

# Association between Supervisory Driver Offences and Novice Driver Crashes Post-Licensure

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**ABSTRACT** – This research explore associations between driving offences of learner supervisory drivers and subsequent crashes as novice independent drivers in a prospective cohort of 20,822 drivers aged 17-24 in New South Wales, Australia, on their first independent driver licence. Information on demographics, primary supervisory drivers, and various risk factors was collected via an online questionnaire and subsequently linked to police-reported crashes two years later. Poisson regression determined that the unadjusted relative risk of crash was 1.35 (CI 1.14-1.60) for novices whose supervisors had offences, with this association remaining when adjusting for supervisor age, gender and relationship to the novice (RR=1.37, CI 1.16-1.63), but not when additionally controlling for novice driver demographics and characteristics (RR=1.50, CI 0.83-2.70). These findings suggest newly-licensed drivers previously supervised by drivers with recent traffic offences have a one-third higher risk of crashing. This risk is independent of the supervisor demographics, but mitigated by the young drivers' personal characteristics. Careful consideration should be given to policy developments regarding supervised driving requirements that rely heavily on parents to adopt this role.

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## INTRODUCTION

There is an increasing body of literature that suggests young drivers with parents who model poor driving behaviors are more likely to adopt those poor behaviors than other young drivers [Bianchi and Summala, 2004; Gulliver and Begg, 2003; Sheehan et al, 2002]. Research in the United States has also demonstrated that young drivers with parents who have traffic violation and crash records are more likely to have these records compared to other young drivers [Ferguson et al, 2001]. This may have significant implications in countries that allow lay supervision of learner drivers and mandate high levels of minimum supervised driving requirements, such as a 3,000 km requirement in France and Austria [Twisk and Stacey, 2007] and 100 to 120 hours in some Australian states [Senserrick, 2009], as much of this supervision is commonly undertaken by parents.

The current study sought to determine the association between driving offences of learner supervisory drivers and subsequent crash risk among a cohort of newly-licensed (independent) drivers in Australia.

## METHODS

The DRIVE Study is a prospective cohort study of 20,822 drivers aged 17-24 years in the state of New South Wales (NSW), Australia, for which detailed methods have been previously reported [Ivers et al, 2006]. Briefly, all drivers resident in NSW aged 17-24 holding a first provisional (independent) license between June 2003 and December 2004 were invited to participate. At the time of the study, this license required 50 hours of supervised driving and was subject to a zero blood alcohol concentration and maximum travel speed of 90km/h (with all NSW drivers restricted from hand-held mobile phone use and required to wear a seat belt). Information on demographics, primary supervisory drivers, and known and hypothesised risk factors was collected via an online questionnaire. All respondents gave consent for their questionnaire data to be linked prospectively to data held by the state jurisdictional authority, including police-reported crashes; with linkage subsequently occurring approximately two years later. The University of Sydney Human Research Ethics Committee and the NSW Health Ethics Committee approved the study

The DRIVE questionnaire included items regarding “the person that supervised most of your non-professional driving practice sessions” including gender, age (years), relationship (parent; brother or sister; other family member; friend; school teacher; other) and offences: “Over the past 12 months, how many penalties for traffic violations has this person received (not including parking fines)?”

Crash records were obtained for the 10-year period, 1 January 1996 to 31 December 2005. In NSW, a crash is required to be recorded by police when: any person is killed or injured; drivers involved in the crash did not exchange particulars; one or more of the drivers was reported to be driving under the influence of alcohol; or if a vehicle involved in the crash was towed away.

### Statistical Analyses

The primary outcome variable, the number of police-reported crashes as a new independent driver, was dichotomized as 0 or 1+ crashes. Univariate and multivariate Poisson regression models were developed to analyse the young drivers’ relative risk (RR) of crash and 95% confidence intervals (CI) by whether their primary supervisor when learning to drive had any traffic offences (0 versus 1+) in the previous year. Two multivariate models were run comprising (a) supervisor demographics (gender, age, relationship) and (b) young driver demographics and characteristics significant in univariate analyses at the  $p < .02$  level (gender, age, remoteness of residence, average weekly driving hours, risky driving behaviour, months as learner, months as independent driver, driving test attempts and previous crashes). An offset for time in the study was included to account for the different time periods between entering the study to the end date of crash data analyzed. All analyses were conducted using SAS Version 9.1 (SAS Institute Inc).

### RESULTS

Table 1 presents details on young driver demographics and characteristics by whether their supervisors as learners had recent traffic offences. While the groups were similar by gender, a slightly higher proportion of the oldest drivers, United Kingdom/New Zealand and Other Europe drivers, urban drivers and the highest socioeconomic group had supervisors with offences.

The unadjusted relative risk of crash was 1.35 (95%CI 1.14-1.60) This association remained when adjusting for supervisor age, gender and relationship to the novice: RR=1.37, 95%CI 1.16-1.63. The

association was no longer significant when controlling for novice driver demographics and characteristics that were significant in univariate analyses: RR=1.50, 95%CI 0.83-2.70.

**Table 1** – Demographics and characteristics of novice drivers by supervisor offences

	Supervisor offences						
	Unknown		No		Yes		Total
	n	%	n	%	n	%	n
<b>Gender</b>							
Female	2010	17.7	8487	74.7	868	7.6	11365
Male	1733	18.3	6973	73.7	751	7.9	9457
<b>Age</b>							
17	1545	15.2	7847	77.4	746	7.4	10138
18-19	1448	18.7	5696	77.3	603	7.8	7747
>=20	750	25.5	1917	65.3	270	9.2	2937
<b>Country of birth</b>							
Aust.	2883	16.3	13497	76.2	1335	7.5	17715
UK/NZ	62	16.9	270	73.6	35	9.5	367
Europe	8	22.9	23	65.7	4	11.4	35
Asia	357	31.6	692	61.2	82	7.3	1131
Other	433	27.5	978	74.2	163	10.4	1574
<b>Socioeconomic status</b>							
Highest	965	18.8	3741	72.8	435	8.5	5141
2 <sup>nd</sup>	920	17.9	3829	74.5	393	7.6	5142
3 <sup>rd</sup>	895	16.4	4138	75.9	420	7.7	5453
4 <sup>th</sup>	963	18.9	3752	73.8	371	7.3	5086
<b>Remoteness*</b>							
Urban	2958	19.2	11286	72.9	1233	8.0	15477
Suburb	624	14.2	3450	78.4	327	7.4	4401
Rural	161	17.1	724	76.7	59	6.3	944
<b>TOTAL</b>	<b>3743</b>	<b>18.0</b>	<b>15460</b>	<b>74.2</b>	<b>1619</b>	<b>7.8</b>	<b>20,822</b>

\* Urban = metropolitan; Suburban = inner region; Rural = outer region, rural, remote.

### DISCUSSION

Newly-licensed (independent) young drivers whose supervisors had recent offences had more than a one-third higher chance of crashing than those whose supervisors did not have such offences. This was irrespective of the age and gender of the supervisor and of the relationship between the supervisor and learner, although the majority of supervisors were parents. This risk was mitigated by the young drivers’ personal demographics and characteristics.

These findings are consistent with previous research that has found young drivers adopt poor driving behaviors and attract offences as modeled by their parents [Bianchi and Summala, 2004; Ferguson et al, 2001; Gulliver and Begg, 2003; Sheehan et al, 2002]. This raises concern regarding the high level of supervised driving requirements in several countries, up to 3,000 km and 120 hours [Senserrick, 2009; Twisk and Stacey, 2007], given that this supervision often falls to parents to complete.

Increased supervision requirements are well-intentioned given positive associations with reduced crash risk as a novice independent driver in several countries; however, not all countries have reported such benefits [Twisk and Stacey, 2007]. The present findings raise concern whether it is possible that such initiatives are inadvertently having counterproductive outcomes for young drivers whose parents are poor driving role models.

The association between crash risk and supervisor offences was no longer significant when controlling for the young drivers' characteristics. This suggests that supervisor offenses and young driver characteristics are strongly correlated. Therefore young driver characteristics are likely to also be an indicator of independent driver crash risk. It could be argued that it is not justified to adjust by such factors in this context. Further research is required to explore the relationship between young driver characteristics and supervisor offenses in the crash risk of independent drivers.

While the young drivers in this research were volunteers and not a representative sample, the study population represented a broad cross-section of the young driver population and substantial heterogeneity in the distribution of potential risk factors for crashes was achieved, making it possible to explore the association of interest [Ivers, Blows, Stevenson et al, 2006]. While there was a need to rely on self-report measures, including retrospective items, these were based on previous studies and several such studies have confirmed the accuracy and reliability of self-reports in this field [Boufous, Ivers, Senserrick et al, in press; Hatakka, Keskinen, Katila et al, 1997]. The strength of this study is the large sample size and the 100% consent rate to crash data linkage needed to generate sufficient power to produce reliable estimates of associations with crash risk, a relatively rare outcome.

## CONCLUSION

The current trend in graduated driver licensing is to increase supervised driving requirements [Senserrick, 2009], which fall heavily on parents to complete with their child. The present findings suggest further research is needed on potential unintended consequences of such requirements, such that heavy parental involvement might unduly foster negative driving behaviors among learners whose parents have regulatory driving offences. In conjunction with this is the added need to explore options for learner drivers seeking assistance with supervision if parents are unsuitable for this role [e.g., Youthsafe, 2009]. There may also be a role for education and training

programs for parents on the importance of their role as a supervisor and the need to model safe and responsible driving behavior to their children [e.g., Jerrim, 2008], if such programs can be shown to be effective in correcting parents' negative driving behaviors. In the meantime, careful consideration should be given to policy developments regarding increased supervised driving requirements that are likely to rely heavily on parents to adopt this role.

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