

# Risky Driving or Risky Drivers?

## Exploring Driving and Crash Histories of Illegal Street Racing Offenders

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Illegal street racing has received increased attention in recent years from road safety professionals and the media as jurisdictions in Australia, Canada, and the United States have implemented laws to address the problem, which primarily involves young male drivers. Although some evidence suggests that the prevalence of illegal street racing is increasing, obtaining accurate estimates of the crash risk of this behavior is difficult because of limitations in official data sources. Although crash risk can be explored by examining the proportion of incidents of street racing that result in crashes, or the proportion of all crashes that involve street racing, this paper reports on the findings of a study that explored the riskiness of involved drivers. The driving histories of 183 male drivers with an illegal street racing conviction in Queensland, Australia, were compared with a random sample of 183 male Queensland drivers with the same age distribution. The offender group was found to have significantly more traffic infringements, license sanctions, and crashes than the comparison group. Drivers in the offender group were more likely than the comparison group to have committed infringements related to street racing, such as speeding, “hooning,” and offenses related to vehicle defects or illegal modifications. Insufficient statistical capacity prevented full exploration of group differences in the type and nature of earlier crashes. It was concluded, however, that street racing offenders generally can be considered risky drivers who warrant attention and whose risky behavior cannot be explained by their youth alone.

Illegal street racing and associated risky driving behaviors have received significant negative media attention internationally in recent years, reflecting general public concern. Most respondents in a Canadian Road Safety Monitor Research project, for example, said that they were concerned or extremely concerned about street racing, and considered it a serious problem (1, 2). Evidence from social surveys and fatal crash data also reveals that street racing has increased internationally over the last decade (3). Because such behavior is not new, however, it is possible that the increased media and police attention, and the treatment of such behavior as a road safety problem, have given the false impression that street racing is increasing, when in reality no change has occurred in its prevalence. Further, it is possible that advances in telecommunications have facilitated the organization of such behavior so that street racing is more visible to

the public: involved drivers can record their behavior and post videos and photographs on public websites.

Illegal street racing and associated risky driving behaviors are collectively known as “hooning” in Australia. The associated behaviors include activities such as “burnouts,” “donuts,” “drifting,” and unnecessary speed or acceleration, as defined in Table 1 and note *b* to Table 2. While some of these behaviors are risky, others merely pose a disruptive nuisance to the general community. While street racing is a term commonly used across jurisdictions in Australia, the United States, and Canada, terms for the associated behaviors can differ. This paper focuses only on drivers with illegal street racing offenses. Associated driving behaviors are detailed for descriptive purposes only.

Illegal street racing, including speed trials, can be highly organized or spontaneous in nature (5–7). Highly organized races typically are staged at night in industrial areas, although they may even be held in the middle of a highway (5). In Sydney, Australia, for example, it has been reported that illegal street racers meet at a central location, and when enough people have gathered, it is decided who will race and where the race will take place (8). These events can be well organized, with start and finish lines marked a quarter of a mile apart (the traditional distance for drag races) (8). Some groups use walkie-talkies and even police tape and false signs to block traffic for the duration of the race, whereas others use rolling road blocks (9). In Canada, street racing can also include an activity known as a “hat race,” where participants put money into a hat and the money is taken to an undisclosed location. The person with the hat calls the participants to inform them where the money is being held, and the first driver to get there wins all of the money (6). Illegal street racing can also be unorganized and spontaneous in nature, involving impromptu, one-off races between drivers that do not know one another (6). Drivers stopped at traffic signals on a straight stretch of a double-lane road may race, for example, with the traffic lights providing a starting signal (5).

As in the United States and Canada, traffic law is enforced at the state level in Australia by state police services. In response to community concern about illegal street racing and associated risky behaviors, all Australian states and territories and New Zealand have implemented laws that target street racing and associated risky driving behaviors, commonly referred to as antihooning legislation. Since the 1990s, each state has implemented legislation that allows the police to immediately seize and impound the vehicles of drivers convicted of an illegal street racing offense, and has implemented other sanctions as well (e.g., fines, demerit points, and license disqualification). The length of the impoundment period increases with repeat offenses within prescribed periods. Before implementation of such legislation, police typically dealt with street racing, and associated risky or nuisance driving behaviors, by showing up at race meeting places and

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**TABLE 1** Driving Behaviors Associated with Illegal Street Racing (4)

Behavior	Definition
Speed trials	When the acceleration and top-speed capability of a vehicle or driver skill are tested, usually on a straight stretch of road of a set distance. Speed trials also include attempts to establish or break records.
Burnout	When the rear tires of a rear-wheel drive vehicle are spun at high revolutions per minute until they heat and smoke. More smoke is generated if the road surface has oil or petrol spills.
Donut	When the driver of a rear-wheel drive vehicle has turned the front tires until the steering is fully locked during a burnout, so that the rear wheels cause the car to rotate and a circular (donut) pattern of tread marks from the rear wheels remains on the road surface.
Drifting	When a rear-wheel drive vehicle slides sideways through a turn taken at high speed.
Rolling road blocks (or road blockades)	The practice of a large number of vehicles traveling as a convoy across all lanes of a roadway, slowing or blocking other vehicles' progress until a racetrack is created.

issuing vehicle defect notices or tickets for other public nuisance or traffic offenses (8). The purpose of this practice was to discourage street racers from meeting in public places and move them along to private spaces or legal meets, which were held monthly in Sydney and weekly in Melbourne, Australia (8). Illegal street racing and associated behaviors represent the first group of driving behaviors to be penalized by vehicle impoundment in Australia, although a number of states have since introduced similar legislation for drivers convicted of repeat drinking-and-driving offenses, as well as unlicensed driving, and driving-while-disqualified offenses. Vehicle impoundment laws were first applied to drinking-and-driving offenses in New Zealand, shortly followed by their application to illegal street racing and associated offenses. Internationally, vehicle impoundment programs in the United States and Canada have typically been applied to drinking and driving and driving while suspended or disqualified, although some jurisdictions have recently applied similar laws to illegal street racing.

In Queensland, Australia, the Police Powers and Responsibilities Act was amended to authorize police to seize for a period of 48 h the vehicles of drivers convicted of the dangerous operation of a motor vehicle, careless driving of a motor vehicle, racing and engaging in speed trials on roads, or willfully starting or driving a vehicle in a way that makes unnecessary noise or emits smoke. An impounded vehicle is towed to the holding yard of an attending towing company, or to the nearest police station, for storage. If it is the driver's first offense of this type, no further action is taken on the vehicle. If, however, the driver had committed a hooning offense in the previous 3 years, the police officer can within the initial 48-h impoundment period apply to a magistrate for a 3-month impoundment order. If the driver has two or more hooning offenses within the past 3 years, the police officer can within the initial 48-h impoundment period apply to a magistrate for a permanent forfeiture order. The vehicle then becomes the property of the state, and can be sold at auction or destroyed. Since the introduction of this legislation in November 2002 until the end of 2008, 5,533 vehicles were impounded for hooning offenses in Queensland. Of these, 5,417 vehicles were held for a period of 48 h

for a first offense. A small proportion ( $n = 103$ , 1.86%) were held for 3 months for a second offense, while 13 were eligible for permanent forfeiture to the state for third ( $n = 11$ , 0.20%) and fourth ( $n = 2$ , 0.04%) offenses (Queensland Police Service, unpublished data). Typically, these drivers were young males (4), consistent with international trends (3, 5–9), and these offenses primarily occurred on weekends. Only about one-fifth of these offenses involved illegal street racing or a speed trial on roads, however, which may indicate that illegal street racing is less common than the other behaviors addressed by Queensland legislation, or that other offenses were easier for the police to detect (4).

Not only is illegal street racing considered socially problematic behavior in general (5), it is associated with a number of specific harms, including crashes; noise (from racing vehicles and crowds); vandalism and littering at racing locations (including businesses where racers commonly gather); loss of commercial revenue (if racing crowds obstruct or intimidate potential customers); and excess wear and tear on public streets (painted street markings are commonly damaged by the burning rubber of vehicle tires) (6). The crash risk is not limited to drivers and passengers. Illegal street races encourage spectators to stand only a few feet away from possibly inexperienced drivers and poorly maintained vehicles, which race at highway speeds (6). The police, the general public, and the media tend to assume that street racing poses a significant road safety risk, as evidenced by the treatment of street racing as a traffic offense that attracts a serious sanction. This assumption needs to be supported with empirical evidence, however. Data are needed on the proportion of illegal street races that result in a crash (i.e., the riskiness of the behavior), the proportion of all crashes that involve street racing (i.e., the involvement of the behavior in crashes), and finally the general driving behavior of drivers that engage in street racing (i.e., the general riskiness of involved drivers).

As the travel speed of a vehicle increases, so does the risk of crashing, as well as the risk of serious injury (10). This suggests an increased risk of crashing when engaging in street racing, because such driving behavior involves high speeds. Empirical literature to support this assumption is limited, however, primarily because of the lack of dedicated coding and analysis of street racing data within most police agencies (6).

In an attempt to address this, the Fatality Analysis Reporting System (FARS), which the NHTSA maintains in the United States, added racing as a factor in 1998. To be included in the FARS database, a crash must occur on a public roadway and result in the death of at least one vehicle occupant or a nonmotorist within 30 days. FARS data are obtained by reviewing documents that include police accident reports, death certificates, state vehicle registration files, coroner and medical examiner reports, state driver licensing files, hospital medical reports, state highway department data, emergency medical service reports, vital statistics, and other state records in each state. Knight and colleagues examined FARS data for the years 1998 to 2001 to determine the involvement of street racing in fatal crashes (7). They found that a total of 315 (0.21%) fatal crashes involved street racing, which resulted in 399 fatalities. In 74.9% of the cases (299 fatalities), either the driver or a passenger in the street racing vehicle was killed (7), meaning that one-in-four fatally injured persons were innocent victims of street racing. Compared with all fatal crashes, street racing fatal crashes were more likely to occur on urban roadways and more likely to occur in the late evening and early morning hours. The days of the week that street racing fatal crashes occurred were similar to those for all fatal crashes. Compared with all drivers involved in fatal crashes, illegal street racers were more likely to be male teenagers. They were more likely to have been involved in a crash previously and to have committed

driving violations. Street racers were more likely to be impaired by alcohol at the time of the crash and to have had a previous license suspension. The researchers concluded that street racing involves risky driving behaviors and warrants further attention (7).

In an Australian study, hooning-related crashes were identified by searching the crash descriptions of all crashes that occurred on Queensland public roads and that involved drivers between 12 and 24 years old; the researchers searched on the words “hoon,” “racing,” “burnout,” and “donut.” (11). A total of 169 crashes between 1999 and 2004 were identified. Similar to the findings of Knight et al., 60% of these crashes occurred on metropolitan roads (7). Most crashes (72%) occurred during the evenings or at night (between 5:00 p.m. and 4:00 a.m.). According to the researchers, these trends suggested that hooning-related crashes were largely urban, nighttime incidents (11). These researchers did not, however, limit the focus of their study to illegal street racing, unlike the present study. Instead they included crashes that involved associated risky driving behaviors (i.e., hooning) in their analyses.

Finnish research suggests that drivers engaged in street racing have a history of crash involvement. Most of the “cruising club” boys observed in the study revealed that they had been involved in six or seven crashes, most of which were minor although some involved fatalities (9). Most of these crashes occurred when the driver lost control at a high speed, and the car ran off the road (9). This research also found that heavy alcohol use and careless risk-taking were common among illegal street racers (9).

Although the empirical research findings discussed above suggest that the involvement of street racing in crashes is relatively low, the data used had their limitations. Unlike the FARS database in the United States, for example, few jurisdictions specifically identify street racing as a contributing factor in road traffic crashes. Such information can be obtained only if the attending police officer is aware of the involvement of street racing and, second, if the officer records such information on the crash form. Researchers must then read through qualitative reports on every crash to identify crashes that involve street racing, being mindful that not all police officers will record additional information about a crash. Thus issues arise with respect to the use of this method to estimate prevalence. Further, not all crashes are included in mass crash databases. Only crashes that involved damage above a particular dollar value, or ones where a police officer or paramedic showed up at the crash site, are eligible for inclusion in the Queensland Road Crash Information System. Given the illegality of street racing, drivers are more likely to refrain from reporting a crash to police or to an insurance company than they are likely to benefit from reporting the crash or admitting to an attending police officer that they were participating in an illegal street race at the time of the crash. Finally, witnesses to street racing offenses and crashes often are reluctant to become involved in court processes, and may fear retribution from offenders (12). Thus it is possible that many crashes that involved street racing are not included in official data sources. Any attempts to use such data to estimate the involvement of this behavior in crashes, therefore, are likely to result in underestimations. Moreover, it is likely that many low-severity, single-vehicle crashes that involve street racing do not appear in official crash data sets at all.

Given the limitations of official data sources and the few empirical studies that have examined the involvement of street racing in crashes, a review of research into other aspects of road safety may be useful. Since, for example, it is mainly young drivers that engage in street racing and associated driving behaviors, often in groups, it is worthwhile to review the published research on the increased crash

risk of young drivers, and the risk-taking behavior or risky driving behavior of young drivers (2, 13–17). Risky driving by teenagers appears to be most associated with recreation, such as when out with friends on a Friday night (18). Young drivers are more likely than older ones to drive “for fun” (2). Further, youths have always had, according to Bender, a “profound need for speed” (6). Finally, driving with peer-aged passengers has been associated with more at-fault crashes for young drivers, and this risk has been shown to increase with the number of passengers (18, 19). Thus although street racing (if addressed at all) is usually the subject of only one or two inquiries, such as the likelihood of (a) driving fast for the thrill of it and (b) driving faster than other drivers (13), the research done on young drivers and risky driving is likely to remain relevant to an understanding of illegal street racing.

In addition to the exploration of other aspects of road safety that may be relevant, an alternative method of exploring an issue and determining whether it warrants special attention is to examine the general riskiness of drivers that engage in the behavior (e.g., to compare the traffic and crash histories of drivers that engage in illegal street racing with a group of similar drivers that do not). This approach permits research that explores the risk associated with the driver, and complements research that explores the risk associated with the behavior. As most street racing offenders are young males (4), a group known to be overrepresented in crashes, comparing them with a group of young males that does not engage in street racing allows researchers to explore whether the risk of street racing is significant over and above the young driver problem.

This paper reports on a study that used such an approach. The previous crash involvement and traffic histories of a sample of male drivers charged and punished for illegal street racing or speed trials in Queensland over a 15-month period were compared with those of a random sample of male Queensland drivers with the same age distribution. This study was limited to male street racing offenders, because the small number of females ( $n = 6$ ) was inadequate for the required statistical analyses.

On the basis of previous research (7, 9), six predictions (Ps) were made for the study reported here:

- P1. Compared with drivers in the comparison group, drivers in the illegal street racing offender group would have more
1. Traffic infringements,
  2. License sanctions, and
  3. Crashes when in control of a motor vehicle or motorcycle.

As illegal street racing involves vehicles traveling at high speeds, it was further expected that

- P2. Speeding infringements would be common for the offender group relative to other offense types;

- P3. Drivers in the illegal street racing offender group would have more high-range speeding infringements (exceeding the speed limit by 30 km/h or more) than the comparison group; and

- P4. By contrast with the comparison group, speeding would be a more common contributing factor to crashes in which drivers from the offender group were in control of a motor vehicle or motorcycle.

As police in Australia previously dealt with these types of offenses by enforcing vehicle standards (8), and illegal street racing offenses in Queensland often occur in imported as well as modified vehicles (4), it was also expected that

P5. Vehicle defect or illegal modification infringements would be common among the offender group relative to other offense types; and

P6. Drivers in the illegal street racing offender group would have more vehicle defect or illegal modification infringements than the comparison group.

## METHOD

### Samples

There were two samples in this study. The illegal street racing offender group sample consisted of all drivers convicted for street racing on Queensland roads between July 1, 2005, and September 30, 2006, inclusive, where the offense was recorded in the Crime Reporting Information System for Police (CRISP) database maintained by Queensland Police Service. The group consisted of 190 drivers with 191 convictions for street racing offenses during this period. Although only one driver was convicted of two offenses during this period, additional repeat offenders had been convicted before the period of time studied. Seven drivers were excluded from the analyses because they were female ( $n = 6$ ) or because they could not be found in the required databases and therefore had no data ( $n = 1$ ), which left a sample of 183.

The comparison group sample also consisted of 183 male drivers. These drivers were randomly sampled from the Transport Registration and Licensing System (TRAILS) database maintained by the Queensland Department of Transport and Main Roads, with the criteria that the comparison group sample had the same age distribution as the offender sample, and that none of the drivers randomly selected for the comparison group was already in the offender group sample. This meant that age, known to be a factor in road traffic crashes, did not have to be controlled for or used as a covariate in any analyses.

### Data Sources

There were two data sources for this study that were used to provide information about the traffic and crash histories of drivers in both samples.

#### *Traffic History Information*

These data included descriptions of all Queensland traffic infringements and license sanctions in the driving career of people in both samples included in the TRAILS database maintained by the Queensland Department of Transport and Main Roads. The end date of the data extraction for each member of the offender group was the day before their offense date. As drivers in the comparison group did not have an offense date, the median offense date for the offender sample, January 21, 2006, was used as the index date for all drivers in the comparison group. The analyses included only infringements and sanctions that had been upheld; all those that had been waived in court or on appeal were deleted.

#### *Crash History Information*

Queensland Department of Transport and Main Roads also provided information regarding the crash histories of both samples of

drivers. Details of all crashes on Queensland roads that involved a person in control of a motor vehicle or motorcycle were extracted from the Road Crash Information System database. This database includes all crashes that occurred since January 1, 1986, and contains data provided by the attending police officers. Again, the end dates of the crash history extractions were the offense dates of the offender group members, and January 21, 2006, was used for the comparison group.

### Procedure

Queensland Police Service personnel extracted offense information from the CRISP database that related to all drivers with an illegal street racing conviction in Queensland between July 1, 2005, and the day before the extraction, September 30, 2006. This time period was selected as an additional field and added to the database on July 1, 2005, which allowed police to quickly determine the number of offenses on a driver's record, and therefore the applicable vehicle impoundment period. The researchers did not have access to identifying information about the drivers, as Queensland Police Service allocated arbitrary codes to each offense and individual to allow them to be matched with other data sources. The Queensland Department of Transport and Main Roads provided a random sample of male drivers with the same age distribution but did not include any drivers from the offender group sample. The department created a set of arbitrary codes to link the comparison group data files in lieu of any identifying information.

The license, traffic, and crash histories for both samples were then requested, and no start date was set. Thus any infringements, sanctions, or crashes included in the databases that occurred before the index offense date (or median offense date for the comparison group) were included in the analyses. The driving career calculated for each driver was the number of days between the date that the driver first obtained a Queensland license to drive unsupervised and the index offense date (median offense date for the comparison group). Drivers that were unlicensed or only held a learner's permit, which did not allow them to drive unsupervised, did not have a start date and could therefore not have a driving career score calculated. Drivers that obtained a driver's license after their offense date ended up with a negative value for their driving career, and all negative scores were then recoded as 0 days. Driving careers ranged from 0 to 7,004 days (0 to 19.18 years), and less than one-quarter of drivers had driving careers that exceeded 5 years.

It was not possible to obtain an accurate measure of driving exposure for this study, given that people may be driving, and in varied amounts, regardless of license status. This type of information is not recorded, and the researchers did not have access to contact details to request it from the drivers in each sample. Because the samples were matched for age, however, the likely inaccuracy of the estimated driving careers and lack of an exposure control variable should not have affected the between-group analyses.

### Statistical Analyses

Once the deidentified data files were provided to the researchers for analysis, all statistical analyses were performed with the Statistical Package for the Social Sciences. The alpha level adopted for all tests was  $p < .05$ . Mann-Whitney  $U$  tests were performed to compare the two groups, because the previous traffic infringement, license

sanction, and crash data violated the normality and homogeneity assumptions of the *t* test as the result of strong positive skews to the distributions. Chi-square tests were performed to test hypotheses for variables with categorical coding.

## RESULTS

### Demographic Characteristics of Drivers

The ages of the drivers in the street racing offender group (at the time of their offense) ranged from 16 to 47 years, although the age data was heavily skewed because most drivers (79.8%) were under 25 (median age = 20 years). As the demographic characteristics of the comparison group sample of 183 drivers matched those of the offender sample, the ages of these drivers on January 21, 2006, had the same range and median.

Preexisting between-group differences were possible in terms of exposure to driving in Queensland and exposure to traffic policing in Queensland. The street racing offender group may have consisted of drivers that resided outside of Queensland, whereas drivers in the comparison group were sourced from the Queensland licensing database. The comparison group may have been more likely than the offender group to have had previous convictions and crashes recorded in the databases used in this study as a result of increased exposure to Queensland traffic law enforcement. It was not possible, however, to accurately determine the mobility of drivers in either sample. Further, as the potential difference between groups was in the opposite direction to study predictions, this issue posed a potential power problem rather than a Type I error, and cannot be considered a rival explanation of the results.

### Traffic Histories of Drivers

#### Previous Traffic Infringements

Within the street racing offender sample, the total number of previous traffic infringements recorded in Queensland was 1,343, where the offender was the driver of a motor vehicle or the rider of a motorcycle; per driver the number ranged from 0 to 50, with a heavy positive skew to the data. Within the comparison group, the total number of traffic infringements before January 21, 2006, was 338; per driver the number ranged from 0 to 36, also with a positive skew.

As seen in Table 2, the chi-square test of independence revealed that drivers in the offender group were significantly more likely than drivers in the comparison group to have committed traffic infringements, which represented a moderate to large effect [Cohen, 1988, as cited by Aron et al. (20)]. Further, the Mann–Whitney *U* test showed that drivers in the street racing sample had committed significantly more traffic infringements than drivers in the comparison group, and this trend was observed for all offense types.

Once the generic category of “other offense types” is excluded, the most common infringements were speeding related, in both their total number and in the proportion of drivers with at least one offense of this type for both groups, although Table 2 does show a small but significant group *x* offense type relationship. An unexpected finding was that, when the adjusted residuals were examined, this relationship was due in part to the offender group having less than the expected proportion of speeding offenses relative to the comparison group. Additional differences included higher-than-expected proportions of hooning-related and vehicle defect and illegal modification offenses, and a lower-than-expected proportion of other offenses for the offender group.

**TABLE 2** Comparison of Previous Traffic Infringements of Illegal Street Racing Offenders (*n* = 183) and a Random Sample of Drivers of Comparable Age (*n* = 183)

	Illegal Street Racing Offenders	Comparison Group	Statistics
Previous infringements			$\chi^2(1) = 71.49, p < .001, \phi = .44$
Yes	158	81	
No	25	102	
Median	4	0	$U = 7,712.00, z = 9.14, p < .001$
Mean rank	232.86	134.14	
Drivers with particular infringement types <sup>a</sup>			
Speeding-related	124 (67.8%)	61 (33.3%)	$\chi^2(1) = 43.38, p < .001, \phi = .34$
Defect or modification	69 (37.7%)	17 (9.3%)	$\chi^2(1) = 41.10, p < .001, \phi = .34$
Hooning-related <sup>b</sup>	75 (41.0%)	11 (6.0%)	$\chi^2(1) = 62.26, p < .001, \phi = .41$
Other offenses	122 (66.7%)	50 (27.3%)	$\chi^2(1) = 56.86, p < .001, \phi = .39$
Total number of particular infringements			$\chi^2(3) = 42.56, p < .001, \phi = .16$
Speeding-related	462 (34.4%)	145 (42.9%)	Adjusted residual <sup>c</sup> = -3.0
Defect, modification	181 (13.5%)	21 (6.2%)	Adjusted residual = 4.9
Hooning-related <sup>d</sup>	165 (12.3%)	11 (3.3%)	Adjusted residual = 3.7
Other offenses	535 (39.8%)	161 (47.6%)	Adjusted residual = -2.6

<sup>a</sup>As some drivers had more than one previous infringement, percentages for each group sum to more than 100%.

<sup>b</sup>Hooning-related offenses included those referred to in Queensland's antihooning legislation, dangerous driving or operation, careless or reckless driving or driving with undue care and attention, racing vehicles on roads, and driving or starting a vehicle in a way that causes undue noise and smoke.

<sup>c</sup>Adjusted residuals are from the perspective of the illegal street racing offender group, where negative residuals indicate a less than expected frequency, and positive residuals indicate a greater than expected frequency.

As a result of the unexpected speeding finding, the speeding offenses of each group were examined further, after they were divided into low-, mid-, and high-range speeding offense categories. Low-range speeding offenses were those up to 15 km/h over the posted speed limit. Midrange offenses were those 15 to 30 km/h over the limit, and high-range offenses were those 30 km or more over the limit. Analyses revealed that the group  $\times$  speeding offense type relationship approached significance,  $\chi^2(2) = 5.20, p = .074, \phi_v = .09$ . Although not significant, the adjusted residuals revealed that the data were trending in the expected direction, with the offender group having higher-than-expected proportions of mid- (adj. res. = 1.3) and high-range offenses (adj. res. = 0.8), and a lower-than-expected proportion of low-range offenses (adj. res. = -2.3), relative to the comparison group.

*Previous License Sanctions*

The previous license sanctions of the offender and comparison groups were also compared. Results revealed that drivers in the street racing offender group were significantly more likely than those in the comparison group to have a sanction on their license (93 vs. 47),  $\chi^2(1) = 24.48, p < .001, \phi = .26$ , which represented a moderate effect [Cohen, 1988, as cited by Aron et al. (20)]. The Mann-Whitney  $U$  test also revealed that drivers in the offender group had significantly more license sanctions (median = 1, mean rank = 210.82) than the comparison group (median = 0, mean rank = 156.18),  $U = 11,745.50$ , and  $z = 5.66, p < .001$ .

Within the street racing offender group, the sanctions totaled 365; the number per driver in the offender group ranged from 0 to 20, with a heavy positive skew to the data. Within the comparison group, the

sanctions totaled 83 on Queensland driver’s licenses before January 21, 2006; per driver the number ranged from 0 to 9, also with a positive skew to the data.

The license sanctions of the street racing offender group were further explored, and it was found that the most common types of sanctions were those that related to exceeding the maximum number of demerit points on the license (63.0%), followed by disqualifications of the license (17.3%), and license suspensions resulting from unpaid fines (14.5%). Of those drivers that exceeded the relevant number of demerit points, almost three-quarters had their license suspended (73.5%), and the remaining 26.5% opted for a good behavior option, where only one demerit point remained on the license for a period of 12 months. If this point was lost, a suspension period longer than the initial one applied.

*Previous Crashes As a Driver*

As shown in Table 3, drivers in the street racing offender group were significantly more likely to be crash involved than drivers in the comparison group, which represented a small effect [Cohen, 1988, as cited by Aron et al. (20)]. Further, the Mann-Whitney  $U$  test on the data revealed that street racing offenders were involved in significantly more crashes than drivers in the comparison group. However, while the descriptive statistics suggest that the crashes of the comparison group were more severe than those of the offender group, this apparent difference was not statistically significant.

The attending police officer attributes circumstances believed to have contributed to road traffic crashes in Queensland. The circumstances attributed to the crashes of each group were compared, and it was found that, although speeding was not the most common

**TABLE 3 Comparison of Previous Crashes Recorded in Road Crash Information System of Illegal Street Racing Offenders ( $n = 183$ ) and Random Sample of Drivers of Comparable Age ( $n = 183$ )**

	Illegal Street Racing Offenders	Comparison Group	Statistics
Previous crashes			$\chi^2(1) = 12.99, p < .001, \phi = .19$
Yes	41	16	
No	142	167	
Median	0	0	$U = 14,507.00, z = 3.51, p < .001$
Mean rank	195.73	171.27	
Number of crashes per driver			
0	142 (77.6%)	167 (91.3%)	
1	37 (20.2%)	12 (6.6%)	
2	3 (1.6%)	3 (1.6%)	
3	1 (0.5%)	1 (0.5%)	
Crash severity	$n = 46$	$n = 21$	$\chi^2(4) = 3.30, p = .509, \phi_v = .22$
Fatal	0 (0.0%)	1 (4.8%)	Adjusted residual = -1.5
Hospitalization	12 (26.1%)	7 (33.3%)	Adjusted residual = -0.6
Medical treatment	8 (17.4%)	3 (14.3%)	Adjusted residual = 0.3
Minor injury	7 (15.2%)	4 (19.0%)	Adjusted residual = -0.4
Property damage only	19 (41.3%)	6 (28.6%)	Adjusted residual = 1.0
Contributing circumstances <sup>a</sup>	$n = 49$	$n = 33$	$\chi^2(3) = 7.12, p = .068, \phi_v = .30$
Inexperience	17 (34.7%)	11 (33.3%)	Adjusted residual = 0.1
Inattention	11 (22.4%)	3 (9.1%)	Adjusted residual = 1.6
Speeding	4 (8.2%)	0 (0.0%)	Adjusted residual = 1.7
Other circumstances	17 (34.7%)	19 (57.6%)	Adjusted residual = -2.0

<sup>a</sup>As crashes can have multiple contributing circumstances, these sum to more than the total number of crashes for each group.

factor in crashes where a driver from the offender group was in control of the vehicle or motorcycle, speeding was more common in this group than in the comparison group, where no crashes were attributed to speeding. As there were insufficient crashes in each of the 15 circumstances, the data were grouped so that the three most common circumstances were retained, and the remaining circumstances were grouped together as "other." The group  $x$  crash circumstance relationship approached statistical significance, with the effect size suggesting that the power of the analysis was insufficient. The trends observed in the adjusted residuals indicated that members of the offender group were more likely to have crashes that involved inattention and speeding than the comparison group, which is consistent with the nature of street racing, and also one of the associated hooning behaviors in Queensland (careless driving), which was previously coded as driving with undue care and attention. There were no group differences in day of crash ( $p = .995$ ), with both groups crashing more on Fridays and Saturdays than on other days.

## DISCUSSION AND CONCLUSION

This study explored the road safety implications of illegal street racing by analyzing the traffic histories of male street racing offenders, and comparing them with those of a group of drivers with a comparable age distribution. The purpose of the study was to determine whether there was any evidence that illegal street racers constitute a more at-risk group than young male drivers do in general. Because any risk associated with street racing can arguably be explained by the youth of the drivers and the overrepresentation of young drivers (particularly males) in crashes, the age distributions of the groups were matched; age did not have to be controlled in the analyses, and cannot be considered a rival explanation for the pattern of results.

The results supported the first prediction that street racing offenders would have significantly more traffic infringements, license sanctions, and crashes than drivers in the comparison group. As the results regarding traffic infringements were significant, the result regarding license sanctions were to be expected, given that most traffic infringements attract demerit points in Queensland, and the most common license sanctions among the offender group were those related to the accrual of demerit points. The smaller effect for license sanctions is also understandable, as open license holders have 12 demerit points in Queensland, and it therefore takes several traffic infringements to lose all of these points and receive a demerit point license sanction. The between-group differences on the crash measures were also significant, consistent with Finnish research with car club members (9). The effect size was smaller than the previous measures, possibly reflecting the low numbers of drivers involved in crashes relative to the traffic infringement and license sanctions. Taken together, however, these results suggest that drivers charged and punished with illegal street racing show evidence of other risky driving behaviors to a significantly greater degree than similar drivers.

The results also supported the second prediction that speeding infringements would be common among the offender groups. More than two-thirds of the group had committed at least one speeding offense, and this type of offense accounted for more than one-third of the total traffic offenses for this group. The results supported the third prediction in part: the offender group had more high-range speeding offenses (>30kmh over the posted limit) than the comparison group, although the number did not reach significance. Similarly, the results supported the fourth prediction in part: no drivers in the comparison group had been involved in crashes where speeding was attributed as

a contributing factor, as compared with four of the crashes where a member of the street racing offender group was driving; the group  $x$  contributing factor relationships was not significant, however. Power may explain this result, as the effect size was 0.22, and the overall numbers of crashes were low. Speed, however, was not a common contributing factor for offender group crashes relative to other factors. This may be because speeding was not involved in the crashes, or because there was no, or not enough, evidence for the attending police officers to attribute speeding as a potential factor in the crashes. Driver inexperience or lack of expertise and inattention were the most common contributing factors to the crashes that involved street racing offenders. These factors often are attributed to young driver crashes in Queensland, however, and may simply reflect that the outcome of their driving was a crash (i.e., some element of lack of expertise or inattention must have resulted in a crash). In summary, crash data, particularly the allocation of circumstances that contributed to a crash, can be highly subjective in nature, and thus analyses on the basis of Queensland crash data should be interpreted with caution.

The results supported the fifth prediction that vehicle defect or illegal modification infringements would be common among the offender group. These types of offenses were the third most common, behind speeding and hooning-related offenses, in terms of the numbers of drivers with at least one offense of this type, and the second most common of the total number of offenses for this group. Finally, the results supported the sixth prediction that drivers in the offender group would have significantly more offenses of this type. This finding may result from the concurrent enforcement of hooning-related offenses and vehicle defect issues, as it was common for drivers to commit these types of offenses on the same date. This is consistent with Leigh's assertion that police often enforce laws related to vehicle defects and other traffic laws as a method of dealing with illegal street racing (8).

These results should be interpreted in light of the study's limitations. First, drivers caught and punished for street racing may not be representative of the population of drivers that engage in this behavior. Further research with the population of involved drivers could be conducted to explore whether the trends observed in this study are consistent, and whether specific factors increase the likelihood of detection and punishment for street racing, or, perhaps more important, the likelihood that detection and punishment will be evaded. Finally, this study relied on official data collected for routine purposes that may include some errors, and only include crashes reported to police and that meet other inclusion criteria (amount of damage). Many other personal, social, and even cultural factors influence street racing and between-group differences in driving behavior that were not measured in this study.

The findings of this research suggest that drivers that engage in illegal street racing (and get caught) are likely to have a driving history with evidence of other risky driving behaviors, such as traffic infringements, license sanctions, and crashes. Street racing offenders could therefore be described as generally more risky drivers. The present study demonstrates that such riskiness cannot be attributed solely to youth. The risks evident in the driving histories of the street racing offenders were significantly greater than for other drivers of a similar age.

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