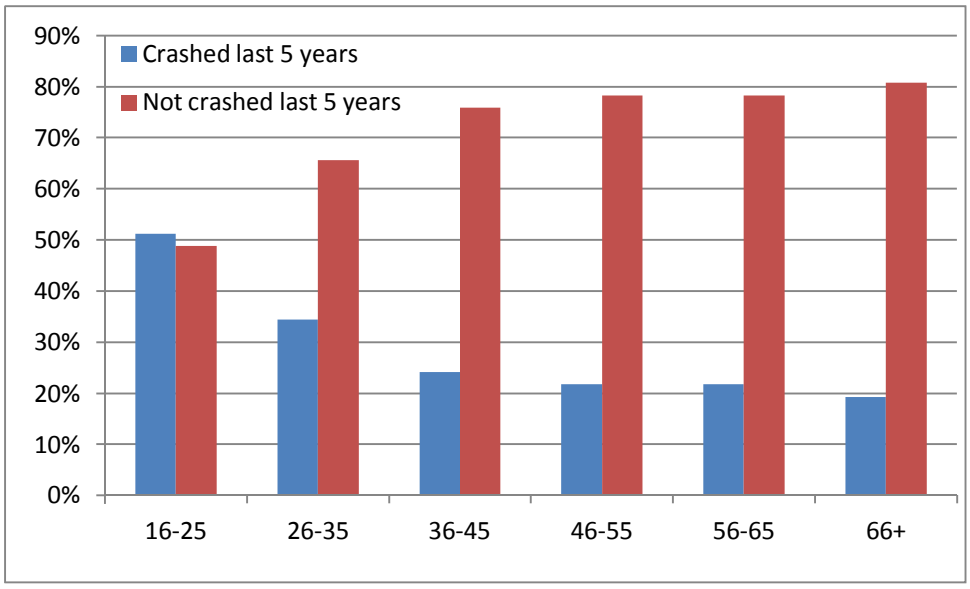


Figure 6.2 Percentage of respondents who crashed within the last five years as a function of rider age.

Figure 6.2 shows that crash involvement decreased with age group, from 51% of 16-25 year olds to 19% of riders aged 66 and over.

Figure 6.3 below breaks the data shown in Figure 6.2 into rider types, though the age groups are more consolidated so that the figure can be legibly inserted.

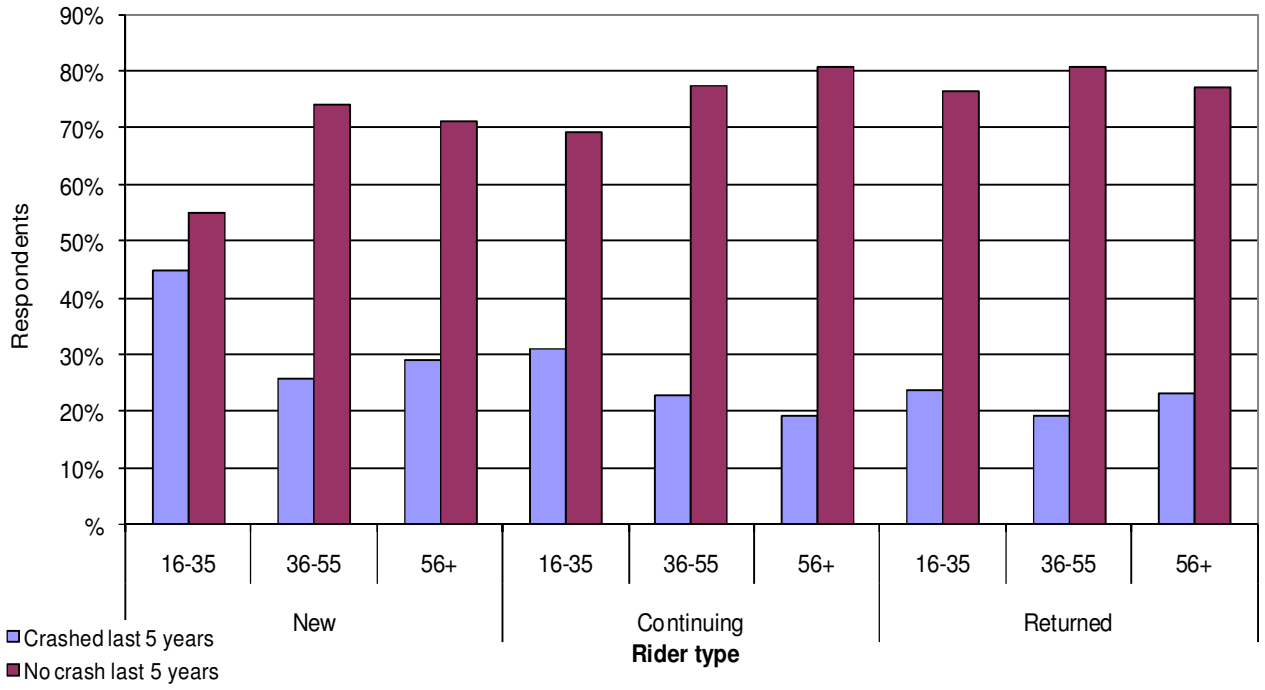


Figure 6.3 Percentage of respondents who crashed in the last five years as a function of rider type and age.

Crash involvement decreased with age group, from 51% of 16-25 year olds to 19% of riders aged 66 and over. Across all three rider groups, younger riders were more likely to crash than older riders. New riders aged 16-35 years were more likely to crash than any other group whilst continuing riders aged 56 and over and returned riders aged 36-55 were the least likely to crash.

6.3 TIMING OF CRASHES

Respondents who had crashed within the last five years were asked about the timing of their most recent crash. Figure 6.4 shows crash profiles as a function of rider group across the year. The relatively small number of crashes makes it difficult to discern any meaningful patterns, and statistically there is no difference ($\chi^2(22)=24$; $p>0.05$) between the groups. The months were then categorised into seasons to produce Figure 6.5.

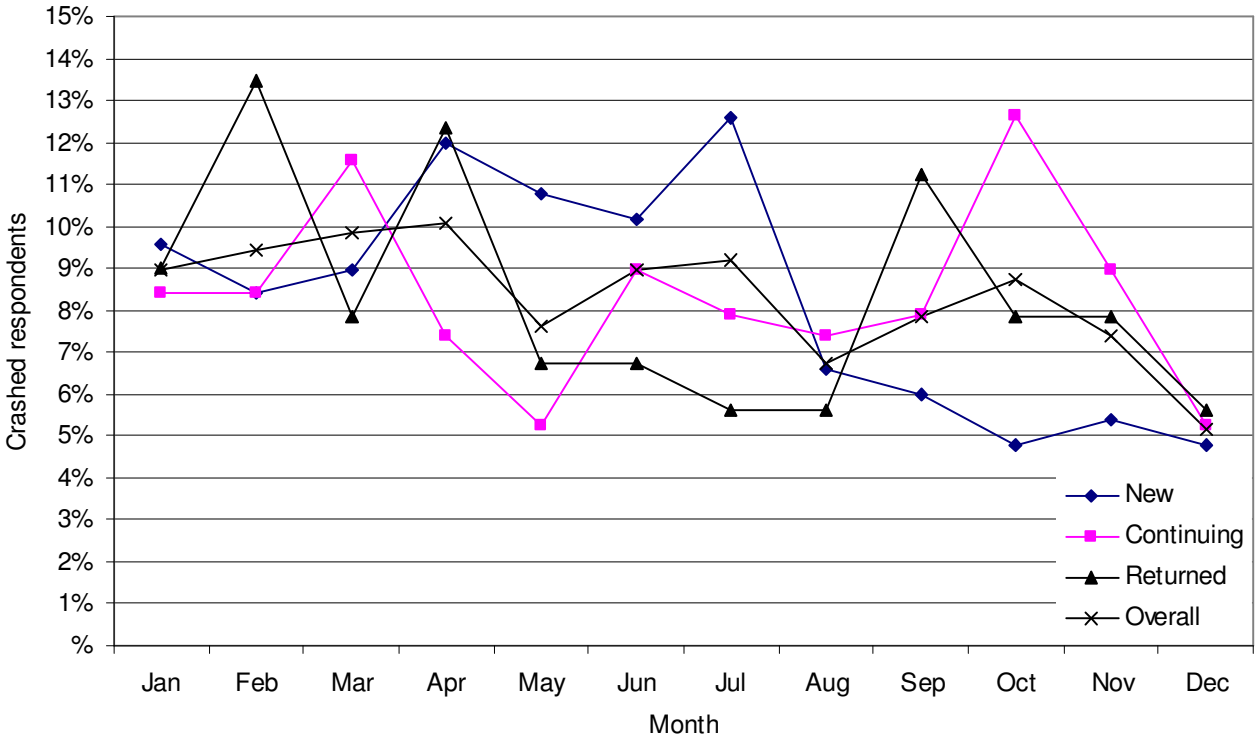


Figure 6.4 Percentage of crashes in each month as a function of rider group.

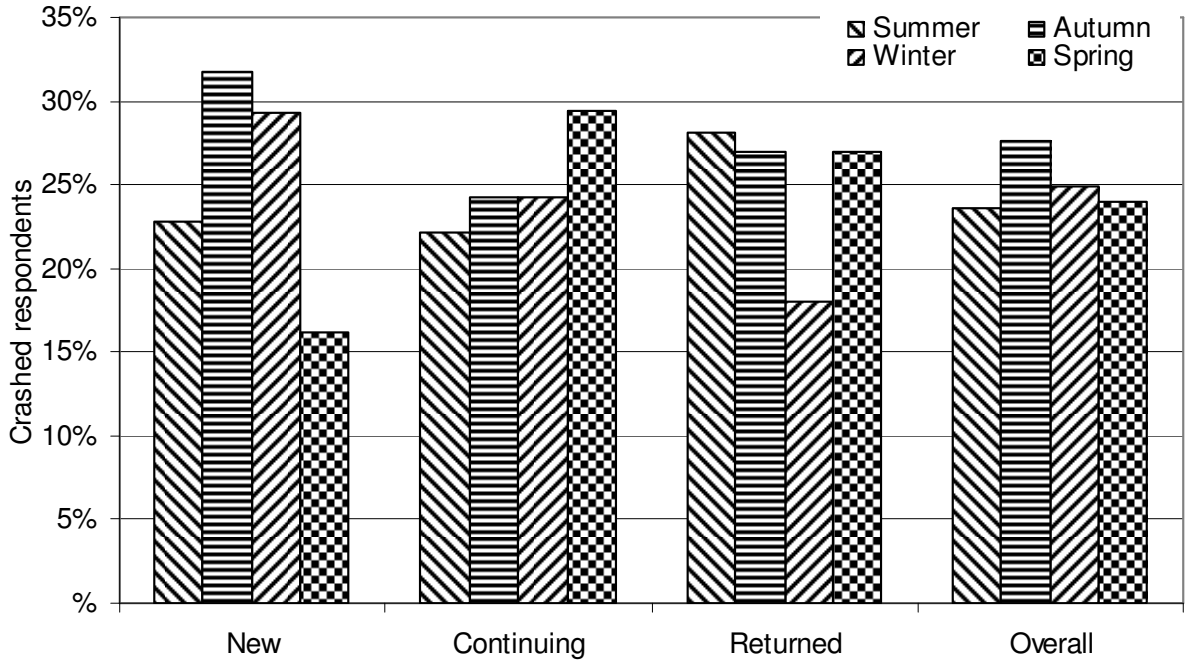


Figure 6.5 Percentage of crashes in each season as a function of rider group.

In a marked pattern shown in Figure 6.5, returned riders were least likely to crash in winter than the other three seasons (at 18% of the group versus 27%-28% respectively). Conversely, continuing riders have a high-crash season that stands apart from three lower-crash seasons (30% versus 22%-24% respectively). The figures for new riders vary more across the seasons, with spring at a low 16%, summer at 23%, winter at 29%, and autumn seeing 32% of new rider crashes. The seasonal differences across the rider groups were statistically significant ($\chi^2(6)=10$; $p<0.05$).

Overall, 15% of respondents did not indicate on which day of the week their crash had taken place. A plot of crashes across the week (Figure 6.6) indicates a wide degree of variation from day to day, but a definite increase at the weekend. The differences between the rider groups were statistically significant ($\chi^2(16)=33$; $p<0.01$). The breakdown of weekend versus weekday crashes – 62% versus 38% respectively overall – is consistent across rider types ($\chi^2(2)=0.8$; $p>0.05$) (See Figure 6.7).

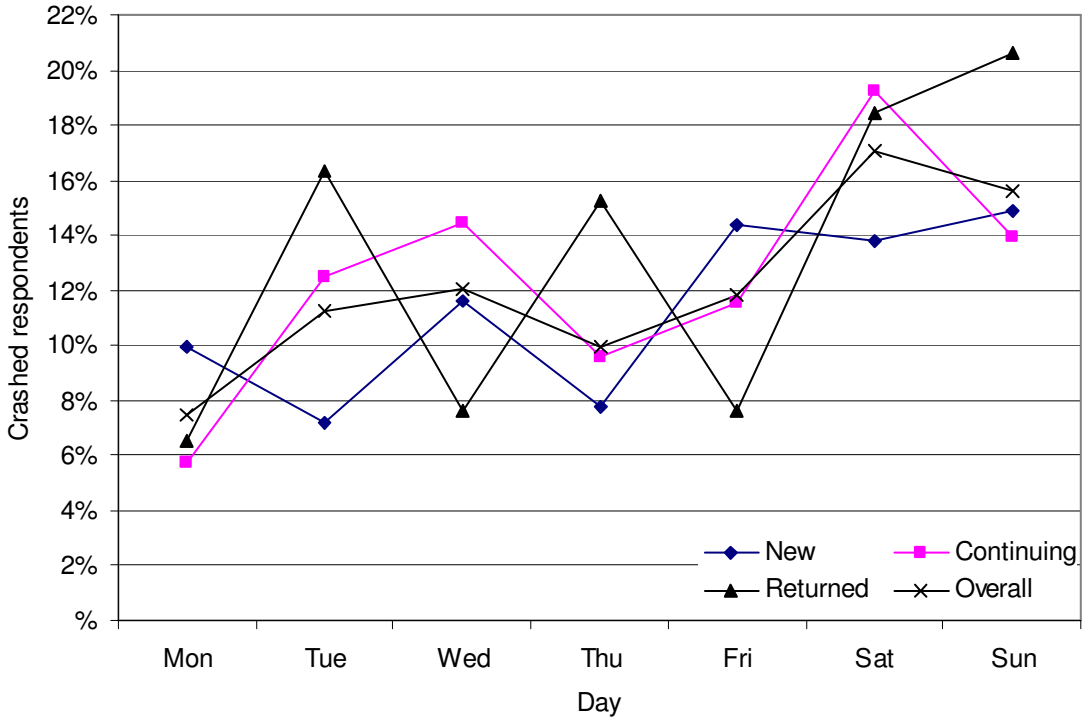


Figure 6.6 Percentage of crashes by day of the week as a function of rider type.

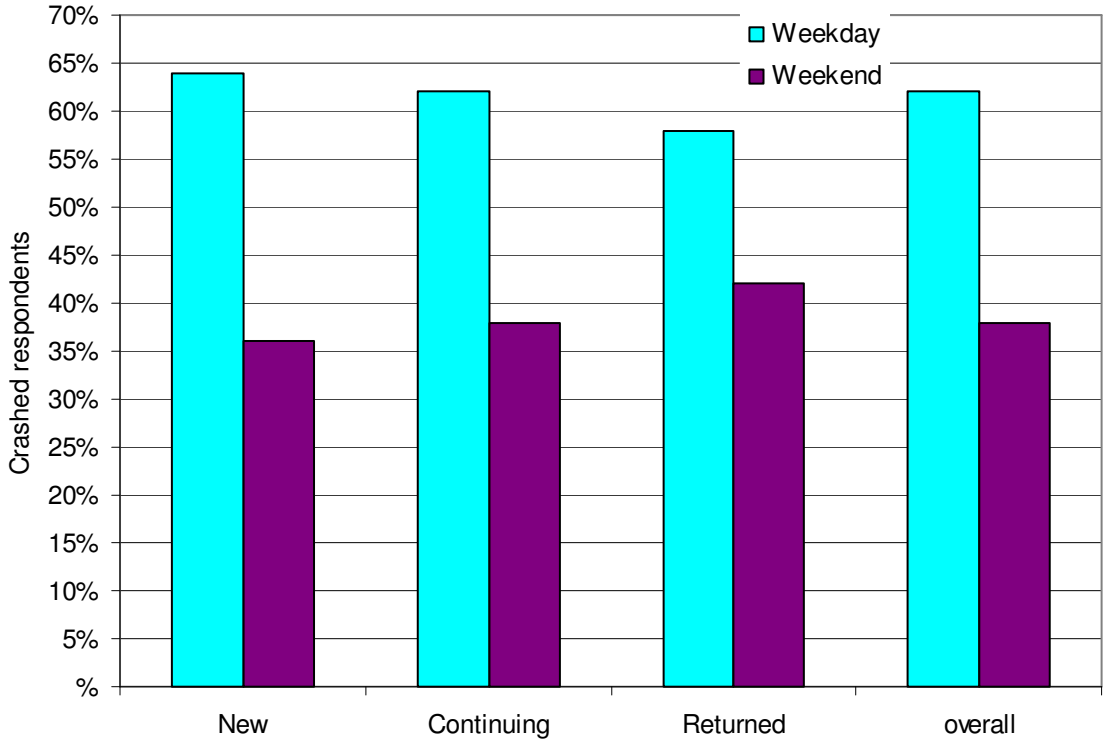


Figure 6.7 Percentage of crashes by day of the week as a function of rider type.

6.4 CRASH SEVERITY

Respondents were asked what level of injury they had suffered in their most recent crash and the maximum level of injury to any party that resulted from the crash. The responses to the latter suggest that in the main, respondents understood that question to only be asking about the level of injury to another party since the results do not reflect the fact that in many instances the rider is likely to be the most severely injured party. Accordingly that data is not reported. Table 6.2 shows the crash severity profile of the three rider groups for the most recent crash within the last five years.

Table 6.2 Crash severity profile as a function of rider type

Injury level	New	Continuing	Returned	Overall
Not injured	60%	47%	55%	54%
Treated at scene	14%	12%	11%	13%
Treated hospital not admitted	14%	21%	17%	18%
Admitted hospital	12%	19%	17%	16%
Total	100%	100%	100%	100%

Across all three rider groups crashes were most likely to not result in any injury to the rider, ranging from 60% of new rider crashes to 47% of continuing rider crashes. The differences between the groups were not statistically significant. However, in reality there is probably minimal difference from the rider's point of view between being not injured at the scene and being treated at the scene, and between being taken to and admitted to hospital. Thus injury level was collapsed into two composite levels – no injury or being treated at the scene ('minor'), and being taken to hospital and either being admitted or not ('major'). The differences between the groups were statistically significant ($\chi^2(2)=8$; $p<0.05$). Figure 6.8 plots rider type by this dichotomous injury level variable, and shows that 74%, 60% and 66% of crashes involving new, continuing and returned riders respectively were minor.

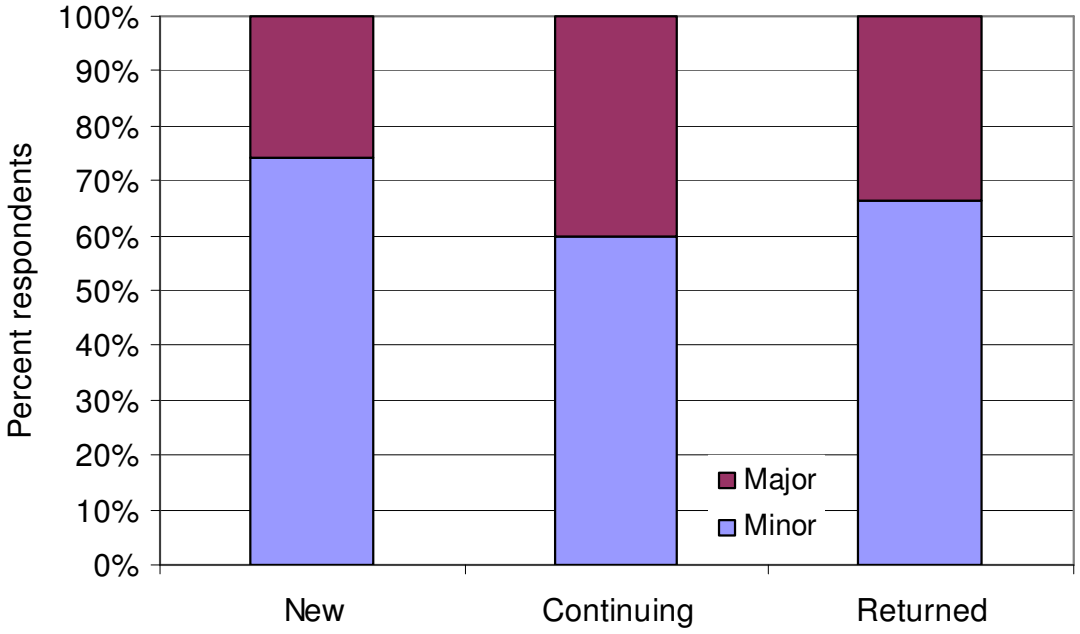


Figure 6.8 Percentage of respondents whose level of injury required no more than treatment at scene (minor) and those who were taken to hospital (major) by rider type.

6.5 CRASH TRIP VARIABLES

Crashed riders were asked for what purpose they were riding at the time of their most recent crash. Very few were riding for work purposes – a maximum of 2% for each rider group (and overall). Riders from all three rider groups were more likely to be riding for recreational purposes than commuting, 55% and 53% of new and continuing riders respectively were riding for leisure, up to 65% for returned riders. However, the differences between the groups were not statistically significant.

When asked how long they had been riding on the particular trip before their crash occurred respondents from all three rider groups were most likely to say they had been riding for less than 15 minutes. This answer accounted for between 33% of continuing rider responses, through 35% for new riders, up to 37% for returned riders (35% overall). The next most common answer for both new and continuing riders was 15-30 minutes riding before the crash occurred, at 30% and 28% of responses respectively. The second most common response for returned riders however was more than 60 minutes. The differences between the rider groups however were not statistically significant.

Riders were also asked how far they were from home when the crash occurred. The most common answer overall, at 34% of responses, was 11-50 kilometres (see Figure 6.9). This was also the most common distance for both new and continuing riders, at 37% and 34% respectively. Returned riders were most likely to say they were more than 100 kilometres from home. The differences between the groups just failed to reach significance ($\chi^2(8)=15$; $p=0.05$).

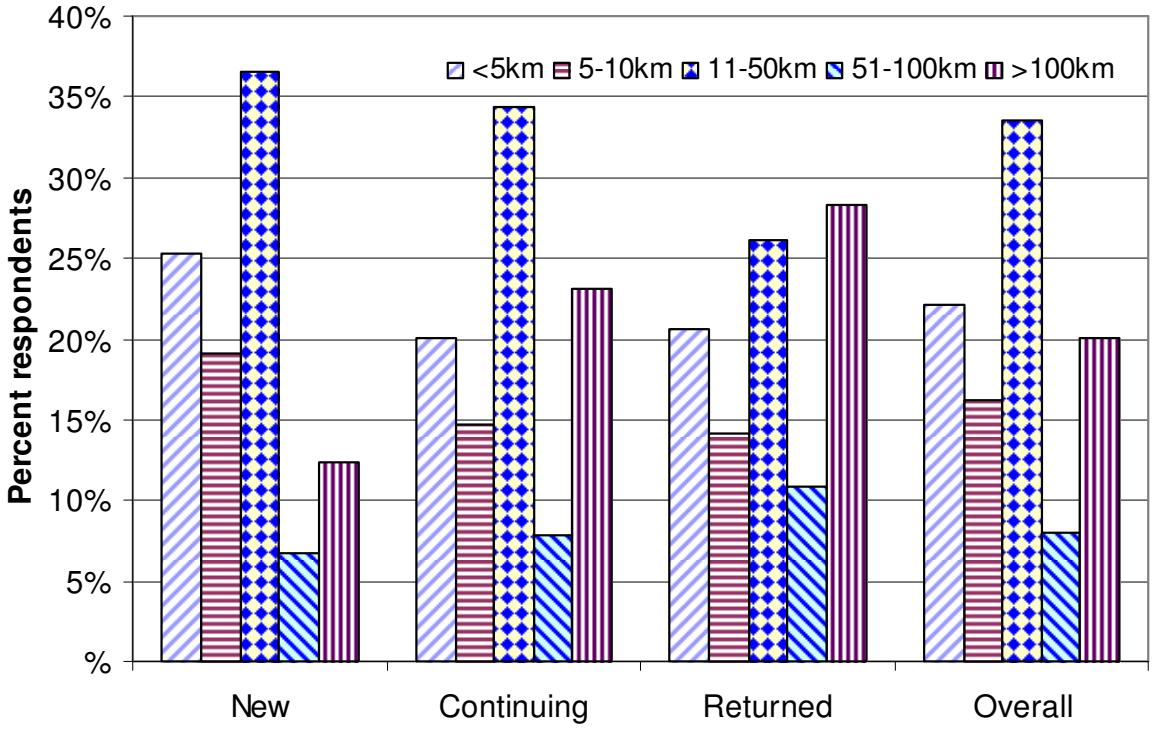


Figure 6.9 Crash distance from home as a function of rider type

For all three rider groups the most recent crash occurred in an urban area: 54% of returned rider crashes, 60% of continuing rider crashes and 73% of new rider crashes. Overall, 64% of crashes occurred in urban rather than rural areas. The differences between the groups were statistically significant ($\chi^2(2)=11$; $p<0.05$).

Relatively few motorcycle crashes (5% overall) occurred on freeways (see Figure 6.10). For both continuing and returned riders the balance of crash locations was around 50% for major (non-freeway) roads and minor roads. New riders however were more likely to crash on a minor road than a major road (59% versus 37% of crashes respectively). The crash location differences were statistically significant ($\chi^2(4)=10$; $p<0.05$).

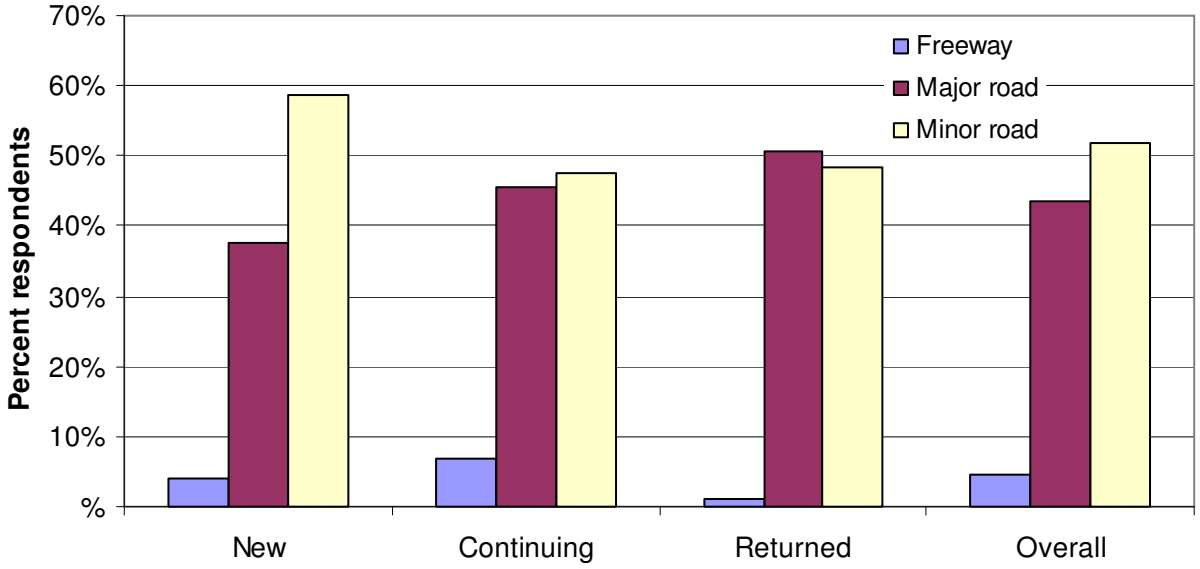


Figure 6.10 Crash road type

Overall, 41% of crashes occurred at intersections. The differences between rider groups on this variable were not statistically significant. Nor were there statistical differences between the groups in terms of whether the crash occurred on a curve or a straight section of road – overall 48% of crashes occurred on curves.

Pillions were involved in very few crashes 1 new rider crash, 14 continuing rider crashes and 4 returned rider crashes, amounting to 19 crashes (or three percent of all crashes). The differences between the rider groups are statistically significant ($\chi^2(2)=10$; $p<0.01$), but caution is urged due to the small numbers involved. When asked whether they had been riding as part of a group at the time of the crash 24%, 29% and 40% of new, continuing and returned riders said they had, respectively. The difference between the rider groups was also statistically significant for this variable ($\chi^2(2)=7$; $p<0.05$).

6.6 CRASH CONTRIBUTORY FACTORS

Fifty-three percent of crashes involved the motorcyclist only. New riders were more likely to be involved in single vehicle crashes than continuing and returned riders (67% versus 53% and 49% respectively).

Crashed riders were asked what they thought were the most important factors that contributed to or caused their most recent crash. The questionnaire provided a list of 17 potential crash factors and the opportunity to say that the factor was a self or other issue (or both), for example "indicator was on when it shouldn't have been" and "fatigue". They were asked to nominate up to five factors in each of the self and other columns, which means that the number of responses can exceed the number of crashes. The questionnaire automatically randomly re-ordered the list of 17 items anew for each respondent. Figure 6.11 shows the number of responses for each crash factor contributed by each rider type, ranked in order of number of overall responses. The responses for 'self' and 'other' have been collapsed. The most common crash contributory or causal factor nominated by riders from all three rider groups was 'road features', which are infrastructure related (and therefore not transitory) and include tram lines, road markings and pit lids (see Figure 6.11). The top five factors – road features, distraction, bad weather, taking a bad line into a corner and excessive speed (either too fast for the conditions or exceeding the speed limit) represent 54% of all responses.

Representing 7% and 6% of all responses and coming in at positions 7 and 8 were (transitory) road surface issues such as examples potholes, loose gravel and oil, and traffic hazards respectively.

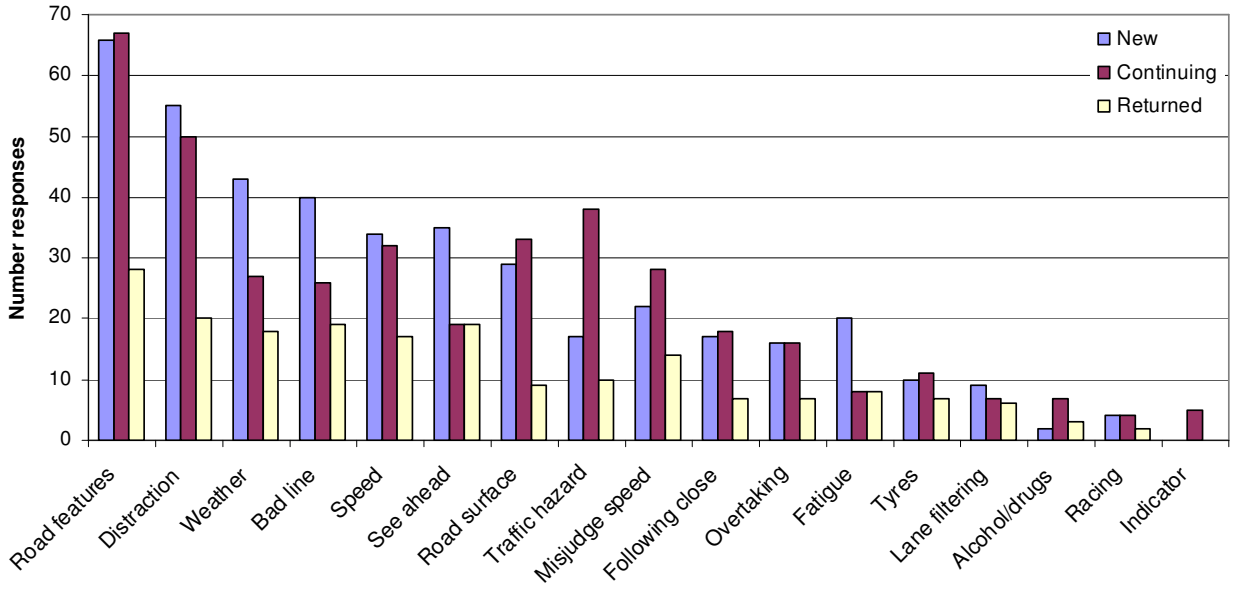


Figure 6.11 Factors nominated by crashed riders as contributory or causal factors in their crash.

Thirteen of the 17 crash factors relate directly to rider actions (or lack of action) or behaviours, while the remaining four – traffic hazard, bad weather, road features and poor road surface – could be classified as outside the rider's direct control (though of course whether the rider detects and appropriately responds to the issue will determine whether a crash occurs). Overall, 51% of all responses related to the 13 rider factors. Both new and returned riders were slightly more likely to nominate rider factors (54% and 53% respectively) while continuing riders were more likely to identify external factors (53%) – the differences between the groups was not statistically significant.

In crashes in which another party had been involved riders from all three rider groups claimed they had had the right-of-way in between 90% and 93% of cases. The rider groups did not significantly differ from each other in this regard. As a counterpart to that question, respondents were also asked who they thought was to blame for the crash, and given a five-point Likert scale to provide their response. The left end of the scale was anchored by "0% my fault" and the right end "100% my fault. As seen in Figure 6.12, the two extremes of blame were most popular for all three rider types. New riders were most likely to fully blame themselves and then the other party (37% and 30% of responses respectively). However, both continuing and returned riders were most likely to blame the other party before themselves (continuing: 43% entirely self at fault, 23% entirely other party at fault; returned: 37% and 32% for self and other blame respectively). The differences between rider types were not significant.

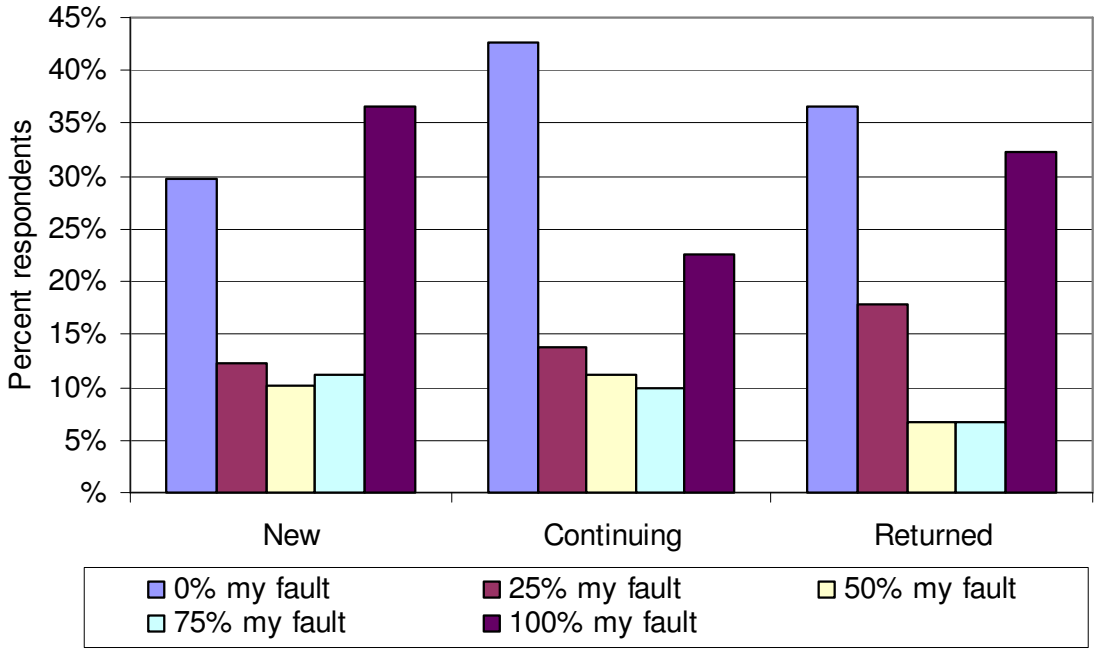


Figure 6.12 Assignation of fault/blame for the crash as a function of rider type

Due to the preference for extremes in assigning fault for crashes, responses were recoded into three levels – it was the fault of the other road user (representing 0% and 25% my fault), it was a 50:50 share of fault, and it was more my fault (representing 75% and 100% my fault). That operation resulted in Figure 6.13 and now a statistically significant difference between the groups ($\chi^2(4)=11$; $p<0.05$) (removing the shared blame middle response increases the degree of significance in the difference to $p<0.01$).

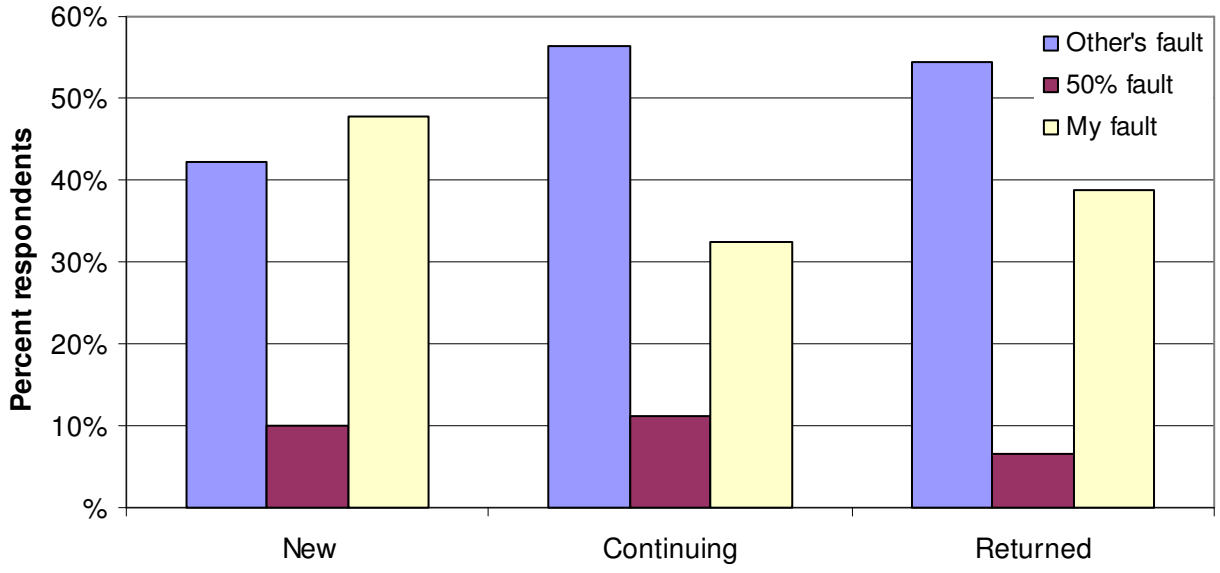


Figure 6.13 Collapsed assignation of fault/blame for the crash as a function of rider type

Crashed riders were also asked whether their riding patterns, behaviours or attitudes had changed after their most recent crash. Overall, three-quarters of riders said it had – 85%, 65% and 78% of new, continuing and returned riders respectively. The differences between the groups were statistically significant ($\chi^2(2)=21$; $p<0.005$).

6.7 SELF-ASSESSMENT OF RIDING SKILLS COMPARED TO PEERS

Respondents were asked to compare themselves to other riders of their age and gender in terms of the likelihood that they themselves would be involved in a crash while riding at some time in the next twelve months. On a 5-point Likert scale ranging from 'much less likely' to 'much more likely', almost half (43%) of all previously-crashed riders thought they were equally likely to crash within the year. The next most common response at 37% was one gradation along the scale at 'less likely'. Together these responses accounted for 80% of all replies. There were no statistically significant differences between the rider groups.

Riders were then asked to use a 7-point Likert scale to rate themselves against their peers on four riding skills that act to improve rider safety: controlling the motorcycle, spotting hazards, getting out of hazardous situations, and anticipating what other road users are going to do. Table 6.3 displays the differences between the groups for each of these items.

Table 6.3 Comparisons between self and riders of same age and gender for safe riding skills

	New	Continuing	Returned	Overall
Controlling the motorcycle				
Much better	6%	11%	7%	8%
Better	14%	17%	12%	15%
Above average	24%	32%	25%	27%
About same	45%	38%	49%	43%
Below average	10%	2%	7%	6%
Worse	1%			%
Much worse				
Total	100%	100%	100%	100%
Spotting hazards				
Much better	14%	18%	12%	15%
Better	21%	24%	26%	23%
Above average	33%	39%	39%	37%
About same	30%	18%	22%	24%
Below average	3%			1%
Worse				
Much worse				
Total	100%	100%	100%	100%
Avoiding hazards				
Much better	8%	11%	5%	9%
Better	13%	22%	11%	16%
Above average	25%	33%	34%	30%
About same	45%	31%	42%	38%
Below average	10%	3%	8%	7%
Worse				
Much worse				
Total	100%	100%	100%	100%
Anticipating what others will do				
Much better	18%	26%	17%	21%
Better	23%	24%	28%	25%
Above average	30%	35%	37%	34%
About same	27%	14%	17%	20%
Below average	2%		1%	1%
Worse				
Much worse				
Total	100%	100%	100%	100%

In terms of ability to control a motorcycle, across all three groups considered themselves to be about the same as their peers (other riders of a similar age and same gender), though this tendency was strongest for returned riders and weakest for continuing riders (49% of the returned rider group, 45% of the new rider group and 38% of the continuing rider group) – see Table 6.3. Continuing riders were the most confident in this ability, reporting the lowest below average percentage (2%) and the highest 'much better' percentage (11%). Overall, 6% of all respondents considered themselves below average, 43% average, and 50% of riders rated themselves as better than average. The differences between the groups were statistically significant ($\chi^2(10)=22$; $p<0.05$).

Overall only 1% of respondents thought they were below average for spotting hazards, and they were all new riders (3% of the new rider group). A quarter of all riders (24%) rated themselves as average and three-quarters (75%) above average. New riders were most likely to think themselves average for spotting hazards (30% of the group) and continuing riders most likely to score 'much better' (18%). In terms of percentages, the continuing and returned riders were similar for 'better' and 'above average' ratings. The differences across the three groups were statistically significant ($\chi^2(8)=17$; $p<0.05$).

While all riders rated themselves well for spotting hazards there was less confidence for avoiding hazards. New riders were least confident in themselves, with 10% of that group scoring themselves as below average, versus 8% of the returned riders and 3% of the continuing riders (7% of all riders overall). At 31% of their group, continuing riders were least likely to rate themselves as average, compared with 45% of new riders and 42% of returned riders (and 38% overall). Rather, continuing riders were most likely to score themselves as better and much better. The differences between the groups were statistically significant ($\chi^2(8)=23$; $p<0.005$).

Only 1% of all respondents (2% of new riders and 1% of returned riders) considered themselves below average for anticipating what other road users are going to do. Continuing riders were most likely to rate themselves as much better (26% versus 17% of returned riders and 18% of new riders, and 21% of all riders overall). At 27%, new riders were most likely to score average, with only 14% of continuing riders and 17% of returned riders (and 20% of all riders) also average. The differences between the groups were statistically significant ($\chi^2(8)=16$; $p<0.05$).

As all four of these riding skills are important for rider safety they were combined (simply added) to form an overall safe riding skills index (of course it is recognised that these four factors alone are only a small part of safe riding and it may not be the case that they should be weighted equivalently). New riders attained the highest overall score with a mean of 12.3 (SD=3.7), followed by returned riders at 12 (SD=3.2) and then continuing riders with a summed score of 10.9 (SD=3.5). The differences seem small, but were statistically significant overall ($F(2,447)=7.4$; $p<0.001$); only the comparison between new and returned riders was not significant in post-hoc testing.

6.8 RIDING BEHAVIOURS

The next block in the questionnaire consisted of 35 items, again using a 7-point Likert rating scale, ranging from "Never", through "Regularly", up to "Always" and asked "How often have these things happened to you over the last 12 months?" Each item related to a hazardous or risky event or behaviour (or the absence of a safe or protective behaviour, such as neglecting to check the condition of the motorcycle before setting out) – see the complete list in Appendix 1. In terms of the analysis, seven levels on the scale proved to be too many, resulting in too many empty cells, which violates the use of the chi-square test. According, the seven levels were collapsed into three: 'never' (which was also 'never' on the 7-point scale), 'occasionally' (which was 2 and 3 previously), and 'regularly' (which was 4 to 7, or 'regularly' to 'always' on the 7-point scale). Here a summary

description of overall results will be described for items for which there was no statistically significant difference between the rider groups. Additional detail will be provided for items that did result in a statistical difference.

Table 6.4 lists the items for which there was no significant difference between the groups, displaying the overall percentage of riders who admitted to never, occasionally or regularly performing the various behaviours (note that the rows rather than the columns sum to 100%).

Table 6.4 Overall results for regularity of occurrence of various riding behaviours or scenarios

Item	Never	Occasionally	Regularly	Composite
Exceeded speed limit in residential streets	16%	53%	32%	69
Opened throttle and go for it	17%	51%	32%	66
Neglected to cancel indicator	21%	72%	7%	58
Allowed mood to influence riding	30%	57%	13%	40
Skidded on wet road, manhole cover, etc	32%	61%	7%	36
Ridden too fast for the conditions	33%	61%	6%	34
Attempted to keep up with riders or drivers going faster than you	34%	54%	12%	32
Disregarded speed limit at night	37%	40%	23%	26
Ridden fast into corner and scared self	39%	56%	5%	22
Attempted to keep up with others	44%	42%	14%	12
Almost lost control on a corner	47%	52%	2%	7
Locked up real wheel while braking	47%	50%	3%	6
Failed to notice or anticipate another driver or rider pull out in front of you and had difficulty stopping	49%	50%	1%	2
Not bothered with protective equipment because short ride or too hot	50%	38%	11%	-1
Raced another rider/driver	51%	41%	9%	-1
Been distracted/preoccupied and nearly crashed	55%	45%	1%	-9
Not done a shoulder-check before changing lanes or pulling into traffic	56%	39%	6%	-11
Intentionally or unintentionally done a wheel spin	59%	34%	7%	-18
Ridden between two lanes of fast moving traffic	64%	24%	12%	-28
Misjudged speed of oncoming traffic while overtaking	68%	31%	1%	-36
Pulled into main road front of unnoticed/ misjudged vehicle	71%	29%	0%	-42
Tried to break your own record for speed or time	72%	24%	4%	-44
Locked up the front wheel while braking	74%	26%	1%	-47
Not noticed a pedestrian	74%	25%	2%	-47
Ridden when might be effected by drugs, alcohol or fatigue	74%	23%	3%	-48
Overtaken someone you haven't noticed signalling a right turn	88%	12%	0%	-76
Travelled through give-way or stop sign and almost crashed	95%	5%	0%	-90

As shown in Table 6.4, the behaviour undertaken most commonly on a regular basis across all crashed riders was opening the throttle on occasion and "just going for it" and exceeding the speed limit on residential streets (both registered 32% of the respondents), followed by disregarding the speed limit at night (23%). None of the other behaviours exceeded 14% of the respondents. Eleven behaviours or actions were exhibited occasionally by at least 50% of the respondents:

- Neglecting to cancel the indicator: 72%
- Skidding on a wet road, pit lid, manhole cover, line markings or similar: 61%

- Riding too fast for the conditions: 61%
- Allowing mood to influence riding style or behaviour: 57%
- Riding sufficiently fast into a corner to scare oneself: 56%
- Attempting to keep up with riders or drivers who are travelling faster than the rider: 54%
- Exceeding the speed limit in residential streets: 53%
- Almost losing control in a corner: 52%
- Opening up the throttle and going for it: 51%
- Locking up the rear wheel while braking: 50%
- Fail to notice/anticipate driver/rider pull out in front and having difficulty stopping: 50%

For 14 items at least 50% of respondents reported that they never exhibited the behaviour or found themselves in that situation. At 95% of respondents, the most common 'never' item was travelling though a give-way of stop sign and almost crashing. The other 13 items can be read off the table from the bottom up (i.e. they are in reverse order).

All of the actions listed in Table 6.4 are negative in terms of road safety. Thus ideally 'never' should be the most common choice for all riders, and both 'occasionally' and 'regularly' are deleterious. Accordingly, a composite 'score' was computed by simply adding the percentages for occasionally and regularly and subtracting the never 'score' (this simple operation gives no consideration to any sort of weighting that might be appropriate in terms of risk, nor any weighting to the difference between 'occasionally' and 'regularly'). This score provides an indication of how many respondents carry out the behaviour. The items in the table are ordered in terms of this composite score, such that the items at the top have the highest positive score and the items at the bottom have the highest negative score. A negative composite score occurs when more respondents claim to never have done it than there are respondents who have done it either occasionally or regularly. All of the items in the table below the solid black line delivered negative composite scores, becoming increasing negative down the table. With composite scores of 69 and 68, exceeding the speed limit in residential streets and opening the throttle and going for it would seem to be the most common behaviours, with neglecting to cancel the indicator at 58 and allowing mood to influence riding at 40.

The items in Table 6.5(a-h) are from the same set as those in Table 6.4 but they returned a statistically significant difference between the rider groups, and so the results are presented in greater detail.

Table 6.5 Results for regularity of occurrence of various riding behaviours or scenarios for which there was a statistically significant difference between rider groups

	New	Continuing	Returned	Overall
a. Exceeded speed limit on country/rural road or freeway				
Never	14%	5%	10%	9%
Occasionally	40%	47%	47%	44%
Regularly	46%	48%	43%	46%
Total	100%	100%	100%	100%
b. Locked up the rear wheel while braking				
Never	28%	45%	43%	38%
Occasionally	65%	52%	57%	58%
Regularly	7%	4%		4%
Total	100%	100%	100%	100%
c. Run wide in a corner				
Never	23%	38%	26%	30%
Occasionally	73%	61%	73%	68%
Regularly	4%	2%	1%	2%
Total	100%	100%	100%	100%
d. Checked condition of bike before setting out				
Never	2%	11%	5%	6%
Occasionally	19%	13%	16%	16%
Regularly	79%	76%	80%	78%
Total	100%	100%	100%	100%
e. Intentionally done a wheelie or stoppie				
Never	68%	70%	85%	72%
Occasionally	22%	23%	11%	21%
Regularly	9%	7%	3%	7%
Total	100%	100%	100%	100%
f. Followed rider through intersection, corner, overtaking at risk				
Never	51%	69%	66%	61%
Occasionally	46%	29%	31%	36%
Regularly	3%	2%	2%	3%
Total	100%	100%	100%	100%
g. Raced away from the lights				
Never	10%	10%	11%	10%
Occasionally	22%	37%	40%	32%
Regularly	68%	54%	48%	58%
Total	100%	100%	100%	100%
h. Been unstable when riding at low speed				
Never	49%	65%	51%	56%
Occasionally	50%	34%	48%	43%
Regularly	1%	1%	1%	1%
Total	100%	100%	100%	100%

Despite no real strongly discernible pattern in the results (see Table 6.5a), there was a significant difference between the rider groups in terms of how often they reported exceeding the speed limit on country/rural roads or freeways ($\chi^2(4)=10$ $p<0.05$). New riders would seem to be least likely to do this while continuing riders are probably most likely.

Locking up the rear wheel while braking was most common for new riders with it never happening for only 28% of this group, compared with 45% and 43% respectively of continuing and returned riders ($\chi^2(4)=17$; $p<0.005$) – see Table 6.5b.

Running wide while cornering happened occasionally for 73% of new and returned riders versus 61% of continuing riders (see Table 6.5c). The latter group were most likely to say it happened never with 38% of that group's responses compared with 23% and 26% of the new and returned rider responses respectively. The differences between the groups were significant ($\chi^2(4)=13$; $p<0.05$).

Little pattern is present in the results for checking one's motorcycle before setting out on a trip (see Table 6.5d, but the differences between the rider groups were significant ($\chi^2(8)=13$; $p<0.05$). Overall, 6% of all crashed riders reported that they never checked their bike, mostly contributed by the continuing rider group.

Returned riders were most likely to say they had never done a wheelie or stoppie, followed by continuing and then new riders – 85%, 70% and 68% respectively (see Table 6.5e). The differences between the groups were significant ($\chi^2(4)=10$; $p<0.05$).

New riders were most likely to have occasionally followed another rider through an intersection or into a corner or into an overtaking manoeuvre at an increased risk to themselves (new: 46%, returned: 31%, continuing: 28% - see Table 6.5f). The differences between the groups were significant ($\chi^2(4)=14$; $p<0.01$).

Racing away from the lights would seem to be a reasonably common behaviour with only 10% of the crashed riders overall saying they never did it (see Table 6.5g). Riders from all three groups were more likely to report regularly than occasionally racing away, with new riders most likely. The differences between the groups were significant ($\chi^2(4)=14$; $p<0.01$). There is discussion elsewhere in the report suggesting that this is actually a potentially protective rather than risky behaviour, removing the rider from potential interactions with other vehicles more quickly (and responses to the survey would suggest that riders hold this opinion as well).

Almost half of both the new and returned rider group report occasionally feeling unstable when riding at low speed, versus 34% of continuing riders (see Table 6.5g). The latter group was substantially more likely than the other two groups to say they were never unstable at low speed. The differences between the groups were significant ($\chi^2(4)=11$; $p<0.05$).

6.9 SELF-ASSESSED RIDING STYLE

Question 89 presented 12 dichotomous scales anchored at each end by opposite personal attributes. The scale consisted of seven steps with 'strongly agree' at one end, 'neither agree nor disagree' in the middle, and 'strongly disagree' at the other end. Respondents were asked to "Consider each statement below and how it applies to how you ride, and decide how strongly you agree or disagree with it". For example, one of the items was "I am careful rather than careless" – riders had to decide how strongly they agreed with that statement. The items were randomly reordered for each respondent. Figure 6.14 shows the relationships between the mean ratings provided by each rider group for each of the items.

Crashed riders were also asked whether their riding patterns, behaviours or attitudes had changed after their most recent crash. Overall, three-quarters of riders said they had changed. New riders were more likely to believe that their attitudes or behaviours had changed than returned and continuing riders (85%, 78% and 65% respectively).

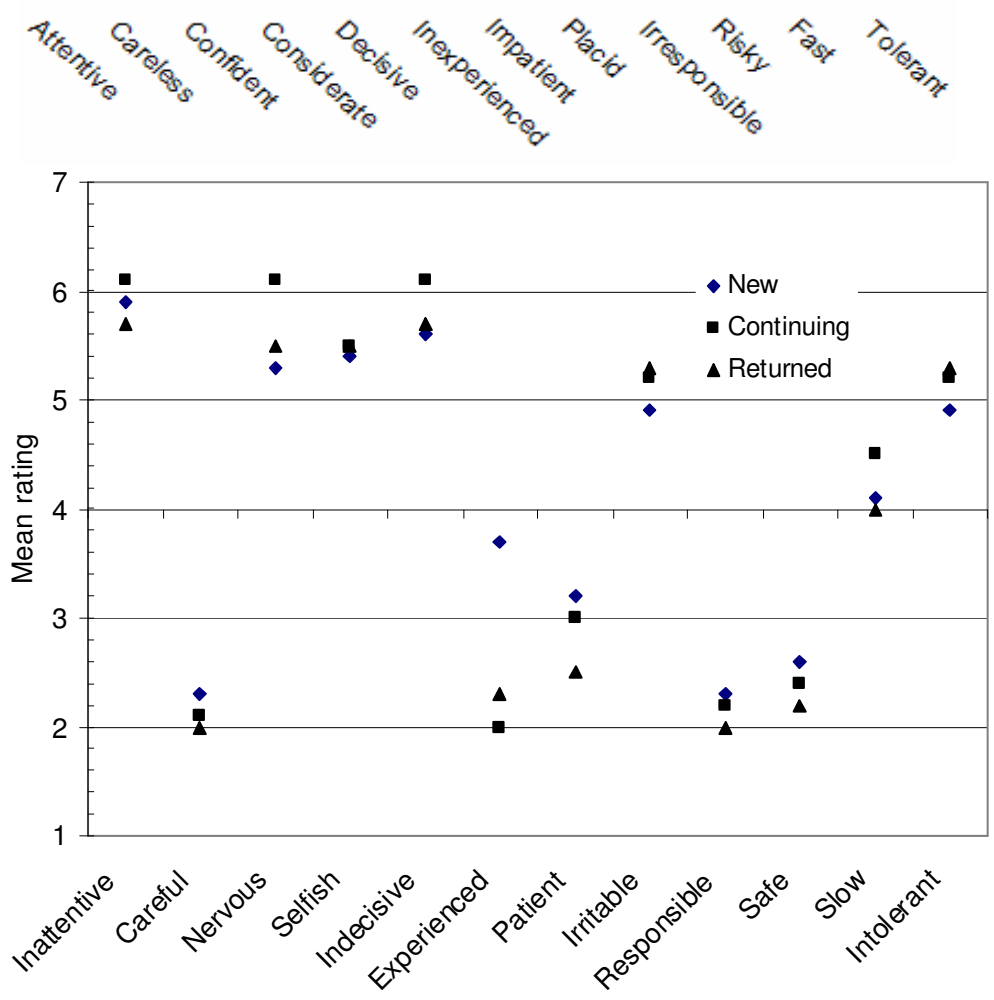


Figure 6.14 Mean ratings for rider attributes as a function of rider type.

Of the 12 items, seven produced statistically significant differences between the three crashed rider groups. However, the presence of empty cells in the chi-square analyses prompted a recoding and reanalysis of the 7-point scale into collapsed symmetrical 5-point and 3-point scales. The number of statistical differences dropped to four with 5-point scales and returned to seven with 3-point scales, and with each reduction the number of empty cells decreased. Six comparisons maintained their significance from 7- to 3-point scales and so to retain detail the seven-point versions are presented in Table 6.6, including the item that became non-significant. The item that became significant with a 3-point scale is also presented. Items that produced non-significant differences are not presented.

Table 6.6 Items on the rider attributes scale that resulted in statistically significant differences between rider groups.

6.6a Inattentive

	New	Contin	Returned	Overall
Strongly agree	1%	3%	1%	2%
Agree	2%	3%	8%	4%
Somewhat agr	3%	1%	1%	2%
Neither	6%	4%	3%	5%
Somewhat dis	9%	4%	17%	8%
Disagree	42%	42%	31%	40%
Strongly dis	37%	44%	39%	40%
Total	100%	100%	100%	100%

$\chi^2(12)=26$; $p<0.05$

6.6b Indecisive

New	Contin	Returned	Overall
2%	2%	2%	2%
5%	2%	2%	3%
4%	2%	3%	3%
9%	3%	7%	6%
11%	11%	17%	12%
46%	41%	34%	42%
23%	40%	34%	33%
100%	100%	100%	100%

$\chi^2(12)=23$; $p<0.05$

6.6c Experienced

	New	Contin	Returned	Overall
Strongly agree	5%	43%	33%	27%
Agree	23%	39%	34%	32%
Somewhat agr	22%	9%	17%	16%
Neither	19%	3%	9%	10%
Somewhat dis	13%	1%	3%	6%
Disagree	13%	1%	3%	6%
Strongly dis	4%	3%		3%
Total	100%	100%	100%	100%

$\chi^2(12)=140$; $p<0.001$

6.6d Nervous

New	Contin	Returned	Overall
2%	1%	1%	2%
5%		3%	2%
13%	3%	8%	8%
7%	4%	8%	6%
11%	10%	13%	11%
42%	45%	40%	43%
20%	37%	26%	28%
100%	100%	100%	100%

$\chi^2(12)=34$; $p<0.005$

6.6e Responsible

	New	Contin	Returned	Overall
Strongly agree	7%	26%	36%	25%
Agree	52%	49%	44%	49%
Somewhat agr	17%	12%	14%	15%
Neither	9%	6%	3%	7%
Somewhat dis	3%	2%	1%	2%
Disagree	1%	4%	1%	2%
Strongly dis	1%	2%		1%
Total	100%	100%	100%	100%

$\chi^2(12)=22$; $p<0.05$

6.6f Safe

New	Contin	Returned	Overall
21%	22%	30%	23%
36%	46%	39%	41%
22%	15%	19%	19%
12%	9%	4%	9%
3%	6%	6%	5%
5%	1%	1%	3%
1%	2%		1%
100%	100%	100%	100%

$\chi^2(12)=22$; $p<0.05$

6.6g Slow

	New	Contin	Returned	Overall
Strongly agree	6%	3%	4%	4%
Agree	13%	9%	17%	12%
Somewhat agr	15%	13%	21%	15%
Neither	25%	24%	17%	23%
Somewhat dis	23%	20%	27%	22%
Disagree	13%	25%	11%	18%
Strongly dis	6%	6%	3%	5%
Total	100%	100%	100%	100%

$\chi^2(12)=21$; $p=0.05$

6.6h Patient

	New	Contin	Returned	Overall
Agree	42%	5%	63%	50%
Neutral	47%	41%	3 %	42%
Disagree	11%	9%	1%	8%
Total	100%	100%	100%	100%

$\chi^2(4)=24$; $p<0.01$

Table 6.6a profiles the rider groups in terms of their self-rated levels of Inattention while riding. The results for all three groups are strongly skewed towards the 'strongly disagree' end of the scale. The primary difference between the groups driving the significant difference is likely to be that the returned riders are less extreme, with a higher percentage of 'somewhat disagree' and lower percentage of 'disagree' than the other two groups. Of all of the items within this question, Inattention seems to have produced the highest levels of polarisation across all three groups.

The most common response for all three crashed rider groups on the Indecisiveness scale was 'disagree' (see Table 6.6b). Again, returned riders were less polar, with a higher percentage of this group compared to the other two groups selecting 'somewhat disagree' and lower percentage choosing 'disagree'. Continuing riders had a substantially higher score for 'strongly disagree', particularly compared with new riders.

The Experienced item produced a very high level of statistical difference, driven in particular by the larger spread of responses from new riders across the scale (see Table 6.6c). Half of the new rider group were either ambivalent or at various levels of disagreement that they were experienced, compared with 8% and 12% of the continuing and returned rider groups respectively. Continuing riders have rated themselves with the highest levels of experience, followed by returned riders.

Overall, a fifth of new riders rated themselves as nervous, compared with 4% and 12% of continuing and returned riders respectively (see Table 6.6d). The other main difference between the groups seems to be at the 'strongly disagree' end of the scale. The returned rider group seemed to think themselves the most responsible riders of the three groups with the highest levels of 'strong agreement' (see Table 6.6e), followed by continuing and then new riders.

Overall, three-quarters of the crashed riders considered themselves Safe riders, with a further 9% ambivalent (i.e. choosing 'neither agree nor disagree') – see Table 6.6f. For all three groups the largest percentage chose 'agree', ranging from 36% of new riders up to 46% of continuing riders.

New riders were approximately equally likely to 'somewhat disagree' and 'neither agree or disagree' that they were Slow riders, while continuing riders were equally likely to be ambivalent and 'disagree', and returned riders most likely to 'somewhat disagree' – see Table 6.6g. The responses are clustered around the central aspect of the scale, but slightly skewed towards disagreeing that they were slow.

The Patient-Impatient item did not result in a statistical difference between the rider groups using the 7-point scale. It became significant however when collapsed to a 3-point scale. At 63% of the group, returned riders were most likely to agree that they were patient, followed by continuing riders with half of that group, and then new riders at 42% (see Table 6.6h). Unlike the other two groups, new riders were more likely to opt for the neutral setting than the agree option however.

6.10 MOTIVATIONS AND REASONS FOR RIDING

The next two questions on the survey explored another set of riding behaviours and the respondents' reasons for riding. Question 90 consisted of 14 items. It asked respondents to indicate on a 7-point Likert scale how strongly they agreed with a series of statements, ranging from strongly agree to strongly disagree – the same as the response scale used for question 89 (see Section 6.9). While this question did not specifically ask respondents why they rode, inferences can be drawn from items such as "I would like to be a professional racer", "Riding is a good social activity", and "I get a sense of freedom when riding". Figure 6.15 displays the mean ratings by rider type across the various items in this block.

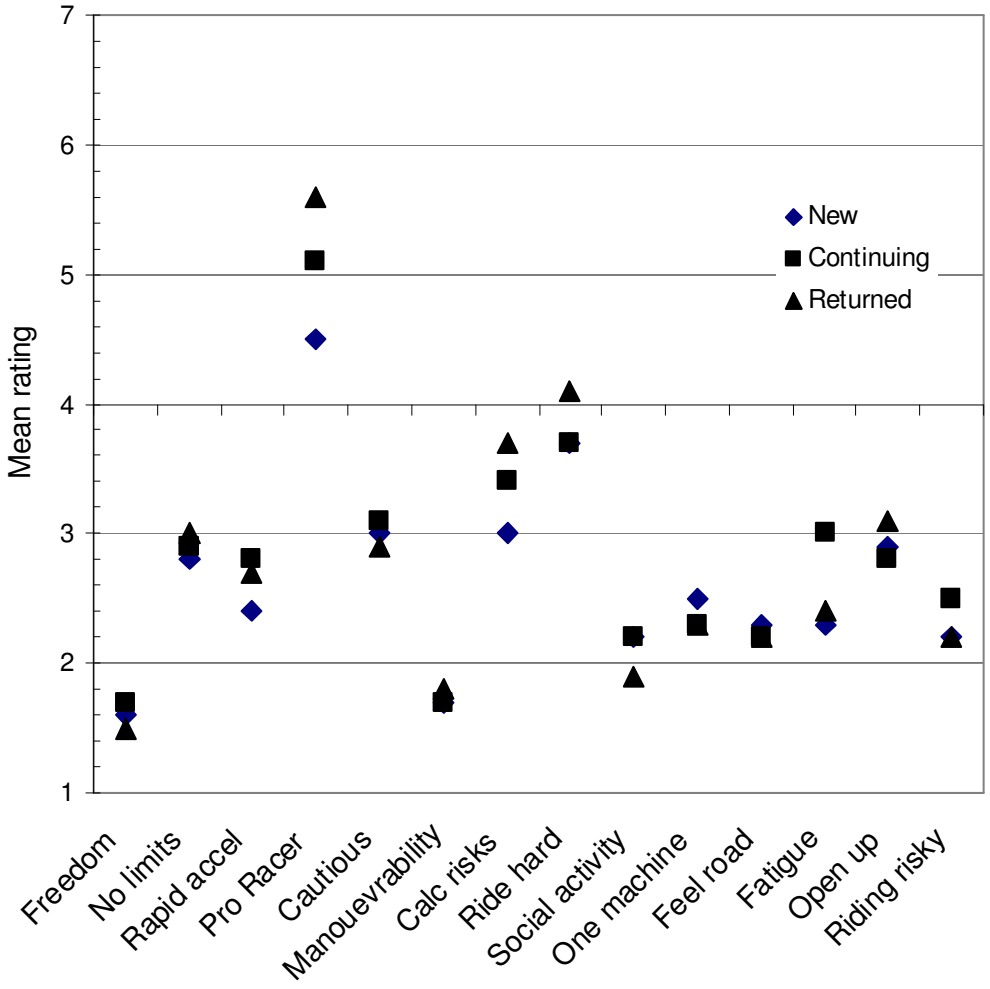


Figure 6.15 Mean ratings for rider opinions as a function of rider type.

Riders were more likely to agree than disagree that they are motivated to ride for motivations associated with recreation, self-expression and freedom. All riders were more likely to strongly agree that they get a sense of freedom when riding and that they like the manoeuvrability of a motorcycle and to agree that: riding is a good social activity; they like accelerating rapidly; they feel at one with their machine; they can feel the road; and that riding is risky. No differences between the rider groups were found in terms of these motivations for riding.

A comparison across the 14 items for crashed riders resulted in four statistically significant differences. The detailed data for those items are contained in Tables 6.7a-d.

Table 6.7 Items on the rider opinions scale that resulted in statistically significant differences between rider groups.

6.7a Pro racer

	New	Contin	Returned	Overall
Strongly agree	12%	7%	3%	8%
Agree	9%	6%	6%	7%
Somewhat agr	14%	8%	6%	10%
Neither	13%	13%	12%	13%
Somewhat dis	8%	9%	3%	7%
Disagree	19%	29%	27%	25%
Strongly dis	26%	29%	43%	30%
Total	100%	100%	100%	100%

$\chi^2(12)=26$; $p<0.05$

6.7b Calculated risks

	New	Contin	Returned	Overall
Strongly agree	14%	10%	3%	10%
Agree	35%	26%	21%	29%
Somewhat agr	27%	25%	33%	27%
Neither	6%	16%	15%	12%
Somewhat dis	6%	8%	11%	8%
Disagree	8%	10%	12%	10%
Strongly dis	4%	5%	4%	5%
Total	100%	100%	100%	100%

$\chi^2(12)=23$; $p<0.05$

6.7c Fatigue

	New	Contin	Returned	Overall
Strongly agree	38%	23%	28%	29%
Agree	35%	32%	45%	36%
Somewhat agr	11%	12%	9%	11%
Neither	5%	8%	8%	7%
Somewhat dis	3%	7%	2%	5%
Disagree	8%	11%	3%	8%
Strongly dis	1%	6%	4%	4%
Total	100%	100%	100%	100%

$\chi^2(12)=29$; $p<0.005$

6.7d Open up

	New	Contin	Returned	Overall
Strongly agree	15%	22%	18%	19%
Agree	34%	30%	29%	32%
Somewhat agr	26%	18%	27%	23%
Neither	5%	17%	6%	10%
Somewhat dis	6%	4%	7%	5%
Disagree	10%	4%	11%	8%
Strongly dis	3%	5%	3%	4%
Total	100%	100%	100%	100%

$\chi^2(12)=31$; $p<0.005$

Riders across all three groups indicated that they had little interest in being a professional racer. New riders however, were slightly more likely than the other groups to agree with this statement (see Table 6.7a). Returned riders had the highest degree of disagreement.

When it was proposed to respondents that they might take calculated risks when riding, 18% of new riders disagreed compared with 23% of continuing riders and 27% of returned riders (see Table 6.7b). New riders had the lowest percentage of ambivalence to this item; they were also most likely to 'agree' and 'strongly agree'. Given that there were high levels of agreement with the statement "Riding is risky" but ambivalence for the item "I like to ride hard" (see Figure 6.15), this item may have been perceived to mean that riding *is* a calculated risk rather than intentionally taking risks while riding that the rider may feel are sufficiently 'safe'.

A large percentage of riders agreed that riding is more fatiguing than driving a car, with new and returned riders most likely to 'agree' and 'strongly agree', and continuing riders slightly more likely to disagree (see Table 6.7c). Of the three groups, continuing riders were most likely to be ambivalent to the statement "When it is safe and I am not likely to be caught I like to open it up a bit" and least likely to 'somewhat agree' (see Table 6.7d).

6.11 SUMMARY

Fifty-eight percent of the 2,116 respondents reported being involved in an on-road crash at some stage, 34% reported not being involved in a crash and 9% did not answer the question about crash involvement.

6.11.1 Rider type and age

As rider type was determined on the basis of the last five years of activity only crashes that occurred within this period were examined. This process accounted for 91% of new rider crashes, 31% of continuing rider crashes and 32% of returned rider crashes (a total of 181, 208 and 92 crashes

respectively). Of the five-year crash count, 43% belong to the continuing rider group, 38% to the new rider group, and 19% to the returned rider group. The proportion of new riders who were involved in a crash in the last five years was significantly higher than that for continuing and returned riders and there was no difference between the latter two groups (33% versus 21% and 19% respectively). Crash involvement decreased with age group, from 51% of 16-25 year olds to 19% of riders aged 66 and over. New riders aged 16-35 years were more likely to crash than any other group whilst continuing riders aged 56 and over and returned riders aged 36-55 were the least likely to crash.

6.11.2 Timing of crashes

Overall, riders were most likely to crash in autumn and least likely to crash in summer. Returned riders were much less likely to crash in winter than the other three seasons whereas continuing and new riders were more likely to crash in spring and autumn respectively.

The largest proportion of crashes occurred on weekends (62%).

6.11.3 Crash severity

Fifty-four percent of crashes resulted in no injury to the rider; 13% resulted in treatment at the scene; 18% resulted in treatment in hospital without admission to hospital and 16% resulted in hospital admission. When injury severity was re-coded into a dichotomous variable (minor – no hospital attendance and major – hospital attendance), new riders were less likely to require hospital treatment, as were riders aged 16-25. As age increased the likelihood of being taken to hospital after a motorcycle crash steadily increased.

6.11.4 Crash trip variables

Riders were more likely to be riding for recreational than commuting purposes at the time of the crash - 55%, 53% and 65% of new, continuing and returned riders respectively, although the differences between the groups just failed to reach statistical significance.

The largest proportion of respondents (35%) reported that they had been riding for less than 15 minutes prior to the crash. Most respondents said their crash occurred between 11 and 50 km from home.

The largest proportion of crashes occurred in urban areas (65%). The difference in crash location was most stark for new riders, for whom almost three-quarters of crashes were urban, followed by a 60:40 split for continuing riders, and then returned riders with 54% of their crashes in urban locations.

Around 40% of crashes occurred at an intersection. Approximately half of all rider crashes occurred at curves in the road and the other half on straight sections. Just over half of crashes occurred on minor roads; 43% on major roads and 5% on freeways. For returned and continuing riders crashes were approximately equally likely on major and minor roads (ranging between 46% and 51%), while new riders were more likely to have crashed on a minor versus a major road (59% versus 37% of crashes respectively).

Pillions were involved in three percent of all crashes. Continuing riders were more likely to be involved in crashes with a pillion than were returned and new riders (14 versus 4 and 1 respectively). Returned riders were much more likely to be riding as part of a group at the time of the crash than continuing and new riders (40% versus 29% and 24% respectively).

6.11.5 Crash contributory factors

Fifty-three percent of crashes involved the motorcyclist only. New riders were more likely to be involved in single vehicle crashes than continuing and returned riders (67% versus 53% and 49% respectively).

For all riders, the most common factor that contributed to or caused their most recent crash was 'road features', including tram lines, road markings and pit lids. The top five factors - road features, distraction, bad weather, taking a bad line into a corner and excessive speed (either too fast for the conditions or exceeding the speed limit) together accounted for just over half of all responses. Overall, about half of all responses related directly to 'rider actions' (or lack of actions). Both new and returned riders were slightly more likely to nominate rider factors, while continuing riders were more likely to identify 'external factors' (i.e. factors outside of the rider's control); however the differences between the groups were not statistically significant.

In crashes in which another party had been involved riders from all three rider groups claimed they had the right-of-way in between 90% and 93% of cases and there was no difference between the rider groups in this regard. The largest proportion of riders assigned fault to another party; followed by 'my fault' and then a 50-50 share of the blame between self and other. Compared to continuing and returned riders, new riders were less likely to assign fault to the other party and more likely to assign fault to themselves. Returned riders took a larger share of the blame for the crash than continuing riders and were less likely to assign a 50-50 share of the blame to self and other.

6.11.6 Self-assessed riding skills

Almost 40 percent of all riders thought they were less likely to be involved in a crash than their peers. All three rider groups more often than not perceived themselves as having better riding skills than their peers, and a substantial proportion believed they were less likely than their peers to be involved in a future crash. The results generally showed that continuing riders perceived themselves as more skilful than their peers, followed by returned and then new riders.

For those tasks requiring a higher level of action rather than anticipation - controlling the motorcycle and avoiding hazards - returned riders rated themselves similarly to new riders, being less likely than continuing riders to rate above average or higher and more likely than continuing riders to rate below average. For those tasks where anticipation is the primary skill – spotting hazards and anticipating what other road users are going to do - returned riders were more similar in their ratings to continuing riders, being more likely rate above average than new riders and less likely to rate being the same as others than new riders.

6.11.7 Riding behaviours

The behaviours undertaken most commonly and on a regular basis by all crashed riders in the last 12 months were intentional speeding related behaviours (excessive or inappropriate speeding) (between a quarter and a third of all riders). A larger number of intentional speeding related behaviours were exhibited occasionally by between 50 and 70% of riders. A small number of unintentional (i.e. lapses or errors) behaviours occurred on an occasional basis.

Of the behaviours for which significant differences between continuing, returned and new riders were evident, continuing riders were more inclined to engage in intentionally risky behaviours and less likely to engage in safe or protective actions compared to other riders. They were also less likely to report making unintentional errors. New and returned riders were similar in their propensity for taking deliberate risks and engaging in safe/protective behaviours. New riders were more likely than both continuing and returned riders to make unintentional errors, while there was little difference between the latter two groups in terms of these behaviours.

6.11.8 Self-assessed riding style

All three rider groups were more inclined to agree than disagree that they had riding styles consistent with positive safety outcomes (experienced rather than inexperienced, responsible rather than irresponsible, safe rather than unsafe and slow rather than fast) and less inclined to agree than disagree that they had riding styles consistent with negative safety outcomes (inattentive rather than attentive; indecisive rather than decisive and nervous rather than confident). Continuing riders were more likely to disagree with the negative descriptors of riding style - inattentive, indecisive and nervous, particularly compared with new riders. Both continuing and returned riders were more likely to agree that their riding style was experienced, safe and responsible compared to new riders.

6.11.9 Motivations and reasons for riding

Respondents were more likely to agree than disagree that they are motivated to ride for reasons associated with recreation, self-expression and freedom and there were no differences between the rider groups in terms of these motivations. Most riders agreed that riding is more fatiguing than driving a car, with new and returned riders being more likely to agree and strongly agree, and continuing riders being more likely to disagree.

In summary, compared to other riders, **returned riders**:

- were less likely to crash in winter than in other seasons
- were less likely to crash in urban areas
- were more likely to be riding as part of a group at the time of the crash

Compared to other riders, **new riders**:

- were more likely to be involved in a crash, particularly the youngest riders aged 16-35
- were less likely to require hospital treatment
- were more likely to crash in urban areas
- were more likely to have crashed on a minor versus a major road
- were more likely to be involved in single vehicle crashes
- were more likely to blame themselves for a crash before the other party
- were less likely to agree that their riding skills were above average compared to peers
- were more likely to make unintentional errors
- were less likely to agree that their riding style was experienced, safe and responsible

Compared to other riders, **continuing riders**:

- were more likely to be carrying a pillion at the time of the crash
- were more likely to blame the other party in the crash before themselves
- were more likely to agree that their riding skills were above average compared to peers

- were more inclined to engage in intentionally risky behaviours
- were less likely to engage in safe or protective actions
- were also less likely to report making unintentional errors
- were more likely to disagree that their riding style was inattentive, indecisive and nervous
- were more likely to disagree that riding is more fatiguing than driving a car.

7.0 MOTORCYCLE RIDER SURVEY: CRASHED VERSUS NEVER CRASHED RETURNED RIDERS

7.1 BACKGROUND

As one of the key aims of this project was to identify the characteristics of crashed returned riders, it was originally proposed to survey crashed riders only. However, it became apparent that interpretation of crash contributing factors would not be possible in the absence of responses from a non-crash involved control group. Therefore, in order to identify attributes of returned riders that might be amenable to intervention through training, this chapter compared returned riders who had crashed within the last five years (2005-2009) and returned riders who had never crashed. The latter group numbered 152, while the number who had crashed in the last five years (i.e. they indicated on the questionnaire both that they had crashed and provided a crash year within the period of interest) was 92; representing 62% and 38% of the number available for the subsequent analyses – a total of 244 respondents.

In other reports comparisons have been made between riders who did versus did not crash in the last say five years. The opportunity to replicate those other studies was available from the data collected for the current project. However, a rider who crashed six years ago may not be "different", from the point of view of the variables of interest, from a rider who crashed five years ago, though they would be in different groups for such an analysis. Thus specifying that a rider must never have crashed maximises the chance of finding a difference between the groups.

The primary variables that have been used to make comparisons within the returned rider group (crashed in last five years versus never crashed) are those in the survey that related to attitudes and behaviours. In most cases respondents were asked to answer the items by choosing an option from amongst a five- or seven-point Likert scale. The items were presented in blocks. Within each block the items were randomly re-ordered each time they were presented (i.e. each respondent saw the items in a unique order). This chapter begins, however, with a description of the groups to be compared.

7.2 BIOGRAPHICAL DETAILS

The crashed and never-crashed returned rider groups were very similar in terms of a number of demographic variables. Both groups consisted of 91% males and 9% females. Regarding marital status they were 11% and 9% single, 73% and 77% with a partner (married or defacto), and 16% and 15% separated, crashed and never-crashed groups respectively. For highest level of education completed, 63% and 65% had started or completed tertiary education, 9% and 7% completed year 12, and 17% and 20% went to secondary school but did not complete year 12 – crashed and never-crashed groups respectively. The largest relative percentage of both groups earned over $80,000 per year (35% and 39% for crashed and never-crashed groups respectively), then $50,001-$80,000 (30% and 33% of the two groups). None of these variables produced statistically significant differences between the groups.

The 92 crashed returned riders who provided their date of birth were aged 24-72 years old, with a mean of 51 years (SD=10 years). The 150 never-crashed riders were aged 26-76 years old, with a mean of 48 years (SD=11 years). The median and mode statistics for age (i.e. the middle and most common age respectively) were both 52 years old for crashed riders and both 48 for never-crashed riders. A t-test determined that the two groups were statistically equivalent. Table 7.1 contains a breakdown of the respondent's ages by 10-year age groups.

Table 7.1 Age group breakdown of returned riders.

Age group	Crashed	Never crashed	Overall
16-25	2%	0%	1%
26-35	8%	11%	10%
36-45	17%	29%	24%
46-55	41%	35%	37%
56-65	28%	21%	24%
66+	3%	5%	5%
Total	100%	100%	100%

Most of the returned riders were fully licensed (97% of crashed and 94% of never-crashed riders). The question asking about most recent course completed was answered by 59 crashed riders and 91 never-crashed riders. There was a relatively high level of recency with 60% of never-crashed riders and 61% of crashed riders completing a course within the last five years (2005-2009). The median year of completion (i.e. the year at which the number of completions since matches the number completed prior) was 2007 and 2006 for crashed and never-crashed riders respectively.

7.3 RECENT RIDING

Most of the returned rider respondents had ridden in the month prior to completing the survey: 92% and 93% of the crashed and never-crashed riders respectively. A series of questions were used to probe the riding undertaken in the month prior to completing the survey. Table 7.2 shows the distance travelled and number of trips undertaken for each group.

Table 7.2 Distance travelled and number of trips undertaken by returned riders in previous month.

	Crashed	Never crashed	Overall
Distance travelled			
<50km	2%	4%	4%
50-100km	6%	10%	8%
101-200km	5%	15%	11%
201-500km	27%	24%	25%
>500km	60%	47%	52%
Total	100%	100%	100%
Trips undertaken			
1-10	52%	64%	59%
11-20	21%	16%	18%
21-30	7%	4%	5%
31-40	4%	7%	6%
41-50	7%	4%	5%
51+	9%	4%	6%
Total	100%	100%	100%

The group of returned riders who have never crashed reported higher percentages for the lower distances travelled, while those returned riders who had crashed in the past five years were more likely to have ridden a greater distance for the previous month (see Table 7.2). Table 7.2 also suggests that crashed returned riders had undertaken a greater number of trips. On average the 85 crashed riders who answered this question had been on 19 trips (SD=21), while the 141 never-crashed riders had undertaken 15 trips (SD=19). None of these comparisons resulted in significant differences between the groups.

There was also little difference between the groups for the types of trips undertaken in the previous month (see Table 7.3). Just over half of all trips undertaken by both groups was for on-road recreation. Trips in urban areas represented 47% of crashed rider trips and 73% of never-crashed rider trips, with 1% off-road for both groups and the balance in non-urban areas – and again the groups were not statistically significant.

Table 7.3 Purpose for trips undertaken by returned riders in previous month.

Trip purpose	Crashed	Never crashed	Overall
Commute	34%	30%	31%
On-road recreation	54%	55%	55%
Off-road recreation	4%	7%	6%
Work	1%	1%	1%
Other	7%	7%	7%
Total	100%	100%	100%

Respondents were asked approximately what percentage of their trips for the last 12 months had been within 50 kilometres of their home. The average percentage provided by crashed riders was 60% (SD=31%), while for non-crashed riders it was 53%. (SD=33%). The difference was not significant.

7.4 INCIDENTS & INFRINGEMENTS

The questionnaire asked how many near misses riders had been involved in during the last month. Most returned riders answered this question (85 out of 92 or 92% of crashed, and 136 out of 152 or 89% of never-crashed riders). On average crashed riders reported 1.9 near misses each while never-crashed riders reported 1.1 (SD=2.6 and 2.3 respectively). This difference was significant according to a between-groups t-test ($t(219)=2.4$; $p<0.05$).

Almost all respondents (242 out of 244) answered the question asking whether they had incurred a traffic infringement while riding a motorcycle in the last three years. On a relative basis, twice the proportion of the crashed group said they had infringed compared to the never-crashed group – 32% (29 riders) versus 15% (23 riders) respectively – and this difference was statistically significant ($\chi^2(1)=9$; $p<0.005$). They were then asked how many speeding and BAC-related infringements they had accumulated in the last one and three year period.

Speeders were more likely to offend twice than once, for both crashed and never-crashed riders. In the previous year 48% and 41% of crashed returned riders incurred two and one speeding infringements respectively, while for never-crashed returned riders it was 64% and 27% (see Table 7.4). The pattern was similar for infringements over the last three years. In total, in the previous year, 29 crashed returned riders amassed 49 fines (an average of 1.7 each, SD=0.7) and 22 never-crashed riders accumulated 41 fines (an average of 1.9 per rider, SD=0.7). Across the three-year period the differences evened out, with 28 crashed riders accumulating 66 infringements (an average of 2.4 per rider, SD=1.1) and 19 never-crashed riders accumulating 44 fines (an average of 2.3 per rider, SD=1.4). None of these differences were statistically significant.

Table 7.4 Percentage of returned riders incurring different numbers of speeding infringements over one- and three-year periods.

Number infringements	Crashed	Never crashed	Overall
		One year	
1	41%	27%	35%
2	48%	64%	55%
3	10%	5%	8%
4		5%	2%
Total	100%	100%	100%
		Three years	
1	25%	32%	28%
2	36%	37%	36%
3	21%	16%	19%
4	14%	5%	11%
5	4%	5%	4%
6		5%	2%
Total	100%	100%	100%

Twenty-six crashed returned riders committed one BAC offence in the last year and one rider committed two offences, compared with 22 never-crashed riders committing one offence each. Across three years 27 crashed riders accumulated 30 infringements (25 single, 1 double and 1 triple offence) and 23 never-crashed riders also committed 30 offences (20 singles, 2 double and 1 rider amassed 6 offences). These differences were not statistically significant.

Riders were asked to indicate what was the fastest speed (in km/h) they had ridden on a public road within the last 12 months and ever. The results are summarised in Table 7.5.

Table 7.5 Summary statistics for maximum speed ridden in last 12 months and ever by returned riders.

Statistic	Last 12 months		Ever	
	Crashed	Never-crashed	Crashed	Never-crashed
Min	70 km/h	80 km/h	105 km/h	95 km/h
Max	298 km/h	298 km/h	300 km/h	298 km/h
Mean	155 km/h	144 km/h	193 km/h	171 km/h
Median	140 km/h	135 km/h	187 km/h	170 km/h
Mode	120 km/h	120 km/h	200 km/h	200 km/h
Std Dev	45 km/h	39 km/h	52 km/h	44 km/h
Num responses	83	141	83	133

The claimed highest maximum speed for a public road for both crashed and never-crashed riders was 298 km/h for the last year and 300 km/h ever – high but within the realms of possibility. For both the last year and ever, crashed riders reported a higher mean maximum speed, and higher median (i.e. the speed at which 50% of responses are higher and 50% of responses are lower – the middle speed). The two groups claimed equivalent maximum mode for speed (i.e. the most common or popular speed). A pair of independent groups t-tests indicated that the difference between the rider groups was statistically significant for both the fastest speed in the last year ($t(222)=2$; $p<0.05$) and the fastest speed ever ($t(214)=3.3$; $p<0.005$).

7.5 SELF-ASSESSMENT OF RIDING SKILLS COMPARED TO PEERS

Two questions, in two blocks, asked respondents to consider themselves in comparison to other motorcycle riders of their age and gender. On a five-point Likert scale ranging from "much less likely" to "much more likely" riders were asked how likely they thought it was that they would be involved in an accident while riding their motorcycle on a public road within the next 12 months. Table 7.6 shows that while returned riders overall believe they are as likely as other riders to be involved in a crash, there is a clear skew with the balance of the responses falling on the less-likely-than-others side. Some differences between the two returned rider groups appear, but there is not a significant difference between the groups ($\chi^2(2)=0.5$; $p>0.05$). None of these comparisons produced any statistically significant differences.

Table 7.6 Self-reported likelihood of being involved in a crash compared with other returned riders of same gender and age.

Relative likelihood	Crashed	Never crashed	Overall
Much less likely	18%	21%	20%
Less likely	39%	29%	33%
Equally likely	42%	49%	46%
More likely	1%	1%	1%
Much more likely	0%	0%	0%
Total	100%	100%	100%

Four items were then presented using a seven-point Likert scale relating to riding skill and/or ability, again in relation to other riders of the same age and gender. The comparison between crashed and never-crashed returned riders for each item is shown in Table 7.7 (a-d). This comparison did not produce any statistically significant differences between the rider groups. Accordingly the following description relates to overall patterns, as shown in Figure 7.7.

Table 7.7 Relative comparison between own ability and that of matched others for controlling motorcycle (a), spotting hazards (b), getting out of hazardous situations (c) and anticipating what others will do (d) – returned riders.

a. Controlling the motorcycle

Controlling motorcycle	Crashed	Never crashed	Overall
Much better	7%	5%	6%
Better	12%	12%	12%
Above average	25%	21%	22%
About same	49%	53%	52%
Below average	7%	10%	8%
Worse	0%	0%	0%
Much worse	0%	0%	0%
Total	100%	100%	100%

b. Spotting hazards

Spotting hazards	Crashed	Never crashed	Overall
Much better	12%	12%	12%
Better	26%	18%	21%
Above average	39%	46%	43%
About same	22%	24%	24%
Below average	0%	0%	0%
Worse	0%	0%	0%
Much worse	0%	0%	0%
Total	100%	100%	100%

c. Getting out of hazardous situations

Getting out of hazards	Crashed	Never crashed	Overall
Much better	5%	5%	5%
Better	11%	15%	14%
Above average	34%	25%	29%
About same	42%	45%	44%
Below average	8%	10%	9%
Worse	0%	0%	0%
Much worse	0%	0%	0%
Total	100%	100%	100%

d. Anticipating what other road users are going to do

Anticipating	Crashed	Never crashed	Overall
Much better	17%	16%	16%
Better	28%	24%	26%
Above average	37%	41%	40%
About same	17%	18%	18%
Below average	1%	0%	0%
Worse	0%	0%	0%
Much worse	0%	0%	0%
Total	100%	100%	100%

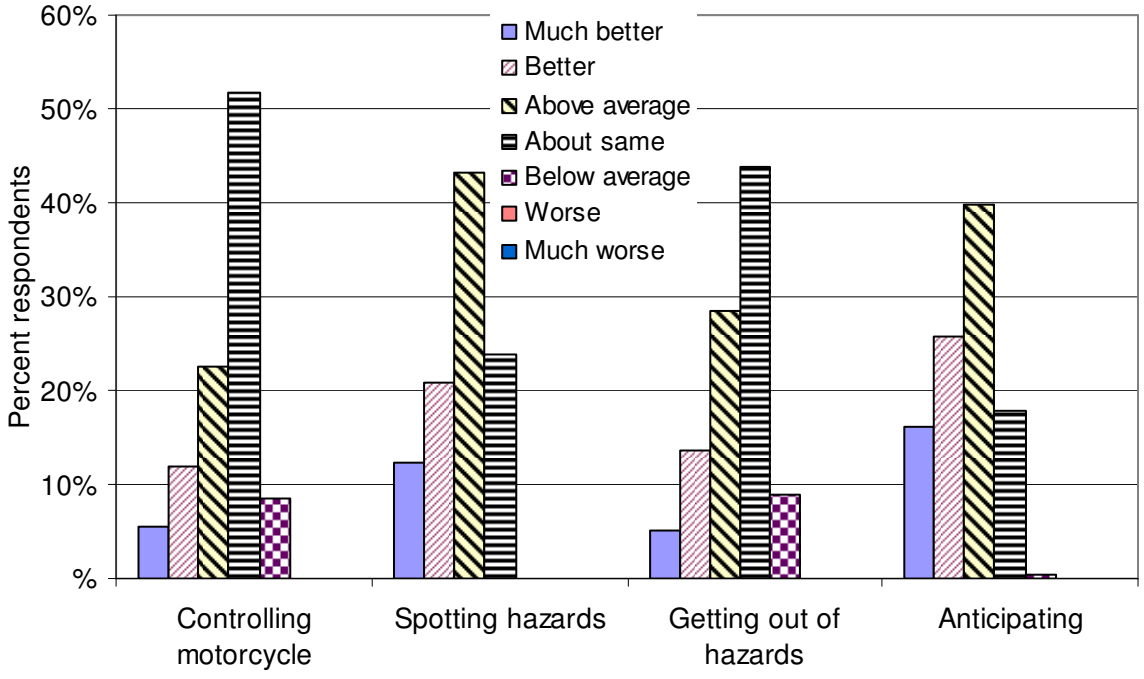


Figure 7.1 Overall self-reported ability ratings for returned riders relative to other riders.

As demonstrated by Figure 7.1, for each riding ability item few respondents thought they were in any way below average. In terms of controlling the motorcycle and getting out of hazardous situations, in both cases the largest block of respondents thought they were average. For both spotting hazards and anticipating the actions of others, the largest block considered themselves to be above average.

7.6 SELF-ASSESSED RIDING STYLE

Respondents were asked to consider the 12 statements listed below about their own riding style and decide how strongly they agreed or disagreed on a 7-point scale ranging from 'strongly agree' through 'neither agree nor disagree' to 'strongly disagree'.

- Inattentive rather than attentive
- Safe rather than risky
- Indecisive rather than decisive
- Experienced rather than inexperienced
- Nervous rather than confident
- Patient rather than impatient
- Responsible rather than irresponsible
- Careful rather than careless
- Slow rather than fast
- Intolerant rather than tolerant
- Irritable rather than placid
- Selfish rather than considerate

The 12 items are presented in two groups of six, with the groupings according to consistency in results. For the first group (Figure 7.2) respondents consistently and overwhelmingly indicated that they disagreed with the descriptors. All had negative connotations in terms of riding behaviours, except perhaps for the nervous-confident item. An overabundance of confidence has been linked to risky road user behaviour before, and so it might be expected that a safe rider should have a more balanced mix between confidence and nervousness, a pattern that could better have materialised with a higher percentage of riders indicating that they were more neutral about the item.

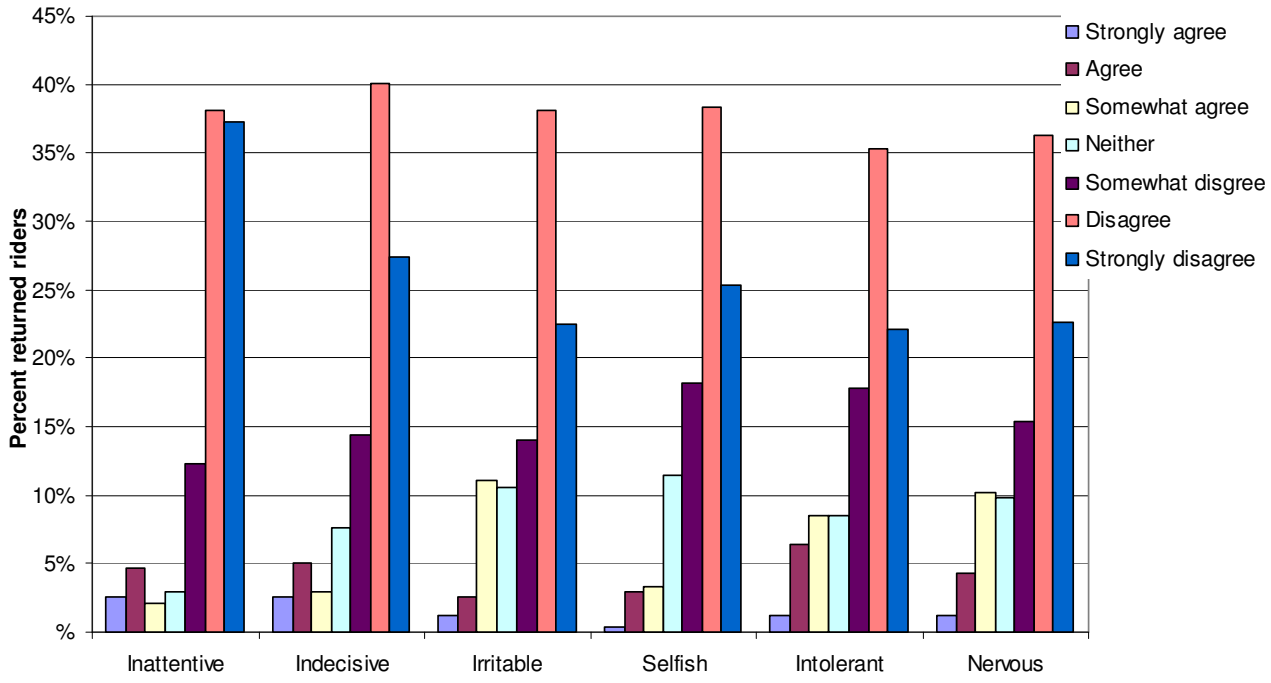


Figure 7.2 Level of agreement of returned riders as a whole to dichotomous descriptors of riding behaviour grouped for strong agreement.

The remaining six items are presented in Figure 7.3. Five of them show strong levels of agreement with the statements, each suggesting a safer rider. The final item – a slow versus fast rider – indicates a higher concentration of responses in the neutral region of the distribution.

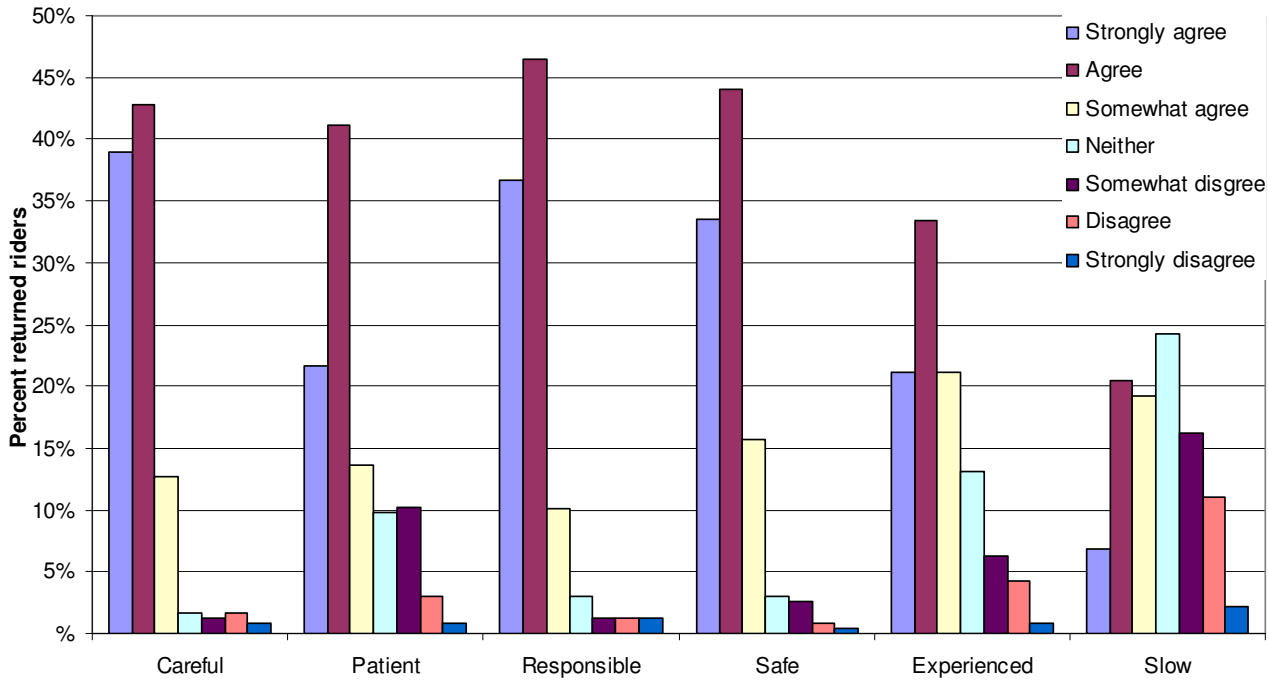


Figure 7.3 Level of agreement of returned riders as a whole to dichotomous descriptors of riding behaviour grouped for strong disagreement.

Table 7.8 shows that only two of the 12 items produced significant differences between the crashed and never-crashed returned rider groups. Crashed riders were more likely to strongly agree than never-crashed riders that their riding was 'experienced' rather than 'inexperienced' ($\chi 2(6)=17$; $p<0.01$) and to somewhat disagree that their riding was slow rather than fast ($\chi 2(6)=17$; $p<0.05$). Crashed riders in general seemed to rate themselves as faster, with consistently lower percentages for 'slow' and higher percentages for 'fast'.

Table 7.8 Returned rider comparison for two statistically significant riding descriptors.

a. Experienced rather than inexperienced

Experienced	Crashed	Never crashed	Overall
Strongly agree	33%	14%	21%
Agree	34%	33%	33%
Somewhat agree	17%	24%	21%
Neither	9%	16%	13%
Somewhat disagree	3%	8%	6%
Disagree	3%	5%	4%
Strongly disagree	0%	1%	1%
Total	100%	100%	100%

b. Slow rather than fast

Slow	Crashed	Never crashed	Overall
Strongly agree	4%	8%	7%
Agree	17%	23%	20%
Somewhat agree	21%	18%	19%
Neither	17%	29%	24%
Somewhat disagree	27%	10%	16%
Disagree	11%	11%	11%
Strongly disagree	3%	1%	2%
Total	100%	100%	100%

7.7 RIDING BEHAVIOURS

Respondents were asked to indicate on a 7-point Likert scale ranging from 'never' through to 'always' how often they had engaged in 35 behaviours while riding their motorcycle on the road in the past 12 months. Each behaviour related to either a hazardous or risky event that could be described as intentional (e.g. done a wheelie or stoppie) or unintentional (e.g. failed to notice another vehicle pull out in front of you), or the absence of a safe or protective action (e.g. checked the condition of your bike before setting out).

The propensity for respondents to choose extreme scores, coupled with the relatively low sample size, meant that in all but one comparison for the 35 items one of the requirements for using a chi-square test was violated – that cells do not contain an expected count of less than five. All items in this block were therefore recoded to a three point scale: 1- never, 2-occasionally (representing 2 and 3 on the original 7-point scale), and 3-regularly (accounting for 4-7 on the original scale) with the result that eight items produced significant differences between the groups, as shown in Table 7.8a-7.8h, below.

Table 7.9 Relative regularity of behaviours by returned riders over previous year for comparisons reaching statistical significance

a. Exceeded speed limit in residential streets

How often	Crashed	Never crashed	Overall
Never	20%	24%	23%
Occasionally	48%	59%	55%
Regularly	32%	17%	22%
Total	100%	100%	100%

b. Exceeded speed limit on rural roads

How often	Crashed	Never crashed	Overall
Never	10%	14%	12%
Occasionally	47%	60%	55%
Regularly	43%	26%	32%
Total	100%	100%	100%

c. Disregarded speed limit at night

How often	Crashed	Never crashed	Overall
Never	42%	61%	54%
Occasionally	42%	31%	35%
Regularly	16%	8%	11%
Total	100%	100%	100%

d. Raced away from the lights

How often	Crashed	Never crashed	Overall
Never	11%	24%	20%
Occasionally	40%	41%	41%
Regularly	48%	34%	39%
Total	100%	100%	100%

e. Skidded on wet road, manhole cover, etc

How often	Crashed	Never crashed	Overall
Never	32%	49%	43%
Occasionally	64%	42%	50%
Regularly	5%	9%	7%
Total	100%	100%	100%

f. Intentionally caught up to or kept up with another rider not met before

How often	Crashed	Never crashed	Overall
Never	47%	63%	57%
Occasionally	44%	32%	36%
Regularly	9%	5%	6%
Total	100%	100%	100%

g. Ridden too fast for the conditions

How often	Crashed	Never crashed	Overall
Never	32%	54%	46%
Occasionally	60%	43%	50%
Regularly	8%	3%	5%
Total	100%	100%	100%

h. Raced another rider or driver

How often	Crashed	Never crashed	Overall
Never	54%	65%	61%
Occasionally	36%	33%	34%
Regularly	10%	2%	5%
Total	100%	100%	100%

As seen in Table 7.8, just over half of all returned riders admitted to exceeding the speed limit on residential roads occasionally, and 22% did it on a regular basis. Returned riders who had crashed were more likely to regularly exceed the speed limit, while returned riders who had never crashed were more likely to do it only occasionally. The difference between the groups was statistically significant ($\chi 2(2)=7$; $p<0.05$). A similar pattern was evident for exceeding the speed limit on country/rural roads (including rural freeways), though the overall percentage of riders speeding in such locations was higher, with only 12% claiming to never do it, compared with 23% of riders who said they never exceeded the speed limit on residential roads ($\chi 2(2)=7$; $p<0.05$).

Crashed returned riders were significantly more likely than never-crashed returned riders to disregard the speed limit at night – both occasionally and regularly ($\chi 2(2)=8$; $p<0.05$). Just over half of all returned riders said they never disregarded the speed limit at night. An equivalent proportion of the two rider groups occasionally "raced away at traffic lights to be ahead of the

traffic", but crashed returned riders were significantly more likely to do it regularly – 48% versus 34% ($\chi 2(2)=8$; $p<0.05$).

Riders were asked how often they had "Skidded on a wet road, manhole cover, road markings etc". Just under half of the never-crashed group said such a thing never happened to them, while a third of the crashed group said never. Almost two-thirds of crashed riders had skidded occasionally versus 42% of never-crashed riders and the differences were significant ($\chi 2(2)=11$; $p<0.01$).

About a third of riders admitted to racing another driver or rider occasionally, with only minor difference between the two groups. Crashed riders, however, were much more likely to have done this on a regular basis ($\chi 2(2)=9$; $p<0.05$). There was also a significant difference between the two groups for the item "Attempted to keep up with other riders or drivers going faster than you" ($\chi 2(2)=6$; $p<0.05$). A higher percentage of crashed riders reported this behaviour both occasionally and regularly for the last 12 months - 63% of never-crashed riders never attempted to keep up, versus 47% of crashed riders.

Finally, half of all returned riders admitted that they had occasionally ridden too fast for the conditions in the last year, while 46% said they had not done so at all. Those who had never crashed were much more likely to say they had not ridden too fast, while the crashed group were more likely to report occasionally or regularly finding themselves in this situation.

While not all of the items posed to riders were related to speed (excessive and/or inappropriate), each of the items that demonstrated a statistical difference between the never-crashed and crashed returned rider groups were speed related. The items related to excessive and/or inappropriate speed for which differences between crash involved and never-crashed riders failed to reach significance were:

- Tried to break your own record for speed or time
- Open up the throttle to 'go for it' on a quiet road
- Ridden so fast into a corner that you scared yourself
- Attempted to keep up with other riders or drivers going faster than you.

7.8 MOTIVATIONS AND REASONS FOR RIDING

Respondents were asked to consider 14 items below, adapted from the MRMQ, in terms of their own motivations for riding. Respondents indicated their level of agreement along a 7-point Likert scale ranging from 'strongly agree' through 'neither agree nor disagree' to 'strongly disagree'. Each item was completed by 236 to 238 returned riders. Figures 7.4 and 7.5 show returned rider overall levels of agreement with the MRMQ items.

- I like the manoeuvrability of a motorcycle
- I get a sense of freedom when riding
- Riding is a good social activity
- When riding I feel I am one with my machine
- When riding I can feel the road
- When it is safe and I am not likely to be caught I like to open it up a bit
- I like accelerating rapidly
- I ride more cautiously than the average rider
- I would like to be a professional racer
- I take calculated risks when riding
- I like to ride hard
- I would like to ride on a road with no speed limits

- Riding is more fatiguing than driving a car

- Riding is risky

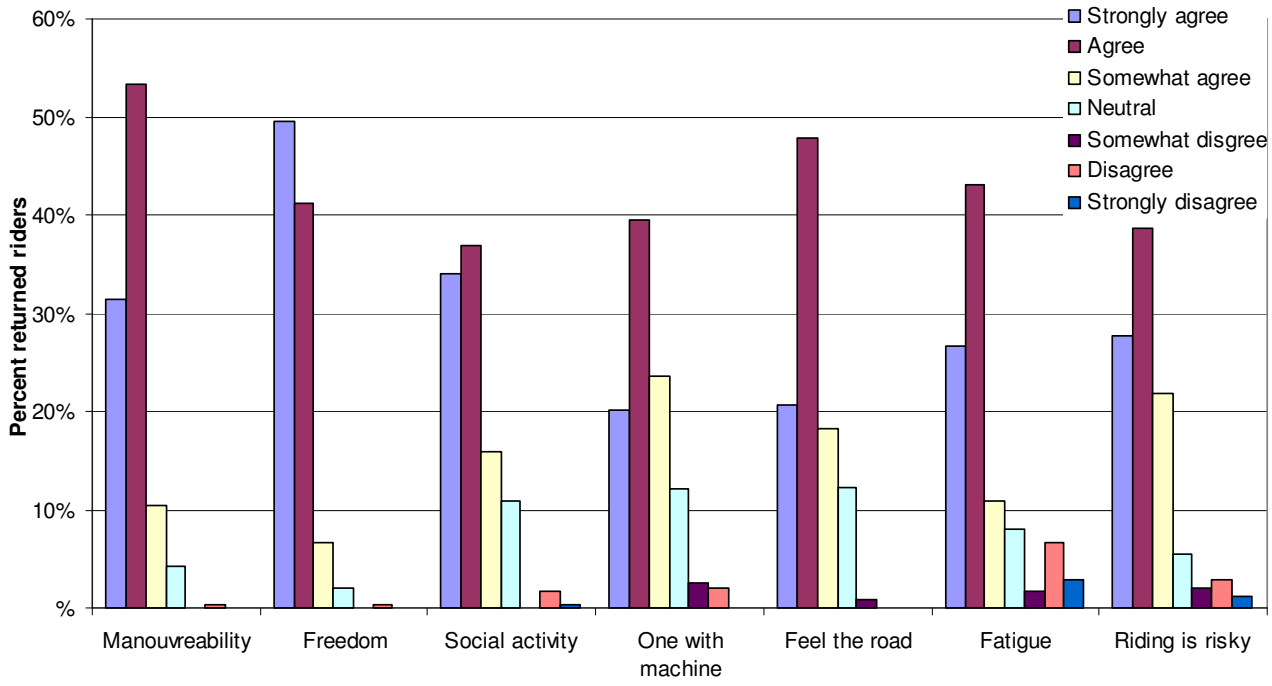


Figure 7.4 Levels of returned rider agreement with a variety of statements that infer reasons for riding.

As seen in Figure 7.4, there was strong agreement amongst returned riders that they liked the manoeuvrability and freedom of a motorcycle, that riding is a good social activity, that they can feel like "one with my machine" and that they can feel the road. Riders also strongly acknowledged that riding is more fatiguing than driving a car and that riding is an inherently risky activity.

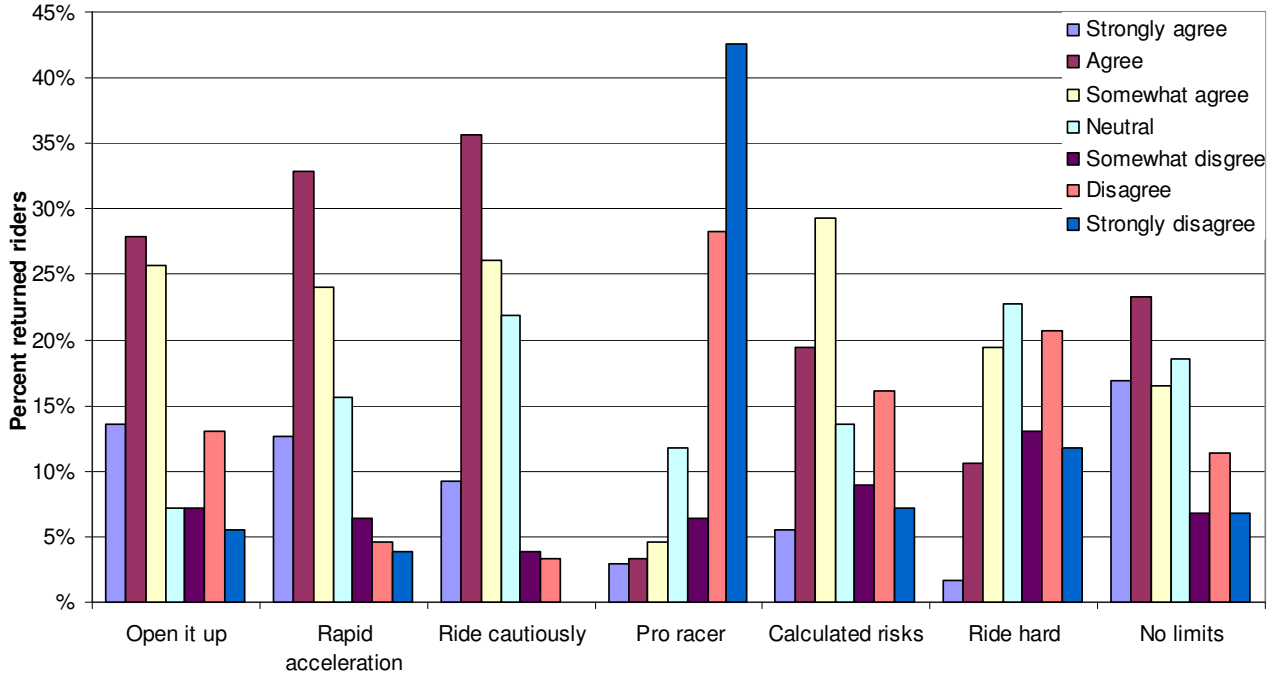


Figure 7.5 Levels of returned rider agreement with a variety of statements that infer reasons for riding.

The items contained in Figure 7.5 resulted in lower levels of agreement and thus higher levels of disagreement with the statements posed to the riders. Even so, in only one item did the level of disagreement outweigh the level of agreement – "I would like to be a professional racer". Further, only one item resulted in the level of 'neither agree nor disagree' (i.e. 'neutral') outweighing individual agreement and disagreement levels – "I like to ride hard". Consistent with the pattern present in Figure 7.4, returned riders logged high levels of agreement for "When it is safe and I am not likely to get caught I like to open it up a bit", "I like accelerating rapidly", "I take calculated risks when riding", and "I would like to ride on a road with no speed limits". Despite a penchant for the speed and risk of riding, there was also a high level of agreement for the statement "I ride more cautiously than the average rider".

The propensity for respondents to choose extreme scores, coupled with the relatively low sample size, meant that in most comparisons of rider motivation between crashed and never crashed riders, one of the requirements for using a chi-square test was violated – that cells do not contain an expected count of less than five. As for the earlier behavioural items, all items in this block were also recoded into a three point scale while maintaining the structure with one level of dis/agreement (respectively) and a neutral setting. The strongly agree and strongly disagree options (and the disagree counterparts) were combined and the two somewhat levels and neutral were combined.

As shown in Table 7.9, collapsing to a 3-point Likert scale resulted in three statistically significant differences. Compared to never-crashed returned riders, crashed returned riders were more likely to agree than disagree that "I get a sense of freedom when riding" ($\chi 2(2)=9$; $p<0.05$), "I like to ride hard" ($\chi 2(2)=8$; $p<0.05$), and "I like accelerating rapidly" ($\chi 2(2)=8$; $p<0.05$).

Table 7.10 Returned riders' motivations for riding for comparisons reaching statistical significance.

a. Sense of freedom when riding

	Crashed	Never crashed	Overall
Agree	9%	86%	91%
Neutral	2%	13%	9%
Disagree	0%	1%	0%
Total	100%	100%	100%

b. I like to ride hard

	Crashed	Never crashed	Overall
Agree	18%	8%	13%
Neutral	56%	55%	55%
Disagree	25%	37%	32%
Total	100%	100%	100%

c. I like accelerating rapidly

	Crashed	Never crashed	Overall
Never	56%	39%	46%
Occasionally	41%	49%	46%
Regularly	3%	12%	8%
Total	100%	100%	100%

7.9 PURPOSE OF RIDING – THEN AND NOW

Respondents were asked why they initially took up riding and what their current reason(s) was/were for continuing to ride. They were provided with 13 options to tick for initial and current reasons, and asked to choose three of them for each. Options included practical considerations, such as the ease of parking a motorcycle, to more personal reasons, such as the challenge provided by riding. Crashed riders provided 265 and 282 initial and current reasons for riding respectively, while never-crashed riders indicated 414 and 419 initial and current reasons respectively. The options are listed in Tables 7.10 and 7.11, ranked by overall popularity. The tables include separate rankings by popularity for crashed and never-crashed riders, the percent accounted for by each item, and the cumulative percentage.

Table 7.11 Reasons given by returned riders for initially taking up riding: percent responses, popularity rank, and cumulative percent.

Reason	Crashed			Never crashed			Overall		
	Rank	%	Cum %	Rank	%	Cum %	Rank	%	Cum %
Fun	1	22%	22%	1	27%	27%	1	25%	25%
Cheaper transport	2	17%	39%	2	16%	43%	2	16%	42%
Be alone	3	11%	50%	3	13%	56%	3	12%	53%
Social	6	7%	57%	4	11%	67%	4	10%	63%
Parking	5	9%	66%	5	7%	74%	5	8%	71%
Congestion	4	9%	75%	7	5%	79%	6	7%	77%
Challenge	9	4%	79%	6	6%	85%	7	5%	82%
It's cool	8	5%	85%	8	4%	88%	8	4%	87%
Rush	7	6%	90%	10	3%	91%	9	4%	91%
Feel the road	11	3%	93%	9	3%	94%	10	3%	94%
Speed	10	3%	97%	12	2%	96%	11	3%	96%
View of traffic	12	2%	98%	11	2%	99%	12	2%	99%
Workout	13	2%	100%	13	1%	100%	13	1%	100%

Table 7.12 Reasons given by returned riders for continuing to ride: percent responses, popularity rank, and cumulative percent.

Reason	Crashed			Never crashed			Overall		
	Rank	%	Cum %	Rank	%	Cum %	Rank	%	Cum %
Fun	1	24%	24%	1	28%	28%	1	26%	26%
Social	2	17%	40%	2	16%	43%	2	16%	42%
Be alone	3	12%	52%	3	14%	57%	3	13%	55%
Cheaper transport	4	9%	61%	4	11%	68%	4	10%	65%
Congestion	5	8%	70%	6	6%	74%	5	7%	72%
Parking	6	6%	76%	5	7%	82%	6	7%	79%
Feel the road	7	6%	82%	7	6%	88%	7	6%	85%
Challenge	8	6%	87%	8	5%	93%	8	5%	91%
View of traffic	10	4%	91%	9	3%	96%	9	3%	94%
Rush	9	5%	96%	10	1%	97%	10	3%	97%
Speed	11	2%	98%	12	1%	98%	11	1%	98%
It's cool	13	1%	99%	11	1%	99%	12	1%	99%
Workout	12	1%	100%	13	1%	100%	13	1%	100%

Accounting for between 22% and 28% of responses, the most common reason given by crashed and never-crashed returned riders for both taking up riding and continuing to ride is simply that it is "fun/enjoyable". The third most common reason for both groups for both initial and continuing is "the chance to be alone or independent". Somewhat contradictory, the second most common reason for continuing to ride for both groups was "the social aspect", which came sixth and fourth for crashed and never-crashed riders as the reason for taking up riding. The second most popular reason for taking up riding for both groups was that it is "cheap(er) transport", which ranks as fourth most common for continuing to ride for both groups.

7.10 OTHER FINDINGS

Respondents were asked "Approximately what percentage of accidents that involve a motorcyclist and a car driver do you think are the fault of the car driver?" Rather than simply providing a text box for the answer, a scale was employed to encourage respondents to consider the relative balance between the parties – marking the scale along the line provides a visual understanding of the relative weights that would be attributed to each party. The 11-point scale was marked in ascending tens of percentage from 0% car driver fault through to 100% car driver fault. The findings, displayed in Figure 7.6, show a consistent pattern amongst both crashed and never-crashed drivers, and indeed the two groups are equivalent from a statistical point of view. The most common answer, accounting for 25% of crashed rider responses and 27% of never-crashed rider responses, was the view that car drivers are responsible for 60% of motorcycle-car crashes. A total of 65% of crashed riders and 61% of new riders believe that car drivers are at fault in 60-80% of motorcycle-car crashes.

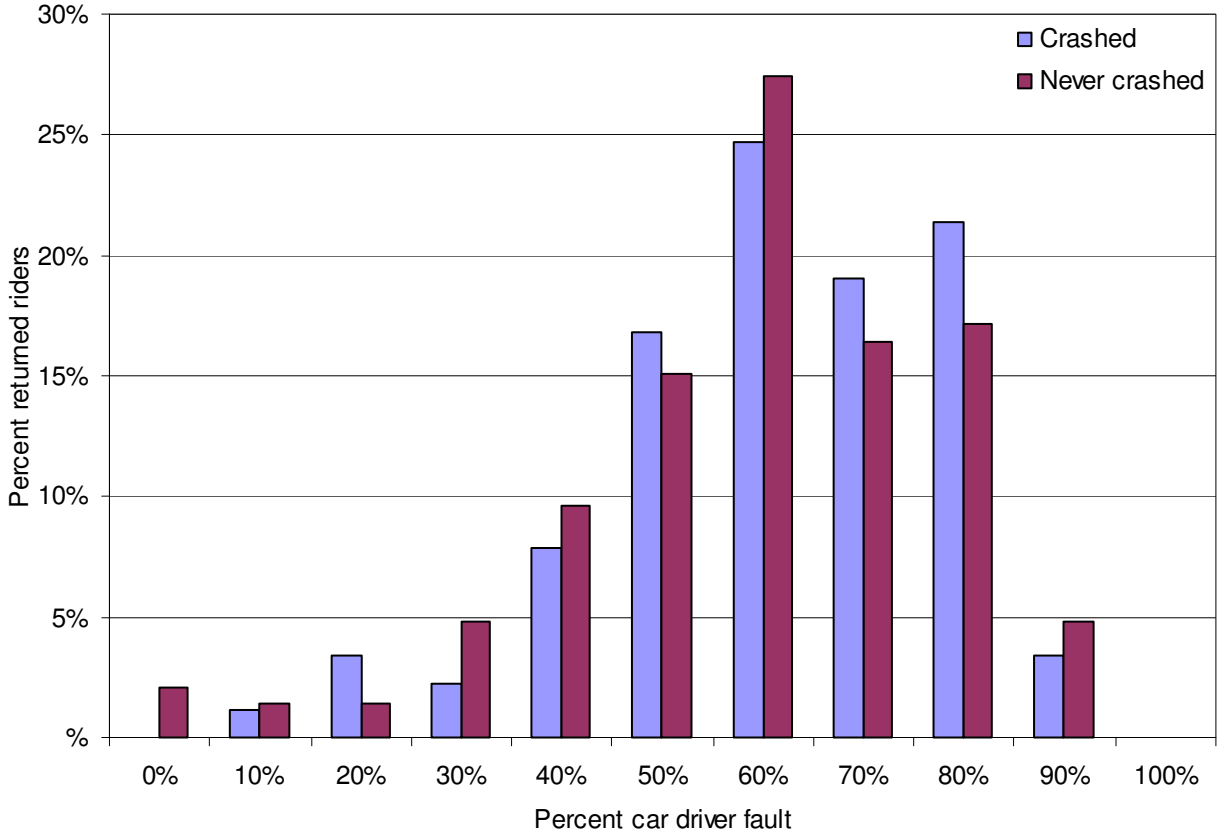


Figure 7.6 Fault attributed by returned riders to car drivers for crashes involving a motorcyclist and a car driver.

7.11 SUMMARY

Crash-involved returned riders did not differ significantly from never-crashed returned riders in terms of age, gender, licence status, completion of training, and purpose of trip in the last month. Crash-involved riders rode further per month and more frequently but the differences were not statistically significant.

On average crashed riders reported significantly more near misses over the last month than never-crashed riders (1.9 versus 1.1 - SD=2.6 and 2.3 respectively) and were twice as likely to incur a traffic infringement over the last three years (32% versus 15% respectively). Crashed riders also claimed a higher maximum riding speed than those who had never crashed for both their fastest speed in the last year (155 km/h versus 144 km/h respectively) and their fastest speed ever (193 km/h versus 171 km/h respectively). There were no differences between the groups in terms of the number of speeding and BAC-related infringements accumulated in the last one and three year periods.

7.11.1 Self-perceived likelihood of being involved in a crash in the next 12 months

While returned riders overall believe they are as likely as other riders to be involved in a crash, there is a clear skew with the balance of the responses falling on the less-likely-than-others side. No significant differences between crashed and never crashed riders were found.

7.11.2 Self-assessed perceptions of riding skills compared to peers of the same age and gender

When asked to rate their riding skill and/or ability in relation to other riders of the same age and gender, few respondents thought they were in any way below average. In terms of controlling the motorcycle and getting out of hazardous situations, in both cases the largest block of respondents thought they were average. For both spotting hazards and anticipating the actions of others, the largest block considered themselves to be above average. No significant differences between crashed and never crashed riders were found.

7.11.3 Self-assessed riding style

Riders were asked to consider 12 statements about riding style and indicate how strongly they agreed or disagreed with each one in terms of their own riding style.

Respondents consistently and overwhelmingly indicated that they disagreed with the descriptors inattentive, indecisive, irritable, selfish, intolerant, and nervous. Riders logged strong levels of agreement with the statements careful, patient, responsible, safe and experienced, each suggesting a safer rider. The item – slow versus fast rider – showed a higher concentration of responses in the neutral region of the scale.

Crashed riders were more likely to strongly agree than never-crashed riders that their riding was 'experienced' rather than 'inexperienced' and to somewhat disagree that their riding was slow rather than fast. Crashed riders in general seemed to rate themselves as faster, with consistently lower percentages for 'slow' and higher percentages for 'fast'.

7.11.4 Riding behaviours

Respondents were asked to indicate how often they had engaged in 35 behaviours while riding their motorcycle on the road in the past 12 months. Each behaviour related to either a hazardous or risky event that could be described as intentional (e.g. done a wheelie or stoppie) or unintentional (e.g. failed to notice another vehicle pull out in front of you), or the absence of a safe or protective action (e.g. checked the condition of your bike before setting out).

Just over half of all returned riders admitted to exceeding the speed limit on residential roads occasionally, and 22% did it on a regular basis. Returned riders who had crashed were more likely to regularly exceed the speed limit, while returned riders who had never crashed were more likely to do it only occasionally. A similar pattern was evident for exceeding the speed limit on country/rural roads (including rural freeways), though the overall percentage of riders speeding in such locations was higher, with only 12% claiming to never do it, compared with 23% of riders who said they never exceeded the speed limit on residential roads.

Crashed returned riders were significantly more likely than never-crashed returned riders to disregard the speed limit at night – both occasionally and regularly. Just over half of all returned riders said they never disregarded the speed limit at night. An equivalent proportion of the two rider groups occasionally "raced away at traffic lights to be ahead of the traffic", but crashed returned riders were significantly more likely to do it regularly – 48% versus 34%.

Just under half of the never-crashed group said they had "skidded on a wet road, manhole cover, road markings etc", while a third of the crashed group said they had never done this. Almost two-thirds of crashed riders had skidded occasionally versus 42% of never-crashed riders.

About a third of riders admitted to racing another driver or rider occasionally, with only minor difference between the two groups. Crashed riders, however, were much more likely to have done this on a regular basis. A higher percentage of crashed riders reported that they "attempted to keep up with other riders or drivers going faster than you" both occasionally and regularly over the last 12 months - 63% of never-crashed riders never attempted to keep up, versus 47% of crashed riders.

Finally, half of all returned riders admitted that they had occasionally ridden too fast for the conditions in the last year, while 46% said they had not done so at all. Those who had never crashed were much more likely to say they had not ridden too fast, while the crashed group was more likely to report occasionally or regularly finding themselves in this situation.

While not all of the items posed to riders were related to speed (excessive and/or inappropriate), each of the items that demonstrated a statistical difference between the never-crashed and crashed returned rider groups were speed related.

7.11.5 Motivations for riding

Respondents were asked to consider 13 items about their motivations for riding and decide how strongly they agreed or disagreed with each one in terms of their own riding.

There was strong agreement amongst returned riders that they liked the manoeuvrability and freedom of a motorcycle, that riding is a good social activity, that they can feel like "one with my machine", and that they can feel the road. Riders also strongly acknowledged that riding is more fatiguing than driving a car and that riding is an inherently risky activity.

Returned riders logged high levels of agreement for "When it is safe and I am not likely to get caught I like to open it up a bit", "I like accelerating rapidly", "I take calculated risks when riding", and "I would like to ride on a road with no speed limits". Despite a penchant for the speed and risk of riding, there was also a high level of agreement for the statement "I ride more cautiously than the average rider".

Compared to never-crashed returned riders, crashed returned riders were more likely to agree than disagree that "I get a sense of freedom when riding", "I like to ride hard", and "I like accelerating rapidly".

7.11.6 Reasons for riding

Accounting for between 22% and 28% of responses, the most common reason given by crashed and never-crashed returned riders for both taking up riding and continuing to ride is simply that it is "fun/enjoyable". The third most common reason for both groups for both initial and continuing is "the chance to be alone or independent". Somewhat contradictory, the second most common reason for continuing to ride for both groups was "the social aspect", which came sixth and fourth for crashed and never-crashed riders as the reason for taking up riding. The second most popular reason for taking up riding for both groups was that it is "cheap(er) transport", which ranks as fourth most common for continuing to ride for both groups.

7.11.7 Assignation of fault by the rider to the driver in motorcycle-car crashes

Respondents were asked "Approximately what percentage of accidents that involve a motorcyclist and a car driver do you think are the fault of the car driver?" The most common answer, accounting for 25% of crashed rider responses and 27% of never-crashed rider responses, was the view that car drivers are responsible for 60% of motorcycle-car crashes. A total of 65% of crashed riders and 61% of new riders believe that car drivers are at fault in 60-80% of motorcycle-car crashes. The differences between the crashed and never crashed groups were not significant.

In summary, compared to returned riders who had never crashed, **returned riders who had crashed**:

- reported more near misses over the last month

- claimed a higher maximum riding speed for both their fastest speed in the last year and their fastest speed ever
- were more likely to strongly agree that their riding was ‘experienced’ rather than ‘inexperienced’
- were more likely to somewhat disagree that their riding was slow rather than fast
- were more likely to regularly exceed the speed limit on residential and country/rural roads
- were more likely to occasionally and regularly disregard the speed limit late at night
- were more likely to regularly race away from traffic lights to be ahead of traffic
- were more likely to regularly race another driver or rider
- were more likely to occasionally skid on a wet road, manhole cover, road markings
- were more likely to have occasionally and regularly attempted to keep up with other riders or drivers going faster than them
- were more likely to have occasionally and regularly ridden too fast for the conditions
- were more likely to feel like they get a sense of freedom when riding
- were more likely to agree that they like to ride hard
- were more likely to agree that they like accelerating rapidly.

8.0 MOTORCYCLE RIDER SURVEY: DISCUSSION

8.1 REPRESENTATIVENESS OF THE SAMPLE

It is difficult to estimate a response rate for internet based surveys because the number of people who become aware of the survey but decide not to complete it cannot be known. Placing a counter on the website allows the number of times the site was accessed to be compared with the number of responses received, but this is problematic because a person may find out about the survey but not access the site, or they may access it more than once from different computers before completing it.

Respondents who decided they met the eligibility criteria outlined at the start of the survey were transferred to the explanatory statement page. A total of 2,630 unique page views were recorded for the explanatory statement and a total of 2,116 riders completed the survey. This is a relatively small percentage of the total readership of the magazines in which advertisements were placed (approximately 318,000 per issue for the two motorcycling magazines and about 1.4 million for the Victorian motoring magazine – though that magazine is primarily pitched at drivers rather than riders). While the response rate cannot be calculated, it is certainly lower than that obtained by Haworth et al. (2002) in their postal motorcycle survey of identified Victorian riders but higher than that obtained by Mulvihill and Haworth (2006) in their on-line motorcycle survey of Australian riders. When asked how they found out about the questionanire 44% of respondents indicated that they had seen the magazine advertising. It is not known how widespread were the other methods of advertising – publicity through a club or group (25% of respondents indicated they had heard about the survey through a club), word of mouth (17%), and on-line mentions (mostly forums – 12%). These four options accounted for 98% of responses.

The population of interest for this study was riders who held at least a motorcycle learner permit and had ridden on-road in Australia in the previous five years. An examination of the characteristics of respondents shows that there is an over-representation of riders from Victoria in the sample, reflecting the degree of local interest in the project and the recruitment of riders by means of the advertisement in the Victorian motoring club magazine. Using the same recruitment methods to those in the current study, Mulvihill and Haworth (2006) also found an over-representation of riders from Victoria.

It is not known whether the characteristics of riders in Victoria are different to those in other states. Riders in Victoria may be less likely to ride in remote areas given that Victoria is a relatively small and populous state. They may also be less likely to ride during the winter months than riders in warmer states. However, there is no available evidence to support these assumptions.

One approach to assessing the representativeness of the sample in this study is to compare the characteristics of the sample with those of the population. Unfortunately, there is no readily available information about the characteristics of the population of motorcycle riders. Age and gender characteristics are available for motorcycle licence holders in most states, but earlier research (Haworth, Mulvihill & Symmons, 2002) suggests that only about half of the older licence holders are riders (with an over-representation of males and younger people). Characteristics of crash-involved riders derived from crash databases further exaggerate the representation of males and younger riders.

8.1.1 Comparing the demographic characteristics with other studies

One method of assessing the representativeness of the sample in the current study is to compare it with other studies where the response rate was high and the data were considered representative. Haworth et al. (2002) obtained a response rate of 49% to a postal survey of Victorian motorcycle licence holders where the names and addresses were provided by the licensing authority.

In the current study, 49% of the 2,058 respondents who answered the question about rider type were continuing riders; 27% were new riders and 24% were returned riders. The proportions of riders in each group were not dissimilar to those found by Haworth et al. (2002). There were proportionally more continuing riders and fewer new and returned riders in the current study than in the survey of Victorian older riders (43%, 31%, 27%, respectively in Haworth et al., 2002). However, much of this discrepancy is likely to reflect the stratified sampling undertaken by Haworth et al. (2002) which was designed to over-sample licences issued recently (new riders) and to over-sample licences issued before 1985 (to boost the numbers in the older age groups).

Using a similar survey and recruitment methods to that of the current study, Mulvihill and Haworth (2006) obtained 1,500 responses to their on-line survey of Australian motorcyclists - 62% of which were submitted by continuing riders, 19% from new riders, and 17% from returned riders. The proportion of continuing riders was much smaller in the current survey (49%) whilst the proportions of new and returned riders were larger (27% and 24% respectively). The differences could be explained by several factors. One concerns the definition of returned riders. In the current survey returned riders were defined as those who 'got their permit/licence more than five years ago, rode for a while, then stopped riding for at least a year, then took it up again within the last three years'. In the earlier survey returned riders were defined as those who obtained their licence more than five years ago and who agreed with the statement 'I rode regularly when I first got my licence and then didn't ride much for a while and now have taken up riding again'. While both definitions stipulate that returned riders must have obtained a licence more than five years ago, the latest survey stipulates a time frame for the period of lapsed riding and the period since riding was taken up again. The definition change is unlikely to explain the higher proportion of returned riders found in the current survey since one might expect fewer returned riders given the more stringent requirement to have stopped riding for at least one year. Rather, the surge in the popularity of motorcycling in Australia in the past five years is probably more likely to account for the increase in the proportion of newly licensed and returned riders found in the latest survey. In addition, unlike in previous surveys, the current survey was not restricted to older motorcyclists aged over 25 who are less likely to be newly licensed than younger riders.

Despite the differences in the proportions of the samples that belonged to each group, the demographic characteristics of continuing, new and returned riders were similar to those reported by Haworth et al. (2002) and by Mulvihill and Haworth (2006). All three studies found that new riders were younger, more likely to be female and more likely to be single than other riders, whilst returned and continuing riders did not differ in terms of these characteristics.

The similarities between the demographic characteristics of respondents in this study and those of previous studies suggest that the sample in the current study was relatively representative.

8.2 CRASH INVOLVEMENT

Riders were asked how many crashes they had been involved in while riding their motorcycles on public roads in Australia. Overall, 58% of riders reported that they had been involved in at least one crash. This percentage is considerably higher than reported by Haworth et al. (2002) and Mulvihill and Haworth (2006) who found only 9% and 30% respectively had been involved in a crash. The higher crash involvement in the current study reflects both the longer time frame in which crash involvement was measured and the broader definition of a crash than used in previous studies. In the current survey respondents were asked to include all crashes they had ever experienced whereas in previous surveys crashes were restricted to those that occurred within the last five years. In addition, respondents in previous surveys were asked to include only those crashes in which someone was hurt, the Police were called, or a vehicle was damaged to the extent that it had to be taken away. In the current survey riders were simply asked whether they had had a

crash and so more non-injury/no damage crashes would have been included than in the previous samples.

8.2.1 Crash involvement in the last five years

In order to define the type of rider at the time of the crash rather than at the time of survey completion, crash involvement comparisons between rider types were restricted to crashes that occurred within the last five years. This restriction also enabled comparisons to be made with previous survey findings. Overall, 23.4% of riders had been involved in a crash in the last five years. This is higher than the nine percent reported by Haworth et al. (2002) and lower than the 30% reported by Mulvihill and Haworth (2006). It is not clear why crash involvement was lower in this study than in the Mulvihill and Haworth study, particularly given that the riders in this study rode further and more often in the past year. In the Mulvihill and Haworth study only about one-quarter of the riders rode less than 50 kilometres in an average week and about half rode between 51 and 100 kilometres per week. In the current study, almost half of the riders reported riding an average of more than 500km over the past month (about 125 kilometres on average per week).

The self-reported crash involvement of the three groups of riders differed significantly. New riders were more likely to be involved in a crash in the last five years than both returned and continuing riders, while the proportion of crash involved riders did not differ between continuing and returned riders (32.6% versus 20.6% and 18.6% respectively). These findings differ to those of previous surveys in which returned riders were less likely to crash than new and continuing riders. In the current study, one might expect the crash involvement of continuing riders to be higher than that found for returned riders given that they rode further and more often in the previous year, and would have ridden for all of the five year period in which crash involvement was measured. Returned riders rode less often and less distance in the past year than other riders and so most likely had less exposure to the risk of a crash. In addition, returned riders would have ridden for a maximum of only three of the past five years in which crash involvement was measured since the definition of a returned rider stipulated that the return to riding had occurred within the last three years.

In the current study, the proportion of crash involved new riders was similar to that found by Mulvihill and Haworth (2006) (about 30% in both). However, the proportions of crash involved continuing and returned riders were lower (35% and 24% respectively in the previous study versus 20.6% and 18.6% in the current study). It is not clear what explains this finding, particularly given that the definition of a crash in the current study included crashes that resulted in no injury to the motorcyclist and no damage to the motorcycle or other vehicle/s.

8.3 CRASH SEVERITY

Consistent with that reported by Mulvihill and Haworth (2006), riders most commonly suffered minor injuries (67% of all riders) and new riders were more likely to suffer minor injuries than both continuing and returned riders. Whilst returned riders were more likely to be seriously injured in the Haworth et al study, it was the continuing riders who were most severely injured in the current survey.

Consistent with previous research, the likelihood of being taken to hospital after a motorcycle crash steadily increased with age. The older average age of continuing and returned riders also probably contributed to their greater propensity to be seriously injured in the crash than new riders.

Not surprisingly, riders involved in crashes in rural environments were more likely to be severely injured than those who crashed in urban environments. Intersection crashes were more likely to result in a minor injury than non-intersection crashes as were crashes on curves (compared to crashes on straight sections of road).

8.4 CRASH TRIP VARIABLES

There were no differences between continuing, returned and new riders in terms of a number of key crash trip variables. The largest proportion of crashes occurred on weekends and when riding for recreation. Respondents were more likely to be riding in urban areas at the time of the crash and the largest proportion of crashes occurred on minor or major roads at locations away from intersections. An equal proportion of crashes occurred on straight and curved sections of road. Most riders suffered only minor injuries and were riding alone at the time of the crash (as opposed to riding with a group). The largest proportion of crashed riders reported that they had been riding for less than 15 minutes prior to the crash and between 11km and 50 km from home.

The larger proportion of crashes occurring on weekends and whilst riding for recreation likely reflects the high levels of recreational riding reported by all riders. Previous research has found that recreational riding is associated with twice the risk of riding for commuting or general transport purposes (Haworth et al., 1999). The larger proportion of crashes occurring in urban environments probably reflects a greater propensity for conflicts with other road users compared to rural environments.

The crash involvement profile of returned riders differed to that of new and continuing riders on a number of variables. Compared to other riders, returned riders were: more likely to crash in rural environments; less likely to crash in the winter months; and more likely to be riding as part of a group at the time of a crash even though they did not participate in group riding any more often than new and continuing riders. Both returned and continuing riders were more severely injured in crashes than new riders. Returned riders were involved in more pillion crashes than new riders (which could be explained, in part, by the pillion restrictions imposed on new riders) but less than continuing riders. Both continuing and returned riders were equally likely to crash on major and minor roads whereas new riders were more likely to crash on minor roads.

The crash profile of returned riders is consistent with their greater propensity to ride for recreational purposes and in rural environments compared to other riders; a finding also reported by Haworth et al (2002) and Mulvhill and Haworth (2006). The propensity for returned and continuing riders to be more severely injured in crashes possibly reflects both their older age and greater involvement in rural crashes where travel speeds are higher and the likelihood of serious injury outcomes is greater. Consistent with that found in previous research, new riders were more likely to ride and crash in urban environments which fits with their greater propensity to ride for commuting purposes.

8.5 CONTRIBUTORY CRASH FACTORS

Just over half of all crashes involved the motorcyclist only. New riders were much more likely to be involved in single vehicle crashes than other groups, suggesting that inexperience may have been a factor in their crashes. Although all riders were relatively experienced with the motorcycle prior to the crash, new riders were the least experienced, with just over half having acquired more than 5,000 kilometres compared to two thirds of returned riders and three-quarters of continuing riders. Only 63% of newly licensed riders were fully licensed at the time of their crash, indicating that a large proportion of this group had less than two years of total riding experience. Being young may have also been a contributing factor in new riders' crashes. New riders comprised a larger proportion of the youngest riders (aged 16-35) than continuing and returned riders, but even within the more experienced rider groups, young riders were more likely to crash than older riders.

For all riders, the most common factor that contributed to or caused their most recent crash was 'road features', including tram lines, road markings and pit lids. The top five factors - road features, distraction, bad weather, taking a bad line into a corner and excessive speed (either too fast for the conditions or exceeding the speed limit) together accounted for just over half of all

responses. Overall, about half of all responses related directly to 'rider actions' (or lack of actions). Both new and returned riders were slightly more likely to nominate rider factors, while continuing riders were more likely to identify 'external factors' (i.e. factors outside of the rider's control); however the differences between the groups were not statistically significant.

In crashes in which another party had been involved riders from all three rider groups claimed they had the right-of-way in between 90% and 93% of cases and there was no difference between the rider groups in this regard. Consistent with that found by Mulvihill and Haworth (2006); the largest proportion of riders assigned fault to another party; followed by 'my fault' and then a 50-50 share of the blame between self and other. Compared to continuing and returned riders, new riders were less likely to assign fault to the other party and more likely to assign fault to themselves. Returned riders took a larger share of the blame for the crash than continuing riders and were less likely to assign a 50-50 share of the blame to self and other. The propensity for continuing riders to take a smaller share of the blame than returned and new riders is also consistent with previous research – Mulvhill and Haworth found that continuing riders were more likely to report that there was nothing they could have done to avoid the crash than returned and new riders.

8.6 NEAR MISSES

Overall half of the riders who had ridden in the previous month reported no near misses. Eighteen percent of all three groups reported one near miss. New riders were most likely to report two near misses than continuing and returned riders while there was little difference between the latter two groups.

8.7 PARTICIPATION IN TRAINING

Overall, only 44 percent of respondents had ever undertaken a formal motorcycle rider training course. This is much lower than the 70% reported by Mulvihill and Haworth (2006) and about the same as that reported by Haworth et al. (2002). It is not clear what explains the differences between studies. In all studies the question about participation in training was worded in the same way. One might expect that respondents in the later studies would be more similar in terms of their participation in training. In the later surveys, the riders were probably more likely to be motorcycling enthusiasts because they found out about the study through reading motorcycling magazines and were relatively very active riders. In contrast the riders in Haworth et al (2002) found out about the study via a direct mail out to a random sample of licence holders, over 50% of whom were inactive riders (i.e. had not ridden in the previous year).

New riders were much more likely to have undertaken training than continuing riders who were in turn more likely to have undertaken training than returned riders (Sixty-two percent of new riders had undertaken a course compared with 39% of continuing riders and 33% of returned riders). The same pattern of results was reported by Mulvihill and Haworth (2006).

The type of courses most commonly undertaken were learner and licence courses, cited by 56% and 55% of all respondents. Not surprisingly, new riders were much more likely to have undertaken learner and licence courses than continuing and returned riders. The type of course most commonly undertaken by returned riders was a licence course. Continuing riders were most likely to have completed a refresher course, followed by returned then new riders. It is interesting to note that continuing, rather than returned, riders were more likely to have undertaken refresher training – a finding also reported by Mulvihill and Haworth (2006).

8.8 SKILL AND KNOWLEDGE DEFICIENCIES OF CRASHED RIDERS

Riders were asked how likely it is that they would be involved in an on-road crash compared to their peers within the next 12 months. While no differences between the rider groups were found, almost 40 percent of all riders thought they were less likely to be crash involved than their peers.

Riders were then asked to rate themselves against their peers in terms of four key riding skills: controlling the motorcycle, spotting hazards, getting out of hazardous situations, and anticipating what other road users are going to do. The proportions of riders who selected the categories 'above average' through 'better than average' to 'much better than average' were 50% for controlling the motorcycle, 55% for avoiding hazards; 75% for spotting hazards; and 80% for anticipating what other road users are going to do.

The results suggest that crashed riders more often than not perceive themselves as having better riding skills than their peers, and a substantial proportion believe they are less likely than their peers to be involved in a crash. This perception most likely reflects a misplaced level of confidence in performance since most riders cannot all be safer and more skilled than their peers. The tendency to over-rate one's own abilities and chances of positive outcomes compared to those of others refers to the psychological construct of unrealistic optimism (Weinstein, 1989) - a finding in the literature that has been observed in young novice drivers (Svenson, 1981; McKenna, 1993; Horswill, Waylen & Tofield, 2002) and also in both young and older motorcyclists (Rutter & Quinne; 1996; Symmons et al., 2007).

The riders in this study were more likely to rate themselves as average compared to their peers at perceiving rather than responding to hazards, including controlling the motorcycle. This finding is consistent with the proportions of below average ratings assigned to each of these skills - six and seven percent of all riders reported below average ratings for controlling the motorcycle and avoiding hazards respectively, compared to one percent each for spotting hazards and anticipating what other road users will do. Mulvihill and Haworth found the same pattern of results in their survey of older motorcyclists. A possible explanation for this finding is that a failure to respond is more noticeable to the rider than a failure to perceive (despite the fact that perception of a hazard is necessary in order to execute a response to it). As such, the riders in this study may be more realistic in their assessment of their own performance of action rather than perception skills.

When self-assessed ratings of skill were compared between the three rider groups, the results generally showed that continuing riders perceived themselves as more skilful than their peers, followed by returned and then new riders – a finding also reported by Mulvihill and Haworth (2006). The pattern of results is probably consistent with the level of experience of each group or, perhaps more importantly, the riders' perceived level of confidence in their riding abilities based on their experience. Although the total riding life experience of the groups is not known, continuing and returned riders, on average, had held a licence for longer than new riders (28.7 and 27.7 years respectively versus only 4.1 years for new riders) and would have had more opportunities to build on their riding skills and experience. While returned riders had ridden less than new riders in the past year, it was the new riders who were least confident in their abilities. Perhaps returned riders take into consideration their pre-break riding experiences when rating themselves against their peers, or more simply the total number of years they have held a licence regardless of the period of lapsed riding. It is also possible that new riders hold a more realistic perception of their skills because of their greater (and more recent) participation in rider training. In the absence of objective data it is difficult to assess the extent to which the differences reported here reflect real skill differences between rider groups. However, it is evident that not all of the riders in this study can be better than their peers. At least for the returned and continuing riders, the results probably reflect a misplaced level of confidence in riding ability.

For those tasks requiring a higher level of action rather than anticipation - controlling the motorcycle and avoiding hazards - returned riders rated themselves similarly to new riders, although the latter group consistently reporting the lowest ratings. For those tasks where anticipation is the primary skill – spotting hazards and anticipating what other road users are going to do - returned riders were more similar in their ratings to continuing riders, although the latter group generally reported lower ratings. The differences reported here are also likely to reflect differences in riders' self-perceived level of riding experience. As noted earlier, a failure to execute skills requiring an action rather than a perception are arguably more noticeable and so it is not surprising that the more experienced group – continuing riders – were relatively more confident in 'action related' skills compared to new and returned riders.

8.9 RIDING BEHAVIOURS OF CRASHED RIDERS

Respondents were asked to indicate how often they had engaged in 35 behaviours while riding their motorcycle on the road in the past 12 months. Each behaviour related to either a hazardous or risky event that could be described as intentional (e.g. done a wheelie or stoppie) or unintentional (e.g. failed to notice another vehicle pull out in front of you), or the absence of a safe or protective action (e.g. checked the condition of your bike before setting out).

The behaviours undertaken most commonly and on a regular basis by all crashed riders in the last 12 months were intentional speeding related behaviours: opening up the throttle and "just going for it"; exceeding the speed limit on residential streets (both registered by about one third of the respondents), and disregarding the speed limit at night (about one quarter of respondents). None of the other 35 items asked of riders exceeded 14% of the respondents on a regular basis. A further five intentional behaviours, also relating to excessive or inappropriate speeding, were exhibited occasionally by between 50 and 70% of riders (riding too fast for the conditions; riding sufficiently fast into a corner to scare oneself; attempting to keep up with riders or drivers who are travelling faster than the rider; exceeding the speed limit in residential streets; and almost losing control in a corner;). Four of the remaining 5 behaviours that occurred on an occasional basis were unintentional (i.e. lapses or errors) and the fifth behaviour was allowing mood to influence riding style or behaviour.

Excessive speed (e.g. Clarke, Ward, Bartl & Truman, 2004; Stephan, Symmons, Hillard, Bohensky, Muir & Lenne, 2008) and inappropriate speed (e.g., Clarke et al., 2004; Haworth et al., 1997; Stephan et al., 2008) are the most frequently cited factors contributing to motorcycle crashes in the literature (Horswill & Helman, 2001). Evidence for the role of speed in risk taking behaviours is also supported by the results of previous self-report surveys of motorcyclists. Using the same behaviour questions as those in the current study, Mulvihill and Haworth (2006) found 'speed related' risky behaviours or intentions occurred much more frequently than 'non-speed' related risky riding behaviours or intentions. Jamson et al (2005) obtained the same findings in a survey of older motorcyclists in the UK. In addition, riders in the current study nominated excessive speed (either too fast for the conditions or exceeding the speed limit) as one of the top five factors contributing to their crash.

Of the behaviours for which significant differences between continuing, returned and new riders were evident, continuing riders were more inclined to engage in intentionally risky behaviours and less likely to engage in safe or protective actions compared to other riders. They were also less likely to report making unintentional errors. New and returned riders were similar in their propensity for taking deliberate risks and engaging in safe/protective behaviours. New riders were more likely than both continuing and returned riders to make unintentional errors, while there was little difference between the latter two groups in terms of these behaviours.

8.10 ATTITUDES AND MOTIVATIONS OF CRASHED RIDERS

All three rider groups in this study were more inclined to agree than disagree that they had riding styles consistent with positive safety outcomes (experienced rather than inexperienced, responsible rather than irresponsible, safe rather than unsafe and slow rather than fast) and less inclined to agree than disagree that they had riding styles consistent with negative safety outcomes (inattentive rather than attentive; indecisive rather than decisive and nervous rather than confident). As for the self-assessed ratings of skills above, this pattern of results most likely reflects a misplaced level of confidence in riding performance since not all riders can be more safe than less safe all of the time.

A comparison of differences between the three groups showed that continuing riders were more likely to disagree with the negative descriptors of riding style - inattentive, indecisive and nervous, particularly compared with new riders. Both continuing and returned riders were more likely to agree that their riding style was experienced, safe and responsible compared to new riders. Some of these group differences may reflect the finding that continuing and returned riders, on average, had held a licence for longer than new riders. Although length of licensure does not correlate well with riding experience in motorcycling (i.e., many licence holders are not active riders), a longer period of licensure may be sufficient to create a perception that one is more experienced and therefore more skilled. This hypothesis would seem to fit with the finding that continuing, and to a lesser extent, returned riders were more likely than new riders to rate their riding skills as better than their peers.

About 75% of riders believed that their riding patterns, behaviours or attitudes had changed after their most recent crash. Compared to new riders, returned riders were less likely to say that their attitudes and behaviours had changed after their most recent crash but more likely to say that they had than continuing riders.

Previous motorcycle safety research has established that motivations for riding related to pleasure and excitement are associated with increased crash risk (e.g. Sexton et al. 2004) and that recreational riding is associated with twice the risk of riding for commuting or general transport purposes (Haworth et al., 1999). In the current study, respondents were more likely to agree than disagree that they are motivated to ride for reasons associated with recreation, self-expression and freedom. Specifically, riders were more likely to strongly agree that they get a sense of freedom when riding and that they like the manoeuvrability of a motorcycle, and to agree that riding is a good social activity; they like accelerating rapidly; they feel at one with their machine; they can feel the road; and riding is risky. No differences between the rider groups were found in terms of these motivations. Most riders agreed that riding is more fatiguing than driving a car, with new and returned riders being more likely to agree and strongly agree, and continuing riders being more likely to disagree.

8.11 SUMMARY OF DIFFERENCES BETWEEN RETURNED, NEW AND CONTINUING RIDERS

The proportions of crash involved returned and continuing riders did not differ significantly, but both were lower than that found for new riders.

The higher crash involvement for new riders could be explained by their younger average age and lower total years of riding experience. New riders comprised a larger proportion of young riders (aged 16-35) and the results showed that young new riders were more likely to crash than any other group, including young continuing and young returned riders. Although an accurate measure of exposure during the period in which crash involvement was measured is not available, 98% of continuing riders and 90% of returned riders held a full car and motorcycle licence at the time of the crash compared to only 60% of new riders. This means that 40% of the new riders held a

learner/restricted licence and thus would have had less than two years of total riding experience. Consistent with this argument, new riders reported a higher number of 'inexperience related factors' compared to continuing and returned riders: they were involved in the highest proportion of single-vehicle crashes; reported more near misses; were more likely to rate their performance on riding skills as below average and reported making more unintentional errors; were more likely to report being at fault in a crash; and had less experience with the motorcycle at the time of the crash. New riders appeared to take fewer intentional risks than both returned and continuing riders, but were less confident in their riding performance.

The self-reported crash involvement of returned and continuing riders did not differ significantly. One might expect the crash involvement of continuing riders to be higher given that they rode further and more often than other riders in the last year, and would have ridden for all of the five year period in which crash involvement was measured. Returned riders rode less often and less distance in the past year than other riders and would have ridden for a maximum of only three of the past five years in which crash involvement was measured since the definition of a returned rider stipulated that the return to riding had occurred within the last three years. This could suggest that the greater amount of riding experience accumulated by continuing riders makes them safer than returned riders despite having more opportunities for a crash. In line with this argument, continuing riders self-reported the lowest number of unintentional errors; more often reported having average or above average riding skills than their peers; had the most experience with the motorcycle at the time of the crash; and were involved in the lowest proportion of single vehicle crashes. In terms of their motivations for riding and propensity to engage in risky behaviours, continuing riders generally took more risks than either of the other two rider groups and were more confident in their riding abilities. It is not known whether the higher risk behavioural and motivational tendencies of continuing riders are an accurate reflection of their riding ability or contribute to their crash involvement.

Returned riders were less likely to undertake training than other riders and rode more often in circumstances associated with a higher crash risk, being more likely than others to ride for recreation and in rural environments; a finding also reported previously. The crash profile of returned riders would seem to fit with their riding patterns. They were more likely to crash in rural environments; less likely to crash in the winter months; and more likely to be riding as part of a group at the time of a crash. In terms of riding skills, the performance of returned riders generally fell in between that found for the new and continuing riders. There was a tendency for returned and continuing riders to perform similarly and better than new riders on perception related riding tasks and for returned and new riders to perform similarly and worse than continuing riders on action related riding tasks. In terms of their motivations for riding and propensity to engage in risky behaviours, returned riders were generally more risk averse than continuing riders, but less so than new riders.

8.12 COMPARISONS BETWEEN CRASHED AND NEVER CRASHED RETURNED RIDERS

In order to identify attributes of returned riders that might be amenable to intervention, returned riders who had crashed within the last five years were compared to returned riders who had never crashed. The primary variables used to make comparisons within the returned rider group were those that relate to attitudes and behaviours.

Comparisons between crashed and never crashed returned riders were also made in terms of self-perceived likelihood of being involved in a crash compared to peers and self-assessed riding skills compared to peers. No differences between the crashed and never crashed riders were identified for these comparisons. While returned riders overall believed they are as likely as other riders to be involved in a crash, there is a clear skew with the balance of the responses falling on the less-likely-

than-others side. In terms of riding skills, few respondents thought they were in any way below average. In terms of controlling the motorcycle and getting out of hazardous situations, the largest block of respondents thought they were average. For both spotting hazards and anticipating the actions of others, the largest block considered themselves to be above average.

Overall, the results showed that crash-involved returned riders demonstrated a greater propensity towards risky riding behaviours than returned riders who had never crashed. All of the behaviours for which statistically significant differences between the groups were found related to speeding, both exceeding the speed limit and riding too fast for the prevailing conditions. Crashed riders were also more likely to strongly agree than never-crashed riders that their riding style was fast rather than slow. Consistent with these findings, crashed riders claimed a higher speed than those who had never crashed for both the fastest speed they had ridden in the last year and the fastest speed they had ever ridden.

These findings do not appear to reflect exposure patterns or other demographic factors since there were no statistically significant differences between crash-involved and never-crashed riders in terms of age, gender, licence status, completion of training, and purpose of trip in the last month. Crash-involved riders rode further per month and more frequently but the differences were not statistically significant.

The results reported here do not indicate a causal link between crash involvement and speeding-related behaviour, but they do warrant attention. Previous motorcycle safety research has established a link between motorcycle rider crash involvement and speeding and stunt-type intentional risk-taking behaviours. Motivations for riding related to pleasure and excitement have also been associated with increased crash risk (Sexton et al., 2004). In the current study both crashed and never-crashed returned riders cited recreation as the main purpose of riding (a finding consistent with previous studies). However, crashed riders demonstrated a greater propensity towards motivations arguably associated with speeding related pleasure and excitement: ‘sense of freedom; ‘like to ride hard’ and ‘like accelerating rapidly’.

Riders who had crashed reported more near misses over the last month than those who had not crashed and were more likely to have incurred a traffic infringement over the previous three years. The contributory factors surrounding the near misses are not known in the current study. Previous research has found that unintentional errors are the biggest predictor of motorcyclist crash involvement and often occur in a violational context, with those displaying a liking for speed and/or a fast and risky riding style being more likely to commit such errors (Sexton et al., 2004). Despite the increased propensity for crashed riders to engage in risky speed related behaviours, no differences were found between the groups on speeding infringements in the last three years. However, a lack of detection does not necessarily indicate a lack of participation in speeding related behaviours.

If a crash provides a learning experience for riders then one might expect a more conservative risk profile from those who had crashed compared to those who had never crashed. However, the crashed riders in this study were either worse than those who had never crashed or statistically equivalent in terms of their risky riding attitudes and behaviours. There are several possible explanations for this finding. Insight from personal experience might be short-lived such that riders soon return to their habitual pre-crash “settings”, especially among those with an increased appetite for risk taking or thrill-seeking. As they gradually return to pre-event settings not being involved in another crash results in the risky behaviours and attitudes becoming self-reinforcing, particularly if the cause of the event is attributed to external and/or transitory factors. Another possible explanation is that the crashes in the current study were not sufficiently serious to engender a change or that riders stop riding altogether following a serious crash. In the latter case, non-current riders will not be sampled by any survey targeting riders, nor will those who were killed in a crash.

8.13 REFERENCES

Australian Bureau of Statistics, (2009). Catalogue No. 8146.0. Household Use of Information Technology, Australia, 2008-09. Released December 2009.

Clarke, D., Ward, P., Bartle, C. & Truman, W. (2004). In-depth study of motorcycle accidents. Road Safety Research Report No. 54. London: Department for Transport.

Guppy, A., Wilson, P. & Perry, J. (1989). Driving attitudes and driving experience. Paper presented to the International Symposium on Driving Behaviour in a Social Context, Paris, 16-18 May, 1989.

Haworth, N., Mulvihill, C. & Rowden, P. (2006). Teaching old dogs new tricks? Training and older motorcyclists. Paper presented at the Road safety Research, Policing and Education Conference. 26-28 October, Gold Coast, Australia (pp 315-320)

Haworth, N., Mulvihill, C. & Symmons, M. (2002). Motorcycling After 30. Report 192. Melbourne: Monash University Accident Research Centre.

Haworth, N., Smith, R., Brumen, I., and Pronk, N. (1997). Case control study of motorcycle crashes (CR174). Canberra: Federal Office of Road Safety.

Horswill, M.S., & Helman, S. (2001). A comparative approach to differential accident liability: Motorcyclists versus car drivers. In Grayson, G.B. (Ed), Behavioural Research in Road Safety: Eleventh Seminar. London: Department of Environment, Transport, and the Regions.

Horswill, M.S., Waylen, A.E. and Tofield, M.I. (2002). Drivers' illusions of superiority for hazard perception and vehicle control skill. In Marçal, S. (Ed.), Behavioural Research in Road Safety: Twelfth Seminar. London: Department of Environment, Transport, and the Regions.

McKenna, F. P. (1993). It won't happen to me: Unrealistic optimism or illusion of control? British Journal of Psychology, 84, 39-50.

Mulvihill, C., Haworth, N. A survey of the crash characteristics of older motorcyclists. Proceedings Australasian Road Safety Research, Policing and Education Conference, Wellington, New Zealand, 14-16 November, 2005.

Rutter, D.R., & Quine, L. (1996). Age and experience in motorcycling safety. Accident Analysis and Prevention, 28 (1), 15-21.

Sexton, B., Baughan, C., Elliot, M. & Maycock, G. (2004). The accident risk of motorcyclists. TRL Report. TRL 607. Crowthorne: Department for Transport.

Stephan, K., Symmons, M., Hillard, P., Bohensky, M., Muir, C. & Lenne, M. (2008). Characteristics of fatal motorcycle crashes involving excessive and/or inappropriate speed. Unpublished Report to VicRoads by Monash University Accident Research Centre.

Svenson, O. (1981). Are we less risky and more skilful than our fellow drivers? *Acta Psychologica, 47,* 143-148.

Symmons, M., Mulvihill, C. & Haworth, N. (2007). Motorcycle crash involvement as a function of self-assessed riding style and riding attitudes. Paper presented at the Road safety Research, Policing and Education Conference. 17-19 October, Melbourne, Australia.

Weinstein, (1989). Optimism biases about personal risks. Science, 246, 1232-1233.

9.0 ON-ROAD STUDY

9.1 INTRODUCTION

A number of previous studies have made comparisons between combinations of new, continuing and returned riders using surveys. By their very nature, self-report surveys suffer from the potential of inhibited or less than honest responses, although in the current project riders were willing to report a range of illegal behaviours and thus some confidence is warranted (see survey report chapter 8). Still, it is difficult to obtain (or be confident in) an accurate or realistically calibrated response from respondents for riding skills and behaviours that are habitual. For example, in the same way that most drivers and riders rate their on-road skills as above average, it is likely that most riders will rate items such as their own defensive riding behaviours, cornering and following distance as superior to other riders as well. Further, it would be difficult for a rider to properly assess such behaviours from the view of a third person in traffic. Simulator studies allow a greater degree of objectivity in assessing skills but suffer from a lack of realism – the motorcycle, the traffic, the environment, the hazards etc are all not real and thus assumptions must be made about how well behaviours approximate what would actually happen in the real world. Several authors have cautioned against the temptation to generalise simulator results to likely on-road skills and behaviours (e.g. Shahar et al, 2010).

In the current project riders were video-recorded as they negotiated an on-road circuit in real traffic. The footage was captured by an instructor following behind with a video camera attached to his protective eye wear. The on-road performance and the footage of that performance were then scored by instructors.

9. 2 METHOD

9. 2.1 Participants

The methods of recruitment for this component of the project included the distribution of fliers by training providers. Additionally, Honda dealerships were asked to target returned rider customers in particular with advertising fliers, and a number of online rider forums were also targeted. Most of the participants were obtained by recruiting through rider trainers.

In order to participate in the study participants were required to:

- Possess their own road-registered, roadworthy motorcycle
- Be legally entitled to ride on the road (i.e. be appropriately licensed)
- Possess appropriate protective equipment and clothing
- Be able to attend the HART base (Somerton in the northern suburbs of Melbourne)
- Be willing to have their riding video-taped by a following observer.

Forty-five licensed motorcycle riders participated – 15 newly licensed, 15 returned, and 15 continuing riders. A new rider was defined as one who held a motorcycle learner permit and had ridden at least 500 km on-road; a continuing rider had held a full motorcycle licence for at least five years and had ridden frequently and for a minimum of 20,000 km during this period; a returned rider had returned to riding within the last six months after having stopped riding for a period of five or more years. The returned rider was required to have ridden at least 20,000 km prior to taking a break from riding and no more than 500 km following their return to riding. The average age was 33 years (SD=13 years) for the new riders, 54 (SD=9) for the continuing riders, and 53 (SD=11) for the returned riders (see Table 9.1). Three participants were women – all in the new rider group. A statistical comparison of rider age (using an analysis of variance - ANOVA with

post-hoc comparisons) revealed that there was a statistically significant difference between the three groups ($F(2,42)=15.9$; $p<0.001$). Post-hoc testing (to identify where the differences lie) found that continuing and returned riders did not statistically differ from each other, but both groups were significantly older than the new riders.

Table 9.1 Summary age data statistics for the three rider groups

Age (years)	Rider type		
	New	**Continuing**	**Returned**
Minimum	19	38	39
Maximum	62	67	84
Mean	33.3	53.7	53.1
Standard deviation	13.2	9	11.3

9. 2.2 Materials

An experienced riding instructor ('Observer') followed each participant at a safe distance as they completed the on-road course. The Observer's riding goggles were fitted with a small video camera to record from their view point. A power pack and flash memory storage unit were carried by the Observer in a backpack. The camera – a VholdR Contour HD – was a high definition camcorder with a resolution of 1280 x 720, operating at 30 frames per second, with a 135 degree wide angle lens. The camera's dimensions were 95 x 53 x 34 mm with a weight of 116 grams. It was housed in a water resistant aluminium body.

A tool was devised for scoring the participant's performance on 14 characteristics of their riding (see Appendix 7), along with an overall safety score. Each item was assessed using a 10-point Likert scale ranging from 1 "Poor" through 5 "Average" up to 10 "Excellent". This instrument was devised in consultation with a panel of qualified and experienced rider trainers, tempered with by practical considerations for how it would be used. The 14 scoring items were:

- Speed control: Appropriate speed for conditions, limit not exceeded
- Lane position: Appropriate and safe position for single and dual carriageway, turning, intersections, etc, with visibility and vision to be taken into account
- Hazard perception and responding: Evidence of detection of actual and potential hazards with appropriate and proportionate responses/precautions in terms of action and response
- Braking: Timeliness, proportional and appropriate application, wheels not locked
- Buffering/survival space: Appropriate spacing from vehicles, infrastructure, and potential hazards
- Cornering: Approach and in-corner – speed, line, no under- or over-steer, appropriate braking and acceleration settings, head turns, planning
- Gap acceptance when crossing and entering traffic
- Appropriate following distance behind other vehicles
- Defensive riding: Read/anticipate other road user actions, identify situations early, with no sudden braking or swerving
- Bike control: Correct gear, head checks, mirrors, travels with traffic
- Overtaking: Planning, suitability, space, completion
- Turning position: defensive, manages road surface

- Signals: Communication of intent to others
- Confidence[1]: in riding ability.

1. Confidence is the extent to which an appropriately chosen action is able to be performed safely and without hesitation. It can be distinguished from misplaced confidence in which the rider believes that his or her abilities to perform a given action are better or worse than what they really are. The latter state can lead to risk taking and potentially unsafe outcomes. A score of ten out of ten on the confidence scale does not indicate that a rider is overconfident – rather it suggests that the rider is highly capable in executing an appropriately chosen action safely and without hesitation.

A copy of a scoring sheet can be found in Appendix 7.

9. 2.3 Procedure

After an initial briefing session, eligibility (in terms of experience, qualification to legally ride on public roads, etc) was confirmed by the Observer, followed by the collection of informed consent from the participant. The Observer checked the suitability of the participant's clothing and protective riding gear and the roadworthiness of the participant's motorcycle. The Observer reiterated the expectations for the session in terms of acceptable behaviour and the need to ride safely, but to try to ride in the manner in which the participant would normally ride. It was also made clear to participants that they could elect to cease the session at any time, and that the Observer too could terminate the session at any point due to safety concerns (regarding the participant, the instructor, or members of the public).

The participant then rode their motorcycle on the off-road training range so that the Observer could be satisfied regarding their basic skills and safety levels before venturing into traffic together.

Participants were shown a map of the route they would be asked to ride (see Figure 9.1). Set in the northern suburbs of Melbourne, the circuit included a range of traffic environments: several different speed limits and road types, and intersections with a variety of controls (traffic lights, stop signs, give-way signs, etc). In total the route was 16.1 km long. Peak traffic times were avoided.

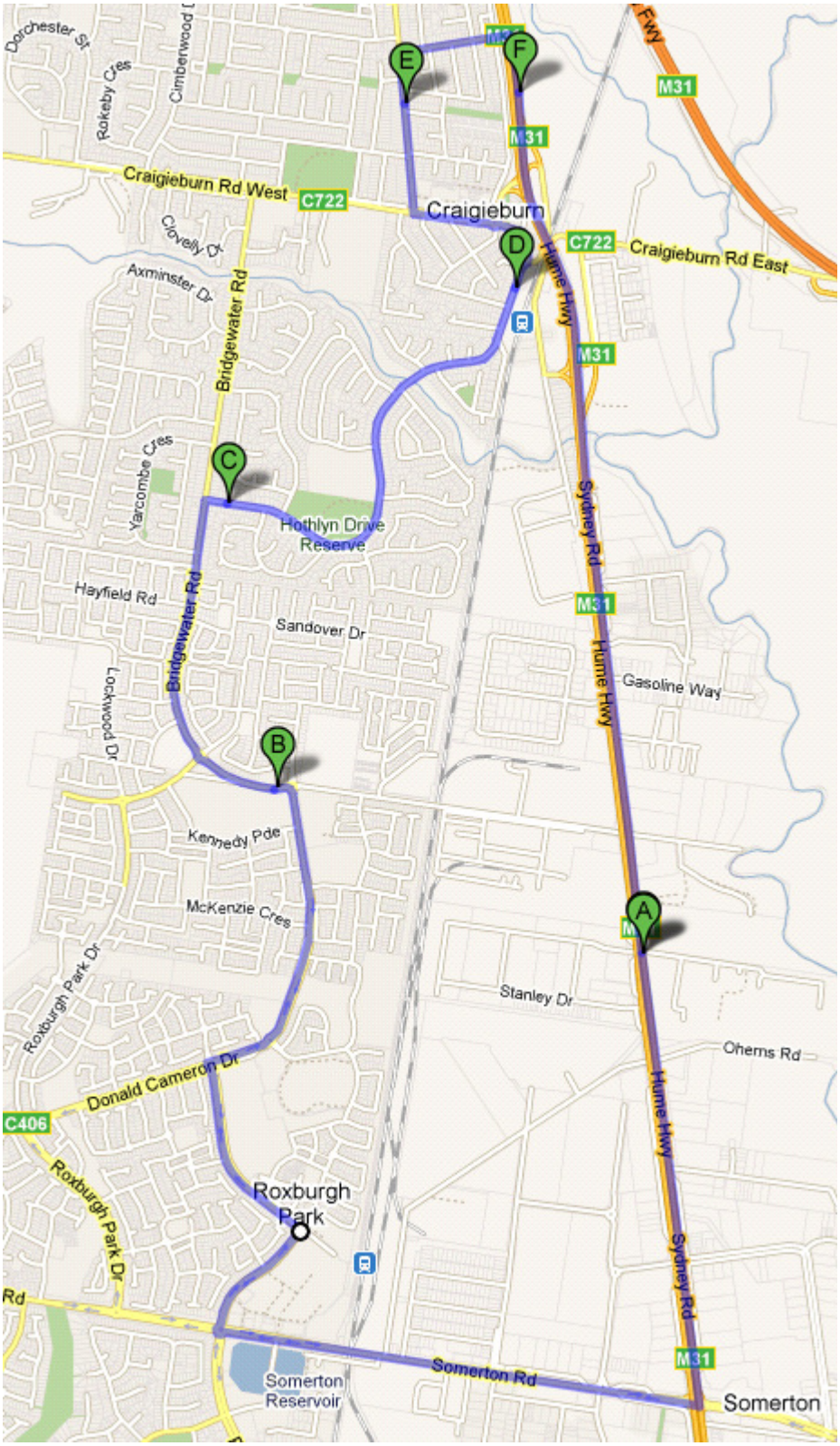


Figure 9.1 Route taken by the on-road participants

Participants completed the ride in segments. The instructor provided directions as needed to the rider via a radio link and they pulled over to the side of the road at one pre-determined point. The instructor provided no feedback to the participant at any time during the ride unless safety was a concern.

Completing a circuit of the test route took an average of 40 minutes. At the conclusion of the ride the Observer and participant independently completed the score sheet, which were then filed for later use. The Observer then provided some feedback to the participant and answered any questions regarding their riding.

After the video footage for all participants had been collected it was viewed in random order by two experienced instructors ('Raters'), neither of whom had been an instructor capturing the footage. The order of presentation was not the same for the two Raters and the Raters did not confer. These Raters scored the riders on 10-point scales for the same 15 items (14 variables plus an overall performance score). The Raters were blinded to rider type. The same two Raters scored the footage for all 45 riders. The first few minutes of video footage were not used for later scoring, allowing the rider some time to become used to being followed and to focus on the traffic rather than the assessment.

Thus there were four sets of data for each participant: from the Observer who followed the rider around the route, a set each from the two Raters who viewed the video footage, and a self-assessment from the participant.

9.3 RESULTS

9.3.1 Inter-rater comparisons

The scoring produced by the two Raters can be compared against each other since they carried out the task in the same way. They could make notes as the footage played, pause and rewind as necessary. The accompanying instructor had to rely on memory, completing their scoring at the conclusion of each ride. Table 9.2 lists the 14 scoring items and the overall safety rating in terms of the mean and standard deviation for each Rater, and whether their scoring was statistically different (a matched subjects t-test was used since the two raters were scoring the same footage).

Table 9.2 Mean scores assigned by video raters and differences between ratings (all participants)).

Item	Rater 1		Rater 2		Difference
	Mean	SD	Mean	SD	
Speed control	6.4	1.3	5.8	1.1	0.6*
Lane position	5.4	1.7	5.0	1.7	0.4
Hazard perception & responding	4.9	1.3	4.8	1.2	0.1
Braking	5.9	1.0	7.9	11.0	2.0
Buffering	5.3	1.6	5.0	1.4	0.2
Cornering	6.0	1.1	6.5	1.0	0.6*
Gap acceptance	6.1	1.1	5.9	1.4	0.2
Following distance	5.3	1.2	4.5	1.1	0.8*
Defensive riding	5.5	1.7	6.3	1.5	0.8*
Bike control	6.0	1.6	6.2	1.2	0.2
Overtaking	5.5	1.2	6.0	1.4	0.6
Turning position	6.2	1.2	6.2	1.0	0.0
Signals	7.0	1.0	6.1	1.1	0.9*
Confidence	6.3	1.8	6.6	1.2	0.3
Overall performance	6.3	1.5	5.9	1.3	0.4

*asterisks indicate statistical significance

Table 9.2 demonstrates that the scores assigned by the two Raters were not substantially different. A series of matched subjects t-tests indicated that five out of the 15 rating items produced a statistically significant difference between the raters. On the ten-point rating scale only one item exhibited a difference greater than one interval – for braking. As the differences between the rater's scores were not substantial the scores were averaged to contribute a single rating score for each item and were used in the analyses that follow.

9.3.2 Skill and behavioural differences as a function of rider type

Tables 9.3 to 9.5 display the comparisons between rider types for each of the 14 rating items plus the overall performance rating (renamed in the table as Overall (score)). Table 1 contains Observer's mean scores, Table 2 the averaged Rater's scores, and Table 3 the self-assigned scores from the participants. The tables also include a mathematical overall mean (Overall (mean)) calculated as the average of the 14 separate scores for comparison against the Overall (score) value.

Each table also includes an “inter-group comparison” column, which identifies significant differences between any of the three combinations of paired comparisons between the rider groups (N=new rider, C=continuing rider and R=returned rider). This data was analysed using a one-way ANOVA with LSD pair-wise comparisons to test for significant differences between the groups.

Table 9.3 Mean rating scores assigned by the Observer for the three rider types and significant differences between rider types (N=new rider, C=continuing rider, R=returned rider)

Instructor	New	Continuing	Returned	Overall	Inter-group comparison
Speed control	5.6	7.3	6.9	6.6	N<C, N<R
Lane position	4.3	5.1	5.0	4.8	
Hazard perception & response	4.9	6.7	6.5	6.0	N<C, N<R
Braking	5.2	7.0	7.3	6.5	N<C, N<R
Buffering	4.0	5.3	5.6	5.0	N<C, N<R
Cornering	5.1	6.9	5.9	6.0	N<C, R<C
Gap acceptance	6.0	7.3	7.5	6.9	N<C, N<R
Following distance	5.3	6.1	6.9	6.1	N<R
Defensive riding	5.0	7.4	7.1	6.5	N<C, N<R
Bike control	5.2	7.1	7.2	6.5	N<C, N<R
Overtaking	4.6	6.8	6.0	6.1	N<C
Turning position	5.2	6.7	6.1	6.0	N<C
Signals	5.5	7.3	7.0	6.6	N<C, N<R
Confidence	6.4	7.9	7.4	7.2	N<C, N<R
Overall (mean)	5.2	6.8	6.6	6.2	
Overall (score)	5.1	6.8	6.6	6.1	N<C, N<R

As shown in Table 9.3, across all 14 rating items the Observer consistently assigned new riders the lowest score out of 10. There was no particular discernable consistent pattern, however, as to which group received the second-highest score across the items. Significant inter-rider group differences were found for 13 of the 14 items – only the lane position item did not deliver a statistically significant difference between groups. For 11 items the new rider group scored significantly lower than the continuing rider group (N<C), for 10 items the new rider group scored significantly lower than the returned rider group (N<R), and in only one instance the returned rider group scored statistically lower than the continuing rider group (R<C) – for cornering.

The maximum difference between the groups across the ratings (i.e. the largest spread between the lowest and highest mean rating for any one item) was 2.4 for defensive riding. The minimum difference between the groups was 0.9 for lane position. The mean of all the differences was 1.7.

For overall performance as rated by the Observer (overall (score)) the new rider group again scored the lowest of the three groups, and scored significantly lower than both the continuing and returned rider groups. Taking a mathematical mean of the 14 items (overall mean) results in a set of overall means (across rider group) almost identical to the overall performance score across the three groups.

With possible scores ranging from 1 to 10 the middle score is 5.5. With the assumption that these scores probably conform to a normal distribution a score of 5.5 could be considered "average". New riders scored less than 5.5 in 11 of the 15 scores, and 5.5 and 5.6 in two others. The continuing riders scored less than 5.5 for two items – lane position and buffering. Returned riders scored a mean of less than 5.5 for only one item – lane position. The overall mean across all three groups (i.e. row, or item, mean) was less than 5.5 for two items – lane position (4.8) and buffering (5.0).

The lowest mean score for the new rider group was 4.0 out of 10 for buffering. For continuing and returned riders it was 5.1 and 5.0 respectively, in both cases for lane position. For all three groups the highest score was obtained for confidence: 6.4, 7.9 and 7.4 for new, continuing and returned riders respectively (though the difference between continuing and returned riders was not statistically significant).

Table 9.4 Mean rating scores assigned by the video raters for the three rider types and significant differences between rider types (N=new rider, C=continuing rider, R=returned rider)

Video raters	New	Continuing	Returned	Overall	Inter-group comparison
Speed control	6.0	6.2	6.1	6.1	
Lane position	5.7	5.0	4.9	5.2	
Hazard perception & response	4.5	4.7	5.0	4.7	
Braking	5.6	5.9	8.7	6.6	
Buffering	5.3	5.2	5.1	5.2	
Cornering	6.2	6.2	6.3	6.3	
Gap acceptance	5.9	6.0	6.2	6.0	
Following distance	4.6	4.9	5.2	4.9	
Defensive riding	6.0	6.0	5.9	5.9	
Bike control	5.5	6.4	6.4	6.1	N<C, N<R
Overtaking	3.7	4.8	4.2	4.3	
Turning position	6.1	6.2	6.4	6.2	
Signals	6.1	6.9	6.7	6.5	N<C
Confidence	5.9	6.9	6.6	6.5	N<C
Overall (mean)	5.4	5.7	5.9	5.7	
Overall (score)	5.6	6.5	6.3	6.1	N<C

Table 9.4 contains the combined ratings ascribed by the Raters who rated the riders on the basis of the video footage taken by the Observer instructor. Here the groups were rated more similarly, with only five statistically significant differences between them. Those differences were for bike control, for which new riders scored statistically lower than both the continuing and returned riders; and signals, confidence and overall performance, where in each case new riders scored statistically lower than continuing riders.

While the other items did not result in statistical differences, the trend was for new riders to score lower, with that group obtaining the lowest scores for 11 items. The maximum difference between the groups was larger for this data than for the Observer scoring – up to 3.1 for the braking item – but the average difference between the groups across all items was only 0.7.

In contrast to the Observer scores, the Rater differences between the two sets of overall score (mean – average of ratings, score – assigned overall score) were more marked. Across all three groups the calculated average was lower than the assigned score. Again the new riders returned the lowest scores for both overall measures, though only the new versus continuing rider comparison was statistically significant.

New, continuing and returned rider groups all scored less than 5.5 for hazard perception and responding, buffering, following distance, and overtaking. In addition, the continuing and returned rider groups scored less than 5.5 for lane position.

Table 9.5 Mean self-rating scores assigned by rider participant for the three rider types and significant differences between rider types (N=new rider, C=continuing rider, R=returned rider)

Participant self-rating	New	Continuing	Returned	Overall	Inter-group comparison
Speed control	7.1	6.7	7.4	7.1	
Lane position	6.9	7.0	6.7	6.9	
Hazard perception & response	7.1	7.1	7.2	7.1	
Braking	7.7	7.4	7.4	7.5	
Buffering	7.8	6.8	7.2	7.3	
Cornering	6.5	6.8	6.6	6.6	
Gap acceptance	7.2	6.6	7.2	7.0	
Following distance	7.3	6.7	7.4	7.1	
Defensive riding	7.7	7.4	7.2	7.5	
Bike control	7.6	7.2	7.2	7.3	
Overtaking	7.1	7.1	6.9	7.0	
Turning position	7.0	7.2	6.8	7.0	
Signals	7.5	7.2	7.6	7.5	
Confidence	7.2	7.3	7.3	7.3	
Overall (mean)	7.3	7.0	7.2	7.2	
Overall (score)	7.4	7.4	7.5	7.5	

Each participant was asked to rate their own performance in completing the circuit using the same score sheet as that used by the Observer and the Raters. As seen in Table 9.5, this data yielded no significant differences between the groups. The average difference between the lowest and highest scores across all items was only 0.4, somewhat less than the difference of 0.7 for the video ratings and 1.7 for the Observer ratings. The riders across all three groups tended to rate their own performance higher than the Observer did, as demonstrated by the higher overall scores for each rider group in a comparison between Tables 9.3, 9.4, and 9.5. Averaging all scores within each table produces a mean of 6.2 for the Observer ratings, 5.7 for the video ratings, and 7.1 for the self-ratings. None of the self ratings across all three groups dipped below the mid-line of 5.5 – in fact the lowest mean rating for new riders was 6.5 for cornering, for continuing riders it was 6.7 for speed control, and for returned riders it was 6.6 for cornering.

9.3.3 "Safe riding score"

The fourteen scoring items account for a range of safe and appropriate riding behaviours and skills, but they may not be equally important. In consultation with the rider trainer panel the items were scored out of ten so that they could be weighted and combined to form an overall safe riding factor. Table 9.6 lists the items and their score out of ten. The Safe Riding Score (SRS) is the simple addition of each of the factors in Table 9.6 multiplied by their weighting factor (score). Thus SRS=1xHazard score + …0.8xBuffering + …0.7xSpeedControl +… All of the items are important, but those weighted as more important apply in particular to avoiding a crash.

The rider trainer panel began this task by ranking the items and then using the weightings to differentiate levels. 'Hazard perception & responding' and 'Defensive riding' were considered the most and equally important because they are really super ordinate factors that take in a collection of other items. Full and proper attention to these facets will ensure that a rider does not find him/herself in a situation in which a crash might occur. Those two items and the next two – Buffering and Lane position – determine whether the rider has put him/herself in a situation in which another vehicle might 'cause' the rider to crash (though this does not suggest that the rider is not without blame of course).

The next six items were all weighted at 0.7. They can be considered to apply once the rider has entered or is about to enter a dangerous situation and determine whether the rider will manage to negotiate the situation or be 'undone' by it. The final four factors rated at 0.6 are a more loose collection of factors that are important but not as important as the ones that preceeded them in the list.

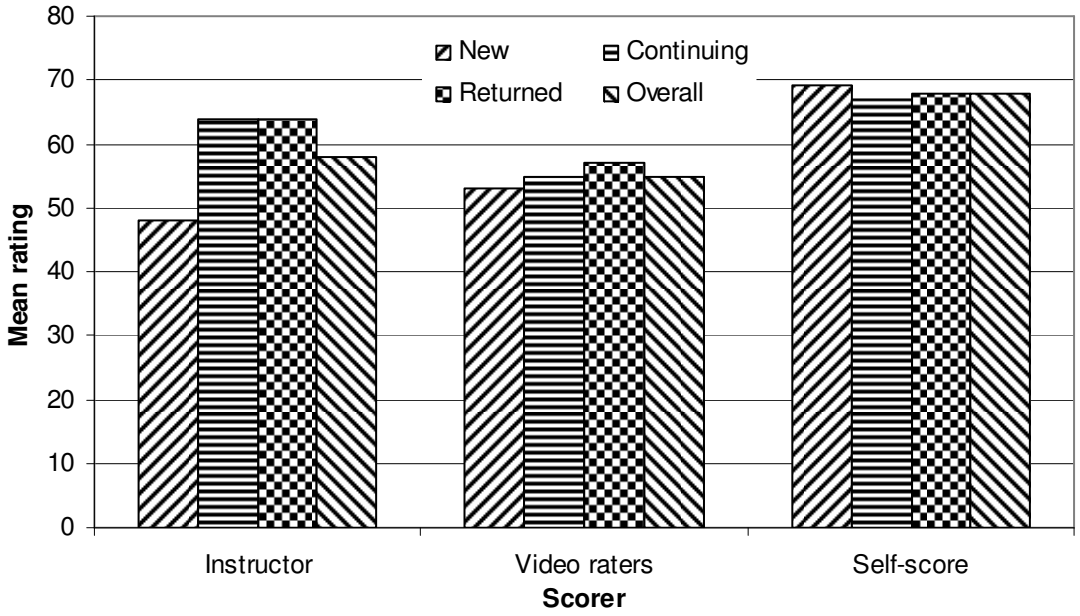
There are of course other rationales that could be used to re-weight the items in Table 9.6. For example, if "Speed control" was instead re-cast as "Appropriate travel speed" rather than *control* of the motorcycle's speed (regardless of what that speed was) then it would receive a higher weighting. Good control of speed relates to maintaining a consistent speed or achieving a smooth transition from one speed to another (e.g. from stationary to the speed limit), both things that can be observed by the instructor. Likewise, here the "Braking" factor again relates to smoothness of braking rather than how well the rider can brake in an emergency situation – the latter could not be observed for each rider during the test ride, but the former could be assessed. If this item related to emergency braking prowess then clearly it would be accorded a higher rating. When designing the study the items were determined on the basis of what could be observed and scored both by the Observer and the Raters.

Table 9.6 Expert scores for rider rating items in terms of importance for safe riding.

Item	Score (/10)
Hazard perception & responding	10
Defensive riding	10
Buffering	8
Lane position	8
Speed control	7
Cornering	7
Gap acceptance	7
Following distance	7
Bike control	7
Overtaking	7
Turning position	6
Signals	6
Braking	6
Confidence	6

Figure 9.1 contains the mean safe rating scores for each of the rider groups calculated using the Observer data, the Rater data, and the participant self-scoring data. Only the Observer data produced a statistically significant difference between the three rider groups ($F(2,38)=17.5$; $p<0.001$): the continuing and returned rider groups were equivalent, but both scored significantly higher than the new riders . Overall, the scores from the Observer do not seem particularly different from those of the Raters, however the participants self-rated themselves somewhat higher.

Figure 9.1 - Mean safe riding score for each rider group for each scoring method



9.3.4 Other analyses

Participants were asked whether they had crashed while riding on the road within the last year. Only three riders – one new and two continuing riders – indicated that they had crashed, too few to conduct any analyses on this variable. With three females – all new riders – gender is also not a useful variable for further analysis. All of the returned and continuing riders had a full licence, while 14 of the new riders had a learner permit and one had a probationary licence. Ranging from 1965 to 2009, there was no particular pattern to when riders obtained their licence (except for the new riders, most of whom qualified for their learner permit in 2009).

Two new, three continuing and six returned riders indicated that their riding was all or mostly rural. Nine new, six continuing and five returned riders did all or most of their riding in urban areas. Four, six and nine new continuing and returned riders respectively indicated an even split between urban and rural riding.

All of the new riders and nine each of the continuing and returned riders indicated that they had undertaken motorcycle training at some point. Using this dichotomous variable a t-test was conducted on the three safe riding scores. Only the Observer instructor data yielded a statistically significant difference between the groups: riders who had participated in training ($M=55.7$, $SD=11.3$) earned a statistically lower safe riding score than riders who had not trained ($M=67.6$, $SD=3.3$; $t(39)=3.1$; $p<0.005$).

In an open-ended question participants were asked to specify how far they had ridden during the last year. Responses ranged from zero to 200,000 kilometres. An ANOVA indicated that the distance ridden did not differ significantly as a function of rider type ($F(2,42)=2.1$; $p>0.05$). As the second-highest distance reported was 35,000 km it is possible that the 200,000 km reported by one continuing rider was an overestimate, or at least an outlier. With that participant removed from the analysis a statistically significant difference between the rider groups did arise ($F(2,41)=6.3$; $p<0.005$). Table 5 indicates that on average continuing riders rode the greatest distance, followed by the new and then the returned riders; post-hoc analyses revealed that the new and returned groups

did not differ statistically, but that both groups rode statistically shorter distances than the continuing riders. The very large relative standard deviations urge caution in interpreting this data, though the median distances are consistent with the pattern indicated by the mean distances.

Table 9.7 – Summary statistics for distance ridden by riders during previous twelve months

Statistic	New	Continuing	Returned	Overall
Mean	3,170	8,714	1,980	4,528
Standard deviation	4,609	8,147	1,919	6,066
Median	1,500	5,500	1,100	2,750
Minimum	650	2,000	0	0
Maximum	19,000	35,000	7,000	35,000

9.4 DISCUSSION

New, continuing and returned riders were scored out of ten on 15 items related to skill and riding behaviour as they negotiated a 16km suburban circuit under normal traffic conditions. An instructor rode behind the participant, using a video camera attached to his riding goggles to record the participant's riding. After the ride the instructor and the participant each scored the participant's riding. At a later time two other instructors scored the participant's riding using the same scoring proforma, but on the basis of the video footage.

Of the 32 statistically significant between-group differences found, all but one indicated that new riders performed worse than either or both of the other two groups. There was a trend of continuing riders scoring at higher levels than the returned riders, but only one statistically significant difference was found – returned riders were scored lower than continuing riders by the Observer for cornering performance.

While the two more experienced groups scored statistically higher than the new rider group, the differences were not *substantial.* Along with new riders, both the returned and continuing riders scored lower than a mid-way 'average' on the video-based assessments for hazard perception and responding, buffering, following distance, and overtaking, and on the Observer assessments for lane position. Continuing and returned riders would be expected to have had more riding experience by virtue of the fact that they have been riding longer, and in this sample continuing and returned riders had ridden further in the previous twelve months than the new riders (though there was substantial variability in the distance ridden data). The results reported here suggest that riding experience itself does not necessarily lead to substantial skill improvement on its own once licensure is completed. An alternative explanation is that current training and testing regimes result in riders that start riding at a higher level than achieved by the returned and continuing riders who had been licensed for longer – i.e. continuing and returned riders may have begun their riding from a lower skill base than latter-day novices.

It is reasonable to hope that newer novices will improve as they gain experience. However, it is not likely that current returned and continuing riders will further improve (given that they are not

substantially better than novice riders) without some form of intervention to strengthen basic skills and develop insight.

The method employed here – video recording riders in real traffic and then scoring the footage – does not seem to have been used previously. Riders certainly have been evaluated on the basis of video footage though. Shahar et al (2010) video recorded participant performance while they rode a Honda rider trainer simulator (the same apparatus used for the simulator study described in Chapter 10 of this report) for later rating by a judge. The scoring was conducted on a two-point scale for measures such as confidence, reaction to hazards, lane position, speed, and overall riding performance and general attitude. In the current study a 10-point scale was used, and two rather than one rater(s) watched the footage and they were blinded to rider type. In addition, here the riders were scored by a third instructor as well as themselves. It is argued that the current method is more rigorous and sensitive than that used by Shahar et al.

A potential limitation of this study is the influence of artificial or 'non-real' riding behaviours adopted by riders conscious of being observed. Apart from safety considerations, there are no real consequences attached to the outcomes such as in a licence test or similar. As such, riders may be keen to show-off or demonstrate their riding skills to the instructor. However, such a limitation is likely to apply to any research in which a participant is aware of being observed.

9.5 SUMMARY

- A riding instructor fitted with a helmet-mounted video camera followed participants (15 each of new, returned and continuing riders) as they rode a 16 km circuit on suburban roads
- Participants were scored out of 10 on 14 items related mostly to riding skill and behaviour. The scoring was carried out by the following instructor (Observer) and the participant themselves (after the ride) and by two independent instructors (Raters) (blinded to rider type) who watched the video footage.
- Observer scores:
    - Across all but one (lane position) of the15 rating items the Observer scored the new riders (statistically) significantly lower than either or both the continuing and returned riders.
    - On only one item (cornering) returned riders were scored significantly lower than continuing riders. On all other items these two groups did not differ statistically.
- Rater sores:
    - Five statistically significant differences arose from the video scoring – all differences related to the new riders
    - New riders scored significantly lower than both the continuing and returned riders on the bike control item; new riders also scored significantly lower than continuing riders for signals, confidence and overall
    - Continuing and returned riders did not differ significantly for any items
- Self-scoring: there were no statistically significant differences between any of the three groups on the basis of the rider's self scoring
- Self scoring produced the highest scores, followed by the Observer, with the video scoring resulting in the lowest scores
- The 14 items were weighted (by experienced rider instructors) in terms of their importance for safe riding to produce a single score – a 'safe riding score' (SRS). Only the Observer data produced a statistically significant difference between the three rider groups: the continuing and returned rider groups were equivalent, but both were significantly higher than the new rider group.

9.6 REFERENCES

Shahar A, Poulter D, Clarke DD & Crundall D (2010). Motorcyclists' and car drivers' responses to hazards. Transportation Research Part F, 13, 243-254.

10.0 SIMULATOR STUDY

10.1 INTRODUCTION

The current project includes data collected via several complementary components. The purpose of the self-report questionnaire was to seek information from a large number of riders nationally – both crashed and non-crashed. A broad range of comparisons could then be made between crashed and non-crashed riders, and between new, continuing and returned riders, on attitudinal and behavioural differences as well as riding patterns and behaviours. Another component of the project, described elsewhere in this report, the on-road study enabled comparisons to be made between the three rider types in terms of actual riding skills and behaviours. The current chapter deals with a third component – a motorcycle simulator study of riders.

Compared to the on-road component, using a simulator allows for greater control of the situation and greater consistency between participants in terms of their experience – the motorcycle, traffic, environment, hazards, and so on can be identical from one participant to the next. It also allows for riders to be put "in harm's way", in a simulated sense, to explore how the rider will react to a hazard. That hazard can in fact be engineered to almost guarantee a crash – a situation not ethically possible if the participant was riding a real motorcycle, either on the range or on the road.

10.2 METHOD

10.2.1 Participants

Forty-five participants took part in the simulator study – 15 each of new, continuing and returned riders and were the same participants who completed the on-road ride. Thus the selection criteria, recruitment strategies and demographic details for the group are identical to those contained in the previous on-road chapter (see chapter 9). Accordingly they will not be repeated here.

10.2.2 Apparatus

The Honda Rider Trainer (HRT) simulator (see Figure 10.1) is designed to be a training and assessment tool for novice motorcycle riders (see Vidotto et al (2007) for a published example of such training). It has, however, been used for research purposes. For example, Liu et al (2009) used a HRT to compare the effect of having a driving licence on the hazard perception and responding performance of novice and experienced motorcyclists; Shahar et al (2010) investigated whether riders and drivers could be discriminated on the basis of their performance in responding to hazards; and Di Stasi et al (2009) used the HRT to assess mental workload on riders as they were exposed to hazardous situations.

Figure 10.1 Honda rider training (HRT) simulator

Vidotto et al (2007) provide substantial detail describing the HRT. In brief, the motorcycle interface consists of handlebars with throttle, clutch and brakes, along with indicators and associated controls, with brakes and gear change operable by the user's feet as is the case for a real motorcycle. A virtual ride is played out on a computer monitor. The rider controls their passage through the scenario, interacting with other road users and infrastructure. Steering at all speeds is controlled via the handlebars only as the motorcycle does not lean for cornering.

Sampling at approximately 20 times per second, the simulator records an enormous amount of data. The status of all controls – clutch, brakes, steering angle, gear position, indicators, etc. – are recorded at each interval, along with the motorcycle's status – speed, engine rpm, etc. – and location within the simulated scenario.

Honda supplies a set of scenarios with the simulator. Each scenario is divided into approximately eight segments, or "scenes", and each scene has a particular challenge or hazardous situation to assess the rider's skill. The hazards, such as a child running into the road in front of the motorcycle, are triggered by the rider's location in the scenario. It is possible, and even likely, to crash during a simulation, after which the simulator allows the rider to continue in the scenario from a stationary start.

In its standard use as a training or assessment tool, the HRT system provides a score from A ('good') to D ('especially beware') for each scene, along with an overall score A-D, on a printed scoresheet. According to Di Stasi et al (2009) A corresponds to "safe behaviour (no accidents, avoided hazards without hard braking or coming too near, followed the speed limits), …[B] = precaution behaviour (didn't follow the speed limit, applied the brakes hard, came near other vehicles)…[C] = hazardous behaviour (hard braking near other vehicles) and …[D] = accident" (p 365). Each score is accompanied by written feedback of one to several sentences. The scoresheet also includes a map to help the rider apply the feedback to their memory of the ride. Figure 10.2 is an example of a simulator scoresheet (from the current data).

Avenue<Course4>Results

Rider No. : 2010-0109-1036	Type : Big(MT)	Date : '10 / 01 / 09

<Riding Map>

Based on your travel path, as in the following figure, review the conditions in which you were driving too fast for conditions and also check your turn signal operation.
In addition, recheck the locations where you suddenly braked or braking violations took place, and examine the causes with respect to where accidents occurred.

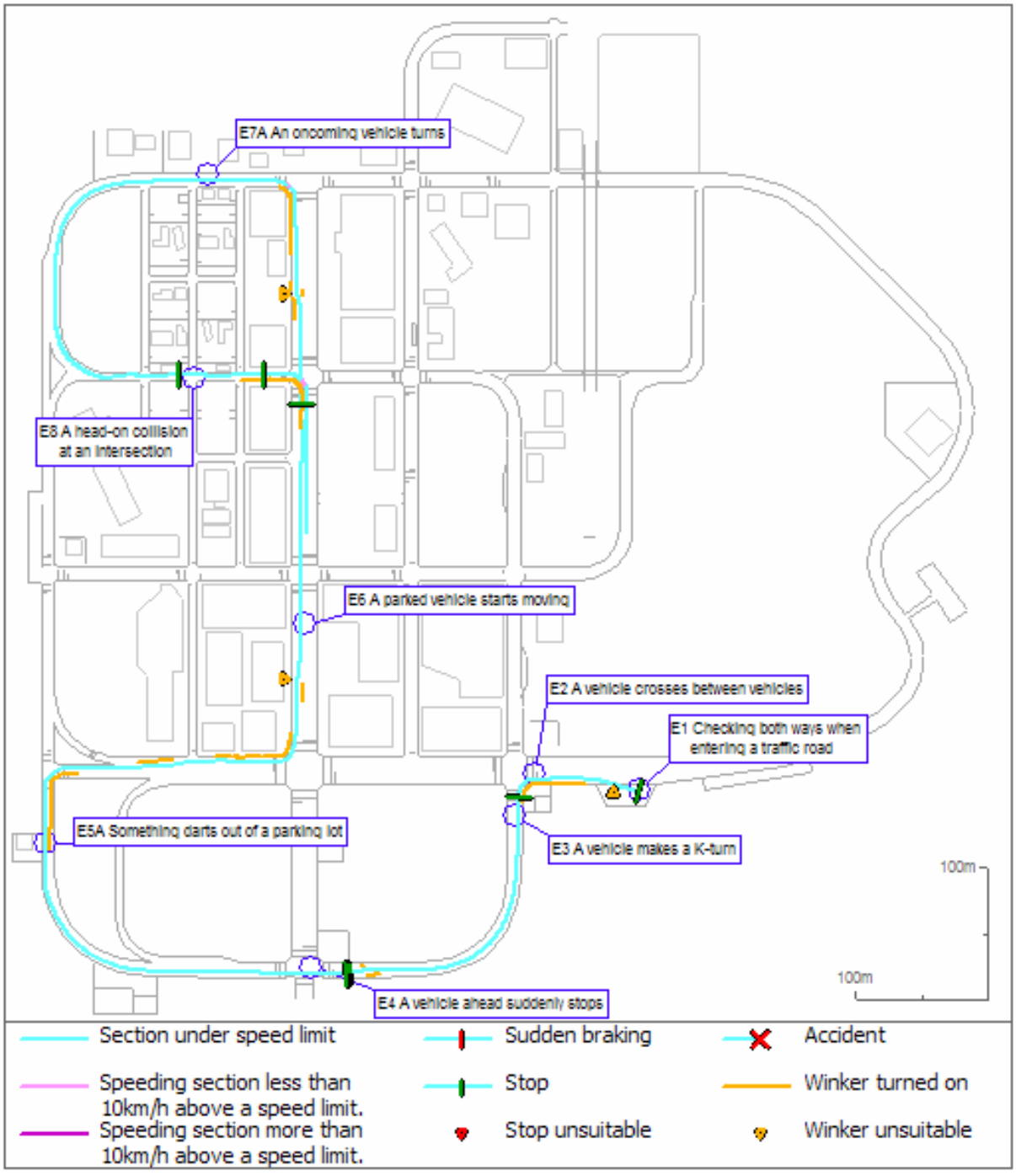


Figure 10.2a. Example of a Part 1 of a standard simulator score sheet

<Result of Scene> [Score] A : Good -- D : Especially beware

Scene	Score	Condittions
E1	C	You came within 1.9m of being rear-ended by a taxi. Stop and check traffic safety conditions, then enter the main thoroughfare.
E2	A	You were able to safely deal with a truck that was crossing the road. The areas around intersections are often congested. Slow down and carefully confirm traffic safety conditions.
E3	A	You maintained a safe distance from a passenger car that was backing up. Always be careful when a vehicle is backing up because the driver may not be able to see you.
E4	A	You were able to safely deal with a situation in which a vehicle ahead of you suddenly stopped. Maintain a safe distance between you and other vehicles to avoid being rear-ended.
E5A	A	You were able to safely deal with a passenger car that darted out from the side. Small motorcycles tend to be overlooked.
E6	A	You were able to safely deal with a situation in which a parked vehicle suddenly pulled out. While driving always maintain a safe distance from other vehicles and travel at a safe speed, as vehicles may suddenly enter the roadway.
E7A	A	You were able to safely deal with a situation in which an oncoming vehicle turned toward you. Since motorcycles tend to be overlooked, watch out for other vehicles that interfere with your sight lines.
E8	A	You were able to safely deal with a motorcycle that came out of a narrow side street. When driving through intersections with poor visibility in residential areas, slow down to the lowest safe speed.

<<Total Advice>> Total Score [A]

There was no accident. However, carelessness is a taboo in daily driving. You appear to have driven very carefully. The reduction of speed will give you some leeway. However, it is important to match with the flow of vehicles lest you are cut in or passed over. Let us reduce the speed in intersections in future as well keeping in mind safety confirmation against danger involved in blind spots of vehicles, etc. and pedestrian crossing when passing them.

Figure 10.2b Example of a Part 2 of a standard simulator score sheet

10.2.3 Procedure

Each rider undertook both the on-road (see Chapter 9) and simulator components of the study, in counterbalanced order.

In the current study each participant completed five rides on the simulator, including a practice ride to gain familiarity with the simulator and the task. The practice ride did not include hazards. The four test rides were presented in counterbalanced order with a rest between rides as necessary. Each ride took approximately four to six minutes, depending on the speed of travel selected by the rider and whether they were involved in crashes during the scenario. Two of the test rides were “Path”

scenarios and two were "Avenue" scenarios (HRT nomenclature). A path ride takes place in a CBD environment with a high traffic density, while an avenue scenario is a medium traffic density CBD environment. Three of the four test rides undertaken for this study consisted of eight scenes and one was composed of seven scenes. Vidotto et al (2007) reported that four simulator scenarios using the Honda rider trainer was not enough to produce boredom and fatigue.

The simulator package does include rural scenarios but the software does not log data for the ride. For this and other reasons associated with the hazards and the reduced realism of faster riding, rural scenarios were not used in this study.

Participants were told that the test rides may contain hazards to which they might have to respond. They were asked to try to maintain (but not exceed) the speed limit, obey all road rules and signs and signals and avoid being involved in a crash.

The analyses presented here are primarily based on the scores the HRT provided for each participant for each ride. Also analysed are crashes as determined by the HRT (further discussion of the definition of a crash is provided in the discussion).

10.3 RESULTS

10.3.1 Scores

Each participant undertook two rides in a high density traffic environment and two rides in a medium density traffic environment – "path" and "avenue" rides respectively. The simulator programming objectively grades the participant on a scale A-D. Table 10.1 reports the distributions of scores across the three rider groups for the high density – Path – rides.

Table 10.1 Distribution of simulator performance scores across rider type for high density "path" rides: a) number of each score accrued; b) percentage of the number of each grade level earned by each group; c) percentage of grades at each level within each group.

a) Number of each grade level by rider group

Grade	New	Continuing	Returned	Total
A	96	108	101	305
B	69	71	79	219
C	52	39	33	124
D	38	20	42	100
Total	255	238	255	748

b) Percentage of each grade level accrued by each group

Grade	New	Continuing	Returned	Total
A	31%	35%	33%	100%
B	32%	32%	36%	100%
C	42%	31%	27%	100%
D	38%	20%	42%	100%

c) Percentage distribution of grades within each group

Grade	New	Continuing	Returned
A	38%	45%	40%
B	27%	30%	31%
C	20%	16%	13%
D	15%	8%	16%
Total	100%	100%	100%

Table 10.1b shows that each rider group accrued about a third of the A grades each, where an A grade is the highest score and a D grade the lowest. Returned riders amassed a slightly higher percentage of B grades compared to the other two groups. There were bigger differences at the C and D levels, with new riders scoring the largest percentage of C grades and continuing riders scoring the lowest percentage of Ds. Table 10.1c shows that within each group, riders were more likely to earn an A grade, followed by a B then a C, and least likely to achieve a D – the lowest score. With the highest percentage of As amongst their scores and equal highest percentage of Bs, continuing riders seemed to have performed at the highest level (see Table 10.1c), followed by returned and then new riders.

The grading scale A to D is ordinal data because the interval between grades is not known and may not be equal – for example, the decrement in performance to drop from an A to a B grade may not be equivalent to that required to descend from a C to a D grade. The algorithm built into the simulator to calculate the scores is not evident from the outcomes. However, this is not a differential effect – all riders in all groups are subject to the same consideration. To make a further comparison between the rider groups the letter-scores have been arbitrarily converted to numeric scores: A was converted to 4, B to 3, C to 1, and Ds were been translated into a score of 1 – thus a higher score represents better performance. Multiplying the distribution of scores by these numeric values provides a non-sophisticated but useful means of collapsing the scores and making a comparison between the three groups on the basis of a single overall score. As the number of data points is not

equivalent the numbers in Table 10.1a cannot be used (i.e. the totals for the three columns are not equivalent). Multiplying the converted scores by the percentages contained in Table 10.1c (and then multiplying by 100 to remove the decimal point) produces a total score of 287 for the new rider group, 312 for the continuing riders, and 294 for the returned riders. This outcome implies that the continuing riders performed better in this task, followed by the returned riders and then the new rider group.

As a counterpart to Table 10.1, Table 10.2 contains the matching score distributions for the avenue data. The simulated environments are similar between the scenarios but there is less traffic in the avenue simulations.

Table 10.2 Distribution of simulator performance scores across rider type for medium density rides: a) number of each score accrued; b) percentage of the number of each grade level earned by each group; c) percentage of grades at each level within each group.

a) Number of each grade level by rider group

Grade	New	Continuing	Returned	Total
A	169	203	151	523
B	75	52	84	211
C	17	13	23	53
D	9	2	12	23
Total	270	270	270	810

b) Percentage of each grade level accrued by each group

Grade	New	Continuing	Returned	Total
A	32%	39%	29%	100%
B	36%	25%	40%	100%
C	32%	25%	43%	100%
D	39%	9%	52%	100%

c) Percentage distribution of grades within each group

Grade	New	Continuing	Returned
A	63%	75%	56%
B	28%	19%	31%
C	6%	5%	9%
D	3%	1%	4%
Total	100%	100%	100%

Table 10.2b indicates that the highest percentage of A scores went to the continuing riders: 39% versus the similarly placed 32% and 29% for new and returned riders respectively. Continuing riders also accrued the lowest percentage of B, C, and D scores, with substantial margins, particularly from the returned riders who scored the fewest As and the largest number of the lower scores. Examining the set of scores accrued by each group (see Table 10.2c) indicates that just over half (56%) of the returned rider's scores were As, compared with three-quarters of the continuing rider group and almost two-thirds (63%) of the new riders. The conversion of letter scores to numeric totals as described earlier was also carried out for this data, resulting in an overall score of 369 for the continuing riders, 350 for the new riders, and 339 for the returned riders; continuing riders seem to have performed at the highest level, followed by new and then returned riders.

The appropriate statistical method for making comparisons between more than two sets of ordinal data is the non-parametric Kruskal-Wallis test. With either seven or eight scene scores and one overall score for each scenario - two path and two avenue – there are a total of 35 potential comparisons between rider groups. Five of those comparisons were statistically significant at the 0.05 level. Table 10.3 contains the data for those significant outcomes. Note that in this instance a lower mean rank indicates a higher level of performance.

Table 10.3 Scenes that resulted in significant between-group differences according to a Kruskal-Wallis test: mean rank for each group and statistic (all are df=2 and all are significant at the 0.05 level)

Scene	Mean rank			Test
	New	Continuing	Returned	statistic
Path 1 E7	28.5	18	20.7	7.5
Avenue 4 E5a	24.1	15.8	29	9.8
Avenue 4 Overall	23.7	17.5	27.8	8.3
Avenue 5 E2	17.8	22.2	28.9	7.1
Avenue 5 Overall	23.8	16.3	28.9	9.1

Each scene within each scenario contains particular elements that unfold in the same manner across participants. While all scenes allow for the possibility of a crash or for the rider to exceed the speed limit, some scenes present particular challenges and hazards. For example, in scene 7 (E7) in the Path 1 (high-density CBD traffic) scenario a child runs onto the road from a bus stop as the rider approaches, increasing the likelihood of a crash. This event resulted in a statistically significant difference between the three rider groups (see Table 10.3) – overall, continuing riders dealt with this event best, followed by the returned and then the new riders. In the E5a scene of the Avenue 4 scenario (lower-density CBD riding) a passenger car darts out of a parking lot in front of the rider. Overall, again continuing riders have exhibited the best performance, followed by the new and then returned riders. This pattern is also evident for the overall Avenue 4 score, which also resulted in a significant difference between the rider groups. In scene 2 of the Avenue 5 scenario a parked car door is opened in front of the rider while another car approaches from the other direction – the motorcyclist must stop. New riders performed best overall in this situation, followed by continuing and then returned riders. Finally, the same pattern of results is repeated for the overall Avenue 5 score.

While only five of the 35 comparisons resulted in significant between-group differences, they can all be considered for the overall trend they convey. Such a trend can be concocted in more than one way. Adding the ranks calculated in the process of performing the Kruskal-Wallis test indicates that overall continuing riders performed substantially better with an overall summed rank of 49 (a lower rank indicates better performance), compared to 73 for new and 84 for returned riders. Another method of conveying a trend is to simply count the number of each rank attributed to each group. As shown in Figure 10.3, continuing riders amassed the greatest number of first ranks. The overall pattern would indicate that continuing riders performed best overall followed by the new riders and then the returned riders.

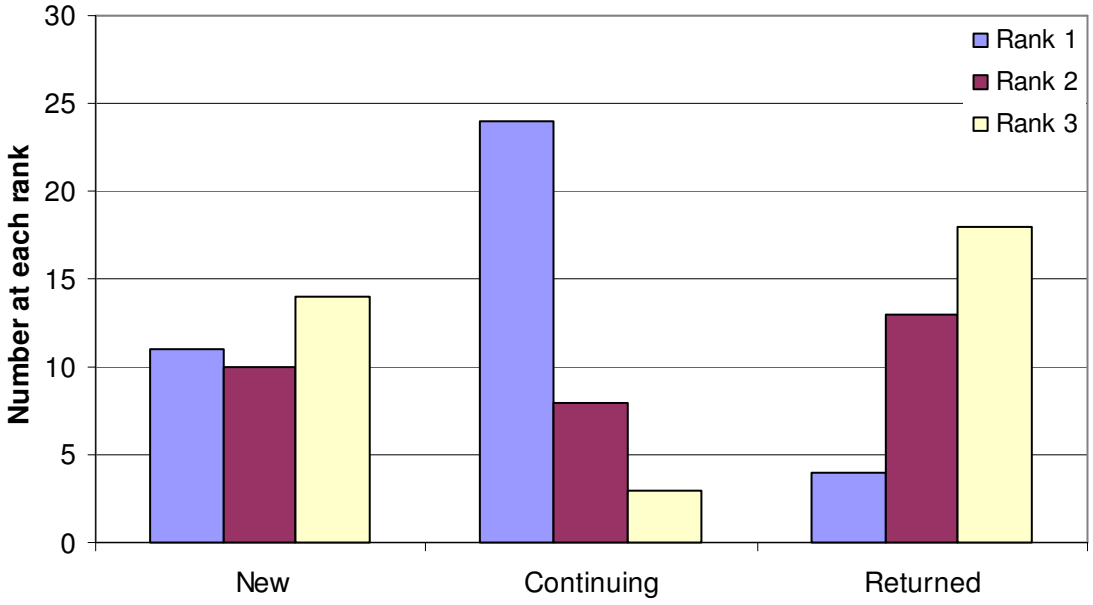


Figure 10.3 Overall counted ranks for each group

10.3.2 Crashes

Each scene in each of the scenarios provided a hazard that could very well result in a crash. Thus over 34 scenes a maximum of 35 crashes are possible for any particular participant. Table 10.4 summarises the crash profiles as a function of rider type for the two types of scenarios – path and avenue – and overall.

Table 10.4 Summary crash data as a function of rider type for a) path scenarios, b) avenue scenarios, and c) overall

a) path scenarios

Statistic	New	Continuing	Returned	Overall
Min crashes	0	0	0	0
Max crashes	6	3	8	8
Mean crashes	2.3	1.3	2.5	2.0
Standard deviation	2.3	1.0	2.2	1.9

b) avenue scenarios

Statistic	New	Continuing	Returned	Overall
Min crashes	0	0	0	0
Max crashes	3	1	3	3

Mean crashes	0.6	0.1	0.8	0.5
Standard deviation	0.9	0.4	0.9	0.8

c) overall

Statistic	New	Continuing	Returned	Overall
Min crashes	0	0	0	0
Max crashes	8	4	11	11
Mean crashes	2.9	1.4	3.3	2.5
Standard deviation	2.9	1.1	2.8	2.5

At least one rider from each group completed all scenarios without being involved in any crashes. The highest number of crashes for any single rider was 11 for a returned rider. On average, continuing riders were involved in the lowest number of crashes for the path and avenue scenarios and overall, followed by the new then returned riders. An analysis of variance (AVOVA) was used to test whether the differences between the groups were statistically significant. The results showed that the differences were not statistically significant for the path scenarios or overall, but they met the 0.5 significance level for the avenue crashes ($F(2,42)=3.1$; $p=0.05$). Returned riders were involved in significantly more crashes than continuing riders.

10.4 DISCUSSION

The use of the Honda training simulator enables all riders to be presented with a consistent ride that contains a high potential for the rider to be involved in a crash. The 45 riders (15 each of new, continuing and returned riders) undertook four simulated rides and were scored by the simulator's programming as A, B, C or D, wherein an A represents the highest performance. Each ride consisted of seven or eight sections (though the boundaries of those sections would not be perceived by the participants) and the participant was scored A-D for each section as well as receiving an overall score on the same scale for the whole ride. Of the 35 opportunities for a statistical comparison between the scores, only five revealed significant differences between the groups for the scores. In four of those comparisons the continuing group achieved the best performance; new riders performed second-best and returned riders worst. A comparison of crash involvement within the scenarios produced only one significant difference between the groups - returned riders had more crashes than continuing riders for the two avenue scenarios. However, on the whole the data indicates a strong trend – that continuing riders generally dealt with the simulation task in a superior manner, followed by the new riders and then the returned riders.

The simulation task is somewhat artificial – probably more so as a motorcycle task than for other simulation tasks, such as car driving. There is little encouragement to suspend disbelief and begin to "feel" like one is riding since the motorcycle does not lean, and thus it does not in any way handle like a real motorcycle, despite the realistic interface involving handlebars, foot pegs and controls, and so on. Liu et al (2010) used the HRT for their investigation of the effect of car driving experience on rider performance and highlighted similar concerns. They also noted that the use of a standard (flat-panel) monitor to display the environment may not allow for peripheral vision to shorten hazard detection time – though of course wearing a helmet while riding also narrows peripheral vision relative to driving other vehicle types. Using the HRT Shahar et al (2010)

projected their footage onto a wall, delivering a larger depiction of the road environment. They noted that at least some of the hazards depicted may not have conveyed the expected degree of "foreshadowing" – advance clues to the pending hazard.

Despite the criticisms that could be levelled at the simulator and the tasks, it is critical to note that all participants were subject to the same short-comings and thus none of these considerations can reasonably be called upon to explain differences in performance between the groups. The task is more concerned with identification of and reaction to hazards to avoid crashes, some road craft and, when being used for training or testing, competent use of the motorcycle controls, and thus high resolution and high fidelity realism may not be critical.

When older participants perform more poorly on simulation tasks a common conclusion or qualifier is that the use of such technology may have been more difficult for them to deal with. While the new riders in this study were the youngest, the returned and continuing riders were very similar in age. Given the superior performance of the continuing riders, age cannot be used to explain the poorer performance of the returned riders. As all of the participants were current motorcycle riders and all were exposed to the same simulations in the same manner, it is also unlikely that other factors such as the simulator interface or the realism or fidelity or content of the simulation could account for the differences between the rider groups.

The HRT is primarily a training and assessment tool, and so its pre-programmed set of scenarios and its standard output of a set of scores ranging from A to D along with commentary and feedback for the rider are probably sufficient and appropriate for that task. However, the inability to program the simulator and manipulate the scenarios for the purposes of research is a shortcoming noted by both Liu et al (2009) and Shahar et al (2010). It is also disappointing that the means used by the simulator to determine the A to D scores is not published. These limitations prevent a more detailed analysis of rider performance for participants in the current study, at least without inventing a new scoring system.

Liu et al (2009 and Vidotto et al (2007) also used crashes reported by the simulator. However, a closer examination of the simulator outputs (both the in-depth data and the rider score sheets) reveals a possible anomaly. The score sheet includes both a map of the scenario and a scene-by-scene commentary and scoring (see Figure 8.2). On some occasions, particularly when heavy braking takes place, a crash can be noted on the map and with a scene commentary but not be taken account of in the overall score or be present in the in-depth output. It is not known whether Liu et al and others who analysed the number of crashes (or hazards successfully avoided) used the more accessible rider score sheets or the in-depth data, though the former is more likely. Likewise it is not clear how Shahar et al (2010), who counted crashes from video footage rather than using the simulator output, defined a crash. As an experienced rider their video judge might easily have counted highly probable crashes (given heavy braking or sudden swerving) as crashes or simply noted the number of occasions in which the simulator was reset due to a crash. These limitations make it difficult to make comparisons between the current outcomes and that of previous research. However, no known published examples were found in which comparisons were made between any combination of returned, new and continuing motorcycle riders using a motorcycle simulator like the HRT.

In the current study the HRT has indicated that on balance continuing riders performed at the highest level, as predicted. Unexpectedly, however, returned riders produced the worst performance, inferior to that of new riders.

10.5 SUMMARY

In summary, the following outcomes are noteworthy for the simulator component of the study:

- The Honda Rider Trainer (HRT) is an interactive rider simulator used primarily for training and assessment of novice riders, but has been used for research previously
- 45 riders (15 each new, continuing and returned) completed four HRT simulations that contained hazards for the riders to identify and respond to
- Analyses were based on the ordinal HRT scores (A-D, where A is best performance) and number of crashes that resulted from interaction with the hazards
- In terms of the A-D scores, continuing riders performed best overall, followed by new riders and then returned riders
- In terms of crashes within the simulated scenarios, continuing riders performed best overall, followed by new riders and then returned riders
- There would seem to be no demographic or technology-based explanation as to why returned riders have performed at the lowest level of the three groups

10.6 REFERENCES

Di Stasi, L., Alvarez-Valbuena, V., Canas, J., Maldonado, A., Catena, A., Antoli, A., & Candido, A. (2009). Risk behaviour and mental workload: Multimodal assessment techniques applied to motorbike riding simulation. Transportation Research Part F, 12, 361-370.

Liu, C. C., Hosking, S. G., & Lenné, M. G. (2009). Hazard perception abilities of experienced and novice motorcyclists: An interactive simulator experiment. Transportation Research Part F, 12, 325-334.

Shahar A, Poulter D, Clarke DD & Crundall D (2010). Motorcyclists' and car drivers' responses to hazards. Transportation Research Part F, 13, 243-254.

Vidotto, G., Bastianelli, A., Spoto, A., Torre, E., & Sergeys, F. (2007). Using a riding trainer as a tool to improve hazard perception and awareness in teenagers. Proceedings International Road Safety and Simulation Conference, November, Rome.

11.0 CONCLUSIONS

11.1 OVERVIEW

This project comprised six stages. Stage 1 of the project was designed to identify the skill and knowledge deficiencies, and attitudinal and development needs of returned riders. The aims of Stages 2-6 of the project were to develop and pilot a training program for returned riders if the Stage 1 research identified that a new training program is warranted.

This report has presented the results of objectives 1 and 2 of the Stage 1 research, as outlined below:

1. Identify and describe returned riders':
    a. Crash profile and potential contributing crash factors
    b. Riding skills and performance
    c. Attitudes, motivations and behaviours
2. Determine whether current motorcycle rider training programs address returned riders' development needs
3. Assess the need for the development of a new training program designed specifically for returned riders.

Five different methods were employed to address the objectives:

- a literature review of current knowledge in the field and reviews of motorcycle rider training currently on offer;
- focus groups with nine experienced motorcycle rider trainers to gauge perspectives on riders' skills, behaviours and attitudes, and training experience.
- a nation-wide online survey of the riding behaviours and crash patterns of 2,000 motorcycle riders
- an assessment of motorcycle riders' skills and performance on the road
- an evaluation of rider performance using an interactive motorcycle rider training simulator.

Within each of the five methods the performance of returned riders was compared with that of new and continuing riders in order to: i) provide a benchmark of performance against which returned riders could be compared; and ii) assess whether any identified development needs were specific to returned riders that would warrant development of a new training program designed specifically for them. As part of the survey method, comparisons were also made between returned riders who had crashed and returned riders who had never crashed. The purpose of this comparison was to determine whether there is an over-representation of factors within the former group that might be contributing to their crash involvement and which might be amenable to modification through training.

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11.2 WHAT ARE THE DEVELOPMENT NEEDS OF RETURNED RIDERS?

Many of the development needs identified for returned riders were the same as those identified for new and continuing riders.

11.2.1 Crash profile and potential contributing crash factors

As for all riders, the largest proportion of returned riders' crashes:

- occurred on weekends and when riding for recreation
- occurred in urban environments
- involved the motorcycle only
- were perceived by the rider to be mainly the fault of the other party in multi-vehicle crashes
- involved road surface factors, distraction, bad weather, taking a bad line into a corner and excessive speed (either too fast for the conditions or exceeding the speed limit) as the main self-reported contributors to the crash
- occurred within 15 minutes of the point of departure
- occurred between 11km and 50 km from the point of departure.

Compared to other riders, returned riders were more likely to crash when riding as part of a group even though they did not report riding more often as part of a group than other riders.

Compared to new riders, returned and continuing riders were more likely to:

- crash when riding with a pillion passenger
- be more severely injured in crashes.

The larger proportion of crashes occurring on weekends and whilst riding for recreation likely reflects the high levels of recreational riding reported by all riders. The larger proportion of crashes occurring in urban environments probably reflects a greater propensity for conflicts with other road users compared to rural environments. It might also indicate that many riders reside in urban areas and while they might often ride in rural environments, the fact they are more likely to crash close to their point of departure does not provide sufficient opportunity to reach a rural location before crashing on a particular trip.

The crash profile of returned riders is consistent with their greater propensity to ride for recreational purposes and in rural environments compared to other riders; a finding reported elsewhere. This pattern would also seem to fit with the relatively high proportion of crashes that occurred whilst riding as part of a group. The propensity for returned and continuing riders to be more severely injured in crashes possibly reflects both their older age and greater involvement in rural crashes where travel speeds are higher and the likelihood of serious injury outcomes is greater.

Overall, the findings would suggest that there is a need to address:

- the different types of risks encountered when riding in rural and urban environments

- the higher level of risk associated with recreational riding compared to riding for commuting or work purposes and the link between motives for recreational riding and crash risk

- crash prevention measures, particularly in single-vehicle crash scenarios.

11.2.2 Riding skills and performance

- Findings from the survey indicated that all riders were prone to making unintentional errors frequently or occasionally

- Ratings assigned on the basis of the video footage for the on-road study indicated that all riders achieved a rating of less than 5.5 (where 5.5 is the mid-point or "average" on a likert scale ranging from 0 – poor to 10 - excellent) for hazard perception and responding (evidence of detection of actual and potential hazards with appropriate and proportionate responses/precautions in terms of action and response); braking (timeliness, proportional and appropriate application, wheels not locked); buffering (appropriate spacing from vehicles, infrastructure, potential hazards); and following distance (appropriate following distance behind other vehicles). Returned and continuing riders scored less than 5.5 on lane position (appropriate and safe position for single and dual carriageway, turning, intersections, etc, with visibility and vision to be taken into account).

- About 30% of returned riders scored 'below par' in the simulator study. Overall, returned riders achieved the worst performance compared to continuing and new riders and had more crashes.

- In the on-road study riders' self ratings of their overall performance were higher than the overall performance ratings assigned by the Observer or the video raters. All riders generally scored highest for confidence as assessed by both the Observer and the video raters. The survey also showed that all crashed rider groups were more likely than non-crashed rider groups to rate themselves as having above average or better riding skills than their peers, and a substantial proportion believed they were less likely than their peers to be involved in a future crash.

Overall the findings would suggest that there is a need to address:

- Unintentional errors - being alert to fatigue and avoiding lapses in concentration that might arise from fatigue and or complacency. Emphasis should be given to discussion of research findings which show that unintentional errors are the biggest predictor of motorcyclist crash involvement and often occur in a violational context, with those displaying a liking for speed and/or a fast and risky riding style being more likely to commit such errors.

- Basic riding skills (including braking, lane position, buffering, and following distance)

- Higher order cognitive skills (including hazard perception and responding). Given that riders self-rated their performance on responding tasks as lower than on perception tasks (as identified in the survey), particular emphasis should be given to responding tasks.

- The potential for misplaced confidence in riding ability and performance and implications for crash involvement.

11.2.3 Riding behaviours and riding style

- Excessive and inappropriate speeding were the most common behaviours occurring on a *regular* basis among all crashed rider groups (between a quarter and a third of all riders): opening up the throttle and "just going for it"; exceeding the speed limit on residential streets, and disregarding the speed limit at night. A number of speeding related behaviours were *occasionally* perpetrated by all crashed riders but involved a smaller proportion of respondents compared to those that occurred on a frequent basis: riding too fast for the conditions; riding sufficiently fast into a corner to scare oneself; attempting to keep up with riders or drivers who are travelling faster than the rider; exceeding the speed limit in residential streets; and almost losing control in a corner.

- Crash-involved returned riders were significantly more likely to frequently and occasionally engage in behaviours involving excessive and inappropriate speeding than returned riders who had never crashed and claimed a higher maximum speed in the last month and ever. Crashed returned riders reported significantly more near misses and traffic infringements than returned riders who had never crashed.

- All crashed riders more often agreed that they have self-reported 'safe' riding styles (experienced, responsible, safe) and more often disagreed that they have self-reported 'unsafe' riding styles (inattentive, nervous and indecisive).

Overall the findings would suggest that there is a need to address:

- The role of speed in motorcycle crashes. This should be addressed by discussion of motives associated with recreational riding and their link with crash risk.

- The role of unrealistic optimism and misplaced confidence, including implications for crash involvement. Riders' self-assessed performance ratings were 'above average' in both the on-road and survey studies. However, the on-road performance ratings assigned by rider trainers were generally lower than those assigned by the riders, and the simulator results showed that about 30% of returned riders scored 'below par'.

11.2.4 Motivations for riding

- All crashed rider groups were more likely to agree than disagree that they are motivated to ride for reasons associated with recreation, self-expression and freedom. Specifically, riders were more likely to strongly agree that they get a sense of freedom when riding and that they like the manoeuvrability of a motorcycle, and to agree that riding is a good social activity; they like accelerating rapidly; they feel at one with their machine; they can feel the road; and riding is risky.

- Compared to returned riders who had never crashed, crashed returned riders demonstrated a greater propensity towards motivations associated with speeding related pleasure and excitement: 'sense of freedom; 'like to ride hard' and 'like accelerating rapidly'.

Overall the findings would suggest that there is a need to address:

- Motivations for riding related to pleasure and excitement and their link with crash involvement.

- The role of speed in motorcycle crashes. This should be addressed in the context of the preceding dot point.

11.3 CAN CURRENT TRAINING PROGRAMS ADDRESS RETURNED RIDERS' DEVELOPMENT NEEDS?

The second component of Stage 1 assessed the potential for current motorcycle rider training programs to address the development needs identified for returned riders in this research. A literature review of the effectiveness of motorcycle rider training was presented in Chapter 2 of this report. The review concluded that current training programs for motorcycle riders:

- include insufficient emphasis on higher order cognitive skills
- include little or no emphasis on the role of attitudes, motivations and risk taking behaviours in riding performance and crash involvement
- tend to improve confidence rather than self-assessment of limitations
- are too short
- are off-road (i.e. on-range) and not sufficiently real-world.

On the basis of the review of motorcycle rider training it is evident that current programs do not adequately address the development needs identified here for returned (or indeed other) riders.

APPENDIX 1 MOTORCYCLE RIDER SURVEY

MOTORCYCLE RIDER SURVEY

MONASH University
Accident Research Centre

Thank you for volunteering to complete the on-line motorcycle rider survey. As part of a larger project, we aim to investigate riding patterns, attitudes to riding and riding experiences across Australia.

Most questions only require you to click a box or circle. A small number of questions ask you to provide more information by typing your answer into a box. Please answer all of the questions honestly. We do not ask for your name or other identifying information so your responses remain anonymous.

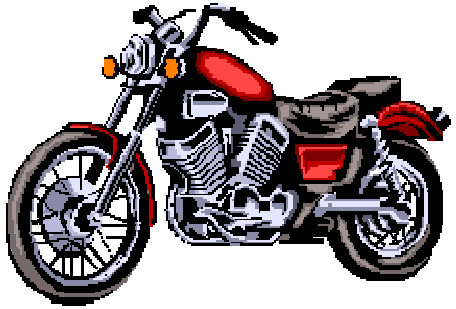
1. Are you legally entitled to ride a motorcycle on a public road in Australia?

(i.e. do you hold a current motorcycle learner permit or full/open licence or probationary/restricted/provisional licence, or equivalent?)

2. Have you ridden on a public road in Australia within the last five years?

If you answered ***YES*** to both questions please click **CONTINUE** to proceed to the survey.

If you answered ***NO*** to either or both of these questions then you are ineligible to participate. Thank you for your time.



MONASH University
Accident Research Centre

MOTORCYCLE RIDER SURVEY

Explanatory statement

Please read the following explanatory note and then click "next" at the bottom if you agree to do the survey.

The Accident Research Centre at Monash University is undertaking a project to investigate differences between motorcycle riders with various levels of riding experience. The project will use an on-line survey to ask you about your riding patterns, attitudes to riding and accident involvement patterns and some details about yourself. The project will help to determine whether there is a need for a targeted refresher course for riders who are returning after a break from riding, and what that course might contain. The project is being conducted by Christine Mulvihill, a Research Fellow at the Monash University Accident Research Centre.

The survey is likely to take between 20 and 30 minutes to complete. To participate you need to possess at least a motorcycle rider learner's permit and have ridden on a public road in Australia within the last five years.

Being in this study is voluntary. All data obtained from your questionnaire will be kept confidential and will be reported in summary form only so that no individuals could reasonably be identified in any reports or publications arising from this research. You are free to withdraw at any time up until you click the final 'submit' button. After that it will not be possible to identify and remove your responses from the pool of data. No harm is foreseen in your taking part in this research.

Data storage will adhere to University regulations and be kept on University premises for 5 years. The data will only be seen by members of the research team and will be destroyed at the end of the five year period.

If you would like to be informed of the overall research findings, please visit www.monash.edu.au/muarc/projects/mcyclesurvey.html where a summary of the survey findings will be available from December 2009.

If you would like to contact the researchers about any aspect of this study, please contact

Christine Mulvihill (Christine.Mulvihill<at>muarc.monash.edu.au, Phone 03 9905 4367, Fax 03 9905 1809).

If you have a complaint concerning the manner in which this research (CF09/1646 – 2009000986) is being conducted, please contact: Executive Officer Standing Committee on Ethics in Research Involving Humans (SCERH), Building 3e, Monash University, 3800, Phone 03 9905 2052; Fax: 03 9905 1420; Email:scerh<at>adm.monash.edu.au)

Thankyou.
Christine Mulvihill

Next

Motorcycle rider survey

Welcome

Welcome to the motorcycle rider survey.

If you have found this page via a search engine and have not yet read the eligibility criteria and explanatory statement, please start at:
www.monash.edu.au/muarc/projects/mcyclesurvey.html

Otherwise please continue.

IMPORTANT NOTES:
- Some questions ask for a number (eg year or speed). Make sure you ONLY type a number in and not letters or words such as "n/a" or "one hundred" or "km/h", for example. If something doesn't apply to you (eg year you got a full licence but you don't have a full licence) please just leave it blank.

- Try to avoid going backwards to change your answers.

- Do not use the back and forward buttons on your browser to navigate the survey.

- If you do have problems with the survey please email Mark at Mark.Symmons<at>muarc.monash.edu.au (obviously use the @ symbol, "at" used here to reduce automatic spam). We want your data!

Motorcycle rider survey

Licence & training

Thank you for volunteering to complete the on-line motorcycle rider questionnaire. Please answer as fully and honestly as possible.

In this section we ask about your motorcycle licence history and the training you have undertaken.

1. In each of the boxes below please type the year (eg 1999) you obtained your MOTORCYCLE licence or permit. For any you don't have please leave blank.

I got a motorcycle learner permit in (year)

I got a probationary/restricted/provisional motorcycle licence in (year)

I got a full/open licence in (year)

2. We would like to get an idea of how regularly you have ridden over the years. Please choose from the following -
I got my licence/permit to ride on the road:

- ◯ only in the last 5 years.
- ◯ more than 5 years ago and have ridden every year since then.
- ◯ more than 5 years ago, rode for a while, then stopped riding for at least a year, then took it up again within the last 3 years.

Optional additional comments

3. If you have ever stopped riding for more than a year please answer the following for your most recent lapse in riding, otherwise skip to the next question.

What year did you stop?

How many years did you stop for?

Why did you stop riding?

What year did you take it up again?

Why did you take up riding again?

Motorcycle rider survey

4. Have you ever undertaken formal motorcycle training?

	Yes/No	Length of course
Learner course		
Licence course		
Off-road course		
Refresher course		
Other		

Please specify if other

5. If applicable, please enter the year you completed your most recent training course.

Year

6. Have you ridden a motorcycle on a public road in the last month?

◯ Yes ◯ No

Motorcycle rider survey

Ridden this year?

7. Have you ridden a motorcycle on a public road in the last 12 months?

◯ Yes ◯ No

Page 4

Motorcycle rider survey

Riding this month

This section is about your riding in the last month.

8. How far did you ride in the last month?

◯ less than 50km ◯ 50-100km ◯ 101-200km ◯ 201-500km ◯ more than 500km

9. How many separate trips have you ridden this month? (Note: to and from work would count as 2 separate trips, riding as a courier all day would count as 1 trip, etc)

Trips _____

10. Approximately what percentage of your riding in the last month was in a group (ie with at least one other rider)?

% With a group _____

% Not with a group _____

11. Did you carry a pillion in the last month?

	Never	Rarely	Sometimes	About half the time	Often	Most of the time
When riding with a group	◯	◯	◯	◯	◯	◯
When riding without a group	◯	◯	◯	◯	◯	◯

12. For what purposes did you ride in the last month? (You may select more than one option)

☐ Commuting to/from work/study

☐ Recreation - on-road

☐ Recreation - off-road

☐ Work (eg farm, courier, etc)

☐ Other

Other (please specify)

13. Where did you mostly ride in the last month?

◯ Mostly in built-up/urban areas

◯ Mostly outside built-up/urban areas

◯ Mostly off-road/bush/etc

Motorcycle rider survey

14. Has your riding in the last month been average for you?

- ◯ I have ridden less than usual this month
- ◯ It's about average
- ◯ I have ridden more than usual this month

15. How many near misses or close calls have you had in the last month while riding on the road?

Number _____

16. Please describe your most RECENT near-miss.

Page 6

Motorcycle rider survey

Riding this year

This section is about your riding patterns over the last 12 months.

17. How far have you ridden in the last 12 months?

◯ less than 1000km ◯ 1001-5000km ◯ 5001-10,000km ◯ 10,001-20,000 ◯ more than 20,000km

18. On average, how often have you ridden on a public road in the last 12 months?

◯ Daily

◯ Weekly

◯ Monthly

◯ Less than monthly

Optional additional comments

19. What was the main purpose of your riding in the last 12 months?

◯ Commuting to/from work/study

◯ Recreation (on or off-road)

◯ Work (eg farm, courier, etc)

◯ Other

Other (please specify)

20. Where did you mostly ride in the last 12 months?

◯ Mostly in built-up/urban areas

◯ Mostly outside built-up/urban areas

◯ Mostly off-road/bush/etc

21. Approximately what percentage of your riding in the last 12 months was in a group (ie with at least one other rider)?

% With a group

% Not with a group

Motorcycle rider survey

22. Do you carry a pillion in the last 12 months?

	Never	Rarely	Sometimes	About half the time	Often	Most of the time
When riding with a group	◯	◯	◯	◯	◯	◯
When riding without a group	◯	◯	◯	◯	◯	◯

23. Has your riding in the last 12 months been average for you?

- ◯ I have ridden less than usual this year
- ◯ It's about average
- ◯ I have ridden more than usual this year
- ◯ I don't have another recent year to compare with because I'm a new OR returned rider.

24. When do you mainly ride?

- ◯ Mostly October to March
- ◯ Mostly April to September
- ◯ All year round

25. What percentage of your motorcycle trips in the last 12 months were within 50km of your home/work/study?

%

26. How many near misses or close calls have you had in the last 12 months while riding on a public road?

Number

27. Please describe your most SERIOUS near miss or close call in the last 12 months.

28. Approximately how far in total did you DRIVE in the last 12 months?

◯ less than 1000km ◯ 1001-10,000km ◯ 10,001-50,000km ◯ more than 50,000km

Motorcycle rider survey

Motorcycle ownership

This section is about the motorcycles you ride, or have ridden in the past.

29. Please describe the MAIN motorcycle you currently ride

Make

Model

cc

Year of manufacture

How many years have you had it

30. Pick the best description for your current MAIN motorcycle

- ◯ Cruiser
- ◯ Sport
- ◯ Touring
- ◯ Scooter
- ◯ Trail

Optional additional comments

31. What other motorcycles do you currently have?
Please put one motorcycle per line in the following format:
Make, cc, Year bought

Bike 1

Bike 2

Bike 3

Bike 4

Bike 5

32. What motorcycles have you had in the past?
Please put one motorcycle per line in the following format:
Make, cc

Bike 1

Bike 2

Bike 3

Bike 4

Bike 5

Motorcycle rider survey

33. How regularly do you ride off-road?

- ◯ Weekly
- ◯ Monthly
- ◯ 6-11 times a year
- ◯ 1-5 times a year
- ◯ I used to ride off-road but not any more
- ◯ I have ridden no more than a couple of times off road
- ◯ I have never ridden off-road

Optional additional comments

34. Have you ever had a motorcycle accident while riding on a public road?

- ◯ Yes
- ◯ No

Motorcycle rider survey

Accidents

This section is about the most recent accident you have been involved in while riding on a public road.

35. When did your most recent on-road accident occur?

Year

Month

Day of the week

Time (to the nearest hour, in 24 hour time)

36. For what purpose were you riding at the time of your most recent accident?

- ◯ Recreation
- ◯ Commuting to/from work or study
- ◯ Work purposes (eg courier)

Other (please specify)

37. What sort of road was it?

- ◯ Freeway
- ◯ Major road
- ◯ Minor road

Optional additional comments

38. Was it an urban/built-up area or a rural/open-road area?

◯ Urban ◯ Rural

39. Did the accident occur at an intersection?

◯ Yes ◯ No

40. Did the accident occur on a curve or a straight section of road?

◯ Curve ◯ Straight

Motorcycle rider survey

41. Who had the right-of-way?

- ◯ I did
- ◯ They did
- ◯ No-one - it was a single-vehicle accident
- ◯ N/A

Optional additional comments

42. How long had you been riding on that trip before the accident occurred?

- ◯ Less than 15 mins
- ◯ 15-30 mins
- ◯ 31-60 mins
- ◯ More than an hour

43. What do you think were the most important factors that contributed to or caused the accident? You may choose up to 5 factors for each column if applicable.

	You	Main other party if applicable
Traffic hazard	☐	☐
Couldn't see far enough ahead	☐	☐
Speed (too fast for conditions OR exceeding limit)	☐	☐
Road surface features (tram lines, markings, pit lids, etc)	☐	☐
Worn tyres or other maintenance issue	☐	☐
Indicator was on when it shouldn't have been	☐	☐
Alcohol or drugs (prescription or illicit)	☐	☐
Lane filtering	☐	☐
Following too closely	☐	☐
Racing	☐	☐
Misjudged speed of other vehicle	☐	☐
Bad weather (rain, wind, etc)	☐	☐
Fatigue	☐	☐
Distraction	☐	☐
Poor road surface (potholes, loose gravel, oil, etc)	☐	☐
Bad line on a corner	☐	☐
Overtaking: wrong place/time	☐	☐

Optional additional comments

Motorcycle rider survey

44. What were you riding at the time?

Make

cc

Type of motorcycle

45. How much experience had you had riding THIS motorcycle before the accident?

- ◯ I had never ridden this motorcycle before
- ◯ Less than 100km
- ◯ 101-1000km,
- ◯ 1001-5000km
- ◯ More than 5000km

Optional additional comments

46. Were you riding alone at the time of the accident?

	yes	no
I was riding with a group	◯	◯
I had a pillion	◯	◯

47. Was anyone else involved in the accident?

- ☐ Pillion
- ☐ Pedestrian
- ☐ Another motorcycle
- ☐ A car
- ☐ A truck
- ☐ No

Optional additional comments

48. Were you injured?

- ◯ Not injured
- ◯ Treated at scene
- ◯ Treated at hospital but not admitted
- ◯ Admitted to hospital

Would you like to describe your injuries?

Motorcycle rider survey

49. What was the worst level of injury sustained by someone else involved in the accident?

- ◯ No-one else was injured
- ◯ Someone else was treated at scene
- ◯ Someone else was taken to hospital
- ◯ Someone else was killed
- ◯ I don't know

50. Approximately how far away from your home did the accident occur?

- ◯ Less than 5km
- ◯ 5km-10km
- ◯ 11km-50km
- ◯ 51km-100km
- ◯ More than 100km

51. What level of licence did you have at the time of the accident?

	Motorcycle	Car
No licence or permit	☐	☐
Learner permit	☐	☐
Probationary/restricted	☐	☐
Full/open/unrestricted	☐	☐

52. What do you think is the share of the blame for the accident?

	0% my fault		50/50		100% my fault
Blame	◯	◯	◯	◯	◯

53. Do you think your riding behaviours, attitudes or patterns of riding changed after this accident?

- ◯ Yes
- ◯ No

If yes, in what way?

54. Thank you for describing your most recent accident. Have you had another accident that was more severe?

- ◯ Yes
- ◯ No

Page 14

Motorcycle rider survey

Worst accident

You indicated that your most recent accident was not your most severe accident. This section is about your most severe accident on a public road.

55. When did your worst on-road accident occur?

Year

Month

Day of the week

Time (to the nearest hour, in 24 hour time)

56. For what purpose were you riding at the time of your worst accident?

- ◯ Recreation
- ◯ Commuting to/from work or study
- ◯ Work purposes (eg courier)
- ◯ Other

Other (please specify)

57. What sort of road was it?

- ◯ Freeway
- ◯ Major road
- ◯ Minor road

Optional additional comments

58. Was it an urban/built-up area or a rural/open-road area?

◯ Urban ◯ Rural

59. Did the accident occur at an intersection?

◯ Yes ◯ No

60. Did the accident occur on a curve or a straight section of road?

◯ Curve ◯ Straight

Page 15

15 of 28

Motorcycle rider survey

61. Who had the right-of-way?

- ◯ I did
- ◯ They did
- ◯ No-one - it was a single-vehicle accident
- ◯ N/A

Optional additional comments

62. How long had you been riding on that trip before the accident occurred?

- ◯ Less than 15 mins
- ◯ 15-30 mins
- ◯ 31-60 mins
- ◯ More than an hour

Motorcycle rider survey

63. What do you think were the most important factors that contributed to or caused the accident? You may choose up to 5 factors for each column if applicable.

	You	Main other party if applicable
Bad or incorrect motorcycle/vehicle handling	☐	☐
Distraction	☐	☐
Speed (too fast for conditions OR exceeding limit)	☐	☐
Road surface features (tram lines, markings, pit lids, etc)	☐	☐
Braking too late or incorrectly	☐	☐
Poor road surface (potholes, loose gravel, oil, etc)	☐	☐
Traffic hazard	☐	☐
Worn tyres or other maintenance issue	☐	☐
Indicator was on when it shouldn't have been	☐	☐
Overtaking: wrong place/time	☐	☐
Bad line on a corner	☐	☐
Following too closely	☐	☐
Alcohol or drugs (prescription or illicit)	☐	☐
Fatigue	☐	☐
Bad weather (rain, wind, etc)	☐	☐
Misjudged speed of other vehicle	☐	☐
Racing	☐	☐
Lane filtering	☐	☐
Couldn't see far enough ahead	☐	☐

Optional additional comments

64. What were you riding at the time?

Make _____

cc _____

Type of motorcycle

Motorcycle rider survey

65. How much experience had you had riding THIS motorcycle before the accident?

- ◯ I had never ridden this motorcycle before
- ◯ Less than 100km
- ◯ 101-1000km,
- ◯ 1001-5000km
- ◯ More than 5000km

Optional additional comments

66. Were you riding alone at the time of the accident?

	yes	no
I was riding with a group	◯	◯
I had a pillion	◯	◯

67. Was anyone else involved in the accident?

- ☐ Pillion
- ☐ Pedestrian
- ☐ Another motorcycle
- ☐ A car
- ☐ A truck
- ☐ No

Optional additional comments

68. Were you injured?

- ◯ Not injured
- ◯ Treated at scene
- ◯ Treated at hospital but not admitted
- ◯ Admitted to hospital

Would you like to describe your injuries?

Page 18

18 of 28

Motorcycle rider survey

69. What was the worst level of injury sustained by someone else involved in the accident?

- ◯ No-one else was injured
- ◯ Someone else was treated at scene
- ◯ Someone else was taken to hospital
- ◯ Someone else was killed
- ◯ I don't know

70. Approximately how far away from your home did the accident occur?

- ◯ Less than 5km
- ◯ 5km-10km
- ◯ 11km-50km
- ◯ 51km-100km
- ◯ More than 100km

71. What level of licence did you have at the time of the accident?

	Motorcycle	Car
No licence or permit	☐	☐
Learner permit	☐	☐
Probationary/restricted	☐	☐
Full/open/unrestricted	☐	☐

72. What do you think is the share of the blame for the accident?

	0% my fault		50/50		100% my fault
Blame	◯	◯	◯	◯	◯

73. Do you think your riding behaviours, attitudes or patterns of riding changed after this accident?

- ◯ Yes
- ◯ No

If yes, in what way?

Page 19

Motorcycle rider survey

Demographic questions

74. What is your gender?

◯ Male ◯ Female

75. In what year were you born?

Year

76. What is the postcode where you live?

Postcode

77. In each of the boxes below please type the year (eg 1999) you obtained your CAR driving licence or permit. For any you don't have please leave blank.

I got a car learner permit in (year)

I got a probationary/restricted car licence in (year)

I got a full/open car licence in (year)

78. Marital status?

◯ Single (never married)

◯ Married/living with partner

◯ Separated/divorced/widowed

79. Highest level of education?

◯ Primary school

◯ Started secondary school but did not complete year 12

◯ Completed year 12

◯ Started or completed technical college, university or similar

◯ Other (please specify)

Page 20

Motorcycle rider survey

80. Present job situation? (You may choose more than one option)

- [ ] Full-time work
- [ ] Part-time work
- [ ] Carer, pension or unemployed
- [ ] Student
- [ ] Home maker
- [ ] Other (please specify)

81. What is your approximate gross annual income?

- ◯ Less than $20,000
- ◯ $20,001-$50,000
- ◯ $50,001-$80,000
- ◯ More than $80,000
- ◯ I'd prefer not to say

82. Have you incurred a traffic infringement within the last three years while riding a motorcycle?

- ◯ Yes
- ◯ No

Motorcycle rider survey

Infringements

This section is about infringements you have incurred while riding a motorcycle.

83. How many times have you been detected exceeding the speed limit?

	Number of times
During the last 12 months	
During the last 3 years	

For your most recent speeding infringement(s) please indicate how fast you were riding and what the speed limit was - one infringement per row.

84. How many times have you been detected with a BAC in excess of what you are allowed for your class of licence?

	Number of times
During the last 12 months	
During the last 3 years	

85. Please describe any other traffic infringements you have incurred in the last three years (eg riding unlicensed, unroadworthy motorcycle, etc)

Page 22

Motorcycle rider survey

Riding attitudes & behaviours

This section is about your attitudes and behaviours as a rider.

86. Compared with other motorcycle riders your age and sex, how likely do you think it is that you will be involved in an accident while riding a motorcycle on a public road within the next 12 months?

◯ Much less likely ◯ Less likely ◯ Equally likely ◯ More likely ◯ Much more likely

87. Compared with other motorcycle riders your age and sex, how much better or worse do you think you are at each of the following while riding?

	Much better	Better	Above average	About the same	Below average	Worse	Much worse
Controlling the motorcycle (i.e. vehicle control skills)	◯	◯	◯	◯	◯	◯	◯
Spotting hazards	◯	◯	◯	◯	◯	◯	◯
Getting out of hazardous situations	◯	◯	◯	◯	◯	◯	◯
Anticipating what other road users are going to do	◯	◯	◯	◯	◯	◯	◯

Motorcycle rider survey

88. How often have these things happened to you over the last 12 months?

	Never						Always
Pulled onto a main road in front of a vehicle you hadn't noticed or whose speed you misjudged	◯	◯	◯	◯	◯	◯	◯
Not bothered to put on all your protective gear because you were only riding a short distance or it was too warm	◯	◯	◯	◯	◯	◯	◯
Disregarded the speed limit late at night or in the early hours of the morning	◯	◯	◯	◯	◯	◯	◯
Ridden too fast for the conditions	◯	◯	◯	◯	◯	◯	◯
Attempted to overtake someone you hadn't noticed signaling a right turn	◯	◯	◯	◯	◯	◯	◯
Ridden when you might be affected by alcohol, drugs or fatigue	◯	◯	◯	◯	◯	◯	◯
Realised you have misjudged the speed of oncoming traffic while overtaking	◯	◯	◯	◯	◯	◯	◯
Checked the condition of your bike (tyres, lights etc) before setting out	◯	◯	◯	◯	◯	◯	◯
Ridden between two lanes of fast moving traffic	◯	◯	◯	◯	◯	◯	◯
Intentionally caught up to or kept up with another rider you have never met before	◯	◯	◯	◯	◯	◯	◯
Failed to notice or anticipate another vehicle pull out in front of you and had difficulty stopping	◯	◯	◯	◯	◯	◯	◯
Raced away from traffic lights to be ahead of traffic	◯	◯	◯	◯	◯	◯	◯
Run wide when going round a corner	◯	◯	◯	◯	◯	◯	◯
Allowed your mood to influence your riding	◯	◯	◯	◯	◯	◯	◯
Tried to break your own record for speed or time	◯	◯	◯	◯	◯	◯	◯
Followed another rider through an intersection, corner, overtaking etc and taken a greater risk than you intended	◯	◯	◯	◯	◯	◯	◯
Opened up the throttle to 'go for it' on a quiet road	◯	◯	◯	◯	◯	◯	◯
Not noticed a pedestrian crossing in front of you or stepping out from behind a parked vehicle	◯	◯	◯	◯	◯	◯	◯
Raced another rider or driver	◯	◯	◯	◯	◯	◯	◯
Locked up the rear wheel while braking	◯	◯	◯	◯	◯	◯	◯
Unintentionally or intentionally done a wheel spin	◯	◯	◯	◯	◯	◯	◯
Not cancelled your indicator	◯	◯	◯	◯	◯	◯	◯
Done a wheelie (on purpose or when taking off) or stoppie (on purpose or when stopping quickly)	◯	◯	◯	◯	◯	◯	◯
Ridden so fast into a corner that you scared yourself	◯	◯	◯	◯	◯	◯	◯
Not done a shoulder-check before changing lanes or pulling into traffic	◯	◯	◯	◯	◯	◯	◯
Traveled through a "Give Way" or "Stop" sign and almost crashed with another vehicle	◯	◯	◯	◯	◯	◯	◯
Exceeded the speed limit on a country/rural road or freeway	◯	◯	◯	◯	◯	◯	◯
Almost lost control on a corner	◯	◯	◯	◯	◯	◯	◯
Attempted to keep up with other riders or drivers going faster than you	◯	◯	◯	◯	◯	◯	◯
Needed to brake urgently to avoid rear-ending a vehicle stopping or slowing in front of you	◯	◯	◯	◯	◯	◯	◯
Been unstable when riding at low speed	◯	◯	◯	◯	◯	◯	◯

Motorcycle rider survey

Been distracted or pre-occupied and nearly had a crash	◯	◯	◯	◯	◯	◯	◯
Locked up the front wheel while braking	◯	◯	◯	◯	◯	◯	◯
Exceeded the speed limit on a residential road	◯	◯	◯	◯	◯	◯	◯
Skidded on a wet road, manhole cover, road markings, etc	◯	◯	◯	◯	◯	◯	◯

89. Consider each statement below and how it applies to how you ride, and decide how strongly you agree or disagree with it.

	Strongly agree	Agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Disagree	Strongly disagree
I am Careful rather than Careless	◯	◯	◯	◯	◯	◯	◯
I am Safe rather than Risky	◯	◯	◯	◯	◯	◯	◯
I am Irritable rather than Placid	◯	◯	◯	◯	◯	◯	◯
I am Inattentive rather than Attentive	◯	◯	◯	◯	◯	◯	◯
I am Nervous rather than Confident	◯	◯	◯	◯	◯	◯	◯
I am Responsible rather than Irresponsible	◯	◯	◯	◯	◯	◯	◯
I am Intolerant rather than Tolerant	◯	◯	◯	◯	◯	◯	◯
I am Selfish rather than Considerate	◯	◯	◯	◯	◯	◯	◯
I am Experienced rather than Inexperienced	◯	◯	◯	◯	◯	◯	◯
I am Indecisive rather than Decisive	◯	◯	◯	◯	◯	◯	◯
I am Patient rather than Impatient	◯	◯	◯	◯	◯	◯	◯
I am Slow rather than Fast	◯	◯	◯	◯	◯	◯	◯

Motorcycle rider survey

90. How much do you agree/disagree with the following statements?

	Strongly agree	Agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Disagree	Strongly disagree
I would like to be a professional racer	◯	◯	◯	◯	◯	◯	◯
I get a sense of freedom when riding	◯	◯	◯	◯	◯	◯	◯
Riding is risky	◯	◯	◯	◯	◯	◯	◯
When riding I can feel the road	◯	◯	◯	◯	◯	◯	◯
When it is safe and I am not likely to be caught I like to open it up a bit	◯	◯	◯	◯	◯	◯	◯
I think riding is more fatiguing than driving a car	◯	◯	◯	◯	◯	◯	◯
Riding is a good social activity	◯	◯	◯	◯	◯	◯	◯
I take calculated risks when riding	◯	◯	◯	◯	◯	◯	◯
When riding I feel I am one with my machine	◯	◯	◯	◯	◯	◯	◯
I like the manoeuvrability of a motorcycle	◯	◯	◯	◯	◯	◯	◯
I ride more cautiously than the average rider	◯	◯	◯	◯	◯	◯	◯
I like accelerating rapidly	◯	◯	◯	◯	◯	◯	◯
I like to ride hard	◯	◯	◯	◯	◯	◯	◯
I would like to ride on a road with no speed limits	◯	◯	◯	◯	◯	◯	◯

91. Why did you initially take up riding? (Choose 3)
And why do you ride now? (Choose 3)

	Initial reason for riding	Current reason for riding
Challenge or test my skills	☐	☐
Speed	☐	☐
Rush or thrill or test my nerve	☐	☐
Better able to deal with congestion, so quicker to get to work	☐	☐
Easier/quicker to park, or able to park closer to work	☐	☐
The social aspect	☐	☐
A better view of the traffic or of the environment	☐	☐
Chance to be alone or independent	☐	☐
Better able to feel the road &/or surroundings	☐	☐
It's cool, gets attention, etc	☐	☐
The physical workout	☐	☐
Cheap(er) transport	☐	☐
For fun/enjoyment	☐	☐

Other (please specify)

Page 26

Motorcycle rider survey

92. Approximately what percentage of accidents that involve a motorcyclist and a car driver do you think are the fault of the car driver?

	0% car driver fault		20% car driver		40% car driver		60% car driver		80% car driver		100% car driver fault
Fault	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯

93. Regardless of whether you've experienced them before, how confident are you or would you be when riding in the following conditions/situations?

	Very confident	Confident	Somewhat confident	Neither confident nor nervous	Somewhat nervous	Nervous	Very nervous
In the dark	◯	◯	◯	◯	◯	◯	◯
In bad weather (rain, wind, etc)	◯	◯	◯	◯	◯	◯	◯
With a pillion	◯	◯	◯	◯	◯	◯	◯
In heavy (peak hour) traffic	◯	◯	◯	◯	◯	◯	◯
With a group	◯	◯	◯	◯	◯	◯	◯
On an unfamiliar route	◯	◯	◯	◯	◯	◯	◯

94. In km/h, what is the fastest speed you have ridden on a public road

in the last 12 months

ever

95. What do you think are the biggest issues or risks currently facing motorcyclists?

96. Do you plan to ride a motorcycle on a public road during the next 12 months?

◯ Yes

◯ No

If no, why not?

Motorcycle rider survey

Finish

97. If you have participated in another component of this research project you will have been given a rider number. Please enter it here, otherwise leave it blank.

98. Finally, please indicate how you found out about this survey (you may choose more than one).

- [ ] Online advertising (Netrider, etc)
- [ ] Email from Honda or HART
- [ ] Magazine advertising (TwoWheels, Australian Motorcycle News, etc)
- [ ] By being involved in another component of this study
- [ ] Someone told me about it or forwarded me an email
- [ ] Through a club or group I am involved in
- [ ] Poster or flyer at uni or training provider

Other (please specify)

APPENDIX 2 ADVERTISEMENT - ROYAL AUTO

APPENDIX 3 **ADVERTISEMENT - AUSTRALIAN MOTORCYCLE NEWS**

MOTORCYCLE RIDER SURVEY

Do you hold a motorcycle learner permit or licence?

Have you ridden on-road in Australia in the last five years?

If YES, we would like to find out more about your riding patterns and experiences in Australia.

Please visit our website and fill in the questionnaire at:

www.monash.edu.au/muarc/projects/mcyclesurvey.html

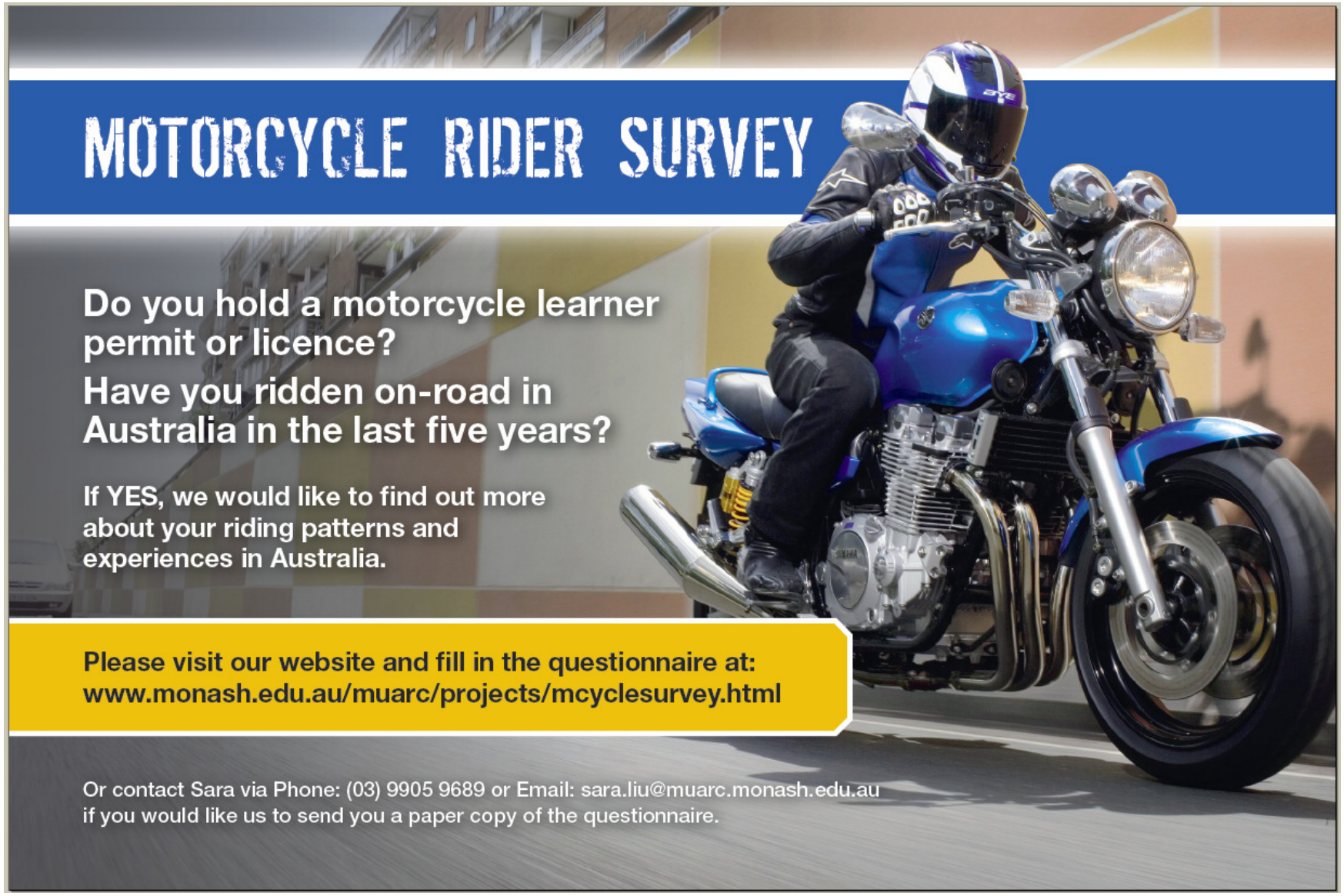
Or contact Sara via

Phone: (03) 9905 9689

Email: sara.liu@muarc.monash.edu.au

if you would like us to send you a paper copy of the questionnaire.

APPENDIX 4 ADVERTISEMENT - TWO WHEELS



APPENDIX 5 MEDIA RELEASE INFORMATION SHEET

Survey of motorcycle riders

Motorcycle riders aged under 25 have higher crash rates than motorcycle riders aged over 25 - a problem which exists worldwide and is also true for car drivers. However, in recent years, the number of 'older' riders killed and seriously injured in crashes has increased while the number of younger rider fatalities and serious injuries has decreased. This pattern has been found not only in Australia, but also in other developed countries including Europe and the UK.

The increase in older rider crashes may reflect an increase in the number of older riders returning to riding after a significant break or an increase in the number of older riders taking up riding for the first time.

Motorcycle riders can be categorised into three groups:

- Riders who have held licences and ridden for many years (continuing riders)
- Riders who have held licences for many years but have returned to riding only recently (returned riders)
- Riders who have only obtained a licence recently (new riders).

Returned and continuing riders cannot be separated in the mass crash data or the licensing data so it is not possible to determine differences in crash characteristics and frequency between continuing, returned and new riders using these sources. The limited number of surveys of older riders (Haworth, Mulvihill & Symmons, 2002; Mulvihill & Haworth, 2006; Jamson & Chorlton, 2009) has found that returned riders rode more often in circumstances associated with increased crash risk compared to other riders.

The proposed research aims to support and extend previous research by focusing in detail on the characteristics and crash involvement patterns of a large sample of riders. Specifically, the objectives of the proposed research are as follows:

- To identify potential skill and knowledge deficiencies, attitudes and development needs of riders returning to riding after an extensive break

- To determine whether there is a need for a specific returned rider training program.

These questions will be addressed by comparing the characteristics and crash involvement patterns of returned riders with those of new and continuing riders. This information will provide important insight into the types of training and countermeasures that would be most beneficial for these different groups of riders with a particular focus on returned riders. The outcomes of this research will target an area of road safety where road trauma is increasing and the severity of injuries is often very high.

If you would like to know more about this project or about the work being done at Monash University Accident Research Centre, please contact Christine Mulvihill on (03) 9905 4367.

APPENDIX 6 EMAIL TO ORGANISATIONS & CLUB MEMERS

Monash University Accident Research Centre and Honda Australia Rider Training are conducting research to examine differences between motorcyclists with various levels of riding experience. The overall aim of the research is to improve safety for riders.

If you are currently legally entitled to ride a motorcycle on a public road in Australia (i.e. you hold a current motorcycle learner permit or full/open licence or restricted/provisional/probationary licence, or equivalent) AND have ridden on a public road in Australia within the last five years, we'd be very interested to hear about your riding patterns, attitudes to riding and riding experiences.

Please go to www.monash.edu.au/muarc/projects/mcyclesurvey.html and complete an on-line survey.

Thankyou.

APPENDIX 7 SCORING SHEET FOR ON-ROAD STUDY

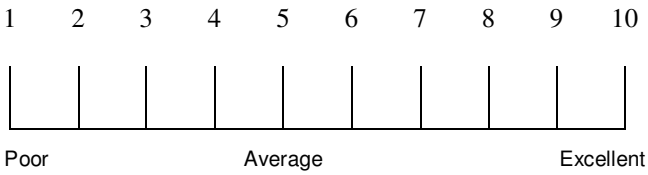
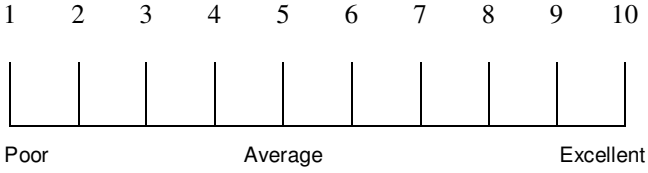
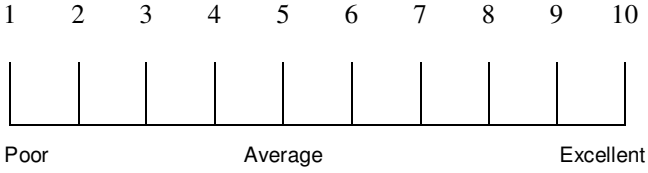
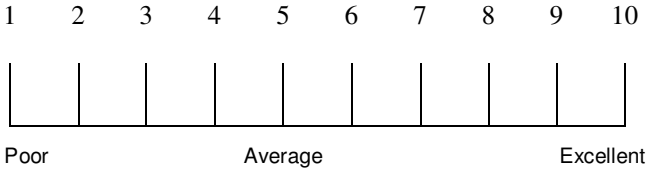
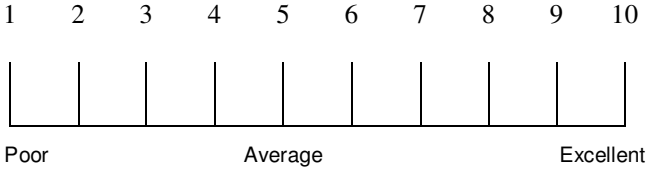
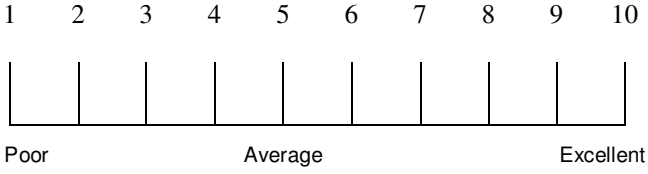
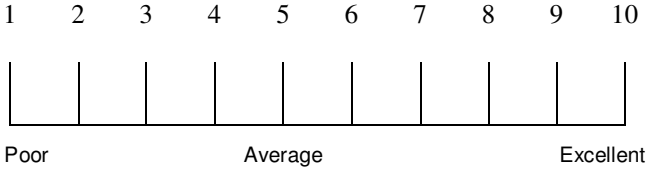
Participant ___

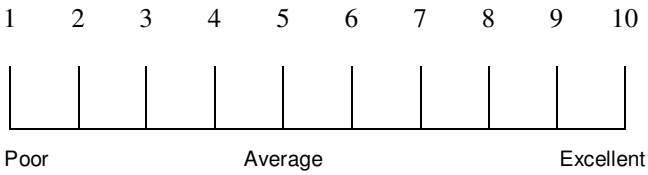
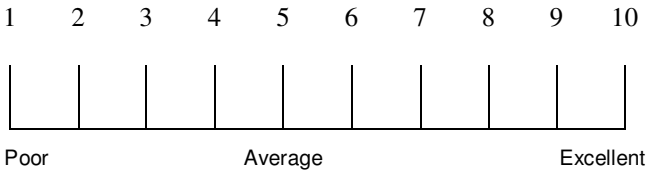
Participant evaluation

Thinking about the ride you just completed, please rate your own level of performance in the following areas.

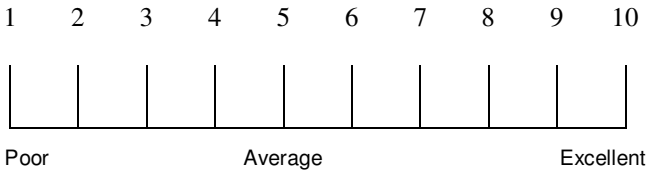
(Please place an "X" on the line below)

Speed control: appropriate speed for conditions, limit not exceeded	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Lane position: appropriate & safe position for single & dual carriageway, turning, intersections, etc; visibility & vision	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Hazard perception & response: detection of actual & potential hazards & appropriate response/precaution in terms of action & proportionate response	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Braking: timeliness, proportional & appropriate application, wheels not locked	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Buffering/survival space: appropriate spacing from vehicles, infrastructure, potential hazards	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent

Cornering: approach & in-corner – speed, line, no under- or over-steer, appropriate braking & acceleration settings, turn head - planning	
Gap acceptance when crossing & entering traffic	
Appropriate following distance	
Defensive riding: Read/anticipate other road user actions, identify situations early, no sudden braking or swerving	
Bike control: Correct gear, head checks, mirrors, travels with traffic	
Overtaking: planning, suitability, space, completion	
Turning position: defensive, manages road surface	

Signals: communication of intent to others	
Confidence	

For the ride you just completed, please rate your overall performance in terms of safety.



Any further comment you'd like to make?

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Instructor__ **Participant ___**

Instructor evaluation

Participant's bike:

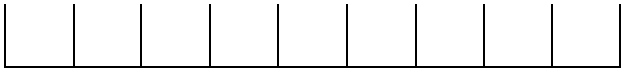
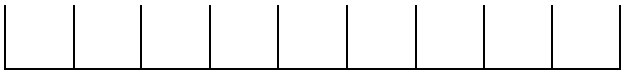
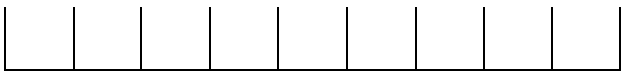
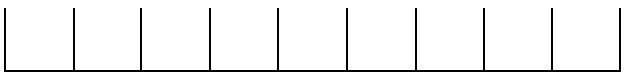
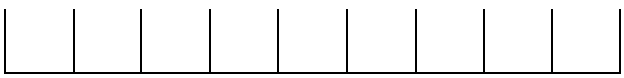
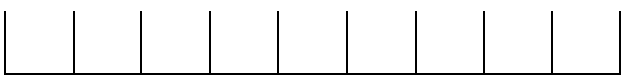
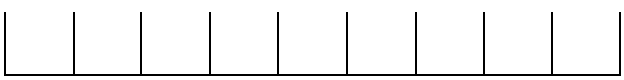
Make ___

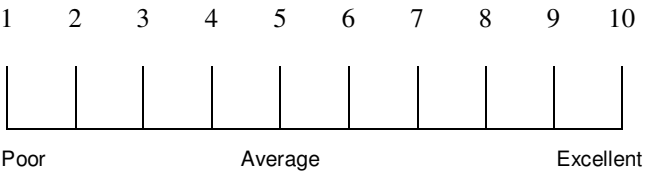
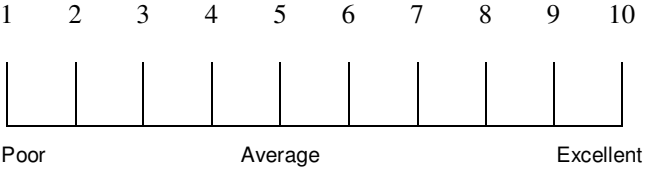
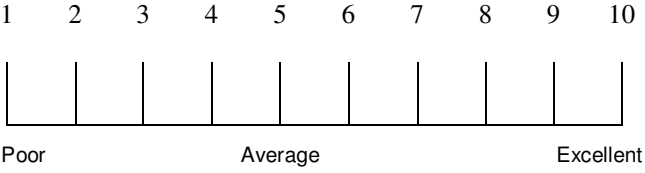
Model ___

Cc ___

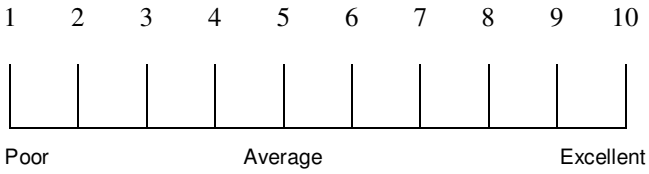
Thinking about the ride the participant just completed, please rate their performance in the following areas.

	(Please place an "X" on the line below)
Speed control: appropriate speed for conditions, limit not exceeded	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Lane position: appropriate & safe position for single & dual carriageway, turning, intersections, etc; visibility & vision	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Hazard perception & response: detection of actual & potential hazards & appropriate response/precaution in terms of action & proportionate response	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Braking: timeliness, proportional & appropriate application, wheels not locked	1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Buffering/survival space: appropriate spacing from vehicles, infrastructure,	

potential hazards	1 2 3 4 5 6 7 8 9 10  Poor Average Excellent
Cornering: approach & in-corner – speed, line, no under- or over-steer, appropriate braking & acceleration settings, turn head - planning	1 2 3 4 5 6 7 8 9 10  Poor Average Excellent
Gap acceptance when crossing & entering traffic	1 2 3 4 5 6 7 8 9 10  Poor Average Excellent
Appropriate following distance	1 2 3 4 5 6 7 8 9 10  Poor Average Excellent
Defensive riding: Read/anticipate other road user actions, identify situations early, no sudden braking or swerving	1 2 3 4 5 6 7 8 9 10  Poor Average Excellent
Bike control: Correct gear, head checks, mirrors, travels with traffic	1 2 3 4 5 6 7 8 9 10  Poor Average Excellent
Overtaking: planning, suitability, space, completion	1 2 3 4 5 6 7 8 9 10  Poor Average Excellent

Turning position: defensive, manages road surface	
Signals: communication of intent to others	
Confidence	

Please rate the participant's overall performance in terms of safety.



Additional comments:

……...

……...

……...

……...

Rater__ **Participant ___**

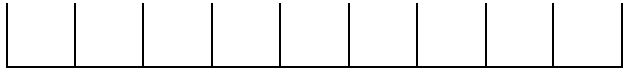
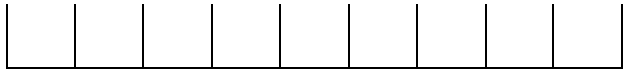
Video evaluation

Please count the number of instances the participant exhibits a non-preferred behaviour/action (eg a an individual instance of inappropriate speed), and score their overall level of performance in terms of number of instances and skill level in the following.

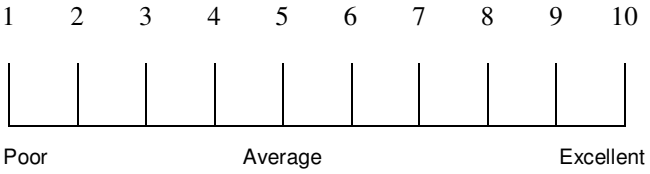
Behaviour	Number of instances	Overall score
Speed control: appropriate speed for conditions, limit not exceeded		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Lane position: appropriate & safe position for single & dual carriageway, turning, intersections, etc; visibility & vision		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Hazard perception & response: detection of actual & potential hazards & appropriate response/precaution in terms of action & proportionate response		1 2 3 4 5 6 7 8 9 10

		Poor Average Excellent
Braking: timeliness, proportional & appropriate application, wheels not locked		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Buffering/survival space: appropriate spacing from vehicles, infrastructure, potential hazards		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Cornering: approach & in-corner – speed, line, no under- or over-steer, appropriate braking & acceleration settings, turn head - planning		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Gap acceptance when crossing & entering traffic		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Appropriate following distance		1 2 3 4 5 6 7 8 9 10

		Poor Average Excellent
Defensive riding: Read/anticipate other road user actions, identify situations early, no sudden braking or swerving		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Bike control: Correct gear, head checks, mirrors, travels with traffic		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Overtaking: planning, suitability, space, completion		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Turning position: defensive, manages road surface		1 2 3 4 5 6 7 8 9 10 Poor Average Excellent
Signals: communication of intent to others		

		1 2 3 4 5 6 7 8 9 10  Poor Average Excellent
Confidence		1 2 3 4 5 6 7 8 9 10  Poor Average Excellent

Please rate the participant's overall performance in terms of safety.



Which rider group do you think this participant belongs to?

□ New rider

□ Returned rider

□ Ongoing rider

Additional comments:

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