ASSOCIATION BETWEEN ADVANCED DRIVER TRAINING, INVOLVEMENT IN FOUR-WHEELED MOTOR SPORT, AND CRASHES ON PUBLIC ROADS

Summary report

April 2018

This report summarises the methodology and results of the AIMSS-commissioned study into the association between advanced driver training, participation in motor sport and crashes on public roads. The study was conducted by the Queensland University of Technology in 2017 and consisted of a literature review followed by an online survey and statistical analysis. The literature review provided an overview of existing evidence, helping to shape the questions included in the online survey.

Existing evidence on association between road safety and driver training programs

Driver training was considered as two distinct formats: pre-licence driver training and post-licence driver training. Since 2010, there have been numerous reviews conducted to examine the association between road safety and driver training programs. The current study summarised the findings of those reviews and also considered new studies conducted since the last review article. For an article to be eligible for inclusion in the current review of the driver training literature, it had to review studies that described an evaluation of a driver training program that:

1. Included practical (on-road or simulated on-road) driver training;
2. Was aimed at the general population; and
3. Reported road crashes and/or driving offences as outcomes.

Reviews of driver training programs for specific populations, including heavy vehicle training and licensing and motorcycle rider training, were excluded.

Although research on pre- and post-licence driver training is abundant, there is limited to no evidence to show that technical skills acquired from driver training has a direct effect on reducing road crash risk. Rather, evidence shows that the combination of acquired technical driving skills, frequent engagement in driving practice, and desires to develop and engage in safe driving behaviours is more important in reducing road crash risk than acquired technical driving skills alone. Graduated driver licensing systems with components that delay time to full licensure and impose driving restrictions on learner and probationary licence drivers have been shown to be effective in reducing road crash risk in young drivers.

Post-licence driver training that specialises in teaching technical driving skills has been shown to be counterproductive to improving on-road safety, but there is some limited evidence that training that focuses on teaching higher-order cognitive skills promotes safe driving behaviours. Cognitive driving-skills training focuses on teaching visual and mental skills, such as detecting on-road hazards and developing safe driving behaviour. These findings suggest that driver training that teaches cognitive skills, encourages mastery of driving skills, and promotes safe driving behaviours are more effective at reducing crash risk than driver training that only teaches technical skills. Previous reviews of these studies, however, have highlighted that evaluations of driver training often have methodological issues such poor sampling, inappropriate control groups, short evaluation timeframes, reporting bias, and failure to control for important confounding factors in the analyses. These methodological issues may weaken the validity of findings, or not provide enough robust evidence to draw reliable conclusions.

Existing evidence on association between road safety and motor sport participation

In contrast to driver training, few studies have been conducted to examine the effect of four-wheeled motor sport involvement on road safety. Therefore, all studies that examined the association between involvement in four-wheeled motor sport and road safety were searched. A total of six studies were found. These included studies from the US, Canada, Australia and New Zealand. Motor sport involvement included participation as a motor sport driver, a motor sport passenger, and/or a spectator at motor sport events.

Evidence from the scientific literature indicates that motor sport involvement and high sensation-seeking tendencies are positively associated with engaging in risky on-road driving behaviours and reporting of driving offences, especially speeding. Research has also consistently shown that men are more likely than women to be interested in motor sport. However, there are too few studies to date that have examined the association between motor sport involvement and on-road safety to draw reliable conclusions about these associations. In most of these studies large amounts of missing data have been noted. Furthermore, most studies have not controlled for important confounding factors, such as exposure (time spent driving or distance driven on public roads), demographic characteristics of the population beyond age and gender (e.g., socio-economic status), attitudes about driving, and specifics about motor sport involvement, such as frequency, level of experience and knowledge, and participation in specialised motor sport driver training. Only a few studies have used complex statistical modelling (e.g., path analysis) to examine associations between motor sport and other factors and crash risk. Studies have also not examined the 'dose' or type of motor sport involvement that could affect road safety. Therefore, future research that addresses these methodological concerns is needed to better understand the association between motor sport participation and road crash risk after accounting for other important influences on crash risk.

A study of the associations between advanced driver training, involvement in four-wheeled motor sport, and crashes on public roads

In the second stage of this project self-report data were collected to answer the question of whether there is an association between crashes on public roads and advanced driver training and/or motor sport participation.

Data were collected via a cross-sectional online survey from Australian adults who regularly drive on public roads in Australia. The survey was based on key learnings from the literature review, which also provided validated tools to measure attitudinal variables. Two variables were used to measure exposure to driving: average kilometers driven per year and hours typically driven per week on public roads. Risky driving behaviours and driver aggression were assessed using questions from the Driver Behaviour Questionnaire (Parker et al, 1998) and Self-Report Driver Aggression Questionnaire (Hennessy & Wiesenthal, 2001). Respondents were asked to report crashes that occurred over the past 5 years involving damage of more than $1,000 or injury to a person, and also to report offences/infringements over this same period. Participants' attitudes to speeding were measured using the Attitudes Towards

Speeding questionnaire (Tranter & Warn, 2008), while the Risk-Taking Propensity scale (Donovan, 1993) was used to measure propensity to engage in risk-taking behaviours.

Survey participants were aged 18 years or older and recruited from three sources: 1) CAMS[1] members, 2) RACQ[2] members and 3) a panel of Australians who had agreed to complete online surveys for the marketing research company Survey Sampling International (SSI) and who had never been involved in motor sport. Responses from a total of 5,413 participants were available for analysis. These responses could be grouped as 3050 motor sport participants, 663 advanced driver training (ADT) graduates who were not motor sport participants, 588 RACQ members who were not motor sport participants or ADT graduates (RACQ control group) and 806 SSI respondents who had not participated in motor sport or ADT (SSI control group).

Most respondents were at least 45 years of age (64%) and male (85%). One-third held bachelor's degrees (33%), and over half worked full-time (56%). Most lived as married or de facto couples (72%) and over half (58%) were living in capital cities. There were notable differences in the demographic characteristics between some participant groups:

- The RACQ control group contained more young adults than did the other groups: 27% of the RACQ control group was aged 18-34 years vs 12-16% in the other groups.
- The percentage of respondents who were male was lower in the RACQ control group (56%) than in the motor sport participant (91%), the ADT graduate (87%) and the SSI (86%) groups.
- Respondents in the control groups tended to have attained lower levels of formal education compared with motor sport participants and ADT graduates. Notably, the percentage of respondents who had a secondary school education or less as their highest level of education was greater in the two control groups (RACQ: 31%; SSI: 34%) than in the motor sport participant (20%) or ADT graduate (24%) groups.
- The percentage of respondents who were working part-time or as casual workers was higher in the control groups (RACQ: 20%; SSI: 17%) than in the motor sport participant (11%) and ADT graduate (11%) groups.
- The percentage of respondents who were living as couples was greater in the motor sport participant group (77%) than in the ADT graduate group (72%) and the control groups (RACQ: 63%; SSI: 64%).

Most respondents reported driving under 20,000 km/year (58%) and driving less than 20 hours per week on public roads (83%). Statistically significant differences in driving exposure were noted between groups (Figure 1). Most respondents had an open driver licence (87%) with just 2% having a probationary or learner driver licence. When asked to report on other licences held, 13% reported holding a motorcycle licence; 17% of the motor sport participant group held a motorcycle licence compared to 11%, 11% and 6% in the ADT graduate, RACQ control group and SSI control groups, respectively.

[1] Confederation of Australian Motorsport
[2] Royal Automobile Club of Queensland

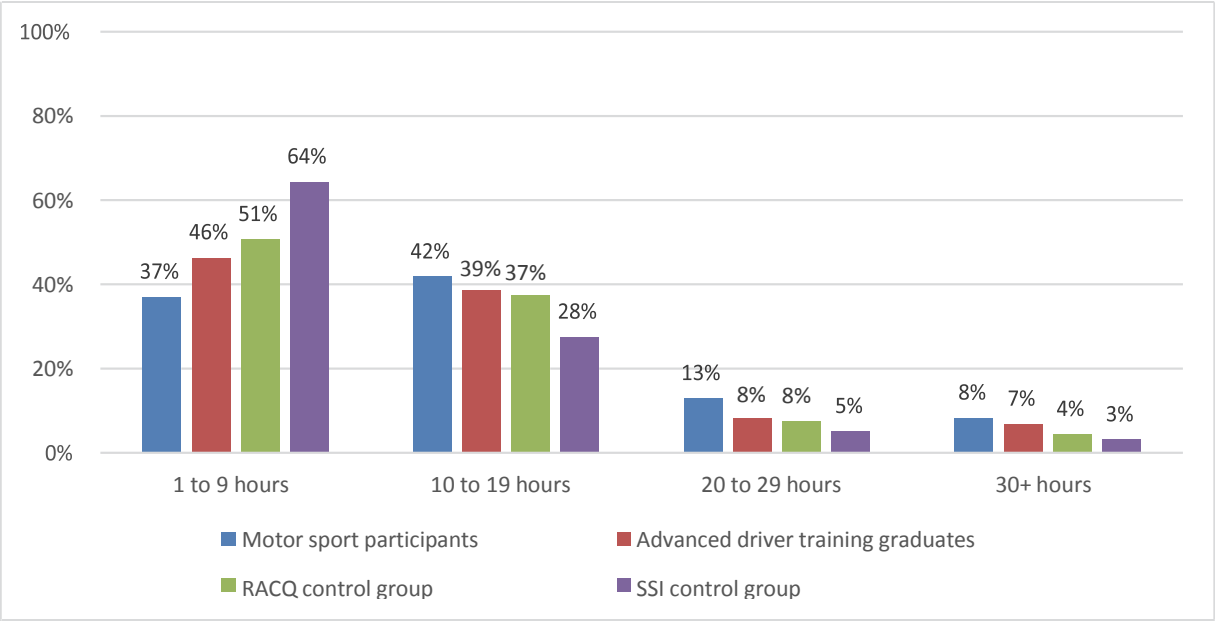

Figure 1. Hours typically driven per week on public roads, by group

Respondents reported low risky driving behavior with a mean score of 1.69 (sd 0.49) on the 1 – 6 scale of the Driver Behaviour Questionnaire, and this was the case for all groups of participants. Likewise, the aggressive driving behavior score was low (mean 1.70, sd 0.63) on a 1 – 6 scale, but there were differences between groups with ADT graduates having the highest mean score (1.72, sd 0.66), followed by motor sport participants (mean 1.69, sd 0.60) and RACQ control group (mean 1.69, sd 0.61), then SSI control group (mean 1.64, sd 0.67).

A total of 16% of respondents indicated that they had been involved as a driver in a crash in the past 5 years with the motor sport participants (17%), ADT group (15%) and RACQ control group (17%) all having similar proportions and the SSI control group having a significantly lower proportion (11%). The proportion of respondents who were drivers in crashes increased with increasing driving distance; 11%, 15% and 19% of respondents driving less than 10,000 km/year, at least 10,000 but less than 20,000 km/year and 20,000 or more km/year reported being drivers in crashes in the past 5 years, respectively. Among respondents who drove at least 20,000 km/year, the proportion reporting at least one crash was similar among the four participant groups (18-19%). Among respondents who drove at least 10,000 but less than 20,000 km/year, the proportion reporting at least one crash was similar across the motor sport, ADT and RACQ control groups (17-19%) but lower in the SSI group (9%). Among respondents who drove less than 10,000 km/year, the proportion reporting at least one crash was similar for the motor sport and RACQ groups (13-14%) but lower in the ADT and SSI groups (9-10%).

Considering driving infringements, 28% of respondents reported being cited for at least one driving offence/infringement in the past 5 years (Figure 2). The most frequently reported offence was speeding (26%), followed by failing to stop at a red light (2%) and using a mobile phone while driving (1%). There was no statistical correlation between the number of driving offences/infringements and being a driver in a crash.

Motor sport participants had a slightly higher score on the Attitude Towards Speeding questionnaire (mean score 3.31, sd 0.94) than other participant groups (mean scores between 2.61 – 2.76), indicating that overall they were marginally more accepting of speeding. There were no differences between participant groups in terms of their attitudes towards risky driving behaviour. All groups had, on average, a negative attitude towards risk driving behaviour. Overall, the Risk-Taking Propensity Scale was low for all participant groups (mean 1.16, sd 0.30 on a scale of 1 to 3); however, motor sport participants were slightly more likely than other groups to report that they engaged in risky behaviours.

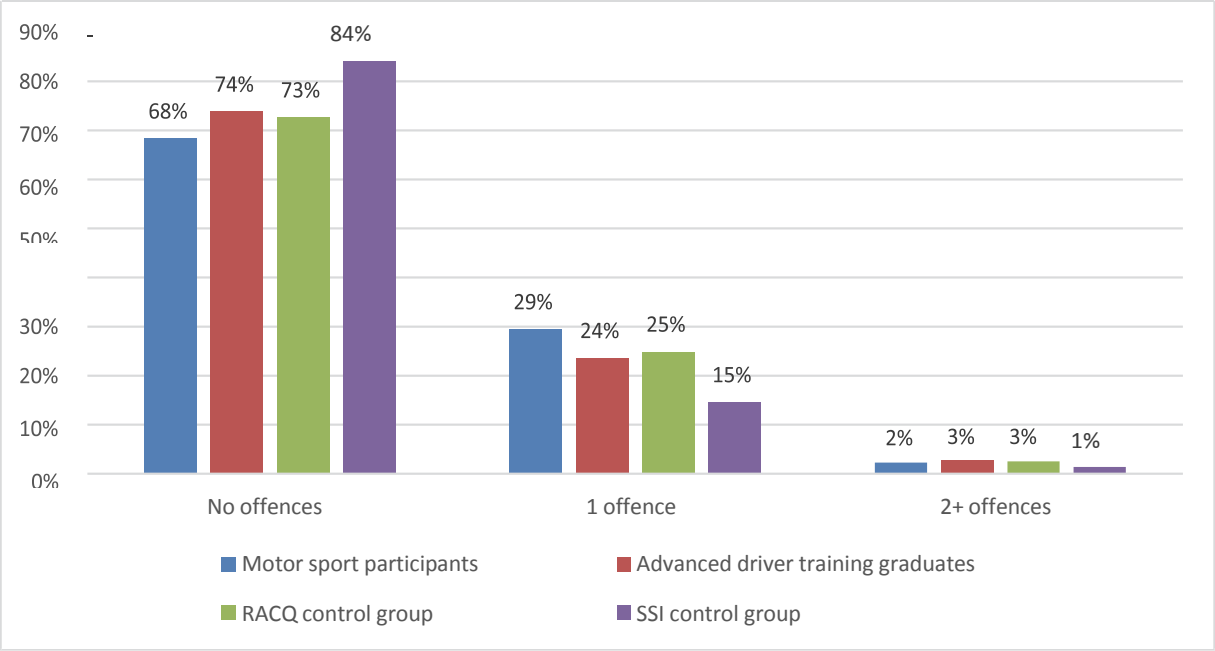

Figure 2. The percentage of respondents reporting driving offences/infringements in the previous 5 years, by group

Main findings for motor sport participants

Most motor sport participants (84%) reported that they had participated in more than 10 motor sport events during their lifetime. About one-quarter (23%) had started to compete in these events when they were between 10 and 18 years of age, and another one-third (31%) had started to compete when they were 19 to 24 years of age. Over 96% of motor sport participants competed in at least one form of single-occupant motor sport. The most common types of motor sport that participants reported competing in were motorkhanas (49%), hillclimbs (54%), and circuit sprints (70%).

Due to the relationship between driving exposure and the likelihood of being a driver in a crash, statistical analyses were conducted separately for respondents who drove fewer than 10,000 km/year, those who drove at least 10,000 km/year but less than 20,000 km/year, and those who drove at least 20,000 km/year.

Among respondents who drove the least (fewer than 10,000 km/year) and respondents who drove the most (at least 20,000 km/year), those who were motor sport participants had no increased or reduced likelihood of being a driver involved in a crash in the previous 5 years compared, with other drivers. The same results held in comparisons with the two different control groups. No demographic factors (e.g., age, gender, education, employment status, area of residence), attitudinal or behaviour factors (e.g., having a competitive attitude towards driving or engaging in risk-taking behaviours) or licensing factors (e.g., holding an open licence, probationary licence or learner's permit) had a meaningful effect on this association.

Among respondents who drove between 10,000 and 20,000 km/year, those who were motor sport participants had no increased or reduced likelihood of being a driver in a crash in the previous 5 years when compared to the RACQ control group. However, when motor sport participants were compared to the SSI control group who were matched to motor sport participants on age, gender and place of residence, the results were different. Motor sport participants were significantly more likely than respondents in the SSI control group to have been a driver in a motor vehicle crash in the previous 5 years.

A separate analysis was conducted to investigate factors associated with motor sport participation that could be related to being a driver in a crash in the previous 5 years. Few factors directly related to motor sport training and competition were significantly associated with being a driver in a crash. Having no training for motor sport before the time of the crash increased the likelihood of a crash on public roads by 50%. Participating in speedway stock car racing was associated with a 3.6 times greater likelihood of a crash, while participating in touring car racing was associated with a 67% reduced likelihood.

Main findings for graduates of advanced driver training (ADT) programs

About one-third (35%) of ADT graduates had received ADT before getting an open licence, and over half (57%) had received ADT after getting an open licence. Nine percent had received driver training for a motor sport licence but were not participating in a motor sport as a driver or a passenger.

Similar to motor sport participants, ADT graduates were compared to the two control groups in regards to their likelihood of being a driver in a crash in the previous 5 years. To be included as an ADT graduate in these analyses, respondents had to have attended an ADT program at least 5 years before completing the survey to ensure participation in ADT occurred before a reported crash. Also, respondents could not be motor sport participants.

Among respondents who drove the least (fewer than 10,000 km/year) and those who drove the most (at least 20,000 km/year), there was no increased or reduced likelihood, for ADT graduates compared with other drivers, of being a driver in a crash in the previous 5 years. No demographic factors (e.g., age, gender, education, employment status, area of residence), attitudinal or behaviour factors (e.g., having a competitive attitude toward driving or engaging in risk-taking behaviours) or driving licencing factors (e.g., holding an open licence, probationary licence or learner's permit) had a meaningful effect on this association.

A similar result was obtained for the group of ADT respondents who drove between 10,000 and 20,000 km/year; there was also no increased or reduced likelihood of between being a driver involved in a crash in the past 5 years compared to either control group.

Finally, an analysis was conducted to learn about the factors that are associated with ADT that could be related to being a driver in a motor vehicle crash in the previous 5 years. In the group of ADT graduates, only one factor related to the training was associated with being a driver in at least one crash: having had at least 8 hours behind the wheel of a motor vehicle during ADT taken before receiving an open licence was associated with a 2.6 times lower likelihood of having a crash.

Limitations of study

A limitation of the survey was that respondents were not asked to indicate whether they were at fault for any crashes that they were involved in, and there was no attempt to determine the severity of the crash. To understand whether the results could have been different if the outcome variable had been more narrowly defined, a new outcome variable representing 'potentially at-fault crashes' was created by recognising that if a respondent had been a driver in an at-fault crash, they would have likely received a police citation. However, this new outcome could not exclude individuals who received a police citation for an incident independent to the crash, and as such, some crashes classified as potentially at-fault may not have actually been at fault. With this new variable as the outcome variable, the results for the association between motor sport participation and likelihood of a crash in the previous 5 years did not change in a meaningful way, no matter the amount of driving per year. In the ADT analysis of drivers who drove at least 10,000 but less than 20,000 km/year this new outcome variable lead to a different result: the ADT graduates who drove this amount were more likely to be drivers in potentially at-fault crashes compared to the SSI control group. In contrast, ADT graduates who drove this amount were no more likely to be drivers in crashes than were drivers in the RACQ control group.

Another limitation is that the survey did not ask motor sport participants if they were drivers or passengers in motor sport events, and the risk of crashes on public roads could differ between motor sport drivers and passengers. However, the survey results indicated that only a few motor sport participants (4%) engaged solely in motor sport that requires a passenger along with a driver, and therefore, few motor sport participants in the study could have participated only as passengers. Consequently, it is not likely that the findings regarding likelihood of a crash in the previous 5 years would have differed significantly if the analysis had been limited to drivers in motor sport events.

The analysis of the association between ADT and crashes only included participants who graduated from ADT programs more than 5 years before the survey. This was to ensure that any reported crashes occurred after the ADT; however, this criteria meant the impact of ADT in young drivers could not be assessed. Further studies could address this by asking for more specific information about the date of ADT graduation if it was within the previous 5 years.

Conclusion

Overall, the results show that for Australians who drive the least (fewer than 10,000 km/year) and those who drive the most (at least 20,000 km/year), there is no increased or decreased likelihood of being a driver in a motor vehicle crash in the previous 5 years for motor sport participants or for ADT graduates. For people who drive between 10,000 and 20,000 km/year, however, the results are not so clear. For those drivers, the increased likelihood of being a driver in a motor vehicle crash in the previous 5 years for motor sport participants and for ADT graduates needs further exploration as these findings only held in the comparison with one of two control groups and the analysis was not able to identify the reason for this.

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