Exploring the prevalence of in-vehicle distraction in moving traffic: A pilot study

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Abstract

Video from four locations around Adelaide was examined to code distracted behaviours of drivers moving in traffic. A total of 920 drivers were observed of whom 8.9% were engaged in one of 16 in-vehicle behaviors that were classified as a distraction. The more significant driver distractions included using mobile phones (2.5%), holding an object (1.8%) and eating or drinking (1.5%) while driving. This pilot study demonstrates that there is camera technology suitable for observing distracted driving behaviour among drivers in moving traffic on public roads in South Australia, which could potentially be deployed for a larger, more representative study.

Background

Observation of drivers while moving in traffic can provide objective information about the prevalence of specific distractions within the vehicle. Distracted behaviours include phone use, interaction with vehicle systems (e.g. navigation systems) or passengers and other behaviours such as eating, drinking and smoking. Recording video of drivers in traffic is a more covert means of obtaining data on driver distractions and allows observations of a larger number of vehicles compared to naturalistic studies, which generally use small numbers of instrumented vehicles. Given the risks associated with driver distraction and the potential increase in technology-related distractions, the development of a methodology to monitor driver distraction over time is important for identifying trends (and potential solutions) for such behaviours.

Method

Four elevated locations were selected for the video camera observations. Elevated locations were used so that drivers could be observed (i) on their approach, from afar (ii) zoomed in to the driver's compartment directly from above and (iii) zoomed in from an angled perspective to capture the driver from an alternate view that might reveal the driver's distracted behaviours not captured in the other two views, or to confirm a behaviour captured from an alternate view.

The video recording of traffic, and a majority of the coding was undertaken by One Task Behaviour Analytics, who specialise in this field of work. Around 90 minutes of video footage was recorded at each location. For each period of recorded video footage, a 30-minute observation period of video was selected and used in the analysis of distracted behaviours.

Results

In the two-hour sample period across the four sites, there were 920 drivers observed, of whom 8.9% (n=82) were engaged in distracted behaviours. Table 1 below shows the number of observed distractions at each location. Twenty-three drivers (2.5%) were observed engaging in mobile phone use while driving.

Table 1. Driver distractions coded at each location

Distraction	1	2	3	4	Total	Per cent
1. Mobile phone - Talking (phone to ear)	-	-	-	1	1	0.1%
2. Mobile phone - Active touching (texting etc)	-	-	1	1	2	0.2%
3. Mobile phone - Hands-free (touching in cradle)	-	1	4	-	5	0.5%
4. Mobile phone - Holding	1	-	6	-	7	0.8%
5. Mobile phone – On lap (passive)	1	3	2	2	8	0.9%
6. Touching navigation system /other tech	-	-	-	-	-	0.0%
7. Adjusting controls	1	1	-	1	3	0.3%
8. Wearing headphones	1	-	3	4	8	0.9%
9. Eating/drinking	1	3	6	4	14	1.5%
10. Smoking	-	2	1	3	6	0.7%
11. Searching for (or holding) object	3	6	5	3	17	1.8%
12. Reading	-	-	-	-	-	0.0%
13. Grooming (& looking away)	-	-	-	1	1	0.1%
14. Attending to/touching passengers or animals	1	2	-	-	3	0.3%
15. Likely/possible distraction (nature unknown)	1	-	3	1	5	0.5%
16. Other	1	1	-	-	2	0.2%
No Distraction	123	320	294	101	838	91.1%
Total	134	339	325	122	920	100.0%

The most frequently observed distracted behavior, aside from mobile phone use, was searching for, or holding an object (1.8%); eating/drinking (1.5%) and wearing headphones (0.9%). Five drivers (0.5%) were assessed as being distracted from driving but the nature of the distraction could not be ascertained.

Of the 82 drivers who were observed as being distracted, 61 (74.4%) were male, 18 (22.0%) were female and in three observations the gender could not be determined. Examples of driver distractions extracted from the video footage are shown in Figure 1.

Figure 1. Examples of driver distractions. The top three images show 'Mobile phone – holding' for the same driver as seen in the three different camera views. The bottom three images show various examples of 'Eating/drinking' and 'Smoking'.

Conclusion

This pilot study has demonstrated that there is technology that is suitable for observing distracted driving behaviour among drivers in moving traffic on public roads. The method used provides a reasonably objective snapshot of distracted behaviour, although some judgement is required when viewing the footage. The observation and coding processes are quite labour intensive but it is anticipated that this will decrease as the technology progresses through automated detection, machine learning and artificial intelligence. A larger study will need to be undertaken to achieve a more representative snap-shot of in-vehicle distractive behaviours.