

Learning to take risks II: The influence of age and experience on risky driving behaviour in New South Wales¹

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The study was designed to test the hypothesis that, among drivers of the same age, risky driving behaviours become more frequent with increasing driving experience. The involvement of New South Wales drivers in accidents and traffic offences was analysed as a function of age, experience and sex. The results of both the accident analysis and the offence analysis supported the study hypothesis. It appears that novice drivers either learn through experience that potential hazards rarely eventuate or they become more confident of their ability to negotiate the hazards successfully if they do eventuate. In particular, there is evidence that an increasing tendency to speed leads to increasing involvement in certain types of accident during the first few years of driving. The findings suggest that the widespread use of combined speed and red light enforcement cameras at signalised intersections may be effective in reducing the frequency of 'right turn against' accidents.

Introduction

It was recognised many years ago that young drivers are particularly over-represented in single vehicle accidents (e.g. Goldstein, 1972; Deutsch, Healy and Strang, 1981). However, early studies did not identify the type of vehicle movements that young, inexperienced drivers are likely to be performing or attempting when they are involved in accidents. Do they have particular trouble with overtaking? With applying priority rules at intersections? Maintaining a safe following distance? Without knowing the type of vehicle movements that are associated with their involvement in accidents, it is difficult to identify the specific skills that may need to be improved to help young adults to become safer drivers.

A study conducted in Victoria by Catchpole, Cairney and Macdonald (1994) had as one of its objectives the identification of the accident types (based on vehicle movements) in which young drivers are most over-represented. The study examined drivers of cars and car derivatives (utilities, station wagons and panel vans) involved in casualty accidents in Victoria during 1988. Drivers affected by alcohol were excluded. It was found that the over-representation of young drivers in accidents is not uniform across all accident involvement roles.

The study identified a group of accident involvement roles in which young drivers were particularly over-represented. The authors labelled this group of involvement roles 'unexpected conflict' accident involvements because they appeared very likely to result from the young driver's failure to cope with a conflict created by an unexpected manoeuvre performed by another road user. This group of accident involvement types included:

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- Drivers involved in collisions with pedestrians
- Drivers of rear (striking) vehicles in rear end accidents
- Drivers of vehicles proceeding straight ahead in 'right thru', 'U turning' and 'emerging' accidents.

A much larger study of the involvement of young New South Wales drivers in accidents was conducted to seek confirmation of the findings of the Victorian study and to investigate the influence of driving experience on the types of accident in which young people are most likely to be involved (Catchpole, 1998). The study analysed the involvement of 17-59 year old passenger vehicle drivers who were involved in reported accidents of any severity in New South Wales from 1986 to 1996 (inclusive). Drivers affected by alcohol and those not holding a full or provisional licence were excluded from the study. Over 600,000 drivers were included in the analyses, of whom over 200,000 were involved in casualty accidents.

The NSW study confirmed the over-representation of young drivers in 'unexpected conflict' accident involvements by comparison with other types of accident involvement. It also yielded important new findings on the influence of driving experience on patterns of accident involvement. A breakdown of accident involvements by age and experience revealed that over-representation in unexpected conflict accident involvements decreases with increasing age (among drivers at the same level of experience), suggesting that voluntary risk acceptance, which is assumed to decrease with increasing age, may make a contribution to unexpected conflict involvements. The analyses also revealed that for drivers of the same age, over-representation in unexpected conflict accident involvements increases with increasing driving experience for approximately the first five to seven years. This is a very surprising result, since increasing experience would be expected to lead to improvements in the skills required to predict or detect unexpected manoeuvres by other road users and to respond safely to them. The increase in unexpected conflict involvements during the first years of driving when the effect of age is removed suggests that some aspect of experience-related driving skill or knowledge is implicated in this type of accident involvement.

One possibility is that newly licensed drivers are initially cautious, but that they learn through experience that potential conflicts rarely lead to actual conflicts and that risky driving behaviour (such as speeding or close following) does not usually lead to adverse consequences. In other words, as experience accumulates, driving behaviours that are *objectively* risky gradually cease to be *perceived* as risky. Drivers with five years of experience may therefore be more willing than first year drivers of the same age to drive at such a speed or at such a following distance that an unexpected manoeuvre by another road user leaves them unable to avoid a collision. Such behaviour can be said to constitute *risk taking*, since the behaviour increases the risk of crashing, but not necessarily *risk acceptance*, since the driver may not perceive the behaviour to be risky.

The hypothesis that newly licensed drivers may, in effect, learn to take more risks as they accumulate driving experience is likely, if confirmed, to be useful in helping to understand many aspects of the driving behaviour of young adults. However, substantial support is required before a new idea such as this can expect to achieve common acceptance and competing ideas can be eliminated. Traffic offences provide a potentially useful source of information for testing this hypothesis. They are much more under the voluntary control of the driver than involvement in accidents. They are also recorded in very large numbers, sufficient to permit simultaneous breakdown by age, experience and sex.

A possible competing explanation for the results of the NSW accident study concerns differences between male and female drivers. Newly licensed male drivers tend to be younger, on average, than newly licensed females. Thus, within a cohort of drivers of the same age, the proportion of males will be higher among the most experienced drivers than among the least experienced drivers. Therefore differences between drivers of the same age

with different levels of driving experience may be wholly or partly due to differences between males and females rather than to the effect of experience *per se*.

Aims of the study

The aim of the present study was to test the hypothesis that, among drivers of the same age, those with several years of driving experience tend to be more willing than newly-licensed drivers to perform objectively risky driving actions.

The specific objectives were:

- (1) to re-analyse the accident data used by Catchpole (1998), examining male and female drivers separately to determine whether over-representation in unexpected conflict accident involvements increases with driving experience for males or females or both; and
- (2) to determine whether risky driving behaviour by drivers of passenger vehicles, as reflected in their traffic offences, increases with driving experience among drivers of the same age.

Re-analysis of novice driver accidents in NSW

Method

The analysis was based on data supplied by the NSW Roads and Traffic Authority (RTA) for the study reported by Catchpole (1998). The data set comprised one record for each driver of a passenger vehicle (sedan, station wagon, hatch-back, car-based utility, panel van, taxi, forward control passenger van or four wheel drive) involved in a reported accident in NSW from 1986 to 1996 (inclusive). As in the earlier study, drivers were excluded if they were aged less than 17 or at least 60 years; had a blood alcohol concentration of 0.020 g /100 mL or more; or held a learner licence or were unlicensed at the date of the accident.

After these exclusions, 607,166 accident-involved drivers remained for inclusion in the analyses, comprising 201,285 drivers involved in casualty accidents and 405,881 drivers involved in non-casualty accidents.

Drivers in 'unexpected conflict' accident involvements were identified by referring to the Road User Movement (RUM) code allocated to each accident and the key vehicle flag allocated to each driver in the RTA database. A driver's involvement in an accident was classified as an 'unexpected conflict' involvement if he or she was the driver of:

- the key vehicle in a RUM 00 or 01 (pedestrian near side or emerging) accident;
- the rear (key) vehicle in a RUM 30, 31 or 32 (rear end) accident; or
- the vehicle proceeding straight ahead (non-key vehicle) in a RUM 21 (right thru), RUM 40 (U turn) or RUM 47 (emerging from laneway) accident.

Since exposure data were not available, the representation of each demographic group in 'unexpected conflict' involvements was measured in relation to the representation of the same demographic group in other types of accident involvement. Specifically, the relative frequency of 'unexpected conflict' accident involvements was defined as the ratio of the number of unexpected conflict involvements to the number of other multi-vehicle involvements for the same driver group (see Catchpole [1998] for further details).

Results

The results for drivers involved in all reported accidents and drivers involved in casualty accidents were very similar. For reasons of space, only the results for all reported accidents are presented here.

The relative frequency of unexpected conflict accident involvements is shown as a function of age and driving experience for male and female drivers in Figure 1. The charts show that relative frequency of unexpected conflict involvements follows a similar pattern for male and female drivers, first rising to a peak and then falling steadily. The main difference between males and females is that the peaks are more pronounced and one year earlier for males.

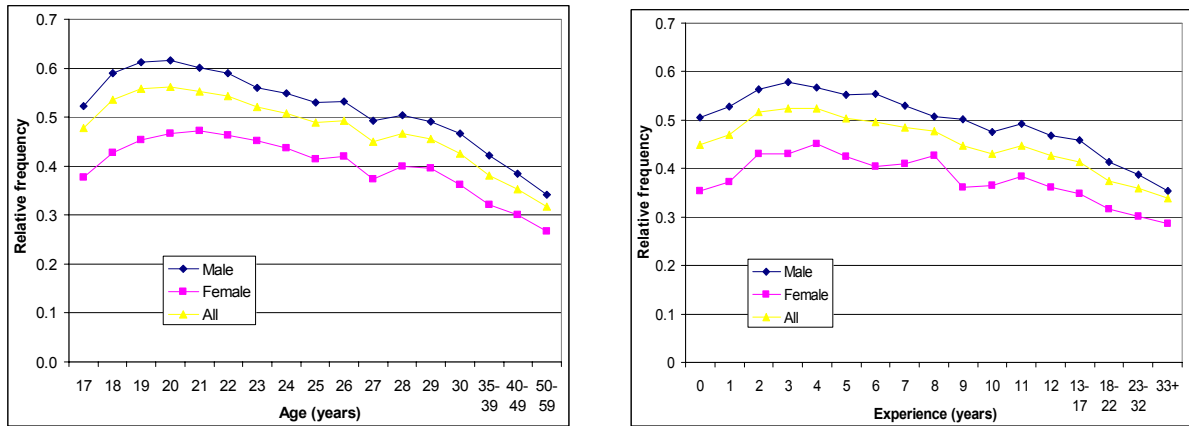


Figure 1. Relative frequency of unexpected conflict accident involvements as a function of driver age (left chart) and driving experience (right chart) for male and female drivers.

Figure 2 shows the relative frequency of unexpected conflict accident involvements as a function of age for drivers at various levels of experience. The charts show very similar patterns for males and females. For males and females with 0-2 years experience, the relative frequency of unexpected conflict accident involvements increases to a peak at ages 19-21 years, before subsequently falling with increasing age. For males and females with 3 or more years of experience, the relative frequency of unexpected conflict accident involvements starts at a maximum and, with a few minor exceptions, falls steadily with increasing age.

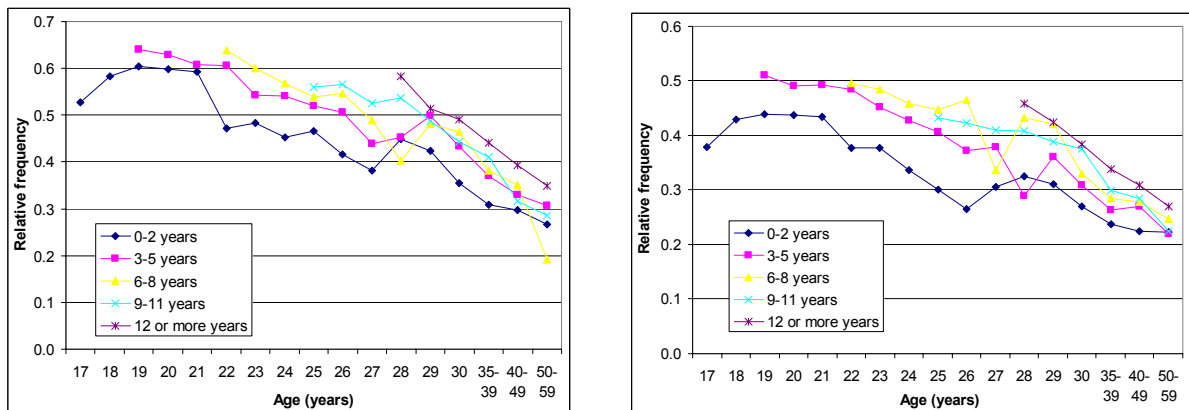


Figure 2. Relative frequency of unexpected conflict accident involvements as a function of age for males (left chart) and females (right chart) at various levels of driving experience.

Figure 3 shows the relative frequency of unexpected conflict accident involvements as a function of driving experience for drivers of various ages. The charts show very similar patterns for males and females. For male and female drivers in all age groups, the relative frequency of unexpected conflict accident involvements increases steadily over at least the first five years of driving experience, possibly levelling out thereafter.

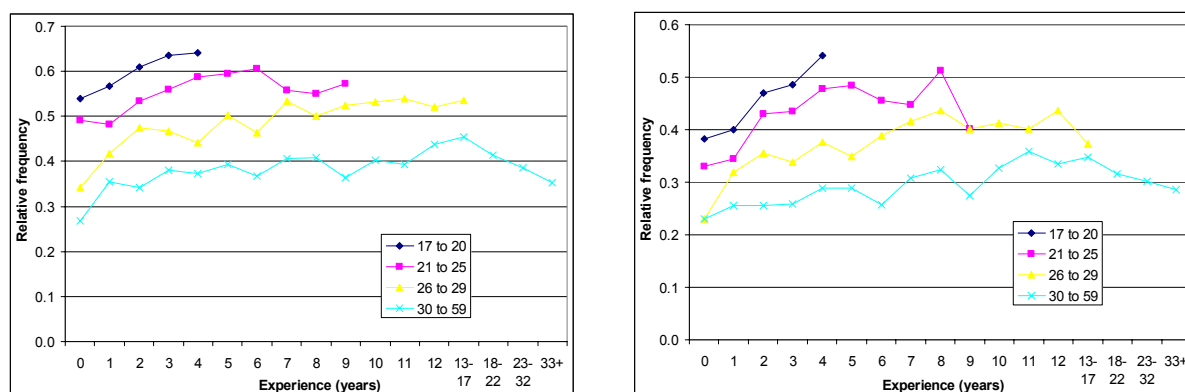


Figure 3. Relative frequency of unexpected conflict accident involvements as a function of driving experience for male drivers (left chart) and female drivers (right chart) of various ages.

Discussion

The relative frequency of unexpected conflict involvements was generally higher for males than for females in all age and experience groups. Apart from this difference, results for males and females were generally very similar. The high degree of similarity between the curves for males and females in all analyses strongly suggests that the processes of maturation and skill development operate and interact in substantially the same way in male and female drivers.

The earlier study by Catchpole (1998) found that the relative frequency of unexpected conflict involvements increases with increasing experience among drivers of the same age. However, because that study did not examine male and female drivers separately, it was possible that the finding applied only to male drivers, who numerically dominate the accident involvement data. Another possibility was that the finding applied neither to male nor to female drivers but was an artefact of the increasing proportion of males with increasing experience among drivers of the same age. The results of the present study clearly show that both of these alternative explanations can be eliminated. The increase in the relative frequency of unexpected conflict involvements with increasing experience among drivers of the same age is real and occurs for both male and female drivers.

Analysis of traffic offences in NSW

It was suggested earlier in this paper that the increasing relative frequency of unexpected conflict involvements with increasing experience among drivers of the same age may indicate increasing willingness to perform objectively risky driving actions. However, risky driving behaviour is by no means the only factor contributing to accident involvement. Experience-related skill and knowledge deficits and the type of road and traffic environment in which driving is undertaken will also influence the number and type of accidents in which a driver is involved. Hence it is important to examine other measures of risky driving behaviour apart from involvement in accidents.

As a source of information on risky driving, traffic offences have the advantage of representing voluntary actions in the great majority of cases. There may be some offences that are committed involuntarily, perhaps because the driver is overloaded by a temporary combination of demands in a particular traffic situation; however, such offences probably constitute a small proportion of the total. It would be neither reasonable nor productive for regulators to declare a driving action to be an offence unless the action were almost always within the voluntary control of the driver. The remainder of this paper uses information about traffic offences to investigate the willingness of drivers at different levels of experience to perform objectively risky driving actions.

Offence and licence holder data

The RTA provided a “snapshot” of the population of New South Wales driver licence holders as at 31/10/2002. Identifying details (name, address, etc.) were not supplied. Drivers aged less than 17 years, learner licence holders, drivers licensed to drive heavy vehicles or ride motorcycles, those whose first licence was issued outside New South Wales and those whose first provisional licence issue date was unknown were excluded from the analyses. All drivers born prior to 1958 were also excluded because the first provisional licence issue date was often not known for these drivers. The remaining licence holder records were used to model the passenger vehicle licence holder population at 12 points during the two-year period when the offences were committed.

The RTA also provided information about all recorded traffic offences committed in NSW during 2000 and 2001. Once again, identifying details were not supplied. Certain types of offence were excluded from the analyses if they related only to heavy vehicles or motorcycles, if they related only to learner licence holders or were not behaviours likely to contribute directly to an accident or injury. The excluded offence types included driving while unlicensed, driving an unregistered vehicle, P plate and L plate offences and failing to exchange particulars after an accident, among others. An offence instance (that is, a record of a particular type of offence being committed by a particular driver on a particular date) was excluded from the analyses if the offence was committed by a driver who held a learner licence, was unlicensed or was licensed to drive a heavy vehicle or ride a motorcycle. Offences committed by drivers whose first licence was issued outside NSW or whose first licence issue date was unknown were also excluded. Finally, all offences committed by drivers born prior to 1958 were excluded because the first provisional licence issue date was often not known for these drivers.

The remaining offences were classified according to level of risk – that is, the probability that committing the offence would contribute to the occurrence of an accident or injury. The terms “high risk” and “low risk” are defined solely in relation to each other, and do not refer to any external standard. That is, “high risk” means higher risk than the offence types in the low risk group and “low risk” means lower risk than the offence types in the high risk group. Offence types classified as high risk included, among others low, middle and high range prescribed concentration of alcohol (PCA) offences; speeding by 15 km/h or more; dangerous, negligent, menacing and culpable driving; red light running; and failing to give way. Low risk offence types included, among others, special range PCA offences; speeding by less than 15 km/h; disobeying a stop or give way sign; failing to signal correctly; driving a defective vehicle; burnouts; and seatbelt offences.

Risky driving behaviour was measured by offence rates. The rate of high risk offences was defined as the number of high risk offences committed in the two-year offence period per thousand licence holders. The low risk offence rate was defined as the number of low risk offences committed in the two year offence period per thousand licence holders.

Offence rates as a function of age and driving experience

The number of high and low risk offences is shown as a function of age and driving experience separately in Figure 4. Rates of both high and low risk offences are considerably higher for males than females. For both males and females, high risk offence rates rise to a peak at age 19 or about 2 years driving experience before subsequently declining – rapidly for males, more slowly for females. For males, the low risk offence rate also peaks at age 19 or 2 years experience before declining, though much more slowly than high risk offence rates. However, for females, the low risk offence rate rises to a plateau at around ages 20-30 years or around 2-13 years experience, followed by a very slight decline with further increases in age or driving experience. For high risk offences but not for low risk offences, both males and females show a small initial dip in the offence rate at about 3-9 months experience before the rate climbs to the peak at about 2 years experience.

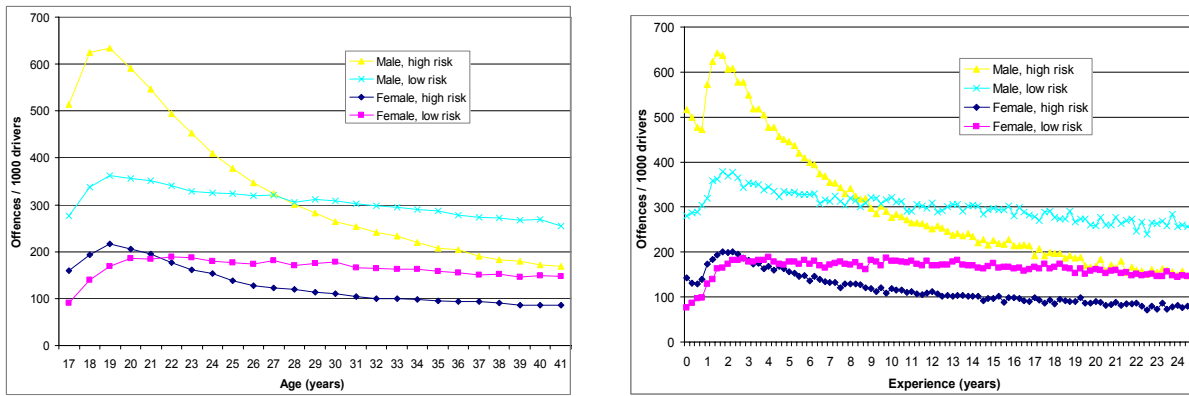


Figure 4. Rate of high and low risk offences per thousand licence holders as a function of driver age (left chart) and driving experience (right chart) for male and female drivers.

The rate of high risk offences per thousand drivers in each of the eight age ranges is shown in Figure 5. For drivers aged 17, 18-19 and 22-23 years, there is an initial dip at 3-9 months experience before the offence rate begins to increase. For all except the youngest age range, the offence rate rises to a peak at around 15-30 months experience, before slowly declining with further increases in experience. This peak is most clearly seen for drivers aged 18-26 years; for older drivers, the trends at low experience are less clear due to high variability caused by the relatively small number of older drivers with low levels of experience.

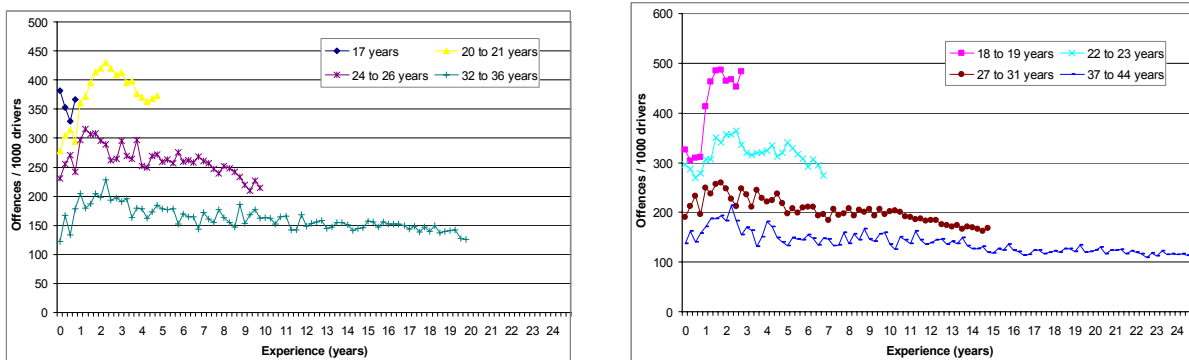


Figure 5. Rate of high risk offences per thousand licence holders as a function of driving experience and age group. For clarity, the eight age groups are presented in two charts.

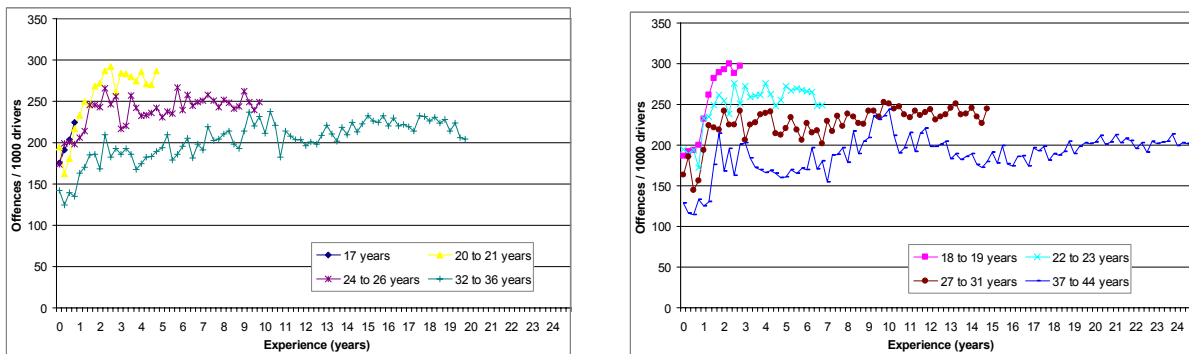


Figure 6. Rate of low risk offences per thousand licence holders as a function of driving experience and age group. For clarity, the eight age groups are presented in two charts.

The rate of low risk offences per thousand drivers in each of the eight age ranges is shown in Figure 6. For drivers aged 17-36 years, the rate of low risk offences climbs steeply for the first 2-2½ years of driving experience, after which any further increase in the rate of low risk

offences is very slow. There is no evidence of a decrease in the rate of low risk offences with increasing experience even at very high levels of experience.

The above breakdowns were repeated for males and females separately, but lack of space prevents the results being presented here. The patterns found for males and females separately were similar to those presented here for males and females combined.

The chi-squared test was used to assess the statistical significance of the increase in high and low risk offence rates found in the first two years of driving experience for each age group (except 17 year olds, since there were no 17 year old drivers with two years experience). The tests showed that the increase was statistically significant (at least at the 1 per cent level) for both high and low risk offence rates for every age group. In other words, drivers with 2 years experience had significantly higher rates of both high and low risk offences than drivers in the same age group with no experience.

Type of offence

For high risk offences committed by drivers aged 17-23 years only, the rate per thousand drivers for each offence type is plotted as a function of driving experience for females and males in Figure 7. For both males and females in this age range, the rate for all high risk offences declines for the first 6 months after obtaining a licence, before rising to a peak at 1½ years for males and 2 years for females and then subsequently declining with increasing experience.

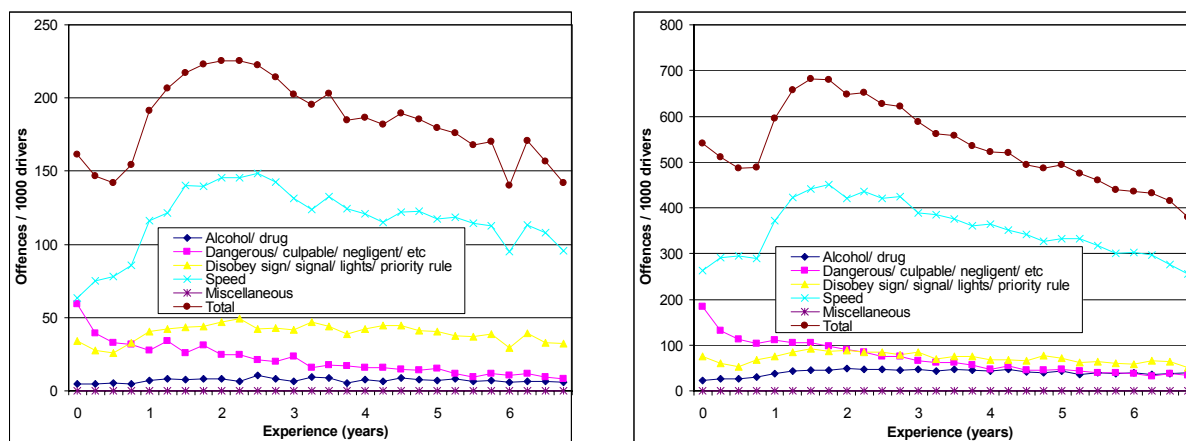


Figure 7. Offence rate by driving experience and offence type for high risk offences committed by female drivers (left chart) and male drivers (right chart) aged 17-23 years.

The charts show that the decline in the total offence rate during the first 6 months is driven by a decline in the rate of dangerous/culpable/negligent driving and related offences and a decline in the rate of offences relating to disobeying a sign/signal/priority rule etc. The rapid increase in the total offence rate after the first 6 months is driven mostly by the enormous increase in the rate of speeding offences, with smaller contributions from the increased rates of alcohol and drug offences and offences relating to disobeying a sign/signal/priority rule etc. These increases more than counterbalance the continuing decrease in the rate of dangerous/culpable/negligent driving and related offences. Chi-squared tests confirmed that the increase in high risk speeding offences over the first two years of driving experience was statistically significant for both females and males.

For low risk offences committed by drivers aged 17-23 years only, the rate per thousand drivers for each offence type is plotted as a function of driving experience for females and males in Figure 8. For low risk offences, unlike high risk offences, there is no initial decrease in the total offence rate for either female or male drivers. For females, the initial decrease in the rate of offences relating to disobeying a sign/signal/priority rule etc is swamped by the

rapidly increasing rate of speed offences and a smaller increase in the rate of seat belt offences. For males, the slight initial decline over the first six months in the rate of speed and some other offence types is counterbalanced by the increasing rate of seatbelt and non-compliant driving offences. Chi-squared tests confirmed that the increase in low risk speeding offences over the first two years of driving experience was statistically significant for females and for males.

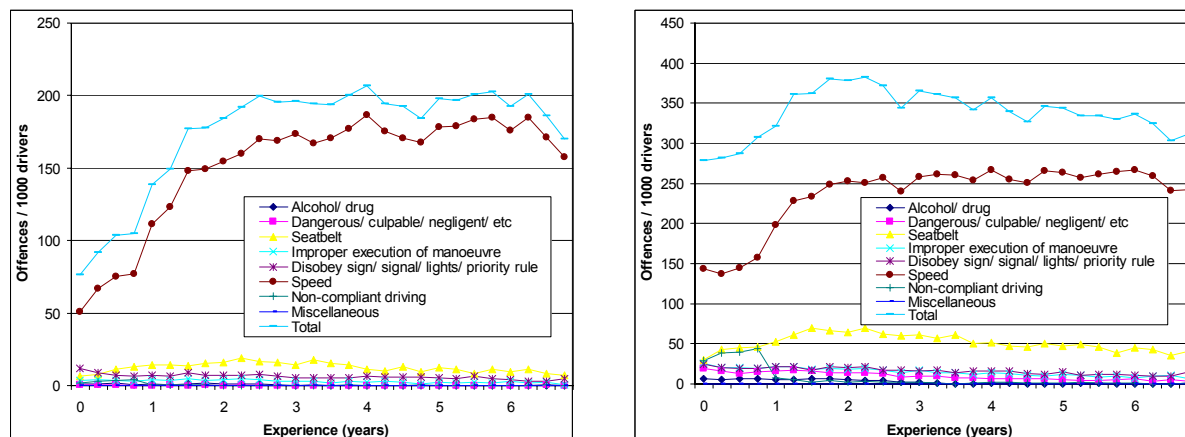


Figure 8. Offence rate by driving experience and offence type for low risk offences committed by female drivers (left chart) and male drivers (right chart) aged 17-23 years.

Discussion

What experience-related factor causes offence rates to rise between 6 and 30 months experience for high risk offences and between 0 and 30 months experience for low risk offences? One possibility is that drivers may learn through experience that various risky driving behaviours seldom lead to adverse consequences, and so they may learn with the accumulation of experience to engage in these behaviours more often². Fuller (1984) discusses this possibility in considerable detail. His model is worth reviewing here.

Fuller (1984) argues that stimuli (sensory inputs) from the road environment, such as hazardous road features or other vehicles, are usually not aversive (that is, unpleasant or harmful) of themselves. Rather, they have the potential to lead to aversive consequences, such as a collision, depending on how the driver responds to the stimulus. Fuller refers to such stimuli as potentially aversive stimuli. Other stimuli that signal to the driver that a potentially aversive stimulus may be imminent are referred to as discriminative stimuli. Upon perceiving a discriminative stimulus (such as a blind curve on a narrow road), the driver may make an anticipatory avoidance response (such as slowing his or her vehicle) to ensure that if the potentially aversive stimulus (an on-coming vehicle) does eventuate, a collision will not result. Alternatively, the driver may choose not to respond to the discriminative stimulus or may make a competing response (such as maintaining speed because he or she is in a hurry). If the potentially aversive stimulus signalled by the discriminative stimulus does not eventuate, no further action is required. If the potentially aversive stimulus (on-coming vehicle) does eventuate and the driver has not made an anticipatory avoidance response, the driver can make a delayed avoidance response (such as braking hard or swerving). Depending on situational factors (such as the speed and separation of the two vehicles), the delayed response may be successful or unsuccessful in averting a collision.

² Even though a behaviour is objectively risky from a system-wide point of view, it will generally be quite rare for a driver to have the experience of engaging in the behaviour and then being in an accident as a result. For example, around 98 per cent of NSW licence holders were not involved in a recorded accident during the year 2000.

It is important to note that the anticipatory avoidance response, if made, occurs before the driver becomes aware of whether the response is necessary or not. Fuller argues that the probability of making an anticipatory response will be influenced by the driver's subjective estimate of the probability that the potentially aversive stimulus will eventuate. When the probability of the potentially aversive stimulus is perceived as low, the driver is less likely to make the anticipatory response.

Alternatively, increased experience may act not to reduce the subjective probability of a hazard (in Fuller's terms, a potentially aversive stimulus) occurring but to increase the driver's perception of his/her ability to cope successfully with the hazard if it does eventuate. Brown (1982) has argued that the novice driver becomes increasingly confident with increasing experience as a result of awareness of his or her rapidly improving vehicle control skills. He argues that, initially at least, such confidence is misplaced, because the driver is unaware that his or her perceptual and cognitive skill development has not kept pace with the improvement in vehicle control skills.

Whether increasing experience leads the driver to believe that the potential hazard is less likely to eventuate or to believe that he or she will be better able to deal successfully with the hazard if it does eventuate, the result will be same: the driver will be less likely to make an anticipatory avoidance response upon perceiving a discriminative stimulus and therefore more likely to need to attempt a delayed avoidance response if the hazard does eventuate.

This model has ready application to involvement in accidents resulting from conflicts created by unexpected actions of another road user.

- For the driver proceeding straight ahead in a 'right thru' accident, the discriminative stimulus (which we might more colloquially term the warning) would probably be an oncoming vehicle with its right indicator blinking. The potentially aversive stimulus (or hazard) would be an oncoming vehicle that makes a right turn across the driver's path.
- For the driver proceeding straight ahead in a 'U turn' accident, the warning stimulus might be a vehicle that pulls over to the left side of the road with its right indicator blinking. The hazard would be a vehicle that performs a U turn across the driver's path.
- For the driver proceeding straight ahead in an 'emerging from driveway' accident, the warning might be the sight of a vehicle reversing down a driveway with only the rear part of the vehicle visible to the driver proceeding straight ahead (and hence the vehicle proceeding straight ahead not visible to the driver of the reversing vehicle in the driveway). The hazard would be a vehicle that emerges from a driveway into the driver's path.
- For the driver of the rear vehicle in a 'rear end' accident, the warning could, for example, be a yellow traffic signal ahead. The hazard would be a vehicle ahead travelling in the same direction that brakes suddenly.
- For the driver in a 'pedestrian near side' accident, the warning could be the presence of a child or an intoxicated pedestrian on the left footpath. The hazard could be a pedestrian who darts out suddenly from the left side of the road.
- For the driver in a 'pedestrian emerging' accident, the warning could be the presence of vehicles parked along the road in an area where pedestrians are likely to cross. The hazard would be a pedestrian who steps onto the road from between parked vehicles.

The most appropriate anticipatory avoidance response to the discriminative stimulus might be slowing down, making eye contact with the other road user, positioning one's own vehicle as close to the centre line and as far from the kerb as possible, sounding the horn, a combination of these or some other response, depending on the exact parameters of the situation.

If a discriminative stimulus, such as the presence of children on the left footpath, is repeatedly encountered without being followed by a potentially aversive stimulus (the child darting out in

front of the driver's vehicle), then the anticipatory response (slowing and/or positioning the vehicle away from the left kerb) may eventually be seen as unnecessary and cease to be performed. In each of these scenarios, if the anticipatory avoidance response is not performed when the warning stimulus is encountered, the chances of being involved in a collision if the hazard eventuates are greatly increased.

The present study has demonstrated a rapid and statistically significant increase in the rate of high and low risk offences up to about two years experience among drivers of the same age. This suggests an increasing willingness to engage in risky driving behaviour. This could be manifested as decreasing willingness to make an anticipatory avoidance response when a discriminative stimulus (warning) is perceived, either because experience has led the driver to believe that the probability of the hazard eventuating is very low or because experience has given the driver a perception of increased ability to deal successfully with the hazard if it does eventuate. Decreased willingness to make anticipatory responses would be likely to lead to increased involvement in accidents resulting from conflicts created by unexpected actions of another road user.

It should be noted that the rapid increase in offence rates during the first two years is driven largely by the rapid increase in the rate of speeding offences, which more than counterbalances the decline in some other offence types. Thus the increase in the relative frequency of unexpected conflict involvements with increasing experience might be caused not by a general increase in willingness to take risks but by a specific willingness to speed, making it more difficult to cope with conflicts caused by the movements of other road users.

Conclusions

Among drivers of the same age, higher levels of experience (up to about two years) are associated with a greater tendency to offend and engage in risky driving behaviour. This might be caused by the more experienced drivers having learned through their experience that risky driving behaviour is rarely followed by unpleasant consequences. Alternatively, it may be caused by a higher level of confidence among the more experienced drivers that they can safely negotiate hazards if they arise. The complex nature of the high risk offence rate curve suggests that offence rates are being influenced by several separate experience-related factors, some of which tend to increase offence rates and some of which tend to reduce offence rates.

Speeding offences are mainly responsible for the increase in offence rates with increasing experience among drivers of the same age. This increase in speeding offences coincides with an increase in the relative frequency of involvement in accidents likely to have been caused by unexpected manoeuvres of another driver or pedestrian. Speeding may be a major contributor to accidents of this type. If this can be confirmed by further research, then measures that reduce speeding would be expected to lead to a reduction in unexpected conflict involvements. The use of combined speed and red light enforcement cameras at signalised intersections would have special potential for the reduction of 'right against' accidents.

Measures intended to reduce unexpected conflict accident involvements are relevant to all drivers, but should be especially targeted at young, inexperienced drivers and male drivers. Persuasive and educational programs, such as mass media advertising, should employ messages designed to appeal to young, inexperienced drivers and male drivers and should be disseminated using media that will reach these driver groups. Enforcement operations should be concentrated at times when and places where young, inexperienced drivers and male drivers are especially prevalent. While measures to reduce high range speeding offences should be especially targeted at the youngest drivers, measures to reduce low range speeding offences continue to be relevant at least to age 41 years, the upper limit of the analyses performed in this study.

While traffic offence records are the best available source of information on risky driving behaviour among the entire New South Wales driving population, there are reasons to be cautious about using offence rates as a measure of risk taking. Thus the findings of the present study in relation to risky driving should be confirmed, if possible, using other methods and other measures before being relied upon as the basis for the development of extensive countermeasure programs.

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