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What can we learn from the crashes of learner riders?

Narelle Haworth, Peter Rowden, Ross Blackman, Barry Watson

Centre for Accident Research and Road Safety-Queensland, Queensland University of Technology, Brisbane, Australia

ABSTRACT

In some parts of Australia, people wanting to learn to ride a motorcycle are required to complete an off-road training course before they are allowed to practice on the road. In the state of Queensland, they are only required to pass a short multiple-choice road rules knowledge test. This paper describes an analysis of police-reported crashes involving learner riders in Queensland that was undertaken as part of research investigating whether pre-learner training is needed and, if so, the issues that should be addressed in training..

The crashes of learner riders and other riders were compared to identify whether there are particular situations or locations in which learner motorcyclists are over-involved in crashes, which could then be targeted in the pre-learner package. The analyses were undertaken separately for riders aged under 25 (330 crashes) versus those aged 25 and over (237 crashes) to provide some insight into whether age or riding inexperience are the more important factors, and thus to indicate whether there are merits in having different licensing or training approaches for younger and older learner riders. Given that the average age of learner riders was 33 years, under 25 was chosen to provide a sufficiently large sample of younger riders.

Learner riders appeared to be involved in more severe crashes and to be more often at fault than fully-licensed riders but this may reflect problems in reporting, rather than real differences. Compared to open licence holders, both younger and older learner riders had relatively more crashes in low speed zones and relatively fewer in high speed zones. Riders aged under 25 had elevated percentages of night-time crashes and fewer single unit (potentially involving rider error only) crashes regardless of the type of licence held. The contributing factors that were more prevalent in crashes of learner riders than holders of open licences were: inexperience (37.2% versus 0.5%), inattention (21.5% versus 15.6%), alcohol or drugs (12.0% versus 5.1%) and drink riding (9.9% versus 3.1%). The pattern of contributing factors was generally similar for younger and older learner riders, although younger learners were (not surprisingly) more likely to have inexperience coded as a contributing factor (49.7% versus 19.8%).

Some of the differences in crashes between learner riders and fully-licensed riders appear to reflect relatively more riding in urban areas by learners, rather than increased risks relating to inexperience. The analysis of contributing factors in learner rider crashes suggests that hazard perception and risk management (in terms of speed and alcohol and drugs) should be

included in a pre-learner program. Currently, most learner riders in Queensland complete pre-licence training and become licensed within one month of obtaining their learner permit. If the introduction of pre-learner training required that the learner permit was held for a minimum duration, then the immediate effect might be more learners riding (and crashing). Thus, it is important to consider how training and licensing initiatives work together in order to improve the safety of new riders (and how this can be evaluated).

INTRODUCTION

The number of motorcycles is increasing in many developed and developing countries (Jamson & Chorlton 2009; Paulozzi et al., 2007). Across Australia, the number of motorcycles registered increased by 67% from 2005 to 2012 (ABS, 2013), the strongest growth of any vehicle type. This increase in motorcycling means that there are many new riders who lack experience. Inexperience has been shown to be a major factor in motorcycle crashes (Rutter & Quine, 1996; Mullin et al., 2000) and the common response by governments is to apply graduated licensing principles or systems that have been developed from learner driver research. Whilst the learner stage has consistently been shown to be much safer for car drivers than the subsequent provisional stage, the same is not true for motorcyclists. For example, in the Australian state of New South Wales during 2011, learner motorcycle licence holders were involved in more injury crashes than provisional motorcycle licence holders (16.1% and 10.9%, respectively) (TfNSW, 2012). In contrast, learner car drivers were involved in only 1.0% of all car driver injury crashes compared to 17.5% involving provisional car licence holders. In Queensland, newly licensed motorcyclists are found to be at considerable risk with more than 16% of motorcyclists in fatal crashes in 2006 having held a licence less a year, and a further 6% having held a licence for between 1 and 2 years. Only 2% had held a licence longer than 8 years (TMR, 2009). However, not all of the newly licensed riders were young: while 39% of first year licensed riders in fatal crashes were aged 17–24, 36% were aged 30–49 (where age and licence history was known). These data suggest that the current licensing system is not producing the same safety benefits for learner riders as for learner drivers.

Pre-learner training aims to ensure that the rider obtains a level of basic riding knowledge and skills in a relatively safe off-road environment before obtaining a learner licence and riding on the road. At present there is no requirement for pre-learner motorcycle rider training to be undertaken to obtain a motorcycle learner licence in Queensland.

In response to concerns about the safety of novice riders, Queensland Transport (later the Department of Transport and Main Roads or TMR) appointed the Centre for Accident Research and Road Safety-Queensland (CARRS-Q) to research the potential benefits of introducing a pre-learner motorcycle licensing and training scheme within Queensland (Haworth, Rowden, Wishart, Buckley, & Greig, 2012). This was part of a larger program of motorcycle safety research funded by the Motor Accident Insurance Commission. The detailed reports from the research program can be downloaded from the TMR website (<http://www.tmr.qld.gov.au/Safety/Motorcycle-safety/Motorcycle-safety-initiatives.aspx#carrsq>).

This paper commences with an outline of the motorcycle rider licensing system in Queensland, before describing learner riders and their crashes and then discussing the implications for training and licensing.

Motorcycle rider licensing in Queensland

In Queensland, there are two classes of motorcycle licence, R and RE (restricted power-to-weight and engine capacity) and three types of licence (Learner, Provisional¹, and Open). Riders who already hold an Open car licence progress directly from the Learner to Open motorcycle licence. Details of the licensing system can be found at <http://www.tmr.qld.gov.au/Licensing/Getting-a-licence/Getting-a-motorbike-licence.aspx>.

To be eligible for a motorcycle (class RE) learner licence, riders must have held a provisional, P1, P2 or open car licence for at least one year in the last five years (introduced in July 2007) and pass a five-item road rules test.

There are two alternative routes to motorcycle licensing in Queensland, Q-Ride and Q-SAFE. Q-Ride involves accredited rider trainers conducting competency-based training and assessment of motorcycle licence candidates through approved Q-Ride Service Providers. Riders are required to achieve a range of competencies before qualifying for a Queensland motorcycle licence. Q-Ride requires licence applicants to demonstrate the knowledge, skills and attitude needed for the safe operation of a motorcycle. On successful completion of Q-Ride, riders are issued a certificate that is presented to the licensing authority as part of process of applying for a licence.

Q-SAFE involves motorcycle licence applicants undertaking a practical test assessed by TMR Driving Examiners. Applicants are required to hold a learner licence for at least six months prior to obtaining a class RE licence. In addition, a class R licence is not issued unless the applicant had held a class RE licence for at least 12 months, with an on-road test also required on a motorcycle which is not learner approved (i.e. has an engine capacity of greater than 660 ml or power to weight greater than 150 kW/tonne to obtain an R class licence.

Before 1 July 2008, riders who completed Q-Ride on a motorcycle of greater than 250cc engine capacity and had held a car licence for at least three years during the last five were eligible to obtain an R class licence without needing to first hold an RE licence. From 1 July 2008, all riders were required to hold an RE class licence for a period of 12 months prior to progressing to an R class licence.

CHARACTERISTICS OF LEARNER RIDERS

The Data Analysis Unit of the Queensland Department of Transport and Main Roads (TMR) provided an electronic data file containing all motorcycle licensing transactions for those customers who had obtained a motorcycle learner licence from 1 January 2006 to 1 July

¹ A Provisional licence is comparable to a probationary or restricted licence in some other jurisdictions.

2009. Analysis of the data showed that the average age at the time of obtaining a motorcycle learner licence was 33 years, and 75% were male. Other TMR data showed that at the end of 2008, there were 127,350 learner licences on record, of which 28% were held by riders aged under 25 years.

Analysis of the licensing transaction data found that half of the riders obtaining a motorcycle licence in Queensland held their learner licence less than 27 days. More than 90% of novices obtained their licence through Q-Ride which has no minimum learner period.

CRASHES OF LEARNER AND OTHER RIDERS

Methods

The Data Analysis Unit of Transport and Main Roads (TMR) provided electronic data files containing information on motorcycle crashes in Queensland from 1 January 2002 to 31 December 2007. Chi-square tests were used to assess the statistical significance of differences in crash characteristics between learner riders and holders of provisional and open motorcycle licences and unlicensed riders and only statistically significant differences are reported in the Results section of this paper. Newly licensed riders are hard to identify because most are granted open, rather than provisional, licences. The crash data set was unable to distinguish between riders who had obtained their licences by Q-Ride versus Q-SAFE but the licensing data showed that very few licences were obtained by Q-Safe in recent years.

Crash involvement and severity

Overall, learner licence holders comprised 567 of the 9,944 motorcycle riders in crashes in 2002-2007 (5.7%). There were fewer learner licence holders in crashes than provisional licence holders (735, 7.4%) or unlicensed riders (838, 8.4%).

The percentages in Table 1 suggest that crashes of learner riders were more severe overall than crashes of open and provisional licence holders (but less severe than those of unlicensed riders). It is not possible to tell from the data whether it accurately reflects the true state, or whether it reflects a greater tendency for underreporting of less serious crashes to the police by learner riders (to avoid endangering their learner licence).

Overall, 69.8% of learner riders were considered “at fault”, compared to 62.2% of provisional riders and 56.0% of open licence holders. Not surprisingly, the percentage at fault was highest for unlicensed riders (81.3%).

Almost 90% of learner riders in crashes were male (89.4%). This figure is similar to that for holders of provisional (89.1%) and open licences (90.9%) and a little lower than for unlicensed riders (93.7%). This pattern was generally consistent across levels of crash severity, with the exception of property damage only (PDO) crashes, where the percentage of males was lower for learners (75.0%) than for other licence types.

Table 1. Number of motorcyclists in crashes by crash severity and rider licence type in 2002-2007 (percentage at each severity level in parentheses).

	Learner	Open	Provisional/ Restricted	Unlicensed	Unknown
Fatal	28 (4.9%)	236 (3.1%)	25 (3.4%)	53 (6.3%)	7 (2.5%)
Hospitalisation	309 (54.5%)	3679 (48.9%)	346 (47.1%)	514 (61.3%)	107 (38.2%)
Medical treatment	157 (27.7%)	2271 (30.2%)	232 (31.6%)	185 (22.1%)	70 (25.0%)
Minor injury	69 (12.2%)	1224 (16.3%)	123 (16.7%)	82 (9.8%)	58 (20.7%)
PDO	4 (0.7%)	113 (1.5%)	9 (1.2%)	4 (0.5%)	37 (13.2%)
Unknown					1 (0.4%)
Total	567	7523	735	838	280

“Unknown” licence type includes Not Known, Not applicable, Undefined.

“Provisional” includes one Restricted where the outcome was Medical treatment.

Table 2 shows that more than a third (34.9%) of the learner riders in crashes were aged 17-20, with a further 23.3% being aged 21-24. In total, 60.3% of learner riders in crashes were aged under 25. In terms of learner licences on issue, 17-20 year olds comprised 17.0% of licence holders in 2006, 15.7% of licence holders in 2007 and 10.9% of licence holders in 2008. Thus younger learners appear to have been over-involved in crashes relative to older learners.

As noted earlier, provisional motorcycle licences are only issued to (mostly young) applicants who still hold a provisional car licence. Thus, provisional motorcycle licence holders in crashes are largely young (57.2% and 25.3%, aged 17-20 and 20-24, respectively).

Comparisons of the crashes of learner and other riders

This section presents a range of comparisons of learner rider crashes with the crashes of other riders. This information will assist in identifying whether there are particular situations or locations in which learner motorcyclists are over-involved in crashes, which can then be targeted in pre-learner training. Many of the analyses are presented separately for riders aged under 25 versus those aged 25 and over to provide some insight into whether age or riding inexperience are more important factors, and secondly to indicate whether there are merits in

having different restrictions for younger and older learner riders. Under 25 was chosen to provide a sufficiently large sample of younger riders for statistical purposes.

Table 2. Number of motorcyclists (percentage in parentheses) in crashes by age and rider licence type from 2002-2007.

Age	Learner	Open	Provisional	Unlicensed	Unknown
Under 17	12 (2.1%)	1 (0.0%)	1 (0.1%)	127 (15.2%)	2 (0.7%)
17-20	198 (34.9%)	177 (2.4%)	421 (57.2%)	160 (19.1%)	16 (5.7%)
21-24	132 (23.3%)	971 (12.9%)	186 (25.3%)	151 (18.0%)	27 (9.6%)
25-29	87 (15.3%)	1132 (15.0%)	59 (8.0%)	137 (16.3%)	28 (10.0%)
30-39	87 (15.3%)	2244 (29.8%)	49 (6.7%)	174 (20.8%)	33 (11.8%)
40-49	33 (5.8%)	1824 (24.2%)	14 (1.9%)	50 (6.0%)	31 (11.1%)
50-59	15 (2.6%)	895 (11.9%)	4 (0.5%)	27 (3.2%)	19 (6.8%)
60-74	3 (0.5%)	250 (3.3%)	2 (0.3%)	10 (1.2%)	5 (1.8%)
75+	0 (0.0%)	25 (0.3%)	0 (0.0%)	0 (0.0%)	2 (0.7%)
Unknown	0 (0.0%)	4 (0.1%)	0 (0.0%)	2 (0.2%)	117 (41.8%)
Total	567	7523	736	838	280

The speed zone distribution of motorcycle crashes differed according to rider licence type. Compared to open licence holders, learner riders had relatively more crashes in 50 km/h speed zones and relatively fewer in speed zones of 80 km/h or higher. This pattern was the same when crashes of riders aged under 25 and 25 and over were examined separately. Overall, crashes involving holders of provisional licences showed a similar pattern to those of learners (but with fewer crashes in 100 and 110 km/h speed zones).

Temporal patterns of crashes

Overall, learner and provisional riders had larger proportions of their crashes at night (27.7% and 27.8%, respectively) than holders of open licences (20.7%). However, age appeared to be a more important influence on the proportion of night-time crashes than licence status. Open licence holders who were aged under 25 had a similar elevated percentage of night-time crashes as learner licence holders aged under 25. In contrast, the relatively small number of

provisional riders aged 25 and over had relatively more crashes at night than younger provisional riders (32.6% versus 26.7%).

During the time period where night-time driving restrictions would apply to learner drivers (11 pm to 5 am), 7.8% of learner rider crashes occurred which is about double the percentage of crashes of open licence holders during that time. Learner riders aged under 25 had double the percentage of crashes during these late night hours than older learner riders.

The percentages of learner and open rider crashes on weekends were similar (31.2% and 30.1%), with a smaller percentage of provisional rider crashes on weekends (26.4%). There were no significant differences in the pattern of crashes across age groups for any of the licence categories.

Types of motorcycle crashes

Learner and open licence holders had similar percentages of crashes that were single unit (and potentially involved rider error only) (35.6% versus 32.9%). The percentage of single unit crashes was higher for older than younger learners and open licence holders. The differences across age group were not significant for provisional, unlicensed and unknown licence types.

The top five individual Definitions for Classifying Accidents (DCA) codes for learner rider crashes were: vehicles from opposite approach: thru-right (64), vehicles from adjacent approach: thru-right (38), off path on curve: off carriageway right hand bend hit object (34), vehicles opposite direction: head on (27) and vehicles same direction: rear end (27). Three of these were also among the top five individual DCA codes for crashes of open licence holders: vehicles from opposite approach: thru-right (792), vehicles from adjacent approach: thru-right (478) and vehicles same direction: rear end (645). For open licence holders, the other most common DCA codes were off path on straight: out of control on carriageway (571) and off path on curve: out of control on carriageway (421).

Contributing factors to crashes

The most common contributing factors to learner rider crashes coded by police were inexperience (37.2%) and inattention (21.5%). The contributing factors that were more prevalent in crashes of learner riders than holders of open licences were: inexperience (37.2% versus 0.5%), inattention (21.5% versus 15.6%), alcohol or drugs (12.0% versus 5.1%) and drink riding (9.9% versus 3.1%). Inexperience was also coded as a contributing factor to 40.0% of crashes of provisional licence holders. The pattern of contributing factors was generally similar for younger and older learner riders, although younger riders were (not surprisingly) more likely to have inexperience coded as a contributing factor (49.7% versus 19.8%).

IMPLICATIONS FOR LICENSING AND TRAINING

The analyses of the licensing data showed that many learner motorcyclists are much older than learner drivers. The Queensland data showed their average age was 33 years, which was

also found in another study in the neighbouring state of New South Wales (de Rome, Ivers, Haworth, Heritier, Du & Fitzharris, 2011). The finding that learner riders are often much older and more experienced (as drivers) than learner drivers suggests that graduated licensing systems for motorcycling need to apply irrespective of age, rather than the common practice of exempting older novices from graduated licensing requirements. The implication for rider education and training is that potentially different approaches are needed for learner riders who are young and have little or no car driving experience compared to the larger group of learner riders who have extensive on-road experience as a driver. These differences may relate to both content (e.g. teaching about road rules) and also to pedagogical styles (adult learning approaches).

While many learner riders were older, the data analysed here and in New South Wales (de Rome & Senserrick, 2011) showed that learners aged under 25 were involved in twice as many crashes as expected. This trend was even more marked for learner riders aged under 21. In the absence of information about the distances ridden by younger and older riders, it is unclear whether this reflects more risky riding by younger riders or not. Nevertheless, there appears to be a need to tailor licensing and training to address the needs of younger riders.

There is some evidence that younger learner riders are more likely to behave riskily than older learners and therefore risk taking could be an additional focus of training for this group. Earlier research has identified that younger learner riders are less likely to wear protective clothing (de Rome et al., 2011). The current research showed that the involvement of alcohol and drugs was greater among learners than open licence holders but there were no age differences.

The learner rider crashes were compared with the crashes of other riders in an attempt to identify whether there are particular situations or locations in which learner motorcyclists are over-involved in crashes, which can then be targeted in pre-learner training. Some of the differences in crashes between learner riders and fully-licensed riders appear to reflect relatively more riding in urban areas by learners, rather than increased risks relating to inexperience. The analysis of contributing factors in learner rider crashes suggests that hazard perception and risk management (in terms of speed and alcohol and drugs) should be included in a pre-learner program. Currently, most learner riders in Queensland complete pre-licence training and become licensed within one month of obtaining their learner permit. If the introduction of pre-learner training required that the learner permit was held for a minimum duration, then the immediate effect might be more learners riding (and crashing). Thus, it is important to consider how training and licensing initiatives work together in order to improve the safety of new riders (and how this can be evaluated).

The characteristics of the current motorcycle rider licensing system in Queensland strongly influences learner rider crash involvement and current and future uptake of training. While training is not mandatory, more than 90% of learners choose to take the competency based training and assessment (Q-Ride) route instead of the test-only approach (Q-SAFE). The lack of a mandatory minimum period to hold a learner licence under Q-Ride as compared with the

six-month minimum under Q-SAFE may contribute to the popularity of training and the limited time spent as a learner. Overall, the short duration found for holding a motorcycle learner licence in Queensland before licensing means that the population of newly licensed riders are essentially ‘learners’ with very little practical riding experience. Q-Ride effectively functions as a pre-learner program given that trainees have held a learner licence for a very short period of time and are likely to have little or no riding experience as a learner. The short period of time that many riders hold a motorcycle learner licence certainly acts to minimise the number of crashes, but it also means that any pre-learner training that could be introduced in the future would occur very soon before licensing.

CONCLUSIONS

Learner riders can be easily identified in the crash data, but newly licensed riders are hard to identify because most are granted open, rather than provisional, licences. Learner riders appear to be involved in more severe crashes and to be more often deemed at fault than fully-licensed riders but this may reflect problems in reporting (under-reporting of less severe crashes and police tendencies to consider learners to be at fault, respectively) rather than real differences. Some of the differences between learner riders and fully-licensed riders appear to reflect differences in riding patterns of younger riders (e.g. more riding in built-up areas where the potential for intersection crashes is greater), rather than increased risks relating to inexperience. The analysis of contributing factors in learner rider crashes suggests that hazard perception and risk management (in terms of speed and alcohol and drugs) should be included in a pre-learner program. However, the short time the learner licence is held poses serious constraints upon delivery of a pre-learner program.

However, one of the constraints to drawing firm conclusions from the research was the lack of scientific evaluations of current motorcycle safety initiatives both in Australia and internationally. There is simply not strong enough evidence that particular programs or requirements are effective or ineffective in reducing the occurrence or severity of motorcycle crashes. Most programs or initiatives that have been implemented have not been evaluated well or at all. Many experts and stakeholders hold views regarding what is effective, but there is little evidence available to assess these claims.

The challenge exists to improve traditional rider training in terms of content, delivery protocols, and the structuring of training within an overall graduated licensing system. Delivering training in stages within a graduated licensing system is important as learners may be more able to integrate information learnt from training once they have had some riding experience as opposed to the learner stage where there is potential for information overload. In addition to ensuring competency in vehicle handling, increasing the focus on higher order factors such as safety attitudes, motivations, and hazard perception could offer substantial potential benefits for novice riders and drivers.

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