

Identifying and characterising crashes of returning riders: A new approach

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Abstract

Surveys have identified that many older motorcyclists are returning riders but it is difficult to draw conclusions about their crash risk because of discrepancies in definitions and the inability to identify returning riders in official crash databases. Analyses of NSW crash data were undertaken in which returning riders were defined as aged 25 and over, holding a full licence 10 years prior to the crash, and not the registered operator of one or more motorcycles during the 5-10 years prior to the crash. Based on this definition, there were 472 riders in casualty crashes in 2005-09 who were returning riders (5.5% of riders aged 25 and over in casualty crashes) and the characteristics of their crashes were similar to those involving continuing riders. In contrast, crashes of new riders were more likely to have characteristics suggestive of relatively more riding in urban areas, probably for transport rather than recreation. More work is recommended to assess the validity of the definition to allow a better understanding of the effects of long periods away from riding on riding skills and crash risk.

Introduction

There has been an upward trend in fatal and serious injury crashes among older motorcyclists (ARTD Consultants, 2011; Johnston, Brooks & Savage, 2008), leading to the perception that the 'returning rider' could be an issue. This pattern of increasing crashes among older motorcyclists has been observed over the last two decades in Australia (Johnston, Brooks & Savage, 2008) and other developed countries including the United States (NHTSA, 2012) and the United Kingdom (Jamson & Chorlton, 2009). The increase in reported crashes among older riders has generally been associated with increases in the median age of motorcycle owners and motorcycle licence holders, as well as overall increases in motorcycle registrations (and usage).

Motorcyclists who are returning to riding following an extended break may be at greater risk of crashing because of limited recent riding experience. This concern has been expressed by authorities and other key stakeholders both locally and internationally (Mulvihill & Haworth, 2006; Symmons, Mulvihill, & Collins, 2011). There are two types of factors that have been claimed to potentially contribute to a greater crash risk of returning riders. The first is a deterioration in motorcycle handling skills resulting from lack of practice and the second is changes in motorcycle design and performance over time leading to unfamiliarity with the motorcycle. The authors consider it possible that the first probably develops over a shorter period than the second, because evolution in motorcycle design occurs over decades. However, returning riders may suffer the same phenomenon of increased crash risk with a new style of motorcycle that is found even with continuing riders (Haworth, Smith, Brumen & Pronk, 1997). Returning riders may also have attitudes and behaviours which contribute to crash risk (Mulvihill & Symmons, 2010).

The research reported here was commissioned by the then Roads and Traffic Authority of NSW (RTA) in 2011 to understand if 'returning riders' is a potential motorcycle crash risk category. The paper focuses on the methods used to identify and characterise returning riders, and because of space limitations, the reader is referred to other sources for more detailed comparisons of the safety of new, continuing and returned riders (Jamson, Chorlton & Connor, 2005; Mulvihill & Haworth, 2006; Mulvihill & Symmons, 2010; Symmons, Mulvihill, & Collins, 2011).

Previous approaches to defining and identifying returning riders

While the term ‘returning rider’ was used for this research, a variety of other terms has been used in the literature, including ‘returned rider’, ‘born again rider’, ‘born again biker’ and ‘BAMBI’ (born again middle-aged biker).

In the older rider literature, returning riders are often compared to ‘new’ and ‘continuing’ riders. New riders are generally defined as those who hold a learner or provisional licence or have held an open licence for only a small number of years. Continuing riders are generally defined as those who have held a licence and ridden for a long period of years without a substantial break.

Those who are currently riding regularly are sometimes referred to as ‘active’ riders, in contrast to those who hold a licence but have not ridden regularly in the recent past, who are commonly termed ‘dormant’ riders. Dormant riders have the potential to become returning riders in the future. Active riders may cease riding in the future, either temporarily (thereby becoming dormant and potential returning riders) or permanently.

Conceptually, a returning rider is someone who was an active rider in the past, who then became a dormant rider for a period of time and recently became an active rider again.

Thus, returning riders are a subset of active riders. Haworth, Mulvihill and Symmons (2002) defined ‘riders’ to be those motorcycle licence holders who reported they had ridden in the previous 12 months. ‘Non-riders’ (equivalent to dormant riders) were those licence holders who reported that they had not ridden in the previous 12 months. In a later survey, Mulvihill and Haworth (2006) used a wider definition of active riders by including all those respondents who had ridden in Australia in the last 5 years. More recent research commissioned by the Queensland department of Transport and Main Roads (TMR) defined active riders as those who both held a licence and currently were the registered owner of a motorcycle (n=103,014) (ARTD Consultants, 2011). There were many more individuals who held a licence but were not the registered owner of a motorcycle (n=581,446) and a similar number who were the registered owner of a motorcycle but did not have a motorcycle licence (n=132,372).

Returning riders may not necessarily be older riders. Depending on the definition used, a ‘returning rider’ may be aged below 30 or even 25 years if (for example) they had ridden for a few years after obtaining a licence, ceased riding for 1 or more years, then resumed riding in the last year or so. The definition of an ‘older rider’ appears to differ across jurisdictions. VicRoads commissioned research in which older riders were defined as those over 30 years of age (Haworth, Mulvihill & Symmons, 2002). In that survey, returning riders had to have obtained their licence prior to 1995, resulting in a minimum age of about 33 years. In research commissioned by the Motor Accidents Authority of NSW (Mulvihill & Haworth, 2006), the minimum age for inclusion in the survey was specified as 25 years. However, the recent study of older riders in Queensland focused on those aged 45 years and over (ARTD Consultants, 2011). Given that the median age of newly licensed motorcyclists is about 33 years (Haworth, Rowden, Wishart, Buckley & Greig, 2012), it seems sensible to have a definition of older riders that does not comprise the vast bulk of rider numbers.

Most of the earlier research has used survey methodologies in which riders are asked about their riding history and the definitions reflect these methodologies. For example, Haworth, Mulvihill and Symmons (2002, p.14) described returned riders as ‘riders who have held licences for many years but have only returned to riding recently’. They were identified in the survey responses as riders who obtained their licence prior to 1995 and who agreed with the statement that ‘I rode regularly when I first got my licence and then didn’t ride much for while and now have taken up riding again’. Their report also contains definitions of continuing and new riders.

In their report to the Motor Accidents Authority on crashes of returned riders, Mulvihill and Haworth (2006) classified returned riders as those who agreed with the statement 'I have held a licence for many years, but have only returned to riding recently'.

A more quantitative definition of returned riders was used by Symmons and Mulvihill (2010) in an on-line survey. Respondents were classified as returned riders if they obtained their permit or 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'.

Symmons, Mulvihill and Collins (2011) had possibly the strictest criteria for returning riders in their on-road study. Returning riders had to have returned to riding within the last six months after having stopped riding for a period of five or more years, having ridden at least 20,000 km prior to the break and no more than 500 km following their return.

A longer absence from riding was stipulated in research conducted in the UK (Jamson & Chorlton, 2009). This study defined returning riders as 'those who returned to riding from 1990 onwards having taken a break of 10 years or more' (p. 338). The maximum time spent riding or distance travelled since returning to riding was not specified, but the required break of 10 years minimum serves to ensure that returned riders would be over 25 years of age and mostly over 30 years.

While they did not use a specific term, the evaluation of the Scottish Bikesafe program (Ormston et al., 2003) described a group of participants who reported that they 'had returned to riding in the last five years after a break in riding of a year or more'.

Two reports from the United Kingdom provide some limited information on returning riders, but neither offers an explicit definition of returning or returned riders (Sexton, Baughan, Elliott, & Maycock, 2004; Sexton, Hamilton, Baughan, Stradling, & Broughton, 2006). Survey questions used in these research projects asked if participants had had a break from riding of more than 1 year, suggesting that this was one of the measures used to identify returning riders. One of these reports shows that of those who had ceased riding for more than a year, the majority (70%) had ceased riding for five years or more, suggesting that a longer than 1 year timeframe for not riding is possibly more appropriate. A recent US telephone survey of motorcycle riders asked respondents if they had taken a break from riding of 2 years or more, though the time spent riding or the distance travelled since returning to riding was not reported (McCartt, Blunar, Teoh, & Strouse, 2011).

Developing an operational definition of returning riders to allow their identification in crash databases

Most of the returning rider research has used survey methodologies where motorcyclists were directly asked if they are currently riding and when they have ridden in the past. This is clearly not possible using official crash, licensing and registration databases, so proxy measures for riding activity must be used.

As noted in the earlier section, a returning rider can be conceptually defined as someone who was an active rider in the past, who then became a dormant rider for a period of time and recently became an active rider again. The only proxy for active riding in the official databases is being the owner of a registered motorcycle. Christie and Newland (2006) support this approach and note that the ratio of licence holders to registered motorcycles is greater than two to one in Victoria and almost four to one in NSW. It is acknowledged that this is an imperfect proxy variable, in that some people might continue to own a registered motorcycle while not riding and that some people might ride a motorcycle that is registered to someone else (and not own a registered motorcycle). Queensland data suggests that more than half of motorcycle registrations are held by individuals who do not hold a motorcycle licence (ARTD Consultants, 2011).

In terms that relate to official databases, a returning rider can be operationally defined as someone who obtained a motorcycle licence and owned a registered motorcycle in the past, who then did not own a registered motorcycle for a period of time, and then recently owned a registered motorcycle again.

No studies were found which examined the number of returning riders or their crash characteristics from official databases. The majority of the reported studies used self-reported crash involvement and a small number assessed riding skills on roads or closed courses. Thus, the preliminary analyses proposed for this study are a valuable first step in determining whether this is a feasible and valuable approach.

The research reviewed earlier provides little guidance on the choice of how long the period of not owning a motorcycle needs to be to result in deterioration in riders' skills and familiarity with the motorcycle. The periods of non-riding used in the definitions of returned riders varied from at least a year to five or more years.

The research similarly provides little guidance on how long the period should be from when riding recommences, or alternatively the distance travelled since returning to riding. The literature varies from 'no more than 500 km' (which cannot be established in official databases) to 'within the last three years'. Many studies provide no measure of this period. One practical consideration in using the operational definition to identify returning rider crashes is to have a period that is long enough for a sufficient number of crashes to have occurred to allow meaningful statistical analyses.

The other issue is whether the crash period should be fixed (e.g. the last five years) or whether it should be rider-specific, relating to when the rider most recently changed from being a non-owner of a registered motorcycle to be an owner of a registered motorcycle. While the second approach probably provides a more valid sample of returning riders, the former is a simpler approach for that was chosen for this study. The second approach may be an option for future research.

Method

An operational definition of returning riders was developed to allow returning riders to be identified by analysing NSW crash, licensing and registration data. The approach below attempts to link the time periods to when each crash occurred on an individual basis. Thus returning riders in crashes in NSW in 2005-2009 are defined as:

those who are aged 25 and over, held a full NSW motorcycle licence 10 years prior to the crash, and were not the registered operator of a motorcycle during the period 5-10 years prior to the crash.

One example of a rider thus defined in the data as 'returning' is one who crashed in 2009 at 35 years of age, was first fully licensed in NSW in 1994 at 20 years of age, and was not the (NSW) registered operator of a motorcycle between 1999 and 2006.

Continuing riders are defined as:

those who are aged 25 and over, and held a full NSW motorcycle licence at the time of the crash and were not identified as returning riders by the data analysis

New riders are defined as:

those who are aged 25 and over, and held a NSW learner or provisional motorcycle licence at the time of the crash

There was a remaining group of riders who were classified as “other riders”. They comprised:

those who are aged 25 and over, with a non-NSW motorcycle licence or unlicensed/expired/disqualified

The “other riders” are a mixture of a high risk group of riders who are not legally permitted to ride and riders who happen to have crashed in NSW while holding a licence from interstate or overseas. Clearly, members of this group are, in reality, a mixture of returning, continued and new riders, but the available data would not allow this allocation to occur.

The definitions above applied in the manner described in Table 1 identified 472 (5.5%) returning, 5,800 (65.1%) continuing, 709 (8.0%) new and 1,928 (21.6%) other riders aged 25 and over in crashes in NSW in 2005-2009. The greatest attrition in numbers of fully licensed riders in crashes occurred in step 4 in which customers who have obtained L, P or full motorcycle licence in the 10 years prior to the crash were excluded. The licensing data base had records for 5,674 fully licensed riders in crashes, but the step 4 requirement excluded 4,323 of these riders (who later became classified as continuing riders), leaving only 1,351 riders. If the step 4 requirement was less onerous, (for example, if it was 5 years prior to the crash rather than 10), then fewer riders would have been excluded and the consequent number of returning riders identified by the process would have been greater.

The step 5 requirement that excluded customers who were the registered operator of one or more motorcycles at any time during the period 5-10 years prior to the crash removed an additional 879 riders, leaving 472. This was the criterion for establishing a period in which the rider was “dormant”. If the rider had been the registered operator of one or more motorcycles at, say 8 years prior to the crash, then had not ridden until perhaps the year of the crash, then they would not have been identified as a returning rider (and would have been classified as a continuing rider).

Table 1. Steps involved in identification of returning riders from NSW crash, licensing and registration data.

Step 1.	Create a master data file (File 1) that contains all motorcycle riders in fatal and injury crashes in NSW 2005-2009 who are aged 25 and over – keep copy for later analyses (N=8909)
Step 2.	Create a subset (File 2) of the master data file that includes riders with full NSW motorcycle licence only (N=5983)
Step 3.	Match the customer numbers in File 2 with the licensing database (309 did not match)
Step 4.	Make File 3 by excluding customers who have obtained L, P or full motorcycle licence in the 10 years prior to the crash (1351 were left)
Step 5.	Make File 4 by excluding customers who were the registered operator of one or more motorcycles at any time during the period 5-10 years prior to the crash (879 excluded, leaving 472)
Step 6.	Match the customer numbers in File 4 back to File 1 and label these customers as ‘returning riders’. Call the variable ‘type of rider’ if this is appropriate.
Step 7.	Label the motorcycle riders in File 1 who had an L or P licence at the time of the crash as ‘new riders’
Step 8.	Label the motorcycle riders in File 1 who had a full licence at the time of the crash but are not ‘returning riders’ as ‘continuing riders’.
Step 9.	Label the motorcycle riders in File 1 who were non-NSW riders or Unlicensed/Expired/Disqualified as ‘other riders’.

The examination of the number of riders excluded at each stage of the analysis to identify returning riders suggests that some returning riders were “missed” and that this may have resulted in an underestimate of the number of returning riders in crashes. It is also likely that some riders were identified as returning riders who, in reality, would better have been classified as continuing riders because they had significant time riding prior to their crash (and so are likely to have restored their skill levels).

Results

Characteristics of returning rider crashes

Table 2 summarises the characteristics of the casualty crashes of the returning, continuing, new and other riders aged 25 and over identified from the crash, licensing and registration databases. About 42% of returning riders were in single vehicle crashes, about 66% on weekdays, about 61% in metropolitan areas and three-quarters in low speed zones (less than 70 km/h). In general, the returning riders were involved in very similar crashes to those of continuing riders in terms of number of vehicles involved, time of day and weekday/weekend, metropolitan/country and speed zone. In contrast, new riders had relatively more multiple vehicle crashes, on weekdays, in metropolitan areas and in lower speed zones. Together, this suggests that new riders were riding more in urban areas. The higher percentages of “other” riders in single vehicle, country and high speed zone crashes probably reflects that this group includes riders licensed interstate who are more likely to be involved in crashes in border regions, which are country areas.

Characteristics of returning riders in crashes

Table 3 compares the characteristics of the returning, continuing, new and other riders aged 25 and over in casualty crashes. There were 12 returning riders killed in crashes, comprising 2.5% of returning riders killed and injured. Returning riders comprised 4.6% of motorcycle riders aged 25 and over who were killed in crashes from 2005-2009. It should be noted that a different definition of returning riders would have led to a different percentage.

Almost 60% of returning riders involved in casualty crashes were aged 25 to 39, with almost 40% aged 40 to 59. Less than 3% were aged 60 and over. Continuing riders were somewhat older on average than returning riders and new riders were much younger (more than 80% aged 25-39). “Other” riders were more likely to be aged 60+ (18.2%) than returning, continuing or new riders in crashes. The higher proportion of returning riders than continuing riders in the 25-39 year age group contradicts the findings of the studies of self-reported crash involvement, which generally report that returning riders are older on average than continuing and new riders. It is possible that the method used here to identify returning riders in the crash database was less likely to exclude 25-39 year old riders according to the criterion that they had been the registered operator of one or more motorcycles in the period 5-10 years before the crash, because some of the 25-39 year olds would have been too young to have been licensed then. This needs further investigation in later research.

Returning riders were less likely to be female than other riders (less than 5%). New riders were most likely to be female (17.3%).

The NSW crash data includes a list of contributing factors to crashes. Information about these is summarised in Table 4. Rider error and speeding were identified as each contributing to about a quarter of returning rider crashes, similar to crashes of continuing riders. The contribution of fatigue, alcohol, equipment and distraction were also similar for returning and continuing rider crashes. New rider crashes were less likely to involve speeding and other rider crashes were more likely to involve fatigue and alcohol.

Table 2. Returned, continuing, new and other riders aged 25 and over according to the characteristics of their motorcycle casualty crashes. NSW 2005-09

Crash characteristic	Returning	Continuing	New	Other
	Number of riders (Percent)	Number of riders (Percent)	Number of riders (Percent)	Number of riders (Percent)
Single vehicle	197 (41.7)	2,479 (42.7)	256 (36.1)	934 (48.4)
Multiple vehicle	275 (58.3)	3,321 (57.3)	453 (63.9)	994 (51.6)
Weekday	310 (65.7)	3,750 (64.7)	508 (71.7)	1,222 (63.4)
Weekend	162 (34.3)	2,050 (35.3)	201 (28.3)	706 (36.6)
Metropolitan	287 (60.8)	3,412 (58.8)	532 (75.0)	996 (51.7)
Country	185 (39.2)	2,388 (41.2)	177 (25.0)	909 (48.3)
Speed zone (km/h)				
<70	354 (75.0)	4,516 (71.7)	597 (84.2)	1,395 (72.4)
70-90	62 (13.1)	742 (12.8)	64 (9.0)	203 (10.5)
100+	56 (11.9)	902 (15.6)	48 (6.8)	330 (17.1)

Table 3. Characteristics of returned, continuing, new and other riders aged 25 and over riders in motorcycle casualty crashes. NSW 2005-09

Rider characteristic	Returning	Continuing	New	Other
	Number of riders (percent)	Number of riders (percent)	Number of riders (percent)	Number of riders (percent)
Killed	12 (2.5)	188 (3.2)	12 (1.7)	47 (2.4)
Injured	460 (97.5)	5,612 (96.8)	697 (98.3)	1,881 (97.6)
25-39	275 (58.3)	2,718 (46.9)	588 (82.9)	966 (51.7)
40-59	184 (39.0)	2,615 (45.1)	93 (13.1)	582 (30.2)
60+	13 (2.8)	467 (8.1)	28 (3.9)	350 (18.2)
Male	449 (95.1)	5,384 (92.8)	586 (82.7)	1,648 (85.5)
Female	23 (4.9)	415 (7.2)	123 (17.3)	155 (8.0)
Unknown	0 (0.0)	1 (0.0)	0 (0.0)	125 (6.5)

Table 4. Returned, continuing, new and other riders aged 25 and over according to factors identified as contributing to casualty crashes. NSW 2005-09.

Contributing factor	Returning	Continuing	New	Other
Speeding	25.4%	24.7%	19.0%	27.4%
Fatigued	5.3%	6.2%	4.7%	10.3%
Alcohol	2.5%	3.0%	3.2%	10.0%
Equipment	1.5%	1.3%	1.7%	2.2%
Distraction	5.7%	4.6%	5.2%	5.4%
Rider error	26.7%	27.1%	26.5%	32.4%

Discussion and conclusions

In this research, operational definitions that could be used to identify returned, new and continuing riders were developed to allow their comparison in crash data. The existing research literature regarding returning riders is largely based on self-reported crash involvement collected by surveys

which are likely to reflect involvement in crashes of low severity (and not be necessarily predictive of involvement in more serious crashes) and to reflect riders who respond to surveys, who may be unrepresentative of riders at risk of crashing.

Preliminary analyses of NSW crash data were undertaken in which returning riders in crashes were defined as those who are aged 25 and over, held a full licence 10 years prior to the crash, and were not the registered operator of one or more motorcycles during the period 5-10 years prior to the crash. These analyses identified 472 riders in casualty crashes in 2005-09 who were returning riders, which corresponds to 5.5% of riders aged 25 and over in casualty crashes. In general, the characteristics of crashes involving returning riders were similar to those involving continuing riders. In contrast, crashes of new riders were more likely to have characteristics suggestive of relatively more riding in urban areas, probably for transport rather than recreation.

Strengths and limitations of the approach

The strength of this approach was that it enabled Police-reported casualty crashes of returning riders across an entire state to be analysed. Thus information about a large number of relatively serious crashes of returning riders was able to be examined, rather than the small number of such crashes that would be identified by even a large survey of riders. Thus, it could be argued that the approach taken is more useful for development of strategic policy for motorcycle safety regarding returning riders than survey approaches.

The approach taken in this paper shares some of the limitations of survey approaches to investigating returning rider safety in that the proportion of riders identified as returning riders is fundamentally dependent on the definition of returning riders that is adopted. As noted earlier in this paper, there is no strong theoretical basis for selecting the length of the period of non-riding, or the length of time (or distance travelled) since returning to riding. If shorter periods of non-riding or longer periods since returning to riding are chosen, then the proportion of riders identified as returning will be larger. If the definition of returning riders was different, this might also result in a different pattern of crashes.

The requirement in this study that a crashed rider had to not have been the registered operator of one or more motorcycles during a period 5-10 years preceding the crash means that some returning riders who had a period of non-riding (but still were the registered operator of a motorcycle) were misclassified in the analysis as continuing riders. This is likely to have been one contributor to the lower percentage of crashed riders classified as returning in the current study (5.5%) compared with surveys which have reported that returning riders comprised between 17% of riders aged 25 and over (mostly) in NSW (Mulvihill & Haworth, 2006) and 27% of riders aged 30 and over in Victoria (Haworth, Mulvihill & Symmons, 2002). Neither of these surveys required that the returning riders were not the registered owner of a motorcycle for a period before the crash.

Given the preliminary nature of the research reported here, the decision was made to use an approach where the focus was on returning riders in crashes, rather than all returning riders. Thus, the identification of returning riders commenced with the relatively constrained size of the crash database, rather than the much larger licensing database. This reduced the resources needed for analyses but meant that there was no information produced regarding non-crashed returning riders, preventing calculation of crash rates or risks for returning riders. Simply, the research provided information about the numbers and characteristics of crashes of returning riders, but not whether returning riders are more or less likely to crash than new or continuing riders. Thus the research reported here does little to address the debate in the literature regarding whether returning riders are disproportionately involved in crashes compared with other riders of the same age who have continued to ride without taking an extended break.

The contributing motorcycling crash factors associated with returning riders

There are two types of factors that have been claimed to potentially contribute to a greater crash risk of returning riders. The first is a deterioration in motorcycle handling skills resulting from lack of practice and the second is changes in motorcycle design and performance over time leading to unfamiliarity with the motorcycle. The variables which were analysed in the NSW crash data do not allow the relative contribution of these two factors to be clearly assessed. For example, if the percentage of crashes that were single vehicle was higher for returning riders than continuing riders, this could reflect either of the two factors. Similarly, “rider error” as a recorded contributing factor could also reflect either deterioration in skills or unfamiliarity with the motorcycle.

The countermeasures most often mentioned in the literature are those that involve rider training, followed by limiting dormant riders’ ability to return to riding by changing the licensing system. While the latter has been suggested in a range of jurisdictions, it has not been implemented anywhere to the authors’ knowledge. There has been little evaluation of refresher courses for returning riders and so it is not known whether they are a successful countermeasure in this context.

Further research requirements to inform the development of government policy and program options

Research is needed to address the gaps in knowledge regarding the following matters:

- Patterns of riding and licensing of returning riders
- Effect of dormancy on riding skills
- Number and characteristics of returning riders
- Reach and effectiveness of refresher courses for returning riders

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