

The influence of attitudes to Graduated Driver Licensing on subsequent risky driving behaviours.

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ABSTRACT

This paper describes a study that examined the relationship between adolescent and parent attitudes towards the graduated driver licensing system (GDLS) and the subsequent driving behaviours of these adolescents. This study was part of an ongoing longitudinal study of a birth cohort, the Dunedin Multidisciplinary Health and Development Study (DMHDS). When the cohort was age 15, which coincided with the introduction of the GDLS in New Zealand, study participants and their parents were asked how they expected to be affected by, and their overall attitude towards, the GDLS. At age 18, after experience with the GDLS, study participants reported how they had been affected by the driving restrictions, and their overall attitude towards the GDLS. Using logistic regression these measures were examined as potential predictors of risky driving behaviours (drink driving, speeding, non-use of seatbelts) reported by the study participants at age 21. The findings will be presented and the conclusions discussed.

Main Subject area: Young drivers

Key words: Adolescents, Parents, Graduated Driver Licensing, Risky Driving

INTRODUCTION

In response to the high motor vehicle crash rate among young drivers in New Zealand a Graduated Driver Licensing System (GDLS) was introduced in 1987. This is a three stage licensing system (learner, restricted and full licence stages) designed to limit new drivers exposure to high risk driving situations while they advance through the stages of GDLS (Ministry of Transport. 1987). The key elements of the GDLS are: a six months learner licence stage of supervised driving; a restricted licence stage of 18 months that allows unsupervised driving except at night-time (10pm-5am) or with young passengers in the car; a full licence stage with no restrictions. Further details of the New Zealand GDLS have been described elsewhere (Begg and Stephenson 2003).

Since its inception in 1987 the GDLS has contributed to a substantial reduction in young driver traffic crashes and related injuries in New Zealand. An early evaluation by Langley and colleagues (1996) concluded that the introduction of the GDLS accounted for at least a 7% reduction in traffic-related hospital admissions among young people aged 15-19 years (Langley, Wagenaar et al. 1996). Begg and others found that GDLS restrictions, especially the night time restriction, had contributed to a significant reduction in fatal and serious crashes involving young drivers (Begg, Stephenson et al. 2001; Begg and Stephenson 2003).

In recent years varying types of GDLS programmes have been implemented in several countries. A Cochrane review of 13 studies from four countries (USA, Canada, New Zealand and Australia) found that crash rates for young drivers decreased by between 26-41% during the first year of driving (Hartling, Wiebe et al. 2004). Although GDLS have reduced the crash risk among young drivers, they are still significantly over-represented in the motor vehicle crash statistics in most Westernised countries (International Road Traffic Accident Database 2005).

In recent years there has been growing interest in the role of parents and their influence on the driving experiences of young drivers. Research from North America has shown that most parents have a good understanding of GDLS, support the programme and its restrictions, and manage the driving experiences of their children by influencing the age of licensure, placing restrictions on vehicle access and enforcing GDLS conditions (Beck, Shattuck et al. 2001; Ferguson and Williams 1996; Goodwin and Foss 2004; Hartos, Eitel et al. 2001; Hartos, Eitel et al. 2002; Mayhew, Simpson et al. 1999; Waller, Olk et al. 2000; Williams, Nelson et al. 2002). There is also evidence, from New Zealand and the US, that adolescents generally have favourable attitudes towards the GDLS, and have a high awareness of the restrictions (Begg, Langley et al. 1995; Goodwin and Foss 2004; McCartt, Leaf et al. 2001; Williams, Nelson et al. 2002).

Research in the US has shown that parental attitudes may influence the driving outcomes for young drivers. In a cross-sectional survey Hartos and colleagues explored the relationship between parenting practices, as reported by the adolescents, and adolescent risky driving behaviours, traffic violations and crashes (Hartos, Eitel et al. 2000). They found that a low level of parental monitoring (knowledge of adolescents daily activities) was related to higher levels of risky driving behaviours (e.g., frequency of tailgating, speeding). Also, adolescents who reported lenient parental restrictions towards carrying friends as passengers, were four times more likely to have a traffic violation and seven times more likely to have had a crash, compared to adolescents whose parents were not so lenient (Hartos, Eitel et al. 2000). Hartos and colleagues also found that among young drivers, fewer parental limits on driving in the first months of licensure predicted increased risky driving behaviours one year later (Hartos, Eitel et al. 2001). This latter study by Hartos and colleagues, for which the follow-up period was one year, is the only published work in the field to examine the longitudinal impact of parent driving restrictions on the subsequent driving behaviours of adolescents. To our knowledge no studies have examined the impact of parents' attitudes towards GDLS on the adolescents' driving behaviours over a longer period, or the effect of adolescents attitudes towards GDLS on their later driving behaviour. The Dunedin Multidisciplinary Health and Development Study (DMHDS), an ongoing longitudinal study of a birth cohort, provides an opportunity to examine these relationships. The introduction of the GDLS in New Zealand in 1987 coincided with the DMHDS cohort turning 15 years of age, and therefore the age at which they were eligible to get a licence under the new GDLS.

The purpose of the present research was to examine the attitudes of New Zealand adolescents and their parents to the GDLS, in relation to the driving behaviours of the adolescents as young adult drivers. The specific aims of this paper were to:

- (a) examine parental attitudes towards GDLS (when cohort was age 15 years) and the subsequent risky driving behaviours of their sons and daughters as young adult drivers (when cohort was age 21 years),
- (b) examine adolescent attitudes towards GDLS before licensure (age 15 years) and subsequent risky driving behaviours (age 21 years) and

(c) examine young drivers' attitudes and compliance with GDLS after experience with licensing (age 18 years) and subsequent risky driving behaviours (age 21 years).

METHOD

This research was part of an ongoing longitudinal study, the Dunedin Multidisciplinary Health and Development Study (DMHDS), which has followed the health, development and behaviour of a cohort born at the only obstetric hospital in Dunedin between 1st April 1972 and 31st March 1973. This cohort (n=1037) has been assessed every two years, from age 3 – 15 years and then at ages 18, 21, 26 and 32 years. Further details about the cohort and the study are described elsewhere (Silva and Stanton 1996).

Injury research has been one of the major components of the DMHDS and since early adolescence, road safety has been a focus of the injury interviews. Included in this study were those adolescents who were interviewed at phases 15, 18 and 21, who did not have a traditional (pre-GDLS) drivers licence and whose parent completed the parent questionnaire at age 15 years (n=732, 360 females and 372 males). Analyses conducted to compare study members who were included in this study with those who were excluded indicated there were no differences between the groups.

Age 15 years –Parent attitudes and adolescent expectations towards GDLS

The parent GDLS questionnaire was a mail out questionnaire completed mainly by mothers (91%). Parents were asked about the *inconvenience* on the family transport arrangements for each of the GDLS restrictions: a) learner licence condition requiring a supervisor in the vehicle at all times (learner supervisor restriction), b) restricted licence condition requiring a supervisor between 10:00pm and 5:00am (night time restriction), and c) restricted licence condition requiring a supervisor when there are passengers in the vehicle (passenger restriction). Response options to any question were 'a little', 'not at all' coded as '*GDLS not inconvenient*' or 'a lot', coded as '*GDLS inconvenient*'. To measure overall attitude to the GDLS parents were asked whether they 'support or oppose these changes to the law?'. 'Oppose' or 'strongly oppose' responses were coded as '*oppose GDLS*'; all other responses were coded as '*support GDLS*'.

At age 15 years all adolescents (n= 732) were asked about their *expectations* towards the GDLS restrictions, prior to experience with the GDLS. The questions related to how much each of the following conditions would affect them: a) learner supervisor restriction, b) night time restriction, c) passenger restriction, and d) not being able to drive after drinking alcohol (alcohol restriction). For each restriction 'not at all' and 'a little' responses were coded as '*not affected*' and 'a lot' was coded as '*affected a lot*'. As a measure of overall attitude to the GDLS adolescents were asked whether they 'agree or disagree with these restrictions on young drivers?'. 'Agree' or 'strongly agree' responses were coded as '*agree with GDLS*', 'disagree' or 'strongly disagree' responses were coded as '*disagree with GDLS*'.

Age 18 years –Adolescent experience and compliance with GDLS

At age 18 adolescents who held a GDLS drivers licence (n=498) were asked about their *experiences* with the GDLS restrictions. The questions and response options at age 18 were the same as those asked at age 15: a) learner supervisor restriction, b) night time restriction, c) passenger restriction, d) alcohol restriction and e) attitude towards GDLS. Adolescents were also asked about compliance with the GDLS restrictions. Responses were coded as 'yes' (*broken GDLS restrictions*) or 'no' (*never broken GDLS restrictions*).

Age 21 years -Risky driving behaviours

At age 21 young adults who had been driving in the last month (n=616) were asked about three common unsafe driving practices: speeding, drink driving and not wearing a seatbelt. *Risky drivers* were those who had engaged in any of the following behaviours: ‘fairly often’ or ‘often’ driving faster than 120kph on the open road, ‘never’ or ‘sometimes’ wearing a seatbelt as a driver, or driving a car after drinking perhaps too much to be able to drive safely in the previous month. All others were classified as *Not-risky drivers*.

Statistical analysis

Unadjusted odds ratios were calculated using logistic regression, to examine the association between the explanatory variables at each level (parent GDLS attitudes; adolescent GDLS attitudes at age 15; adolescent GDLS attitudes and compliance at age 18) and the outcome variable (risky driving as age 21). As many of the explanatory variables at each of these levels were expected to be correlated, multivariate logistic regression analyses were conducted to determine the independent association between each significant explanatory measure with risky driving, while controlling for the effect of the other significant measures. For each level of explanatory variables (parent GDLS attitudes; adolescent GDLS attitudes at age 15; adolescent GDLS attitudes and compliance at age 18) the measures meeting $p \leq 0.05$ at the univariate stage were entered into multivariate logistic regression models.

Table 1. Descriptive statistics of parent and adolescent GDLS attitudes before experience with GDLS at age 15 years.

		Adolescent Males		Adolescent Females		χ -square (1.d.f.)	<i>p</i> -value
		N	%	N	%		
<u>Parent GDLS Attitudes</u>							
	GDLS not inconvenient	314	(85)	291	(82)		
	GDLS restrictions inconvenient	57	(15)	62	(18)	0.64	0.425
	Support GDLS	334	(90)	322	(89)		
	Oppose GDLS	38	(10)	38	(11)	0.02	0.880
<u>Adolescent Expectations of GDLS</u>							
Learner supervisor restriction	Not affected	233	(68)	229	(70)		
	Affected A lot	110	(32)	99	(30)	0.28	0.598
Night time restriction	Not affected	308	(86)	298	(88)		
	Affected A lot	52	(14)	39	(12)	1.26	0.261
Passenger restriction	Not affected	257	(72)	234	(70)		
	Affected A lot	99	(28)	101	(30)	0.46	0.498
Alcohol restriction	Not affected	347	(97)	342	(98)		
	Affected A lot	10	(3)	6	(2)	0.92	0.337
	Agree with GDLS	293	(79)	290	(81)		
	Disagree with GDLS	76	(21)	66	(19)	0.49	0.485

Response of not sure, not applicable, don't know and missing all excluded.

RESULTS

Table 1 reports the descriptive statistics for parent GDLS attitudes and adolescents' GDLS expectations at age 15. Most parents (male 85%; female 82%) did not expect to be inconvenienced by the GDLS restrictions, and overall the majority supported them (89-90%). Over two thirds of the adolescents expected the restrictions would not affect them, and overall the majority agreed with them (male 79%; female 81%). These results did not differ by gender.

Table 2 reports the descriptive statistics for adolescents' GDLS experiences, at age 18. Significantly more males than females reported being affected a lot by the learner licence restrictions, while more females felt that they were affected a lot by the night time restriction and the passenger restriction compared to males. Overall, the majority of males (69%) and females (74%) agreed with the GDLS. Two-thirds of adolescents reported violating the GDLS restrictions at least once.

Table 3 reports the descriptive statistics for the risky driving behaviours at age 21. Compared to females, significantly more males drove faster than 120 km/h, never or only sometimes used a seatbelt, or drove after having too much to drink. Overall, 50% of male drivers were classified as risky drivers, compared to 20% of female drivers.

Table 2. Descriptive statistics of adolescent GDLS attitudes and compliance after experience with GDLS at age 18 years.

		Males		Females		χ -square (1d.f.)	<i>p</i> -value
		N	%	N	%		
Adolescent Experience with GDLS							
Learner supervisor restriction	Not affected	178	(67)	168	(79)	8.25	0.004
	Affected A lot	89	(33)	46	(21)		
Night time restriction	Not affected	191	(70)	130	(60)	4.82	0.028
	Affected A lot	82	(30)	85	(40)		
Passenger restriction	Not affected	164	(61)	109	(51)	4.43	0.035
	Affected A lot	106	(39)	104	(49)		
Alcohol restriction	Not affected	258	(95)	206	(96)	0.25	0.620
	Affected A lot	14	(5)	9	(4)		
	Agree with GDLS	189	(69)	158	(74)	1.11	0.293
	Disagree with GDLS	83	(31)	56	(26)		
	Never broken GDL restrictions	83	(30)	72	(33)	0.54	0.461
	Broken GDL restrictions	193	(70)	145	(67)		

Response of not sure, not applicable, don't know and missing all excluded.

Table 3. Descriptive statistics of risky driving behaviours at age 21 years.

		Males		Females		χ^2 -square	
		N	%	N	%	(1d.f.)	<i>p</i> -value
Speeding	Never, Rarely	206	(62)	248	(89)	55.81	<0.001
	Fairly often, Often	124	(38)	31	(11)		
Seatbelt use	Nearly always, Always	298	(90)	267	(95)	4.56	0.033
	Sometimes, Never	33	(10)	15	(5)		
Drink driving	No	267	(82)	255	(91)	10.42	0.001
	Yes	57	(18)	24	(9)		
	Not-risky Driver	167	(50)	225	(80)	58.63	<0.001
	Risky Driver	167	(50)	57	(20)		

Response of not sure, not applicable, don't know and missing all excluded.

As there were significant gender differences in the risky driving behaviours (Table 3) logistic regressions analyses were conducted separately by gender.

Parents GDLS attitudes (age 15) and subsequent risky driving (age 21)

The unadjusted results (Table 4) indicated that parents attitudes towards GDLS were not related to males risky driving, however, females with parents who opposed the GDLS were twice as likely to become risky drivers (OR 2.3, 95% CI 1.0, 5.2, $p=0.038$).

Adolescent GDLS expectations (age 15) and subsequent risky driving (age 21)

At age 15, the unadjusted results (Table 5) showed that males who expected to be affected a lot by the learner restriction (OR 1.9, 95% CI 1.2, 3.0, $p=0.011$), passenger restriction (OR 2.5, 95% CI 1.5, 4.2, $p<0.001$) or disagreed with GDLS (OR 2.9, 95% CI 1.6, 5.2, $p<0.001$) were two to three times more likely to be risky drivers at age 21. Adjusted results showed that the passenger restriction (OR 2.2, 95% CI 1.3, 3.8, $p=0.004$) and disagreeing with GDLS (OR 2.1, 95% CI 1.1, 3.9, $p=0.020$) remained significantly associated with being a risky driver for males. For females (Table 5), the unadjusted results indicated that disagreeing with GDLS was associated with subsequent risky driving (OR 2.7, 95% CI 1.4, 5.2, $p=0.003$).

Table 4. Unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI) comparing risky drivers with non-risky drivers at age 21 years, on their parents GDLS attitudes (when adolescents age 15 years), by gender.

	Unadjusted			Adjusted*		
	OR	95% CI	<i>p</i> -value	OR	95% CI	<i>p</i> -value
<u>Adolescent Male</u>						
Parent GDLS attitudes						
GDLS restrictions inconvenient	1.4	0.8, 2.5	0.285			
Oppose GDLS	1.7	0.8, 3.4	0.161			
<u>Adolescent Female</u>						
Parent GDLS attitudes						
GDLS restrictions inconvenient	1.7	0.8, 3.5	0.133			
Oppose GDLS	2.3	1.0, 5.2	0.038	2.3	1.0, 5.2	0.038

*only variables significant at $p<0.05$ were included in the adjusted (multivariate) model

Table 5. Unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI) comparing risky drivers with non-risky drivers at age 21 years, on their GDLS expectations at age 15 years, by gender.

		Unadjusted			Adjusted*		
		OR	95% CI	P-value	OR	95% CI	P-value
<u>Male</u>	<i>Age 15 years</i>						
Adolescent Expectations of GDLS							
Affected a lot by.....							
learner supervisor restriction		1.9	1.2, 3.0	0.011	1.4	0.8, 2.4	0.215
night time restriction		1.0	0.5, 1.9	0.948			
passenger restriction		2.5	1.5, 4.2	<0.001	2.2	1.3, 3.8	0.004
alcohol restriction		2.4	0.6, 9.5	0.209			
Disagree with GDLS		2.9	1.6, 5.2	<0.001	2.1	1.1, 3.9	0.020
<u>Female</u>	<i>Age 15 years</i>						
Adolescent Expectations of GDLS							
Affected a lot by.....							
learner supervisor restriction		1.7	0.9, 3.2	0.093			
night time restriction		1.1	0.4, 2.7	0.862			
passenger restriction		1.5	0.8, 2.8	0.239			
alcohol restriction		2.0	0.2, 22.2	0.582			
Disagree with GDLS		2.7	1.4, 5.2	0.003	2.7	1.4, 5.2	0.003

*only variables significant at $p < 0.05$ were included in the adjusted (multivariate) model

Adolescent GDLS experiences and compliance (age 18) and subsequent risky driving (age 21)

The unadjusted results (Table 6) showed that males who were affected a lot by the learner restriction (OR 2.6, 95% CI 1.5, 4.5, $p < 0.001$) or disagreed with GDLS (OR 2.1, 95% CI 1.2, 3.6, $p = 0.006$) at age 18 were two to three times more likely to be risky drivers at age 21. In the multivariate analyses both measures remained significantly associated with being a risky driver (learner restrictions (OR 2.3, 95% CI 1.3, 4.0, $p = 0.003$); disagreeing with GDLS (OR 1.9, 95% CI 1.1, 3.4, $p = 0.022$)). For females, the unadjusted results indicated that females who disagreed with GDLS at age 18 were twice as likely to become risky drivers at age 21, (OR 2.1, 95% CI 1.0, 4.3, $p = 0.052$), as reported in Table 6.

Table 6. Unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI) comparing risky drivers with non-risky drivers at age 21 years, on their GDLS experiences and compliance at age 18 years, by gender.

		Unadjusted			Adjusted*		
		OR	95% CI	p-value	OR	95% CI	p-value
<u>Male</u>	<i>Age 18 years</i>						
Adolescent Experience with GDLS							
Affected a lot by.....							
learner supervisor restriction		2.6	1.5, 4.5	<0.001	2.3	1.3, 4.0	0.003
night time restriction		1.1	0.6, 1.8	0.799			
passenger restriction		0.8	0.5, 1.4	0.440			
alcohol restriction		0.7	0.2, 2.1	0.527			
Disagree with GDLS		2.1	1.2, 3.6	0.006	1.9	1.1, 3.4	0.022
Broke GDL restrictions		1.6	1.0, 2.8	0.067			
<u>Female</u>	<i>Age 18 years</i>						
Adolescent Experience with GDLS							
Affected a lot by.....							
learner supervisor restriction		1.9	0.9, 4.1	0.113			
night time restriction		1.2	0.6, 2.5	0.559			
passenger restriction		1.2	0.6, 2.4	0.596			
alcohol restriction		3.4	0.9, 13.3	0.079			
Disagree with GDLS		2.1	1.0, 4.3	0.052	2.1	1.0, 4.3	0.052
Broke GDL restrictions		1.7	0.8, 3.6	0.209			

*only variables significant at $p < 0.05$ were included in the adjusted (multivariate) model

DISCUSSION

This longitudinal study provided a unique opportunity to examine the attitudes and experiences of adolescents and their parents towards graduated driver licensing, and the relationship between these factors and young adult driving behaviour.

The results showed that the majority of parents, regardless of the gender of their adolescent, strongly supported the GDLS and did not think their transport arrangements would be inconvenienced by the restrictions. On the whole parents' attitudes were not associated with the risky driving behaviour of the young adults, except that female adolescents whose parents opposed the GDLS were twice as likely to be risky drivers at age 21 years.

Before commencing licensure the majority of adolescents did not expect to be affected by the driving restrictions and agreement with the GDLS was high. However the longitudinal results showed that, at age 15, the males who did expect to be affected by the restrictions or disagreed with GDLS were two to three times as likely to be risky drivers at 21 years. The results were similar for females, with those who disagreed with the GDLS three times more likely to become a risky driver.

At age 18 years, after experience with the driving restrictions, a higher proportion of adolescents had been affected by the restrictions compared with their age 15 expectations, and previous research has shown these differences to be significant (Begg, Langley et al. 1995). A greater proportion of males than females, were affected by the learner licence restrictions, while more females than males, were affected by the restricted licence restrictions. Overall agreement with GDLS remained high for both males and females.

When the age 18 experiences were examined in relation to later risky driving behaviour males and females who had disagreed with the driving restrictions were twice as likely to become risky drivers at age 21, compared to those who agreed with them. These results support the age 15 findings (discussed above), which also found that disagreement with GDLS was associated with risky driving at age 21.

Non-compliance with the driving restrictions was high, with around two thirds of the age 18 drivers reporting having broken at least one restriction. However, non-compliance with the driving restrictions was not significantly associated with risky driving at age 21, for either males or females. This may be partly due to the measure of compliance that was used in the present study, which was a simple yes/no response and did not capture how many times a driver may have broken the restrictions. There is evidence that violating the restrictions was commonplace among young drivers at this time in New Zealand. Frith and Perkins found that 33% of drivers reported breaking the passenger restriction, and 17% the night time restriction, at least weekly (Frith and Perkins 1992).

In summary the results from this study show that the attitude of parents towards the graduated driver licensing system was supportive, with few expecting to be inconvenienced and few opposed to GDLS. The majority of adolescents also supported the graduated driver licensing system. However, the adolescents who did not agree, either before or after experience with GDLS, were two to three times more likely to become risky drivers at 21. Targeting road safety interventions at adolescents who have negative views towards graduated driver licensing may be one way of reducing their propensity to engage in risky driving behaviours.

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