

**Young unlicensed drivers: are they impulsive, sensation seeking, aggressive, hazardous alcohol or other drug users?**

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**Abstract**

The objective of this study was to identify the characteristics of those who drove unlicensed before gaining their learner licence, to determine factors that could be considered when addressing unlicensed driving among young people.

The study was based on data from the New Zealand Drivers Study (NZDS) which is a prospective cohort study of newly licensed car drivers in New Zealand. Study participants were recruited face-to-face at driver licensing agencies (participation rate 75%) and learner licence courses (participation rate 90%). Participants aged 15-24 years (n=3,526) were included in this study. The data examined was from the baseline questionnaire which was self-administered at the time of obtaining a learner licence. This included socio-demographic characteristics (age, gender, ethnicity, residential location, deprivation), and behavioural factors such as sleepiness (how often have trouble staying awake), frequency and quantity of alcohol use, frequency of using cannabis, other recreational drugs, or party pills, and Zuckerman's impulsivity, sensation seeking, and aggression/hostility scale. An unlicensed car driver was anyone who had driven a car on a public road before they passed their learner licence test.

Univariate logistic regression was used to determine the odds of being an unlicensed driver for each of the explanatory variables. Significant factors from these analyses were entered into a multivariate logistic regression model. The results from the multivariate analysis showed that the most important factors associated with unlicensed driving were: rural residential location, high deprivation, being Māori, hazardous alcohol use, cannabis use, sensation seeking and aggression. Some implications of these findings are discussed.

**Keywords**

Young drivers, drivers licence, impulsive, sensation seeking, aggression, alcohol, drugs

**Introduction**

Unlicensed drivers have been shown to have a much higher crash risk than licensed drivers (1), yet they are a relatively under-studied group of road users. One possible reason for this is that they are especially difficult to identify among the general driving population (2). The unlicensed drivers that are identified are those that come to the attention of the police, either because of their driving behaviour or because they are involved in a crash. Much of the research on unlicensed drivers, therefore, has focused on drivers involved in crashes, and typically the characteristics of crashes involving an unlicensed driver have been compared to crashes involving a licensed driver. Within the unlicensed driver population, however, there are several subgroups, including suspended drivers, disqualified drivers, drivers who do not hold a valid licence, and those who have never held a licence. This latter group are sometimes referred to as "never licensed" and they are the drivers of interest in the present study. In particular, this study aimed to identify the characteristics of young people who chose to drive unlicensed before they got their car drivers licence.

Much of the previous research on unlicensed drivers has focused on suspended or disqualified drivers, although some studies have specifically targeted drivers who have never been licensed. One recent Swedish study compared crashes among young licensed drivers (aged 18-20 years) with crashes involving young unlicensed drivers (i.e. never licensed). They found the unlicensed driver crashes were more likely to be

single vehicle, to occur in a sparsely populated areas, in an area with a speed limit over 70 km/hr, at dawn or daylight, and alcohol or drugs were more likely to be suspected (3). Another Swedish study (4) also compared licensed and unlicensed driver crashes and found that crashes involving an unlicensed (never licensed) driver were significantly more likely to be single vehicle crashes, involve a male driver, the driver was from a family of lower socio-economic position, and both the driver and others injured in the crash were likely to have more severe injury. The crashes were more likely to have occurred in a speed restriction limit >70 km/hr, occur between 23:00 and 05:59, in darkness or at dawn, in dry or hazy weather conditions, on a dry road surface, and in a rural traffic environment (4).

In the United States, a descriptive study of fatal crashes involving drivers less than 19 years of age, who had never held a licence, found that 75% involved males, 73% of the drivers aged 16 years or older, and southern and western states were over-represented (5). In New South Wales, Australia a descriptive study of crashes involving underage drivers (<16 years) found that most (79%) involved male drivers, 47% had a BAC above the legal limit, 40% were exceeding the speed limit, 31% occurred at night, and around two-thirds were carrying passengers. In this study, the significant factors associated with a fatal or injury crash, compared with a non-injury crash, were a female driver (odds ratio 2.01) and three or more passengers (odds ratio 2.32) (6).

In New Zealand, as part of a case control study of car crashes in Auckland, Blows et al. (2005) compared crashes involving an unlicensed driver (included disqualified, suspended or never licensed) with the crashes where the driver was licensed (1). After adjusting for age and sex, the odds of an unlicensed driver being involved in a car crash involving injury was 11 times that of a driver holding a valid licence. However, after adjusting for a wide range of other factors (education level, ethnicity, driving exposure, time of day, sleepiness, age of vehicle, passengers present, seatbelt use, blood alcohol level, and speed) this finding was no longer significant.

All of the above studies examined crashes involving unlicensed drivers, and, beyond age and sex, provide very limited information about the characteristics of the unlicensed drivers. In the US, a recent school-based survey of a nationally representative sample was conducted to ascertain the level of unlicensed driving and factors associated with it (7). The results showed that unlicensed teenage drivers, that is drivers without any type of licence, were more likely to be Black or Hispanic, to live in a rural or central city location (compared with suburban or town location), to report lower school grades, less use of seatbelts, more driving while impaired by alcohol or drugs, and more driving without any particular purpose. However, the unlicensed drivers did not report higher crash involvement than the licensed drivers. In New Zealand, a non-crash based study (8) compared the unlicensed driving experiences of Māori living in rural and urban areas. The participants in this study were aged 15-69 years (72% were aged 15-17) and had very recently passed their learner licence theory test (the first stage of the New Zealand graduated driver licensing system). The results showed that unlicensed driving (that is on-road driving before licensing) was very common among both urban (65%) and rural (83%) residents, and did not differ by gender. Multivariate analysis showed that unlicensed driving was twice as likely among the rural drivers compared with the urban drivers but gender and age were not significant. Driving on-road more than five times before licensing was three times more likely among those age 25 years or older, than the 15-24 year olds, but gender and residential location were not significant.

From the above studies, it is apparent that crashes involving unlicensed drivers differ from those where the driver is licensed, and that these tend to be single vehicle crashes and are associated with crash risk factors, such as at night-time (4, 6), alcohol and/or other drugs (3, 6), carrying passengers (6) and exceeding the speed limit (6). In the US, young people who drove unlicensed also tended to engage in other risky road behaviours that are often associated with crash occurrence or being injured in a crash, such as driving after drinking or using drugs, not using seatbelts.

Unlicensed driving could be considered one type of risky driving behaviour, and among young people risky driving behaviour is known to be associated with many other factors, than those that have been included in the above studies. Jonah (9) has shown a strong association between risky driving behaviour and sensation seeking, which would suggest that young unlicensed drivers may also be sensation seekers. Aggressive

behaviour has also been shown to be associated with various risky driving behaviours such as alcohol and cannabis impaired driving (10) and driving fast just for the thrill of it (11). Other factors have also been shown to be associated with young driver crashes. For example, Beirness and Simpson found that trouble due to drinking, attitudes to alcohol, alcohol consumption, experience seeking, and less than 8 hours sleep were all predictors of traffic crashes among a cohort of young people in Canada (12).

The purpose of the present study was to investigate a range of factors that are either associated with risky driving behaviour or crash risk among young people to determine whether young unlicensed drivers are more likely to share these characteristics than their peers who do not drive unlicensed. This should provide a better understanding of the characteristics of the young people who chose to drive on-road before they get their licence and which may help with the development of programmes aimed at discouraging illegal driving and encouraging licensure among this risky group.

## Methods

The New Zealand Drivers Study (NZDS) is a prospective cohort study of 3,992 newly licensed car drivers in New Zealand (13). The NZDS cohort was recruited, face-to-face by trained research assistants between 1<sup>st</sup> February 2006 and 31<sup>st</sup> January, 2008 from driver licensing agencies and licensing courses throughout New Zealand. For those recruited at the licensing agencies, of all the eligible newly licensed drivers invited to take part in the study the recruitment rate recorded across all research assistants was 75%. For those recruited at a learner licence course the overall recruitment rate was around 90%. Recruitment took place at various locations selected to cover the major rural and urban geographic locations in the both North and South Islands. To increase rural participation, postcards inviting newly learner licensed drivers to take part in the study were available at driver licensing centres throughout the country. Eligibility for the study required that the person had never previously held a car driver's licence, either in New Zealand or overseas. No age restriction was imposed. All participants were recruited as soon as practical after they had passed their car learner licence theory test (Class 1L Licence). This was to ensure that the information provided at baseline related to their driving behaviour before they passed their learner licence test. Before a self-administered baseline questionnaire was completed, signed consent was obtained from each study participant.

Each member of the NZDS cohort provided information on a number of socio-demographic characteristics, some (eg date of birth and gender) were verified using data from the driver licence registry. Age at the time of obtaining a learner licence was calculated from date-of-birth information provided and the date when the learner licence was issued. Our primary interest was young drivers, so the present study was limited to those aged less than 25 years and did not have missing data for the relevant driving questions (n=3,526).

Ethnicity was self-identified using the same question as for the New Zealand 2006 census. Multiple responses were permitted therefore the total number of ethnicities recorded exceeds the number of study participants. An objective of the NZDS is to identify road safety issues that apply disproportionately to Māori, therefore, only Māori and non-Māori ethnicity classifications were examined. The residential address of each study participant was classified using the Statistics New Zealand "urban/rural profile" (14). NZDep2006 was used to measure socioeconomic deprivation. The score is created by combining nine variables, which reflect eight dimensions of deprivation, from the 2006 census. (15). These are: income (2 variables), home ownership, support (eg. single parent family), employment, qualifications, living space, communication (eg access to telephone), transport (access to a car). The residential address of each study participant was used to assign a deprivation score based on the meshblock (as defined by Statistics New Zealand) in which they lived.

To obtain a measure of chronic sleepiness, study participants were asked "During the past month how often have you had trouble staying awake while driving, eating meals or engaging in social activity?" A response of "not during the past month" was classified as "not sleepy" and the others as "sleepy".

Alcohol was measured using the first three questions of the AUDIT (the Audit-C) which is a well established validated measure of hazardous drinking (16). Question 1: How often do you have a drink containing alcohol? Response categories: Never, monthly or less, 2-4 times per month, 2-3 times per week, 4 or more times a week. Question 2: How many standard drinks containing alcohol do you have on a typical day when you are drinking? Response categories: 1 or 2, 3 or 4, 5 or 6, 7 to 9, 10 or more. Question 3: How often do you have six or more standard drinks of alcohol on one occasion? Response categories: Never, monthly or less, 2-4 times per month, 2-3 times per week, 4 or more times a week. (17). The responses to these three questions were summed to give a score ranging from 0-12. For this study a cut-off of  $\geq 4$  was used to indicate hazardous drinking.

Cannabis or marijuana use was measured by the following question: "How often do you use marijuana or cannabis?" The response options were: Never, monthly or less, 2-4 times per month, 2-3 times per week, 4 or more times a week. Responses were classified at three levels: "never", "monthly" (monthly or less and 2-4 times per month, "weekly" (2-3 times per week, and 4+ times per week). The use of other drugs was measured by asking: How often do you use other recreational drugs such as "P", speed, ecstasy; and how often do you use Herbal Highs (party pills) such as "Rapture", "Bliss"? Response options were same as for cannabis, but because of the small number of users these were categorised as yes (have used) or no (never).

The Zuckerman Impulsivity Sensation Seeking (IMP-SS) scale (18) was included in the questionnaire to obtain a measure of impulsivity (8 items), sensation seeking (11 items), and aggression-hostility (17 items). Gender specific cut-off points were selected to classify each of the scales into three categories: low, middle, high. The low group had scores in the lowest quartile (approximately 25%), the high group had scores in the highest quartile (approximately 25%), and the remainder were in the middle quartiles (approximately 50%).

An unlicensed car driver was defined as anyone who had driven a car on a public road before they passed their learner licence test.

## Results

A comparison of those who drove unlicensed with those who did not, for each of the explanatory variables is presented in Table 1. There was no difference by gender. The age distribution was significantly different with the main difference being a smaller percentage of 15 year olds among those who drove unlicensed (49.8%) than those who did not drive unlicensed (58.2%). For all other ages the proportion that drove unlicensed was higher than for those who did not. A higher proportion of those who drove unlicensed, compared with those who did not drive unlicensed, were Māori (29.2% versus 9.8%), from rural residential areas (17.7% versus 5.1%). The NZ deprivation score results show the highest proportion of unlicensed drivers (19.4%) lived in an area of highest deprivation (level 10) whereas of the drivers who had not driven unlicensed the highest proportion lived in an area of least deprivation (level 1). On the behavioural measures, compared to those who did not drive unlicensed, the unlicensed drivers were significantly more likely to be hazardous drinkers (43% versus 20%), to use cannabis (7% versus 1% were weekly users, 11% versus 4% were monthly users) and to be "users" of other recreational drugs. Those who drove unlicensed were significantly more likely than those who did not drive unlicensed, to have higher scores for sensation seeking, impulsivity, and aggression/hostility.

**Table 1**  
The frequency distribution for each of the explanatory variables for those who drove unlicensed on road and those who did not.

	<b>Unlicensed On-Road Car Driver</b>				df*	Chi square	p-value
	Yes (n=1732)		No (n=1794)				
	n	%	n	%			
<b>Gender</b>							
Female	845	48.8	905	50.4			
Male	887	51.2	889	49.6	1	0.97	0.325
<b>Age</b>							
15 years	862	49.8	1044	58.2			
16 years	340	19.6	326	18.2			
17 years	214	12.4	177	9.9			
18 years	120	6.9	81	4.5			
19 years	60	3.5	55	3.1	9	32.9	0.001
20 years	36	2.1	33	1.8			
21 years	34	2	19	1.1			
22 years	30	1.7	28	1.6			
23 years	24	1.4	19	1.1			
24 years	12	0.7	12	0.7			
<b>Ethnicity</b>							
Māori	506	29.2	175	9.8			
Non-Māori	1226	70.8	1619	90.2	1	214.1	<.001
<b>Residential location</b>							
Urban	1426	82.3	1702	94.9			
Rural	306	17.7	92	5.1	1	138.4	<.001
<b>NZDep2006</b>							
1	190	11	279	15.6			
2	157	9.1	233	13			
3	151	8.7	208	11.6			
4	146	8.4	202	11.3			
5	145	8.4	153	8.5			
6	150	8.7	152	8.5	9	124.3	<.001
7	132	7.6	137	7.6			
8	130	7.5	136	7.6			
9	195	11.3	137	7.6			
10	336	19.4	157	8.8			

Table 1 continued							
<b>Sleepy</b>							
Yes	321	19.5	333	19.7	1	0.007	0.930
No	1322	80.5	1361	80.3			
<b>Alcohol hazardous drinking</b>							
Yes	744	43	348	19.4			
No	988	57	1446	80.6	1	228.8	<.001
<b>Cannabis</b>							
Weekly	113	6.6	17	1			
Monthly	195	11.4	63	3.5	2	165.2	<.0001
Never	1401	82	1695	95.5			
<b>Recreational drugs (eg. xtasy, "P" etc)</b>							
Yes	37	2.2	10	0.6			
No	1670	97.8	1761	99.4	1	16.8	<.001
<b>Party Pills/herbal/ highs</b>							
Yes	161	9.4	53	3			
No	1544	90.6	1719	97	1	62.6	<.001
<b>Sensation seeking</b>							
High	491	29.1	343	19.7			
Medium	879	52.1	885	50.7	2	72.9	p<.001
Low	317	18.8	516	29.6			
<b>Impulsivity</b>							
High	429	25.3	347	19.7			
Medium	866	51.1	878	49.9	2	26.8	<.001
Low	401	23.6	535	30.4			
<b>Aggression/hostility</b>							
High	450	26.8	319	18.3	2	75.5	<.001
Medium	943	56.1	928	53.3			
Low	289	17.2	495	28.4			

\*degrees of freedom

Logistic regression was used to determine the odds of being an unlicensed driver for each of the explanatory variables (Table 2). The unadjusted results show that the only factors not significantly associated with unlicensed driving were gender and sleep. Given the importance of gender in most young driver research it was forced into the adjusted model. The adjusted results (Table 2) showed: compared with 15 year olds, the only age group more likely to drive unlicensed was 18 year olds, Māori were more than twice as likely as non-Māori to drive unlicensed, and those living in rural locations were nearly four times more likely to drive unlicensed than those living in an urban location. Those living in the areas of highest deprivation (NZDep2006 = 10) were nearly twice as likely to drive unlicensed as those in the areas of lowest deprivation (NZDep2006=1). Those who drove unlicensed were nearly twice as likely to be hazardous drinkers and two times more likely to be monthly and three times more likely to be weekly cannabis users, than those who did not drive unlicensed. However, they did not differ on their use of other recreational drugs or herbal highs. Those who drove unlicensed were more likely to have higher sensation seeking scores, and aggression/hostility scores than those who did not drive unlicensed, but their impulsivity scores did not differ.

Table 2 Results from logistic regression showing the unadjusted and adjusted odds* of being an unlicensed driver for each of the explanatory variables.							
		Unadjusted results			Adjusted results		
		OR	95% CI	p-value	OR	95% CI	p-value
<b>Gender</b>	female	1					
	male	1.1	1.0,1.2	0.189	1.2	1.0,1.3	0.063
<b>Age (years)</b>	15	1					
	16	1.3	1.1,1.5	0.010	1	0.8,1.2	0.902
	17	1.5	1.2,1.8	0.001	1.1	0.8,1.4	0.537
	18	1.8	1.3,2.4	0.001	1.4	1.0,2.0	0.030
	19	1.3	0.9,1.9	0.147	1.0	0.6,1.5	0.835
	20	1.3	0.8,2.1	0.256	1.1	0.7,1.9	0.631
	21	2.2	1.2,3.8	0.008	1.7	0.9,3.2	0.083
	22	1.3	0.8,2.2	0.329	1.0	0.5,1.8	0.918
	23	1.5	0.8,2.8	0.171	1.4	0.7,2.8	0.295
	24	1.2	0.5,2.7	0.641	1.0	0.4,2.5	0.977
<b>Ethnicity</b>	non-Māori	1					
	Māori	3.8	3.2,4.6	0.001	2.2	1.7,2.7	0.001
<b>Residential Location</b>	Urban	1					
	Rural	4.0	3.1,5.1	0.001	3.7	2.9,4.8	0.001
<b>NZDep2006</b>	1	1					
	2	1	0.7,1.3	0.94	0.9	0.7,1.2	0.583
	3	1.1	0.8,1.4	0.654	0.9	0.7,1.2	0.481
	4	1.1	0.8,1.4	0.679	1	0.7,1.3	0.807
	5	1.4	1.0,1.9	0.027	1.2	0.9,1.7	0.216
	6	1.4	1.1,1.9	0.013	1.1	0.8,1.5	0.500
	7	1.4	1.0,1.9	0.024	1	0.7,1.3	0.800
	8	1.4	1.0,1.9	0.028	0.9	0.6,1.2	0.414
	9	2.1	1.6,2.8	0.001	1.4	1.0,1.9	0.074
	10	3.1	2.4,4.1	0.001	1.7	1.2,2.3	0.001
<b>Sleepy</b>	No	1					
	Yes	1	0.8,1.2	0.93	--	--	--
<b>Hazardous alcohol Consumption</b>	No	1					
	Yes	3.1	2.7,3.6	0.001	1.8	1.5,2.1	0.001
<b>Cannabis use</b>	Never	1					
	Monthly	3.7	2.8,5.0	0.001	2.3	1.6,3.2	0.001
	Weekly	8	4.8,13.4	0.001	3.3	1.8,5.8	0.001
<b>Recreational drugs</b>	No	1					
	Yes	3.9	1.9,7.9	0.001	1.1	0.5,2.5	0.807
<b>Herbal highs/ party pills</b>	No	1					
	Yes	3.4	2.5,4.6	0.001	1.2	0.8,1.8	0.332

OR=odds ratios, 95% CI = confidence interval

\*adjusted for all other variables significant at unadjusted stage, plus gender.

Table 2 continued							
<b>Sensation Seeking</b>	Low	1					
	Medium	1.6	1.4,1.9	0.001	1.3	1.1,1.6	0.003
	High	2.3	1.9,2.8	0.001	1.5	1.2,1.9	0.001
<b>Impulsivity</b>	Low	1					
	Medium	1.3	1.1,1.5	0.001	1	0.8,1.2	0.780
	High	1.6	1.4,2.0	0.001	1	0.8,1.2	0.726
<b>Aggression</b>	Low	1					
	Medium	1.7	1.5,2.1	0.001	1.3	1.1,1.6	0.002
	High	2.4	2.0,3.0	0.001	1.5	1.2,1.9	0.002

## Discussion

This study has several limitations. The NZ Drivers Study cohort is not a representative sample of all newly licensed drivers in New Zealand therefore the results presented here may not apply to other populations within New Zealand. This was a cross-sectional study which means that temporality, and therefore causality, cannot be determined and should not be inferred. Also, all data were self-reported so some behaviours may be under-reported and some over-reported. It must also be borne in mind that the young drivers who took part in this study had all recently passed their learner licence theory test, and had thus commenced the first stage of the New Zealand graduated driver licensing process. These results, therefore, may not apply to young people who have not yet started licensing, or older drivers who may have driven unlicensed for many years. Also, other studies of unlicensed driving may have included drivers who have had their licence suspended or disqualified, which was not the case in the present study.

Nearly half of the participants in this study had driven on-road before commencing licensure, which shows it was a relatively common practice among these young people. While many of the demographic factors were significant at the univariate level, the multivariate analysis showed that unlicensed driving did not differ by gender or age (except 18 year olds who were more likely to drive unlicensed than 15 year olds). However, unlicensed driving was significantly higher among Māori (than non-Māori), among those living in a rural rather than an urban residential location, and those living in an area of very high deprivation (level 10). While it was beyond the scope of the present study to examine the reasons why these young people had driven unlicensed, an earlier study of unlicensed driving among Māori of all ages, (8) reported the most common reason was “learning to drive”. While that study was based solely on Māori, the other demographic characteristics of the participants in that study, such as residential location and NZDep2006 score, were similar to the present study. This may suggest that similar reasons for unlicensed driving could apply to the present study.

From the multivariate analysis, the behavioural factors examined in this study showed that compared to those who did not drive unlicensed, those who drove unlicensed were nearly twice as likely to consume hazardous quantities of alcohol, be frequent users (monthly or weekly) of cannabis (but not other recreational drugs or party pills), and to have medium or high, rather than low, scores for sensation seeking and aggression (but not impulsivity). These results showed that those who drove unlicensed differed from the others on a range of high risk behaviours. This combination of behavioural factors could very likely place anyone at an increased risk of being in a traffic crash, which may help explain why several studies have found unlicensed drivers to be at a higher risk of being in crash (1), or crashes involving severe injury (4), than licensed drivers. As the NZ Drivers Study progresses, it will be of interest to see if the study participants who have driven unlicensed prior to getting their learner licence are at increased crash risk as they progress through the graduated driver licensing system.

The findings from this study may also provide some useful guidelines for those wishing to encourage licensing among the unlicensed driver population. While this study was limited to young people (15-24 years) who had started the driver licensing process, it may also provide some useful insight into the possible characteristics of the rather more recalcitrant unlicensed drivers. For example, driver licensing courses, such



as those already being run by Māori community groups in Hastings and Gisborne, should be given more resources to enable them to extend their existing programmes and help them to address driver licensing issues among their people.

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