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International drivers in unfamiliar surroundings:  
the problem of disorientation

Jeffrey Wilks, Barry Watson, Kim Johnston and Julie Hansen
Leading up to the Sydney 2000 Olympic Games, increased attention is being given to road safety for international visitors to Australia. Current research suggests that there are some identifiable differences in the nature of road crashes involving international and Australian drivers. In particular, international drivers are more likely to be involved in crashes that appear to result from disorientation. The incidence of disorientation-related crashes seems to be exacerbated by driver fatigue and unfamiliarity with Australian driving conditions. The problem is particularly acute among visitors from right-side of the road driving countries. Implications of these findings for the provision of travel advice are discussed.
In the lead-up to the Sydney 2000 Olympic Games, the road safety of international visitors to Australia is receiving increased attention from both government authorities and private sector groups involved in transport and tourism (Wilks et al, 1999). Although the number of road fatalities in Australia involving international drivers is relatively low in absolute terms, motor vehicle crashes remain the most common cause of injury death for tourists (Wilks, 1999), and are often given prominence in the media (Wilks et al, 1996). Current Australian research suggests that international driver fatalities could rise from the present level of approximately 45 per year to 70 as a result of the higher visitor numbers on the roads in the year 2000. A further 1,000 serious injuries to international visitors can also be expected (Ellis, 1999).

**Motor Vehicle Crashes Involving International Drivers**

It is difficult to isolate a single cause of motor vehicle crashes due to the complex chain of events which usually contributes to their occurrence (Queensland Transport, 1997). However, reviews of the literature (eg. Wilks and Watson, 1998) suggest at least five road safety issues for medical practitioners to include in advice for patients travelling to Australia:

- Be conscious of driving on the left hand side of the road
- Wearing a seat belt (as well as child restraints) is required by law in all parts of the country
- Don’t drink alcohol and drive
- Be aware of local speed limits, which are signposted in Kilometres per Hour
- Don’t drive if you are tired, and take regular rest breaks.

In terms of priority, research by the Federal Office of Road Safety (1995) shows that speed and alcohol consumption above the legal limit are less likely to be factors in the fatal crashes involving international drivers than those involving Australian drivers. On the other hand, fatigue, not wearing a seatbelt and overturning a vehicle are more likely to be factors in the fatal crashes involving international drivers. The most recent analysis of coroner’s records by the Federal Office of Road Safety (Ellis, 1999) confirms the earlier findings for alcohol, speed and seatbelt use. However, one issue that has not received much attention in Australia is that of driving on the opposite side
of the road to that which is familiar in the home country, and the consequences of any resulting disorientation.

The Problem of Disorientation
In a study of 730 road traffic injury patients seen at hospitals on the island of Crete (a right-side of the road driving jurisdiction), Petridou and her colleagues (1997) found that visitors from left-side of the road driving countries were at an increased risk for a traffic accident when they drove a rented rather than an owned vehicle, possibly on account of maladaption during the adjustment period in the country of visit. In addition, road traffic victims from left-side driving countries, compared with foreigners from right-side driving countries, were involved 2.5 times more frequently in accidents in which overpassing or other driving manoeuvres required reflexes conditioned on reverse directionality. The study concluded that road traffic accidents are a major hazard during pleasure travelling and that victims of such accidents among travellers have a distinct epidemiological profile compared with accidents of a similar nature among locals.

Similarly, in New Zealand (a left-side of the road driving country like Australia) Page and Meyer (1996) found that nearly 20% of fatalities involving foreign drivers were due to drivers not keeping to the left side of the road. Page and Meyer also found that not keeping left was a significant factor in non-fatal injury crashes involving foreign drivers.

In order to contribute to this growing knowledge base, and to focus the road safety information that might be provided to tourists, the present study examined crashes involving international drivers in the state of Queensland, Australia. Of particular interest was whether side of the road familiarity and disorientation resulted in any identifiable pattern of motor vehicle crashes.

Information Source
The Queensland Transport road crash database contains information on all crashes reported to police on Queensland roads. Under Queensland law, drivers are required to report all crashes where a person is injured, a vehicle is towed away, or the damage cost
is estimated to be greater than $2000 (Traffic Act 1949, section 31). The subset of data used in this research covers the period 1993-1998. Although these records do not explicitly state whether a driver was a tourist, the licence status of drivers (local or international) involved in crashes is recorded. Based on this approach, it was possible to identify 2571 drivers of international origin involved in a crash during the period. However, one shortcoming of the data set is that specific nationality is often not recorded. Despite this inherent weakness, it was possible to classify a total of 874 drivers (34%) according to whether they were from left or right side of the road driving countries. The classification was based on available publications (eg. Kinkaid, 1986) and advice from travel experts.

**Comparison of International and Australian drivers**

Table 1 indicates that there are some clearly identifiable differences in the nature of road crashes involving international and Australian drivers. International drivers are significantly more likely (p<.001) than Australian drivers to be involved in angle, sideswipe and head-on related crashes. The difference is particularly notable for head-on crashes.

Conversely, Table 1 shows that international drivers are significantly less likely (p<.001) than Australian drivers to be involved in crashes where fixed obstructions, pedestrians, parked vehicles or animals are hit. However, there was no significant difference between the two groups of drivers in relation to overturn, rear-end or miscellaneous crashes.

**Comparison of international drivers from left-side & right-side driving countries**

Table 2 examines the crash involvement pattern of those international drivers for whom it was possible to identify their country of origin (and thus the side of the road they would normally drive). Drivers from right-side driving countries appear to be over-represented in angle, sideswipe and head-on crashes. However, this over-representation was only statistically significant in the case of head-on crashes. Indeed, drivers from
right-side driving countries were involved in proportionally three times more head-on crashes than those from left-side driving countries.

There was some evidence of an opposite trend in the case of crashes involving fixed objects and pedestrians being hit. Drivers from left-side countries were more likely to be involved in these crashes than their right-side driving counterparts. However, these differences should be treated with caution since they were only significant at the p<.01 level and the numbers involved are relatively small.

Insert Table 2 about here

**Discussion**

The findings summarised in Table 3 suggest a pattern of behaviour that can be understood within the context of driving in an unfamiliar environment. While all crashes tend to involve some form of loss of control, the contributing factors can vary greatly. For example, the types of crashes in which international drivers are over-represented (i.e. angle, sideswipe and head-on) appear to represent cases where disorientation may be a problem. In other words, they are instances where drivers have allowed their vehicles to impinge on the road space of other vehicles. In contrast, those in which they are under-represented (hitting fixed obstructions, pedestrians, parked vehicles and animals) appear to involve a lack of attention or poor observation.

**Table 3. Summary of key findings**

<table>
<thead>
<tr>
<th>International drivers are MORE LIKELY than Australian drivers to be involved in:</th>
<th>International drivers are LESS LIKELY than Australian drivers to be involved in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Head-on crashes</td>
<td>• Hitting a parked vehicle</td>
</tr>
<tr>
<td>• Side-swipe crashes</td>
<td>• Hitting a fixed obstruction</td>
</tr>
<tr>
<td>• Angle crashes</td>
<td>• Hitting a pedestrian</td>
</tr>
<tr>
<td></td>
<td>• Hitting an animal</td>
</tr>
</tbody>
</table>

A number of factors may contribute to this apparent problem with orientation among international drivers. As noted earlier, research has indicated that fatigue is more likely
to be a factor in fatal crashes involving international drivers than Australian drivers (FORS 1995). According to Lumley General Insurance, a major insurance provider for the Australian rental vehicle market, claims by international drivers also show a clear increase in crashes around noon and between 5:00 and 6:00 PM., suggesting that fatigue is a contributing factor (Matcham, 1999). This confirms anecdotal evidence that fatigue is a major factor in crashes involving international drivers, particularly head-on crashes.

Many international drivers are unlikely to be familiar with the wide range of driving conditions encountered in Australia, particularly those experienced in remote areas (Wilks and Watson, 1998). The combined lack of familiarity with different driving conditions and road rules may contribute to disorientation among some international drivers.

Finally, the problem of disorientation appears quite acute among international drivers from right-side driving countries. In total, 60.5% of the crashes involving these drivers featured head-on, angle or side-swipe collisions. Furthermore, ‘right-side’ drivers were significantly more likely to be involved in head-on crashes than their left-side driving counterparts. The findings support anecdotal evidence that these drivers can automatically revert to the right-side of the road in emergency situations or drift to the right when fatigued (Wilks and Watson, 1999).

**Advice for Travellers**

As noted by Hargarten (1991:109) “knowledge of the variable in-country risks of motor vehicle crash mortality and morbidity is essential for the international traveller to develop strategies to prevent injuries.” It appears that international drivers, particularly those from right-side of the road driving countries, can experience orientation difficulties when driving in Australia.

At a recent parliamentary meeting held in Brisbane to discuss international visitors and road safety, delegates particularly emphasised the need to increase seat belt wearing and awareness of driver fatigue, as priority measures to assist visitors on Australian roads (Watson et al, 1999). This advice is further supported by current tourism initiatives to develop roadside rest areas, interesting photographic opportunities and other reasons to
stop and enjoy local culture, shopping and scenery during a driving vacation (Crick, 1999). In a country as large as Australia, advising visitors to take regular rest breaks during their travel is essential to help counter the effects of possible disorientation while driving.

Additional Road Safety Advice for Travellers

Based on the findings of current Australian research, the following additional points of road safety advice are suggested for travel medicine practitioners.

- Discuss the effects of medication, alcohol and jet-lag with patients who plan to drive a motor vehicle when they reach their destination;
- Advise patients to take a rest after a long distance flight, especially before taking charge of a motor vehicle;
- Suggest that patients renting a motor vehicle request a full familiarisation of the vehicle (particularly if the vehicle type is not familiar to them, eg. a 4 wheel drive or campervan) and a briefing on their travel route from staff of the hire company before leaving the airport or car depot;
- If possible, drive the rental vehicle around the car park before heading onto a public road for the first time;
- Advise patients to plan to drive only in daylight hours; and
- Ideally, build in rest stops every two (2) hours to counter fatigue.

Acknowledgments

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References


Table 1. Nature of crashes involving Australian and international drivers in Queensland: 1993-1998.1

<table>
<thead>
<tr>
<th>Crash Nature</th>
<th>Australian drivers (%)</th>
<th>International drivers (%)</th>
<th>Significant at p&lt;.001 level²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 109,000</td>
<td>N = 2,497</td>
<td></td>
</tr>
<tr>
<td>Angle³</td>
<td>34.8</td>
<td>41.0</td>
<td>Yes</td>
</tr>
<tr>
<td>Sideswipe⁴</td>
<td>4.8</td>
<td>7.4</td>
<td>Yes</td>
</tr>
<tr>
<td>Head-on</td>
<td>3.1</td>
<td>6.8</td>
<td>Yes</td>
</tr>
<tr>
<td>Hit fixed obstruction</td>
<td>19.2</td>
<td>13.6</td>
<td>Yes</td>
</tr>
<tr>
<td>Hit pedestrian</td>
<td>4.3</td>
<td>1.6</td>
<td>Yes</td>
</tr>
<tr>
<td>Hit parked vehicle</td>
<td>3.6</td>
<td>1.8</td>
<td>Yes</td>
</tr>
<tr>
<td>Hit animal</td>
<td>1.5</td>
<td>0.6</td>
<td>Yes</td>
</tr>
<tr>
<td>Overturned</td>
<td>7.7</td>
<td>7.5</td>
<td>No</td>
</tr>
<tr>
<td>Rear-end</td>
<td>19.1</td>
<td>17.9</td>
<td>No</td>
</tr>
<tr>
<td>Miscellaneous⁵</td>
<td>1.8</td>
<td>1.7</td>
<td>No</td>
</tr>
</tbody>
</table>

1 Crashes involving drivers of unknown licence status were excluded from this analysis in order to ensure that no international drivers were inadvertently included among Australian drivers.

2 Based on an adjusted standardised residual statistic (ê). An overall chi-square [χ²(df9) = 284.71] found a significant difference between Australian and international drivers at the p < .001 level.

3 An angle crash is defined as where two road vehicles collide at an angle to each other, but not rear-end or head-on. The vehicles most often will be travelling in adjacent directions.

4 A side-swipe crash is defined as where two road vehicles collide side against side. Vehicles may be travelling in the same or opposite directions (Queensland Transport, 1996).

5 Includes falling from a moving vehicle, motorcycle and bicycle overturns, being struck by an external load and other miscellaneous crash types.
Table 2. Nature of crashes in Queensland involving international drivers from left-side vs right-side driving countries: 1993-1998.

<table>
<thead>
<tr>
<th>Crash Nature</th>
<th>Drivers from left-side countries (%)</th>
<th>Drivers from right-side countries (%)</th>
<th>Significant at p&lt;.001 level(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 377)</td>
<td>(N = 497)</td>
<td></td>
</tr>
<tr>
<td>Angle</td>
<td>32.1</td>
<td>36.2</td>
<td>No</td>
</tr>
<tr>
<td>Sideswipe</td>
<td>5.3</td>
<td>8.0</td>
<td>No</td>
</tr>
<tr>
<td>Head-on</td>
<td>5.3</td>
<td>16.3</td>
<td>Yes</td>
</tr>
<tr>
<td>Hit fixed obstruction</td>
<td>20.7</td>
<td>13.5</td>
<td>No</td>
</tr>
<tr>
<td>Hit pedestrian</td>
<td>2.4</td>
<td>0.4</td>
<td>No</td>
</tr>
<tr>
<td>Hit parked vehicle</td>
<td>1.3</td>
<td>1.0</td>
<td>No</td>
</tr>
<tr>
<td>Hit animal</td>
<td>1.1</td>
<td>0.4</td>
<td>No</td>
</tr>
<tr>
<td>Overturned</td>
<td>11.4</td>
<td>10.5</td>
<td>No</td>
</tr>
<tr>
<td>Rear-end</td>
<td>16.7</td>
<td>11.5</td>
<td>No</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>3.7</td>
<td>2.2</td>
<td>No</td>
</tr>
</tbody>
</table>

\(^1\) Based on an adjusted standardised residual statistic \((\hat{e})\). An overall chi-square \([\chi^2 (df9) = 46.95]\) found a significant difference between the drivers from left-side and right-side countries at the \(p < .001\) level.