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Comparing provisional and unrestricted licence holders on speeding offences  
and crash rates

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ABSTRACT

Speeding is the single largest behavioural factor contributing to road trauma, and is estimated to be a factor in around 40% of fatal crashes in NSW. Age, driving experience and gender, are well recognised as predictive factors in speed-related crashes. The present study examined the interrelationships of these factors and speeding by interrogating the RTA's licence, offence and crash data, to compare provisional and unrestricted licence holders on speeding offences. The data showed that speeding offence rates are much higher amongst provisional drivers than unrestricted drivers, especially at extreme levels of speeding. Males tend to speed more than females, again especially at excessive speed. However, male to female ratio of unrestricted speeding offenders is similar to or slightly higher than that of provisional speeding offenders across all speeding ranges. Hence, being a novice driver also seems to add independently to the tendency to speed at high ranges regardless of gender. Overrepresentation of high range speeding offence rates amongst provisional drivers also appears to be a major contributor to their overrepresentation in serious crashes. Examination of crashes in NSW over the last five years reveals that speeding is more likely to be a factor in the fatal crashes of provisional drivers than unrestricted drivers. Results are discussed in terms of psychological factors in speeding and road safety countermeasures. The automatic licence suspension for P1 drivers caught speeding being introduced in NSW is likely to produce road safety benefits.

INTRODUCTION

Speeding is the most common traffic offence in New South Wales (NSW) and the single largest behavioural factor contributing to road trauma. It is estimated to be a factor in around 40% of fatal crashes in NSW. Males and younger drivers are well recognised to show risk taking behaviour (Hewitt et al, 1995; Byrnes, Miller, and Schafer, 1999; Harris et al, 2006) and be involved in casualty crashes (Turner and McClure, 2003). Speeding is considered as a form of risk taking behaviour in that it is associated with increased risk of mortality, morbidity and disability. The present study

examined the interrelationships between age, gender, driving experience (in terms of licence type held) and excessive speeding in NSW.

Young drivers are overrepresented in crashes in Australia (Cavallo and Triggs 1996; Dunsire and Baldwin 1999; Palamara et al. 2001; TAC 2003) and in many other industrialised countries including the United States, Canada, New Zealand, the United Kingdom, and Europe (OECD 2006; Begg and Langley 2000; Clarke et al. 2002; Engström et al. 2003; Laapotti et al. 2001; Shope et al. 2001). There has been research to suggest that young adults' greater tendency to engage in high-risk driving behaviour is an important contributor to their high crash involvement rate (Harré, 2000; Williams, 1998). They are particularly over-represented in crashes involving excessive speed, driver fatigue and/or alcohol use (Clarke et al., 2002; Dobbie, 2002; Dunsire and Baldwin, 1999; Engström et al., 2003; Palamara et al., 2001). They also tend to wear seatbelts less frequently than older drivers (Begg and Langley, 2000; Engström et al., 2003; Triggs and Smith, 1996), thereby increasing the chances of injury following crash involvement (Norris et al., 2000). In NSW 34% of provisional drivers involved in fatal crashes are speed-related compared to 17% of unrestricted drivers. (These figures are lower than the overall rate of around 40% speeding involvement because of multiple vehicle crashes.)

Speeding is a form of high risk behaviour and the largest factor in fatal crashes in NSW. The overrepresentation of provisional licence holders in speed-related fatal crashes in NSW may be at least in part explained by their overrepresentation in speeding offences. Investigation of the interrelationships between age, gender, licence type, and speeding and crashes can help understand the extent and direction in which these factors independently lead to the overrepresentation of provisional licence holders in crashes compared to unrestricted licensees. Hence the aims of this paper were to compare between provisional and unrestricted licence holders licence holders on 1) speeding behaviour; 2) the extent of high range speeding offences relative to other traffic offences; 3) overall and speed-related fatal crash rates. Age and gender were controlled for in all comparisons to reveal to some extent the independent effect of being a novice driver on speeding and fatal crash involvements.

## METHODS

### Data

Data from the NSW Roads and Traffic Authority including licence, offence and crash data were employed. Recorded crashes include crashes that have occurred on public roads and have been reported to the police and where at least one person has been killed or injured, or where at least one vehicle has been towed away.

### Sample

For offence data analyses, those who held an unrestricted licence as their highest type (n=3,823,368) or a provisional licence as their highest type (n=495,484) at the time of committing a traffic offence between 2001 and 2006 were included. When a driver held an unrestricted car licence and a provisional rider licence s/he was classified as unrestricted licence holder because that is the highest licence type held. A driver who had a provisional rider licence and a learner car licence was classified as a provisional licence holder.

For crash data analyses the licence type of the vehicle controllers involved in crashes between 2001 and 2006 were included.

In NSW, the minimum age required to obtain a provisional licence is 17 years and it must be held for a minimum of 3 years. Since the Graduated Licensing Scheme (GLS) was introduced in July 2000, novice drivers are required to go through two stages on a provisional licence; P1 and P2. However, the current analyses did not separate them. In this study both the P1 and P2 are analysed together as provisional licence holders. Provisional drivers are referred to as novice drivers in this paper when our aim is to point out the experience factor separate from the age factor.

### Weighting of the offence data

Due to delays such as protracted court hearings, there is up to a 3 year lag in offence records being entered in the RTA database. Hence, offence counts from 2004 have been extrapolated to take in account the lag. The number of offences committed presented in this report for 2004 through to 2006 is therefore not actual counts recorded in the RTA database on the data extraction date of March 2007 but

estimated counts, correcting for data yet to be received. The estimates have been calculated based on the offence committed date, the recorded date in DRIVES, and the differential delays between court, Infringement Processing Bureau, and State Debt Recovery Office processing the offence records

### Analyses

Offence rates were calculated as the number of offences per 100,000 licence holders. In NSW between 2001 and 2006 unrestricted licence holders accounted for on average 90% of all licence holders whereas provisional licence holders only accounted for 5% on average. Therefore raw counts of offences are larger for unrestricted licence holders because there are more of them and comparing raw counts misrepresents the problem.

The speeding offence and speed-related crash rates were calculated by licence type (provisional versus unrestricted), age, and gender to compare the speeding offence rate and crash rate by age and gender between provisional and unrestricted licence holders.

Regression analyses were conducted to examine the extent and direction in which age and gender and licence type related to the severity of speeding and to speeding in excess of over 30 km/h. For the former multiple linear regression analysis and for the latter logistic regression analysis was employed.

## RESULTS

### Comparing the speeding offence rate between provisional and unrestricted licence holders

The speeding offence rate is 20% higher on average for provisional than unrestricted licence holders between 2001 and 2006 (Figure 1).

Examination of speeding offence rate by speeding range suggest that the greater level of speeding offence amongst provisional licence holders is largely explained by their overrepresentation in higher ranges of speeding offences (Figure 2). The 2006 figures are presented as an example because that is the most recent full year data available.

Figure 1.

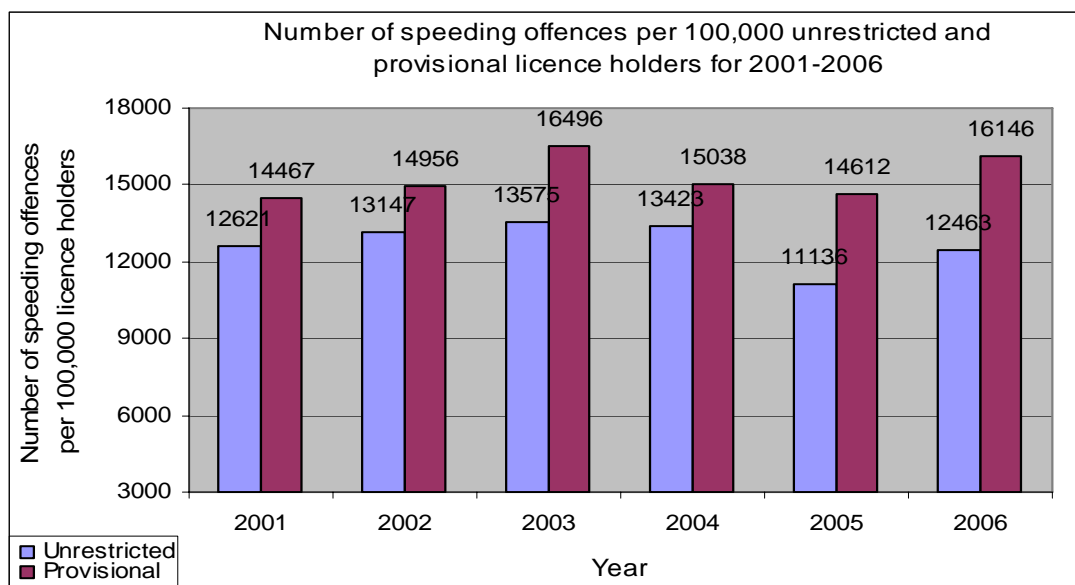
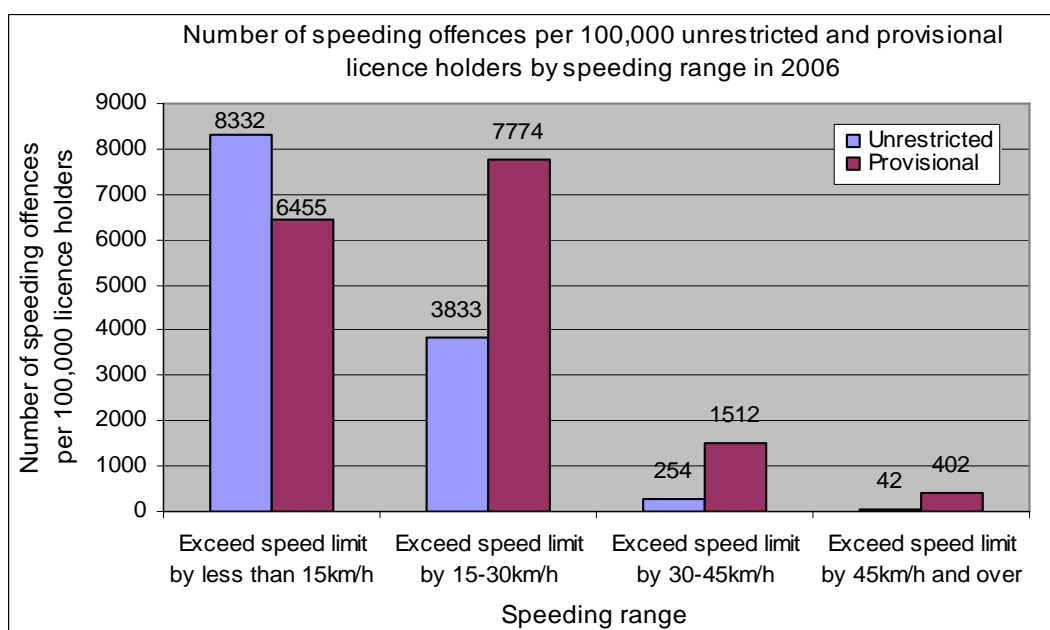


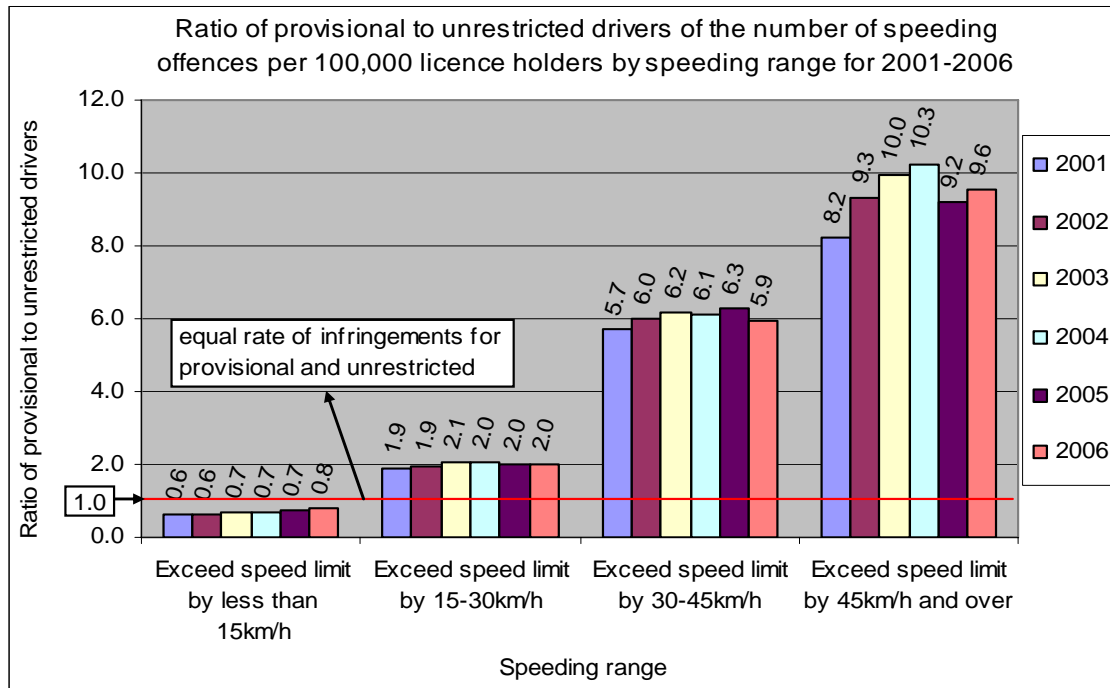
Figure 2.



For the years between 2001 and 2006, the ratio of provisional to unrestricted licensees caught speeding has remained stable, except for slight fluctuations for speeding over 45 km/h (Figure 3). As the 2006 figures indicate (Figure 2), provisional licensees show higher rate of speeding than unrestricted at higher ranges of speeding (Figure 3). For example, unrestricted drivers are more likely to be caught speeding by less than 15 km/h than provisional licence holders (ratio less than one),

but provisional drivers are eight to ten times more likely than unrestricted drivers to be caught speeding by over 45 km/h. This indicates that provisional drivers are more likely to engage in high risk speeding behaviour than unrestricted drivers.

Figure 3.



Comparing the speeding offence rate between provisional and unrestricted licence holders by age and gender

The male to female ratio amongst provisional and unrestricted licence holder population is respectively one to one (Table 1). However unsurprisingly, males are overrepresented in the speeding offender population for both provisional and unrestricted licence holders. Moreover, the male to female ratio is higher amongst provisional licence holders than unrestricted licence holders (Table 1).

Table 1. Male to female ratio amongst provisional and unrestricted licence holders.

Population	Provisional	Unrestricted
Licence holders	0.9	1.1
Speeding offenders (all ranges)	2.3	1.8

Unsurprisingly the average age amongst provisional licence holders licence holder population is lower than unrestricted licence holders licence holder population (Table

2). The average age amongst speeding offenders is lower than the average licence holder population for both provisional and unrestricted licence holders. This is consistent with the well recognised claim that younger people show more risk behaviour.

Table 2. Mean age for provisional and unrestricted licence holders.

Population	Provisional	Unrestricted
Licence holders	21.7	46.0
Speeding offenders (all ranges)	20.6	41.8

Given the difference between provisional and unrestricted speeding offenders in age and gender distribution, the age and gender effects on speeding must be taken into account to compare speeding offence rates between provisional and unrestricted licence holders. Figure 4 and Figure 5 show the percentage of males and females respectively caught speeding by licence type and age. They suggest that for the same age and gender, the speeding offence rate is higher for unrestricted than provisional licence holders.

Figure 4.

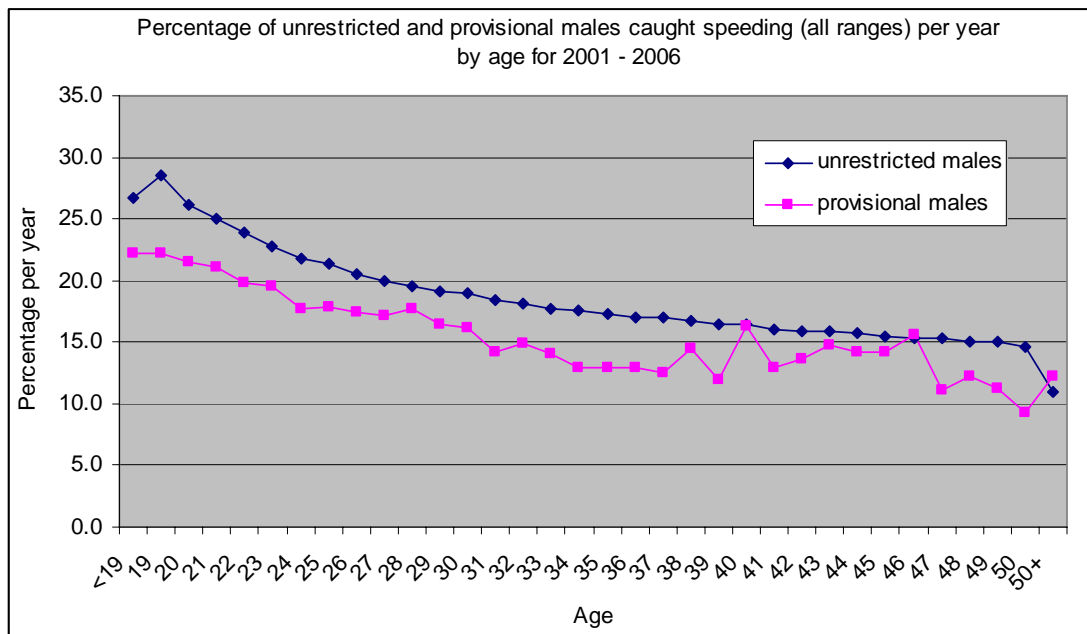


Figure 5.

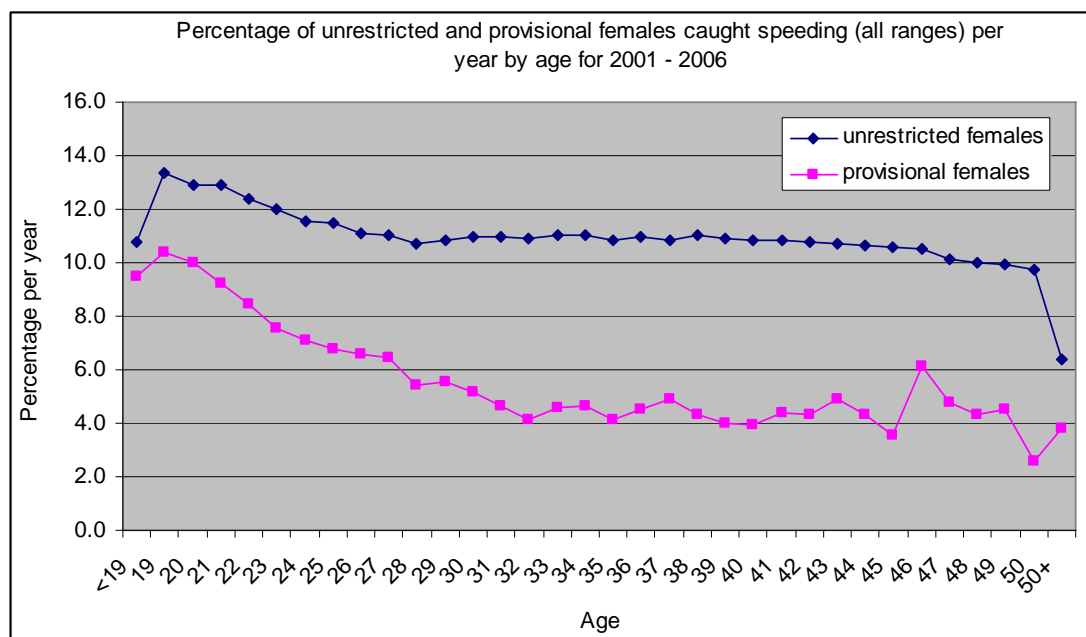


Figure 6 and Figure 7 show the percentage of males and females respectively caught speeding by over 30 km/h above the speed limit by licence type and age. They show that for the same age and gender (except for some ages over late 30's in females, and some ages in males where the rates are equal), the high range speeding offence rate is higher for provisional than unrestricted licence holders. This is consistent with the above figures suggesting that provisional licence holders are overrepresented in the more dangerous levels of speeding.



Figure 6.

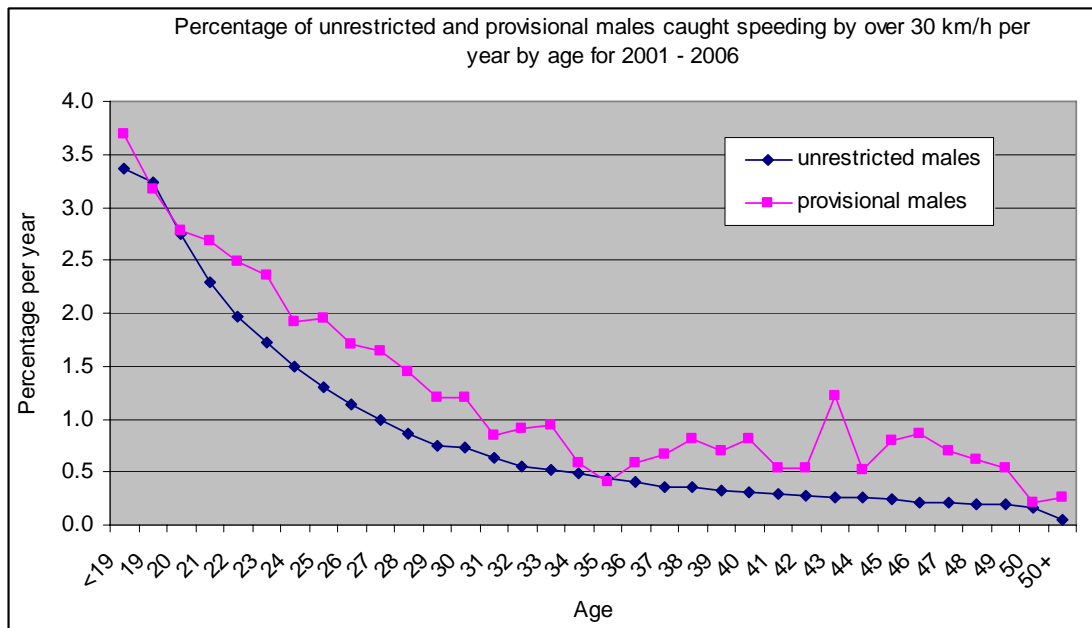


Figure 7.

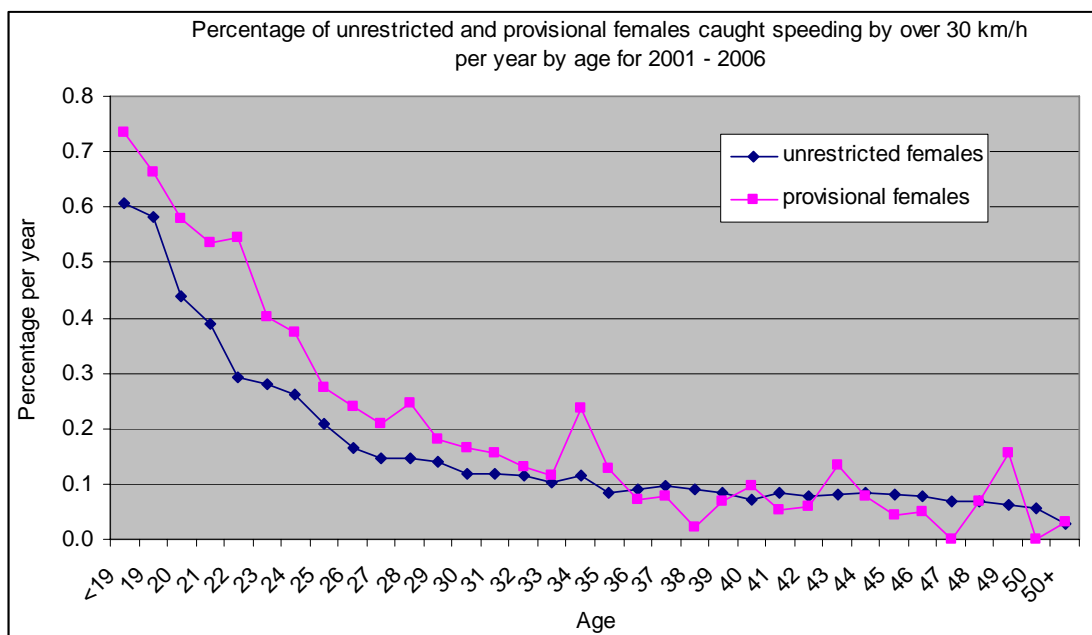


Figure 1 showed that the speeding offence rate was higher by provisional than unrestricted licence holders overall, but Figures 4 and 5 show that when age and gender are considered, for the same age and gender the speeding offence rate is higher for unrestricted than provisional licence holders. However, when only over 30

km/h speeding offences are considered, provisional licence holders still show more of those offences than unrestricted licence holders for the same age and gender. Age seems to be a major factor in the overrepresentation of provisional licence holders in speeding offences overall but age by itself does not seem to explain the overrepresentation of provisional licence holders in high range speeding. Being a novice driver, other than being young, seems to be relevant for particularly high risk behaviour.

#### Comparing mean range of speeding above the limit between provisional and unrestricted speeding offenders controlling for age and gender

In NSW ranges of speeding above the limit is categorised into four levels; speeding by not more than 15 km/h, of 15-30 km/h, of 30-45 km/h, and of more than 45 km/h. When the licence types were compared controlling for age, gender and logical interactions, the regression analyses showed that provisional licence holders are likely to speed at severer levels than unrestricted licence holders regardless of age and gender (Table 3) . Amongst females in each age group and amongst males in each age group, provisional licence holders show a higher mean range of speeding than unrestricted licence holders (Figure 8). The mean is higher for those under 25 than those aged 25 and above for provisional than unrestricted licence holders across gender. The drop with age is larger for unrestricted males than provisional males. Provisional females are also still worse than unrestricted females at ages 25 and over (Figure 8).

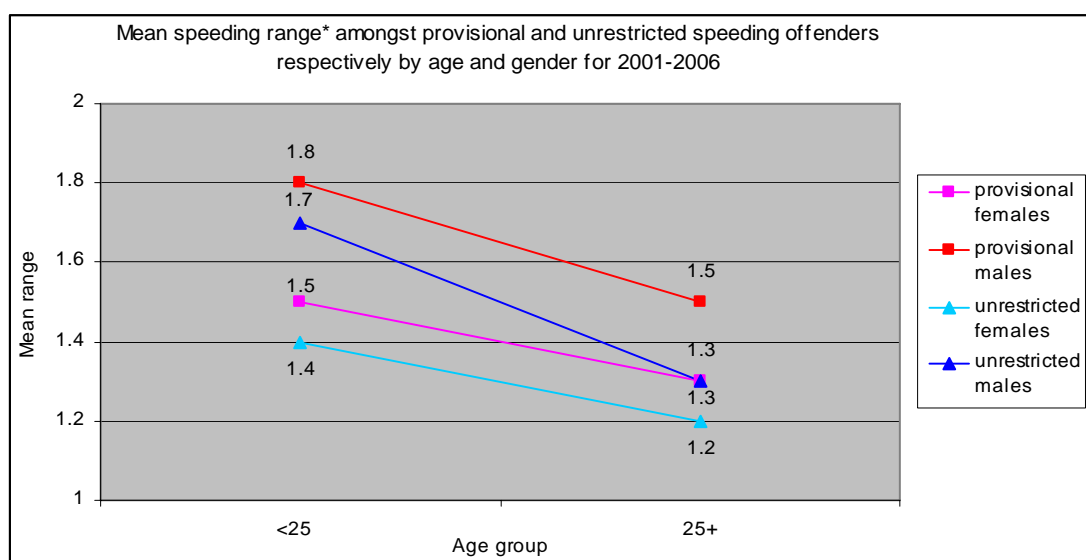
These results show that the higher risk behaviour in terms of higher range speeding amongst provisional licence holders is more than just about being young but also being novice drivers. Reduced level of high risk behaviour with age is less observed amongst provisional males than unrestricted males. Moreover, provisional females are as bad as unrestricted males amongst those aged 25 and over.

Table 3. Parameter estimates, t-values, and p-values for the variables predicting the ranges\* of speeding over the limit.

Predictors**	Co-efficient	t-value	p-value
Licence type (UR [0] vs P [1])	0.2	53.7	<0.0001
Age group (< 25 [0] vs 25+ [1])	-0.2	-106.1	<0.0001
Gender (F [0] vs M [1])	0.2	112.1	<0.0001
Age group x gender	-0.15	-69.9	<0.0001
Licence type x age group	-0.04	-6.3	<0.0001
Licence type x gender	0.01	3.2	0.0015
Licence type x age group x gender	0.07	8.8	<0.0001

\* Ranges were categorised into four numerical levels where 1 = speeding by not more than 15 km/h, 2 = speeding by 15-30 km/h, 3 = speeding by 30-45 km/h, 4 = speeding by more than 45 km/h.  
 \*\* The numerical values assigned to each level of the predictors are indicated in [ ].

Figure 8.



\* Ranges were categorised into four numerical levels where 1 = speeding by not more than 15 km/h, 2 = speeding by 15-30 km/h, 3 = speeding by 30-45 km/h, 4 = speeding by more than 45 km/h.

Comparing the likelihood of speeding by over 30 km/h relative to other traffic offences between provisional and unrestricted licence holders controlling for age and gender

The likelihood of speeding by over 30 km/h relative to other offences was compared between licence types, controlling for age, gender and logical interactions in a regression analysis. It showed that the likelihood of speeding by over 30 km/h compared to other offences was greater for provisional than unrestricted licence holders regardless of age and gender (Table 4). Figure 9 presents the percentage of speeding by over 30km/h offences out of all traffic offences in each age by gender group for provisional and unrestricted licence holders. Amongst the under 25 age group, the percentage of high range speeding is higher for provisional females than unrestricted females, but it is similarly high amongst provisional and unrestricted males. Amongst the 25 and over age group, the percentage of high range speeding is higher for provisional males than unrestricted males but it is similarly low amongst provisional females and unrestricted females (Figure 9). That is, younger provisional females and older provisional males are worse than their respective unrestricted counterparts. Generally females and older age groups are recognised as less likely to be risk takers but provisional females in the younger age group show more high risk behaviour than unrestricted females in the same age group, and provisional males in the older age group show more high risk behaviour than unrestricted males in the same age group in terms of high range speeding.

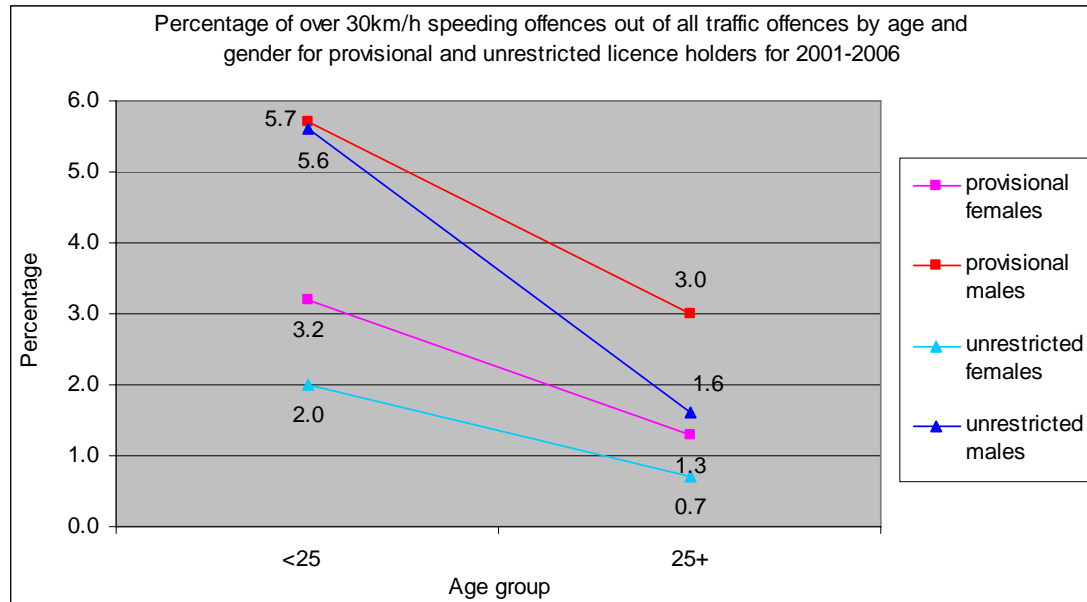
Table 4. Parameter estimates, chi-square and p-values for the variables predicting the likelihood of speeding by over 30 km/h compared to other traffic offences.

<b>Predictors*</b>	<b>Co-efficient</b>	<b>Chi-square</b>	<b>p-value</b>
Licence type (UR [0] vs P [1])	0.2	600.2	<0.0001
Age group (< 25 [0] vs 25+ [1])	-0.5	2812.0	<0.0001
Gender (F [0] vs M [1])	0.4	1913.2	<0.0001
Age group x gender	-0.01	1.2	0.28
Licence type x age group	-0.1	132.0	<0.0001
Licence type x gender	0.07	47.7	<0.0001
Licence type x age group	0.045	22.6	<0.0001

x gender

\* The numerical values assigned to each level of the predictors are indicated in [ ].

Figure 9.



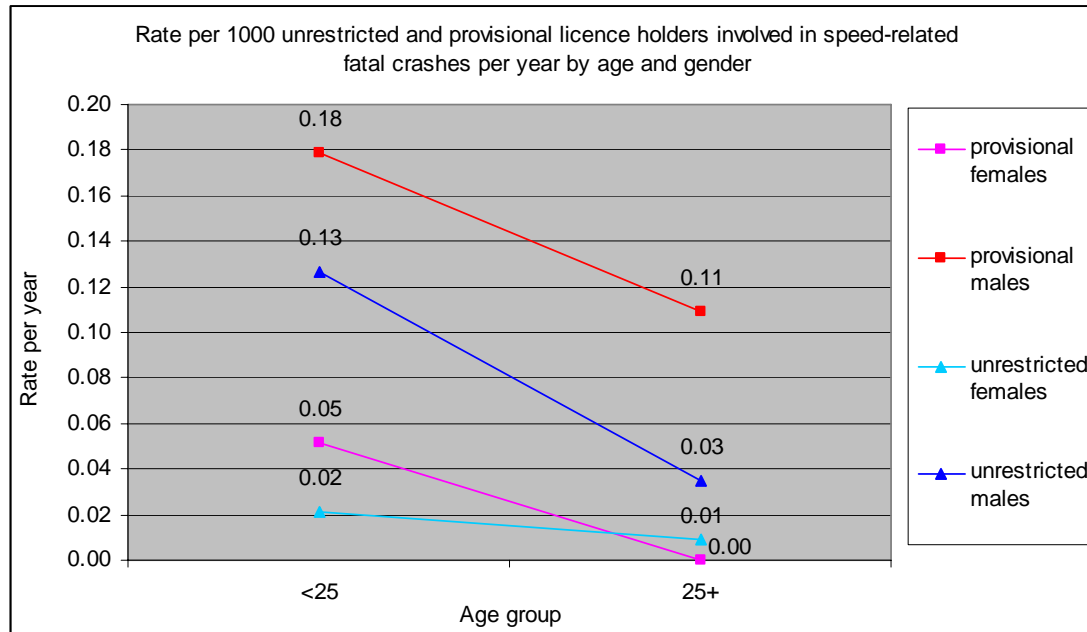
### Comparing speed-related crash rates between provisional and unrestricted licence holders by age and gender

The average rate per 1000 provisional and unrestricted licence holders involved in fatal crashes per year where the vehicle controller was speeding, by age and gender, for the years between 2001 and 2006 is shown in Figure 10.

Figure 10 shows that provisional males have worse speed-related fatal crash rates than unrestricted males and this difference increases with age as unrestricted males improve more with age than provisional males. High risk speeding behaviour drops by 47% (Figure 9) for provisional licence holders but speed-related crash rate drops less at 39% (Figure 11) with age. For unrestricted licence holders, high risk speeding behaviour drops by 71% (Figure 9) and speed-related fatal crash rate drops more at 77% (Figure 10). Moreover, provisional and unrestricted males under 25 showed similar percentage of high risk speeding behaviour (Figure 9), but provisional males under 25 show much worse likelihood of fatal crashes than unrestricted males under 25 (Figure 10). High risk speeding behaviour seems more likely to result in harmful consequences for provisional males than unrestricted males. Speeding seems particularly relevant for provisional males' overrepresentation in speed-related

crashes. The speed-related fatal crash rate is worse for provisional females than unrestricted females only amongst those under age 25. Speeding seems relevant for provisional females under age 25 in their higher rate of speed-related fatal crash compared to unrestricted females of the same age group.

Figure 10.

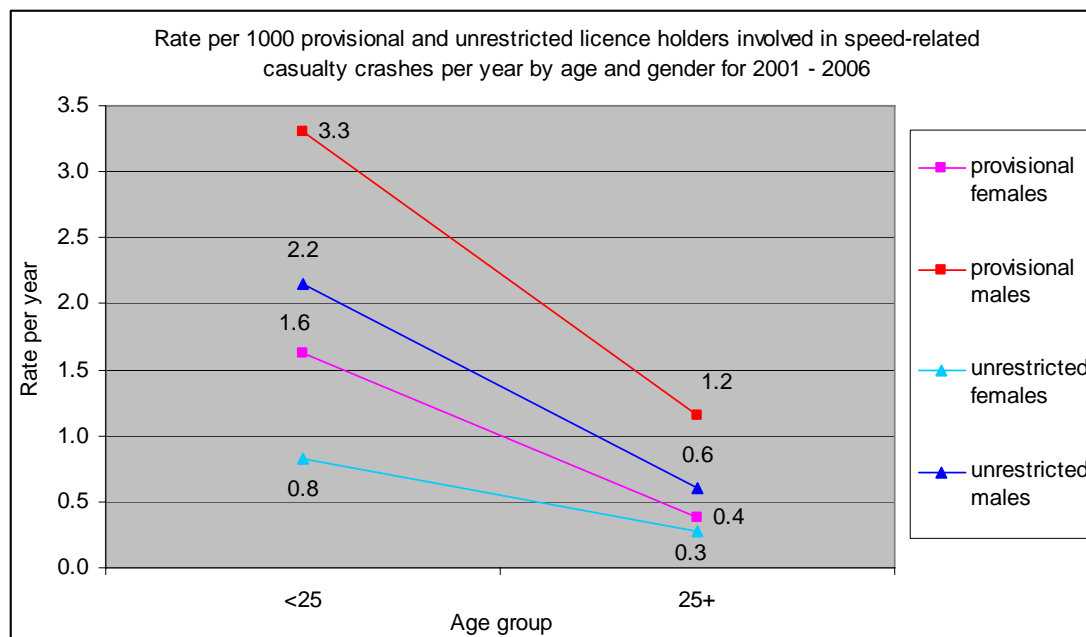


The average rate per 1000 provisional and unrestricted licence holders involved in casualty (injury and fatal) crashes per year where the vehicle controller was speeding, by age and gender, for the years between 2001 and 2006 is shown in Figure 11.

Figure 11 shows that provisional females age 25 and above still have higher crash rate than unrestricted females age 25 and above. This suggests that older provisional females show higher percentage of high risk speeding behaviour and have higher speed-related crash rate overall than unrestricted females of the same age group but crashes involving provisional females 25 and over are less likely to involve a fatal.

Overall these data suggest that the overrepresentation of provisional drivers in high range speeding contributes to at least in part their overrepresentation in speed-related crashes. The data presented here do not in themselves prove a causal link. However, extensive research attests to such a link between speeding and crash risk (Kloeden et al, 1997).

Figure 11.



## DISCUSSION

This study showed that 1) provisional licensees are on average younger and show higher speeding offence rate; 2) the rate of overall speeding offences controlling for age and gender is higher for unrestricted than provisional licence holders, but the rate of over 30 km/h speeding offences across age and gender is higher for provisional than unrestricted licence holders; 3) the mean speed above the limit is higher for provisional licence holders regardless of age and gender; 4) the likelihood of being detected for high range speeding of over 30 km/h compared to other traffic offences is higher for provisional than unrestricted licence holders, particularly for males aged 25 and over, and females under 25; 5) the rates per licensee of speed-related crashes are higher for provisional than unrestricted licence holders across age groups for males and females. Furthermore, previous research suggests that the greater speeding of younger drivers is deliberate rather than inadvertent, and based on greater perceived risk utility (Prabhakar, Lee and Job, 1996).

The results of this study suggest that high range speeding is a large contributing factor for the overrepresentation of speed-related crashes amongst provisional licence holders. Better speed compliance with age is not as strong for provisional males as for unrestricted males and provisional males seem less safe drivers than

unrestricted males across age groups. Moreover, provisional females do not seem to be as safe drivers as unrestricted females.

Under the new conditions for novice drivers in NSW since July 2007, P1 car licence or provisional rider licence holders will receive a minimum of four demerit points and a licence suspension when they are caught speeding. The automatic suspension for P1 drivers or provisional riders caught speeding is soundly based on overrepresentation in high range speeding and speed-related crashes. Catchpole (2005, 2004) has shown that speeding behaviour increases with experience during typical provisional licence ages. Catchpole (2005, 2004) suggests that this is due to the experience of speeding without being caught. While this may be true for speeding generally, P1 drivers in particular were targeted because their overrepresentation in speed-related fatal crashes is greater than that of P2 drivers. We speculate that this greater crash involvement may be due to the combined effects of inexperience and excessive speed. The automatic suspension has the potential to deter provisional licence holders from speeding, and help reduce crashes in NSW.

Increased deterrence for speeding can be achieved through increased penalty and/or increased perceived probability of apprehension for speeding. The automatic suspension for speeding aims to encourage the perception that all forms of speeding are serious and will result in a significant penalty. The increased number of fixed speed cameras in NSW aims to increase the perceived (and real) probability that speeding will be detected. Provisional licence status adds to the predictive power of age and gender in predicting high range speeding and crashes, suggesting that being a provisional/novice driver is an independent risk factor.



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