

Associations between sleep quality and distracted driving. Exploratory results from the Enhanced Crash Investigation Study (ECIS) control data

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Abstract

The ECIS is an ongoing multi-disciplinary case-control in-depth crash investigation study that seeks to understand the factors associated with serious injury crashes in Victoria. Data are collected from injured drivers and later from uninjured (control) drivers passing through crash locations. Sleeping patterns and engagement in activities whilst driving are captured. Results from 233 drivers suggest that the most common potentially distracting activities reported by drivers are talking with passengers (20% of the sample) and adjusting the radio (12% of the sample). However, the tasks drivers engage in differ according to the quality of a driver's sleep and whether other passengers are in the vehicle.

Background

Fatigued driving is a major road safety concern and accounts for approximately 20-30% of all fatal and 8% of all serious injury crashes on Australian roads (Australian Transport Council, 2011). Although many factors can contribute to driver fatigue, the most common include deficits in duration and quality of recent sleep. A fatigued state can be as, if not more, impairing for drivers than drink-driving. The crash-risk for a driver who has been awake for 17 hours is equivalent to that for a driver with a blood alcohol content of .05 g/ML, and the comparable BAC triples (.15) for those who have been awake for 21 hours (Williamson & Feyer, 2000).

While impairment from fatigue is widely recognised, the relationship between fatigue and driver distraction is less researched. However, relationships have been found between restricted sleep and increased distraction-related driving incidents (Anderson & Horne, 2013). This paper explores the associations between sleep quality and distracted driving.

Method

Data presented here are part of the Enhanced Crash Investigation Study (ECIS). The ECIS is a case-control study that will collect and analyse data from 400 serious road crashes in Victoria occurring across a three-year period (see Fitzharris et al., 2015 for a full description of the study protocol). Control participants are those who, within a few weeks of a case-vehicle crash, have safely driven through that crash site, at which time an ECIS investigator using a laser speed camera covertly recorded their speed. Recordings are taken within a 30-minute window each side of the crash time. For privacy reasons, the Transport Accident Commission sends the questionnaire on behalf of the ECIS researchers. Drivers receive a \$50 gift voucher as reimbursement for their time. The response rate is 34%.

The survey seeks information about the observed trip, vehicle details and driver demographics. Drivers rate the quality of sleep they had the night before the trip (excellent, good, okay, poor) and report whether a passenger/s were present in the vehicle and whether or not they the driver was engaged in any potentially distracting activities during that drive (i.e., talking to a passenger, interacting with a smart device).

Results

Data from 233 control study drivers (male: 50%) are presented, which relates to 19 sites where a crash had occurred. Table 1 shows the frequency of reported distracting activities, separated across

drivers who reported the quality of their previous night's sleep as 'good' (excellent or good) or 'not good' (okay, poor). Overall, talking to a passenger inside the vehicle (20%) and interacting with the radio (12%) were the most commonly reported activities, although differences were evident in the frequency of distracting activities according to sleep quality and the presence of passengers.

Table 1. Ranking of activities and behaviours across sleep quality and presence of passengers

Activities and behaviours	Overall	Good quality sleep (n = 152)		OK/Poor quality sleep (n = 72)	
		No passengers (n = 98)	Passengers present (n = 54)	No passengers (n = 44)	Passengers present (n = 28)
Talking to a passenger inside the vehicle	20.1%	N/A	44.4%	N/A	75.0%
I changed the radio station / adjusted the volume	11.6%	11.2%	9.3%	15.9%	10.7%
I felt stressed or worried about something	8.0%	7.1%	3.7%	13.6%	10.7%
I found the road layout to be confusing	6.7%	8.2%	5.6%	9.0%	Nil
I was running late for something	6.2%	6.1%	1.8%	2.3%	21.4%
I felt 'lost' in personal thoughts	5.8%	6.1%	1.8%	13.6%	0.0%
I thought the road signs were poorly positioned	5.8%	6.1%	11.1%	2.3%	0.0%
I thought the traffic was driving too fast	4.9%	3.1%	5.6%	9.1%	3.6%
I was distracted by something outside of the vehicle	4.9%	3.1%	9.3%	4.5%	3.6%
I felt tired from a lack of sleep	3.6%	1.0%	Nil	6.8%	14.3%
I was viewing a map / route on a navigation device (or smartphone)	3.6%	1.0%	5.6%	6.8%	3.6%
I was trying to pass a slow moving vehicle	3.6%	3.1%	1.8%	4.5%	7.1%
My cars wheels touched or crossed the centre line on the road	3.1%	2.0%	3.7%	6.8%	Nil
Eating or taking a drink	3.1%	2.0%	3.7%	6.8%	Nil
I felt physically exhausted	2.7%	2.0%	1.8%	6.8%	Nil
I felt pressure from another driver	2.7%	2.0%	1.8%	4.5%	3.6%
I was talking on hands-free phone (Bluetooth)	2.7%	3.1%	1.8%	4.5%	Nil
I was adjusting the heater / air-con or demister	2.7%	3.1%	1.8%	4.5%	Nil
I was looking for a street sign	2.7%	1.1%	5.6%	2.3%	3.6%
The bend in the road was shaper than I thought	2.7%	4.1%	1.8%	2.3%	Nil
My attention was caught by a disturbance in my vehicle (passengers, child, animal)	2.7%	0.0%	3.7%	0.0%	14.3%

Conclusions

The exploratory results suggest a relationship may exist between quality of sleep and engagement in distracting activities. The data indicate that a higher proportion of drivers who reported 'okay' or 'poor' sleep quality on the day prior to their drive engaged in a range of different tasks to a greater extent than did drivers who reported 'good' or 'excellent' sleep quality. This might reflect attempts by drivers to keep engaged given their acknowledgement of increased exhaustion and poorer driving performance after poor quality sleep. Data collection is ongoing and more formal analyses of these relationships will be undertaken once data collection has been completed. This will allow incorporation of hours of sleep in addition to sleep quality, as well other subjective measures of drowsiness. Nonetheless, this analysis provides a snapshot of the range of activities drivers performed by drivers.

References

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ECIS Study team

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