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TEACHING OLD DOGS NEW TRICKS?: TRAINING AND OLDER MOTORCYCLISTS

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ABSTRACT

Past studies of the effects of motorcycle training on crash involvement have shown mixed results. However, many of the studies were conducted when most trainee riders were aged under 20. Now, many trainees are older and have considerable car driving experience. Training programs have also changed. For these reasons, this paper examines the training history of a sample of older riders and the links to their crash involvement.

INTRODUCTION

The number of older motorcyclists killed or injured in crashes has increased in the last decade in many developed countries including the United States (National Center for Statistics and Analysis Research and Development, 2005; Stutts, Foss & Svoboda, 2004), Great Britain (Sexton, Broughton, Elliot & Maycock, 2004) and Australia (ATSB, 2006). In some countries, this increase has been the main contributor to an overall rise in rider fatalities.

In Australia, the number of motorcyclist (rider and pillion) fatalities fell from a high of 299 in 1989 to 175 in 1997 and has since increased to 233 in 2005. There has been a decrease in the number of motorcyclists aged under 25 killed and an increase in the number of riders aged over 25 killed since 1991. The percentage of riders killed aged over 25 increased from 49% in 1991 to 70% in 2005 (ATSB, 2006).

This pattern is not confined to fatalities. In the State of Victoria, as in other jurisdictions, the involvement of "older" motorcyclists in crashes has increased since 1990. The number of riders in crashes aged 30 and over more than doubled from 501 in 1991 to 1,120 in 2003. In contrast, the number of riders in crashes aged under 30 more than halved from 1,353 in 1991 to 663 in 2003. Riders aged 30 and over comprised 26.8% of riders in crashes in 1991 and this increased to 63.2% in 2003.

While the numbers of older riders in crashes have increased, older riders have lower crash rates per licence held (Haworth, Mulvihill & Symmons, 2002) and per distance travelled (ATSB, 2002). Thus, there appear to be two main rider groups of concern; riders aged under 25 who continue to be over-represented in casualty crash rates, and older riders aged 30-54 who are the fastest growing group among serious crashes.

The trends in motorcycle involvement in crashes have mirrored changes in motorcycle registration and rider licensing data. In Australia, the number of motorcycles registered increased by 18.7% from 1999 to 2004 (ABS, 2005), showing the strongest growth of any vehicle type in Australia. There is relatively less information available regarding the age profile of riders. In New South Wales, the number of motorcycles registered to people aged 40 and over increased by 57% between 1995 and 2000, while the number of motorcycles

registered to people aged under 25 years decreased by 33% (de Rome and Stanford, 2002). At the same time, the number of licences held by older riders also increased.

Motorcycle Rider Training

Rider training is one of the most popular measures aiming to reduce motorcycle crashes. While there is little empirical evidence to demonstrate improvements in motorcycle safety as a result of training, training is encouraged and is compulsory in some jurisdictions. An international review concluded that voluntary motorcycle training programs do not reduce crash risk (TOI, 2003). On the contrary, these programs seem to increase crash risk. This may be due, in part, to the increased confidence felt by many riders who have completed training, despite minimal improvements in rider skill. These riders may ride more often or take more risks in situations where they lack the skills to safely avoid a crash.

The same review concluded that compulsory training through licensing programs produces a weak but consistent reduction in crashes (TOI, 2003). This may result from reductions in the amount of riding (exposure reduction) or by riding more safely (risk reduction). It is not always possible to neatly separate these effects. For example, one of the underlying principles of graduated licensing is to reduce exposure in high-risk situations.

In a recent review of motorcycle licensing and training, Haworth and Mulvihill (2005) asserted that there are some key deficiencies in most current training that may account for the apparent lack of overall effectiveness. These include a lack of attention to higher order cognitive factors such as hazard perception, attitudes and motivation as well as insufficient duration of training (see Haworth & Mulvihill, 2005 for a full review).

Recent changes in the demographics of riders lead us to question whether the results of earlier evaluations of rider training remain valid. Traditionally, most riders undertaking training were young, with little car driving experience. Thus, the published evaluations relate to a different age profile of trainees to that now presenting to training. The effectiveness of training has not been studied as a function of rider age. There are a number of issues that cause us to wonder if the effects of training are different for older riders, compared with younger riders.

Firstly, older riders bring more car driving experience (and possibly more riding experience) to the training situation and arguably a lower propensity to take risks (Clarke, Ward, Truman, & Bartle, 2004). Alternately they may bring a range of bad habits and preconceived ideas to the training situation which may inhibit their learning.

Secondly, many States provide exemptions from the graduated licensing requirements for older novice riders who hold full car licences. Thus, older novice riders are moving from training straight into riding without restrictions on engine size (or power to weight ratio) or lower travel speeds or lower BAC limits or restrictions on carriage of pillions. This could potentially increase the crash risk or crash severity for newly trained and licensed older riders (compared to younger riders) and at least appear to reduce the benefits of training for the older riders.

Thirdly, most of the published evaluations of training were based on large numbers of riders taking learner or licence courses. Many older riders are returning riders, who already have motorcycle licences and therefore, if they take training courses, are taking refresher or

advanced courses. Some of these riders may have not undertaken training for many years and some may never have received formal training at all.

Fourthly, many older riders may not ride often enough to practice and improve the skills taught in training. Earlier analyses of the survey data showed that half of the older riders rode less than 100kms per week (Mulvihill & Haworth, 2005a). Previous studies suggest that riders who ride infrequently are at greater risk of crashing (Harrison & Christie, 2003). Paradoxically, whilst new riders who have just completed licensing training and need to gather experience, increased on-road exposure particularly places them at high risk as well (Mulvihill & Haworth, 2005a).

Keeping these issues in mind, training is only one measure that may affect motorcycle crash occurrence or crash severity. A range of further measures aimed at riders, other road users, vehicle design, the road environment, and injury response/treatment can all have influence on overall rider safety. Therefore, it is difficult to isolate at any given time the pure effects of training.

Requirements for motorcycle training (and licensing systems) differ across Australia (see Haworth & Mulvihill, 2005). This paper will focus on riders from Victoria, New South Wales and Queensland, because they comprised the largest numbers of respondents in the survey. Training has been compulsory to gain a motorcycle learner permit or a licence in NSW (except for some riders in rural or remote areas) since 1989 and has been effectively compulsory in Victoria since at least 1993. In Queensland there is no requirement for training to obtain a motorcycle learner permit and training has been optional to gain a motorcycle licence since August 2001. In each State, many older riders gained their licence before the current requirements were put in place and so were not required to complete a training course.

Clearly the issues associated with measuring the effectiveness of rider training for older riders are complex. This paper seeks to contribute to answering this question by presenting new analyses of data related to training history and crash outcome that were collected as part of a survey of older rider crash characteristics and countermeasures conducted in 2005. Preliminary analyses of a wide range of variables collected in this survey were presented in Mulvihill and Haworth (2005a). The present study aims to investigate the influence of training on crash involvement for older riders with particular reference to when training was last undertaken (if at all). Where training occurred many years ago, it is less likely to have had an effect on crash involvement than when it occurred closer in time to the period when crash involvement was measured (2001-2005 in this study).

METHOD

An on-line survey of Australian motorcycle riders aged 25 and over was undertaken to explore potential contributors to crash risk such as attitudes, personal characteristics, self-reported riding behaviours and level of experience and training. The rationale for choosing this method and its advantages and disadvantages are discussed elsewhere (Mulvihill & Haworth, 2005b). A detailed description of the methodology is provided in Mulvihill and Haworth (2005a).

RESULTS

Characteristics of respondents

Of the 1,500 valid questionnaires received, 86.7% were from male riders. The largest age group was 45-54 years old (32.9%), with 25.6% of respondents aged 35 to 44, 22.9% aged 25 to 34 and 16.4% aged 55 and over. Most (45%) of respondents were residents of Victoria, with 28% from New South Wales and 13% from Queensland.

Overall, 92.7% of respondents held a full motorcycle licence, with 2.4% holding a learner permit and 3.7% holding a provisional or restricted licence. Of the riders who held a full licence, 12.2% had obtained their licence before 1970, 25.3% in 1970-79, 17.9% in 1980-89, 21.9% in 1990-99 and 22.7% in 2000 to 2005.

Training history

Riders were asked whether they had ever undertaken a motorcycle rider training course, and if so, the type of course they had most recently completed and the year in which that occurred. Overall, 70% of fully-licensed riders had undertaken a motorcycle rider training course at some time. The percentage of riders who had completed a training course was lower for riders licensed before 1990 (51.8% to 56.7%) than after 1990 (84.7% to 90.0%, see Figure 1).

Figure 1. Number of trained and untrained riders in the survey according to the year in which they obtained their full motorcycle licence.

Given the current and past differences in requirements for training in NSW, Queensland and Victoria, an attempt was made to compare the training histories of riders from these three States. While the questionnaire did not collect information about the State in which the riders obtained their licences, it did include items about their current State of residence and the State in which their most recent crash occurred. Analyses were conducted based on current State of

residence because this information was available for all riders, whether or not they had been involved in a crash.

There was little difference among the States in the percentage of fully-licensed riders who had completed a training course at some time: 69.7% for NSW, 65.5% for Queensland and 71.6% for Victoria. In each State, the percentage who had undertaken training was highest for riders who obtained their full licence after 1990 (see Figure 2).

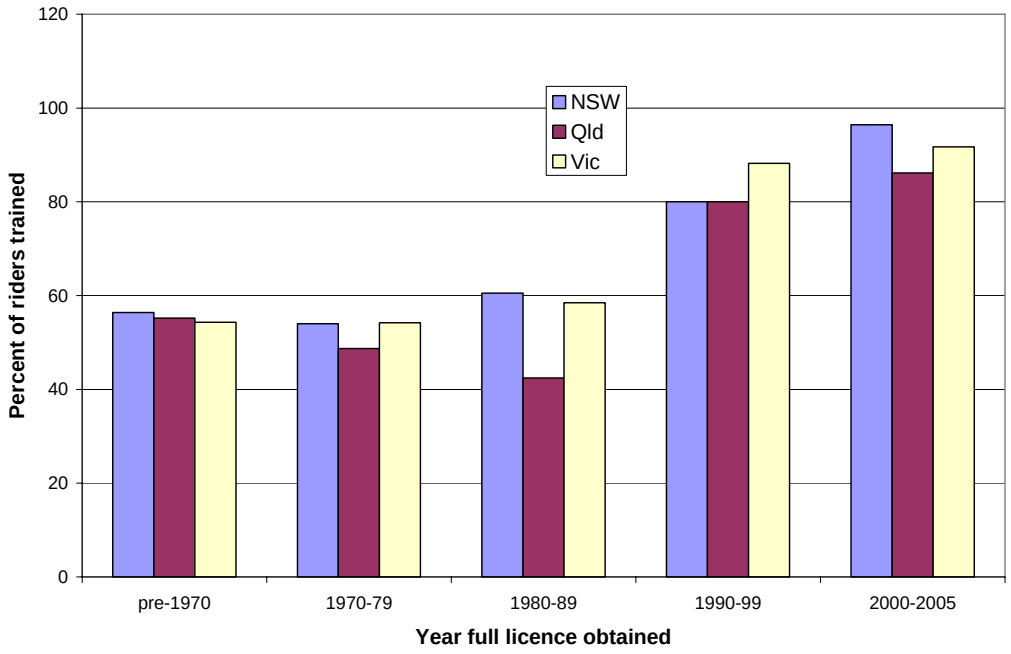

Figure 2. Percent of riders in the survey from each state who had completed training according to the year they obtained their full motorcycle licence.

Riders were asked to describe the most recent rider training course they had completed. The options provided were "learner", "licence", "advanced", "off-road", "refresher", and "other". The last course that had most commonly been undertaken by fully-licensed riders was an advanced course (33.3% of riders). A licence course was the last course for 16.2% of riders, with a refresher course taken most recently by 6.3% of riders and learner course by 4.5% of riders. Among riders who had completed training, the mix of types of training did not differ significantly for riders from New South Wales, Queensland and Victoria ($\chi^2(10)=16.7$, $p>.05$, see Figure 3).

Overall, 35.1% of all fully-licensed riders in the survey had completed a training course in 2001-05. Among trained riders, 55.3% of fully-licensed riders (and 58.8% of all riders) had completed their most recent training course in 2001-05. The percentages of trained riders whose most recent training course was in 2001-2005 were similar (23.2% to 28.4%) for riders obtaining their full licence pre-1970 up to 1990-99. Not surprisingly, for riders who obtained their full licence in 2000-2005, 79.0% had completed their most recent training course in 2001-05.

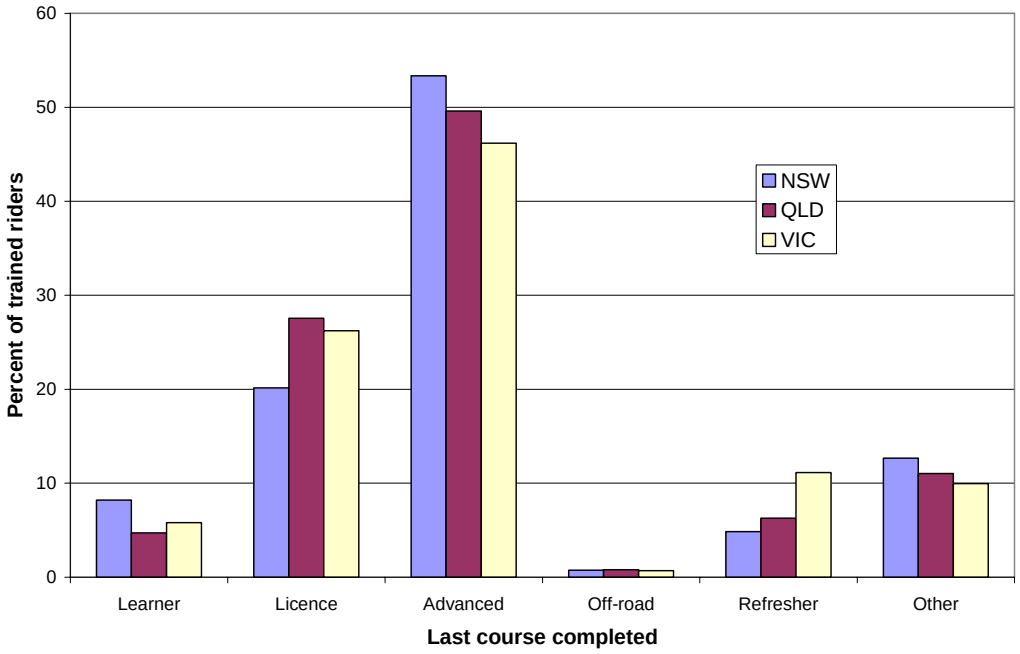

Figure 3. Percent of trained riders from NSW, Queensland and Victoria who had completed each type of training course.

Crash involvement

Riders were asked how many crashes they had been involved in while riding their motorcycles on Australian roads in the last five years. They 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. Overall, 445 riders (about 30%) reported that they had been involved in at least one crash. About 75% of these riders had been involved in one crash, 20% in two crashes, 4% in three crashes and 2% in four crashes.

For those riders who had been involved in a crash, the severity of the most recent crash was measured in terms of injuries sustained to the rider and the damage to the rider's motorcycle. Riders most commonly suffered slight injuries (cuts and bruises) (46% of crashes). About 19% of riders suffered no injuries at all. About 20% of riders suffered serious injuries that required hospital emergency treatment and 16% suffered serious injuries that required admission to hospital.

Over half of the crashes were single vehicle (54%) (involving the motorcycle only). New riders appeared to be over-represented in single vehicle crashes (61%) compared to returned riders (55%) and continuing riders (51%), although these differences were not significant ($\chi^2(2)= 2.6$, $p>.05$).

Relationship between crash involvement and training history

In order to assess whether training reduced crash risk or severity, it was first necessary to identify and remove instances where it was unclear that training preceded the crash. An analysis identified 55 riders where the year of their most recent training course was later than the year of their most recent crash and 49 riders where their most recent training course and their most recent crash were in the same year. It is acknowledged that this procedure may

incorrectly remove some riders who may have undertaken a previous training course prior to the crash.

After removing these riders, there was no significant relationship between involvement in one or more crashes in the past five years and having completed a training course at some time for fully-licensed riders ($\chi^2(1)=0.96$, $p>.05$). In percentage terms, 69.2% of crashed riders and 66.2% of non-crashed riders had completed a training course. There was no significant relationship either for single vehicle crashes only ($\chi^2(1)=0.01$, $p>.05$) or for multi-vehicle crashes only ($\chi^2(1)=2.77$, $p>.05$), although there was a trend towards ($p<.01$) an association between having completed training and involvement in multiple vehicle crashes.

The severity of crashes of trained and untrained riders did not differ significantly ($\chi^2(3)=1.41$, $p>.05$).

The analyses above compare crash involvement as a function of having completed a training course at some time. It may be that only recent training courses are likely to have a measurable effect on crash involvement. For this reason, the analyses below compare the crash involvement of riders who have never undertaken training, those who have undertaken training since 1996 and those whose most recent training course was before then.

There was no significant relationship between crash involvement in the past five years and whether training occurred since 1996, before 1996 or not at all ($\chi^2(2)=0.24$, $p>.05$). The same pattern was found for involvement in single vehicle crashes only ($\chi^2(2)=1.55$, $p>.05$) and for involvement in multi-vehicle crashes only ($\chi^2(2)=3.22$, $p>.05$).

DISCUSSION

The survey data showed that a large proportion (over 70%) of fully-licensed riders aged over 25 had undertaken some form of training. More than half of the riders licensed before 1990 (when training was unlikely to be compulsory) had completed a training course and about half of these had completed a training course in 2001-05. Thus, for many older riders their most recent experience of training was a post-licence course, rather than a learner or licence course. This supports the concern raised earlier in this paper regarding the likely applicability of the results of studies of learner and licence training to older riders.

It is useful to consider whether the high prevalence of training among the older riders who responded to this survey is representative of older riders as a whole. Certainly we know that many older motorcycle licence holders are not active riders (Haworth et al., 2002) and thus it is likely that the prevalence of training in our sample of active older riders would be higher than among all licensed older riders. 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 an article in the Victorian motoring club magazine. Given that learner and licence training has been effectively compulsory in Victoria since at least 1993, this might boost the prevalence of training among the sample. However, the data showed that the prevalence of training was very similar for riders (currently resident) in NSW, Queensland and Victoria, so the over-sampling of Victorian riders is unlikely to account for the high prevalence of training (and particularly since advanced training, not learner licence training was the most frequent form of most recent training course).

A greater concern for the representativeness of the data collected is the extent to which the survey attracted motorcycling enthusiasts. The larger proportion of continuing riders in the current survey, many of whom are enthusiasts, may also reflect the effect of advertising the survey in motorcycle magazines. Enthusiasts are probably more likely to undertake training, particularly post-licence training. Nevertheless, comparisons of the demographic characteristics of respondents in this study and those of Haworth et al. (2002), which had a response rate of 49% to a mail-out to motorcycle licence holders, suggest that the sample in the current study was of a similar level of representativeness to that of earlier studies.

An attempt was made to assess the relationship between crash involvement in the past five years and training history. While earlier preliminary analyses reported in Mulvihill and Haworth (2005a) had shown that crash involved riders were more likely to have undertaken training than non-crash involved riders (77.5% versus 68.5%) ($\chi^2(1)=12.0$, $p<.005$), this effect disappeared when riders whose most recent crash had occurred in the same year or prior to the year of their most recent training course were removed from the sample. Although the relationship between training and crash involvement should conceptually be stronger for single vehicle crashes (because there is no contribution from another road user), there was no significant relationship between training and the most recent crash in the last five years being a single vehicle crash.

Given that the effects of training may not be permanent, the effect of recency of training on crash involvement was investigated. Again, there was no significant relationship between crash involvement (all crashes, single vehicle or multi-vehicle crashes) in the past five years and whether training occurred since 1996, before 1996 or not at all. While it is tempting to conclude that this result is evidence of no effect of training on crash risk, there are a number of constraints to the analysis that should be considered. In terms of the analyses of the recency of training, the time periods used may not have been appropriate. It may be that training does reduce crash involvement but only for 6-12 months, rather than the period of up to 10 years as used in the analysis.

The analyses of crash involvement as a function of how long ago training occurred are potentially confounded by age of the rider: while some of the oldest riders in the sample may have undertaken a training course recently, the youngest of the riders could not have undertaken a training course many decades ago. Mulvihill and Haworth (2005a) demonstrated in earlier analyses of the survey data that there was an overall reduction in crash risk by age of the rider. While this issue should be considered in analyses of this kind, a check of the data showed that while the mean age of the three groups differed significantly in a statistical sense ($F(2, 1221)=23.5$, $p<.001$), they were not so markedly different as to be of real concern (no training: 47.2 years, training since 1996: 43.0 years, training before 1996: 45.0 years).

The analyses are also potentially confounded by amount of riding experience: while riders who were trained most recently may be more likely to show benefits of training, conversely they may have less riding experience and therefore a higher crash risk. An analysis of the data showed that the median year of obtaining a full licence was 1997 for riders trained since 1996 and 1982 for riders trained before 1996. If riding experience increases with years since licensing (and despite exceptions this is probably true), then the confounding factor of riding experience may have contributed to the inability to demonstrate a relationship between recency of training and crash involvement.

In addition to the issues related to the analysis of the effect of recency of training on crash involvement, there are wider issues that relate to the general analysis of the relationship between training and crash involvement. Firstly, the analysis is constrained by not knowing the content of the training that riders have undertaken and the wide variety of courses that have been completed. Some courses may have positive effects on crash involvement, others may have no effect or even a negative effect.

The relationship between training and crash involvement is potentially confounded by amount of riding: riders who ride more are more likely to crash in a given time period (even if their risk per km is lower) and may be more likely to complete training courses. There was no significant relationship between distance ridden per week and whether the rider had completed training since 1996, before 1996 or not at all in the current study, however ($\chi^2(12)=14.67$, $p>.05$).

This analysis examined the crash involvement of current riders. Therefore it was unable to measure some potential benefits of compulsory training in terms of exposure reduction – making learning to ride less attractive by increasing the expense associated with obtaining a licence, riders being discouraged from further riding by their experiences of rider training (finding out that riding is "not for them").

CONCLUSIONS

Many of the published evaluations of rider training as a method for reducing crash occurrence and severity were undertaken when most trainees were novice riders were young and most riders were undertaking learner or licence courses. The results of these evaluations may not be valid for the new profile of riders. The results of this survey show that there are now many old dogs trying to learn new tricks and that it is hard to measure whether these efforts are being successful. Several approaches to measuring the effects of training on crash involvement in this paper all concluded that there was no statistically significant relationship.

ACKNOWLEDGEMENTS

The survey was funded by the Motor Accidents Authority of New South Wales. Our special thanks to all the motorcyclists who provided comments on the draft questionnaire, publicised the survey or completed the survey. Ashley Verdoorn and Glenda Cairns made the Internet survey work and Ian Morrison entered the data from paper questionnaires.

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