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

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TITLE

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

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ABSTRACT

This pilot study sought to examine the prevalence of in-vehicle driver distractions at four locations around Adelaide. Specialised video cameras were used to record drivers and their behaviour inside their vehicle, while they were driving in moving traffic. From each of the four locations, 30-minute samples of video were extracted, analysed and coded, to determine whether drivers were distracted or not, and to document the nature of any distraction. In the two-hour sample period, across the four sites, 920 drivers were observed, of whom 8.9% (n=82) were engaged in distracted behaviours. Twenty-three drivers (2.5%) were observed engaging in mobile phone use while driving. This included seven drivers holding a mobile phone (0.8%), eight drivers with a mobile phone in their lap (0.9%) and five drivers who were touching a mobile phone in a cradle (0.5%). Only one driver was observed talking on their phone (phone to ear) while two drivers were observed actively touching/texting on their phone while driving. While this pilot study was not intended to record observations from a representative sample of South Australian roads, it does give insights into the prevalence of distracting behaviours at specific locations. Importantly, the study demonstrates that there is 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.

KEYWORDS

Distracted driving, mobile phone use, driver observations

Summary

Observation of drivers while moving in traffic can provide objective information about the prevalence of specific potential distractions within the vehicle. Recording video of drivers in traffic is a covert means of obtaining data on potential driver distractions and allows for the observation of a large number of vehicles. This pilot study sought to examine the prevalence of in-vehicle driver distractions at four locations around Adelaide. Specialised video cameras were used to record drivers and their behaviour inside their vehicle, while they were driving in moving traffic.

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 behaviour not captured in the other two views, or to confirm a behaviour captured from an alternate view. Around 90 minutes of video footage was recorded at each location. From each of the four locations, 30-minute samples of video were extracted, analysed and coded, to determine whether drivers were distracted or not, and to document the nature of any distraction.

In the two-hour sample period, across the four sites, 920 drivers were observed, of whom 8.9% (n=82) were engaged in distracted behaviours. Twenty-three drivers (2.5%) were observed engaging in mobile phone use while driving. This included seven drivers holding a mobile phone (0.8%), eight drivers with a mobile phone in their lap (0.9%) and five drivers who were touching a mobile phone in a cradle (0.5%). Only one driver was observed talking on their phone (phone to ear) while two drivers were observed actively touching/texting on their phone while driving. The most frequently observed distracted behaviour, aside from mobile phone use, was searching for, or holding an object (1.8%); eating/drinking (1.5%) and wearing headphones (0.9%). 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.

While this pilot study was not intended to record observations from a representative sample of South Australian roads, it does give insights into the prevalence of distracting behaviours at specific locations. Importantly, the study demonstrates that there is 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. The method used provides a reasonably objective snapshot of distracted behaviour, although some judgement is required when viewing the footage. The observation and coding process was labour intensive but it is anticipated that this will decrease as the technology progresses through automated detection, machine learning and artificial intelligence.

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1 Introduction

Observations of distractions within vehicles, while in the traffic flow, can provide detailed objective information about the prevalence of specific potential distractions within the vehicle. Examples of distracted behaviours include phone use, interaction with vehicle systems (e.g. navigation systems) or passengers and other manual behaviours such as eating, drinking and smoking. Recording drivers in traffic is also a more covert means of obtaining data on driver distractions and allows observations of a larger number of vehicles than naturalistic studies, which tend to use a small number 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.

This component of the project involves recording footage of drivers on public roads in moving traffic, to observe whether they engage in behaviours that potentially distract from the driving task. Specifically, the aim of this study is to determine whether the available technology is able to adequately capture and record distracted driving behaviour in moving traffic and be used to provide an indication of the prevalence of distracted driving behaviour at specific locations. As it is a pilot study, it is not intended to be a representative study of distracted driving behaviour on South Australian roads.

Ethics approval was obtained from the University of Adelaide Human Research Ethics Committee to undertake the filming and observations for this study (approval number H-2018-102).

1.1 Method

Four elevated locations were selected for the observations so that video cameras could be easily set-up to record passing traffic from above. Elevated locations were used so that drivers could be observed:

(i) on the approach, from afar (camera angle approximately –5 degrees from the horizon, camera zoomed in) to see where the driver was focussing attention and looking, whether both the driver's hands were on the steering wheel or whether the driver was attending to another task,

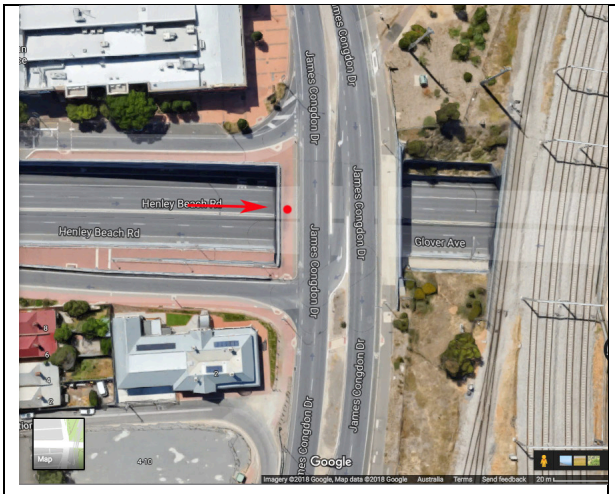
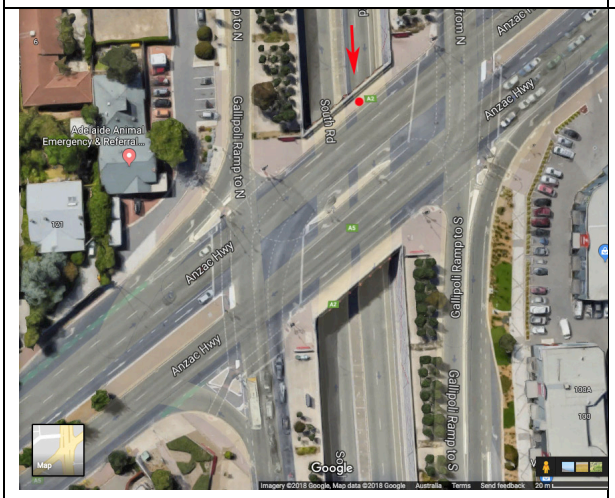
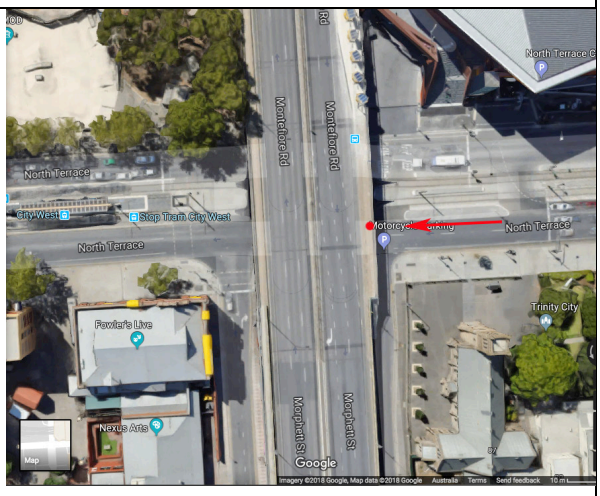
(ii) directly from above (camera angle approximately –70 degrees from the horizon, camera zoomed in) to see whether any distractions were on the lap or legs of the driver or to see if the driver's hands were attending to distracting tasks,

(iii) from an angled perspective (camera angle approximately -45 degrees from the horizon and rotated approximately -45 degrees from the vertical plane and zoomed in) 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 set-up for Location 1 is show in Figure 1.1, while Table 1.1 shows each of the locations selected for observations.

Figure 1.1
Camera set-up at Location 1

Table 1.1
Locations of observations

	
Location 1: James Congdon Drive Bridge capturing traffic travelling East on Henley Beach Road, right most lane (60 km/h speed limit)	Location 2: Waverley Ridge Road Bridge capturing traffic travelling North West on South Eastern Freeway, centre lane (100 km/h speed limit)
	
Location 3: Anzac Highway Bridge capturing traffic travelling North on South Road, right most lane (60 km/h speed limit)	Location 4: Morphett Street Bridge capturing traffic travelling West on North Terrace, right most lane (50 km/h speed limit)

1.1.1 Video recording of drivers in traffic

The video recording of traffic was undertaken by One Task Behaviour Analytics, who specialise in this field of work. The filming occurred on 2 and 3 July 2018. On both days, the weather was fine but slightly overcast at times. One Task recorded around 90 minutes of footage at each observation 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. The date, time periods recorded, and time periods observed for each location are shown in Table 1.2.

Table 1.2
Video recording and observation timing

Location	Date	Recorded Time Period	Observation Period
1	2 July 2018	9:45am to 11:15am	10:15am to 10:45am
2	2 July 2018	1:53pm to 3:37pm	1:53pm to 1:23pm
3	3 July 2018	8:35am to 9:48am	8:35am to 9:05am
4	3 July 2018	12:42pm to 2:21pm	12:43pm to 1:13pm

1.1.2 Driver behaviours being observed

For each location, a 30-minute sample of video was observed (as in shown Table 1.2), and footage of each driver was examined from the various recorded vantage points, to assess whether the driver was distracted by something within the vehicle, while driving. At each location, each distracted driver was observed and their details noted according to the coding protocol provided in Table 1.3. The distraction classification codes, which were assigned to each driver observed, were developed by CASR and are shown in Table 1.4 below.

Each of the videos were examined by One Task Behaviour Analytics. Additionally, video from location 3 was also examined by CASR researchers, to check that there was a reasonably consistent assessment of driver distraction.

Table 1.3
Distracted driver coding table

Required Information	Code
Vehicle Number	Vehicle count in sample observed. 1, 2, …. Last vehicle in observation sample
Time	Time stamp on up-road camera
Distraction code	Codes provided in Table 1.4 below
Gender	M, F or U/K
Passenger	0 (none), 1 (yes)
Notes	Nature of distraction. E.g. grabbing drink, eating apple, cigarette in fingers, phone in lap etc.
Desirable Information	**Code**
Plates	Ps or Ls
Vehicle Category	1. Passenger, 2. Utility, 3. SUV, 4. Van, 5. Truck, 6. Taxi
Passenger phone	0 (no) 1 (yes)
No seat belt	Only code 1 if NOT wearing seatbelt
Camera No.	Camera distraction can be seen in camera i, ii, or iii (as shown if Fig 1), can be multiple e.g. i and ii

Table 1.4
In-vehicle distraction classification codes

Code	Distraction	Distraction Description
0	No Distraction	-
1	Mobile phone	Talking (phone to ear)
2	Mobile phone	Active touching (texting etc)
3	Mobile phone	Hands-free (touching in cradle)
4	Mobile phone	Holding
5	Mobile phone	On lap (passive)
6	Touching navigation system /other tech	-
7	Adjusting controls	-
8	Wearing headphones	-
9	Eating/drinking	-
10	Smoking	-
11	Searching for (or holding) object	-
12	Reading	-
13	Grooming/attending to (& looking away)	Hair/face/make up/etc
14	Attending to/touching	Passengers or animals
15	Likely/possible distraction (nature unknown)	(e.g. looking down at something)
16	Other	-
99	Unknown	-

2 Results

2.1 General observations

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 2.1 below shows the number of observed distractions at each location. Twenty-three drivers (2.5%) were observed engaging in mobile phone use while driving. This included seven drivers holding a mobile phone (0.8%), eight drivers with a mobile phone in their lap (0.9%) and five drivers who were touching a mobile phone in a cradle (0.5%). Only one driver was observed talking on their phone (phone to ear) while two drivers were observed actively touching/texting on their phone while driving.

The most frequently observed distracted behaviour aside from mobile phone use was searching for, or holding, an object (1.8%, n=17); eating/drinking (1.5%, n=14) and wearing headphones (0.9%, n=8). 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 were female (22.0%) and in three observations the gender could not be determined from the video image.

Table 2.1
Various distractions for each location

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

Note: For the single driver in the study assessed as talking on their mobile phone (phone to ear), the manner in which the driver's right hand was held near his ear, with his elbow elevated and not resting on the driver door panel, was strongly suggestive that a phone was being held to his ear, however, a phone was not clearly visible due to the angle of the image.

2.2 Site specific observations

2.2.1 Location 1

Location 1 was on James Congdon Drive Bridge capturing traffic travelling East on Henley Beach Road, right most lane (60 km/h speed limit). Table 2.2 shows the distracted drivers disaggregated by gender. During the observation period, 8.2% of drivers were found to be distracted; eight males and three females. Four of the eleven vehicles with distracted drivers had a front seat passenger. An example of phone use at Location 1, depicted by the three camera angles, is shown in Figure 2.1.

Table 2.2
Various distractions for Location 1 by gender

Code	Distraction	Males	Females	Unknown	Total
1	Mobile phone - Talking (phone to ear)	-	-	-	-
2	Mobile phone - Active touching (texting etc)	-	-	-	-
3	Mobile phone - Hands-free (touching in cradle)	-	-	-	-
4	Mobile phone - Holding	1	-	-	1
5	Mobile phone – On lap (passive)	1	-	-	1
6	Touching navigation system /other tech	-	-	-	-
7	Adjusting controls	1	-	-	1
8	Wearing headphones	1	-	-	1
9	Eating/drinking	-	1	-	1
10	Smoking	-	-	-	-
11	Searching for (or holding) object	2	1	-	3
12	Reading	-	-	-	-
13	Grooming (& looking away)	-	-	-	-
14	Attending to/touching passengers or animals	1	-	-	1
15	Likely/possible distraction (nature unknown)	1	-	-	1
16	Other	-	1	-	1
	TOTAL	8	3	0	11

Figure 2.1
The approach view, above view and angled view of a driver holding their mobile phone at Location 1

2.2.2 Location 2

Location 2 was at Waverley Ridge Road Bridge, capturing traffic travelling North West on South Eastern Freeway in the centre lane (100 km/h speed limit). A total of 5.6% of drivers were observed to be distracted. Table 2.3 shows the distractions disaggregated by gender for Location 2, and it indicates that 13 males were observed as being distracted compared to five females. Four vehicles with distracted drivers had a front seat passenger while 15 vehicles had no front seat passengers. An example of phone

use at Location 2, depicted in the three camera angles, is shown in Figure 2.2. Note that in the approach view, phone use is not visible due to the camera angle.

Table 2.3
Various distractions for Location 2 by gender

Code	Distraction	Males	Females	Unknown	Total
1	Mobile phone - Talking (phone to ear)	-	-	-	-
2	Mobile phone - Active touching (texting etc)	-	-	-	-
3	Mobile phone - Hands-free (touching in cradle)	-	1	-	1
4	Mobile phone - Holding	-	-	-	-
5	Mobile phone – On lap (passive)	-	2	1	3
6	Touching navigation system /other tech	-	-	-	-
7	Adjusting controls	1	-	-	1
8	Wearing headphones	-	-	-	-
9	Eating/drinking	3	-	-	3
10	Smoking	2	-	-	2
11	Searching for (or holding) object	4	2	-	6
12	Reading	-	-	-	-
13	Grooming (& looking away)	-	-	-	-
14	Attending to/touching passengers or animals	2	-	-	2
15	Likely/possible distraction (nature unknown)	-	-	-	-
16	Other	1	-	-	1
	TOTAL	13	5	1	19

Figure 2.2
The approach view, above view and angled view of a driver touching their phone in a cradle at Location 2.

2.2.3 Location 3

Location 3 was at Anzac Highway Bridge capturing traffic travelling North on South Road in the right most lane (60 km/h speed limit). Table 2.4 presents distracted drivers disaggregated by gender for Location 3, and it shows that 23 males were observed as being distracted compared to six females. Overall, 9.5% of drivers were distracted at this location. None of the 31 vehicles with distracted drivers had a front seat passenger. Figure 2.3 shows an example of active phone use at Location 3. Note that in the approach view, the phone use is not visible, but in the approach view the driver's eyes could be observed looking toward his lap (driver's face has deliberately been removed from the image to ensure privacy). Note also that in the top view, there is some cloud reflection, which can often obscure part of a driver's image.

Table 2.4
Various distractions for Location 3 by gender

Code	Distraction	Males	Females	Unknown	Total
1	Mobile phone - Talking (phone to ear)	-	-	-	-
2	Mobile phone - Active touching (texting etc)	1	-	-	1
3	Mobile phone - Hands-free (touching in cradle)	3	1	-	4
4	Mobile phone - Holding	5	1	-	6
5	Mobile phone – On lap (passive)	1	1	-	2
6	Touching navigation system /other tech	-	-	-	-
7	Adjusting controls	-	-	-	-
8	Wearing headphones	2	1	-	3
9	Eating/drinking	5	-	1	6
10	Smoking	1	-	-	1
11	Searching for (or holding) object	3	1	1	5
12	Reading	-	-	-	-
13	Grooming (& looking away)	-	-	-	-
14	Attending to/touching passengers or animals	-	-	-	-
15	Likely/possible distraction (nature unknown)	2	1	-	3
16	Other	-	-	-	-
	TOTAL	23	6	2	31

Figure 2.3
The approach view, above view and angled view of a driver actively touching their phone on their lap at Location 3.

2.2.4 Location 4

The fourth location was at Morphett Street Bridge capturing traffic travelling West on North Terrace in the right most lane (50 km/h speed limit). This location had the smallest number of observations during the observation period but had the highest percentage of distracted drivers (17.2%). Table 2.5 indicates that seventeen males were observed as being distracted compared to four females at this location. There were no front seat passengers observed in the 21 vehicles with distracted drivers. Figure 2.4 shows an example of active touching of a phone at Location 4. Note that in the approach view, the phone use is not visible. (The driver's face has deliberately been removed from the image to ensure privacy).

Table 2.5
Various distractions for Location 4 by gender

	Distraction	Males	Females	Unknown	Total
1	Mobile phone - Talking (phone to ear)	1	-	-	1
2	Mobile phone - Active touching (texting etc)	1	-	-	1
3	Mobile phone - Hands-free (touching in cradle)	-	-	-	-
4	Mobile phone - Holding	-	-	-	-
5	Mobile phone – On lap (passive)	1	1	-	2
6	Touching navigation system /other tech	-	-	-	-
7	Adjusting controls	1	-	-	1
8	Wearing headphones	4	-	-	4
9	Eating/drinking	3	1	-	4
10	Smoking	2	1	-	3
11	Searching for (or holding) object	3	-	-	3
12	Reading	-	-	-	-
13	Grooming (& looking away)	-	1	-	1
14	Attending to/touching passengers or animals	-	-	-	-
15	Likely/possible distraction (nature unknown)	1	-	-	1
16	Other	-	-	-	-
	TOTAL	17	4	0	21

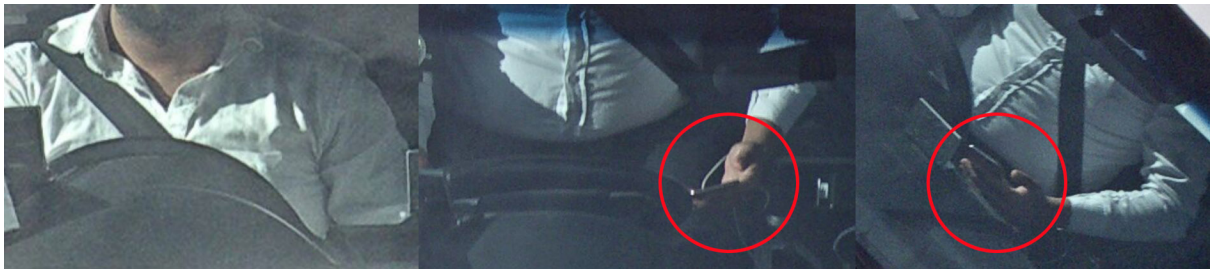


Figure 2.4
The approach view, above view and angled view of a driver actively touching their phone on their lap at Location 4.

2.3 Validation of results

In order to cross check the analysis by One Task, two CASR researchers also examined the 30 minutes of footage from Location 3. The drivers in each vehicle were examined to determine whether they were distracted, the category of distraction and the gender of each driver (as best as possible). The presence of a front seat passenger was also recorded for all vehicles.

The results of the analysis are shown in Table 2.6 below. In total, CASR counted 331 drivers, of whom 12.4% (n=41) were assessed as being distracted. In 21 cases it could not be determined definitively whether the driver was distracted or not. Some of these cases included vehicles in which a mobile phone was present in a cradle, the driver was wearing sunglasses (or a sun visor was down) and did not appear to be looking ahead at the road, but we could not be certain the driver was distracted. Other cases included drivers who were observed not looking ahead at the road but the images from the other camera angles were not available (technical failure) or could not reveal any further information about any potential in-vehicle distractions (e.g. for trucks where we could not see inside the vehicle at particular angles). Therefore, of those for whom the distraction status could be determined (n=310), 13.2% were observed to be distracted. Of those who were distracted, 75.6% were male (n=31).

As the gender of all drivers was recorded (rather than only those who were distracted), the distraction rates for each gender were calculated. When considering only those for whom distraction status was known (n=310), 13.8% (n=31) of male drivers were observed to be engaged in distracting behaviour compared to 11.8% (n=10) of female drivers.

Mobile phone use (codes 1 to 5) accounted for 3.5% (n=11) of all cases in which distraction status was known. Of those eleven drivers observed using a mobile phone, nine were males. Of those for whom distraction status was known, around 4% (n=9) of male drivers observed in traffic were using a mobile phone compared to 2.4% (n=2) of females. The prevalence of eating and drinking at Location 3 was also quite high as a distracting behaviour, with 2.1% of drivers observed to be eating or drinking (n=7), most of them being male drivers (n=6). An example of drivers eating and drinking, and an example of a driver smoking, is shown in Figure 2.5 below.

Table 2.6
Distractions and non-distractions by gender for Location 3, coded by CASR

Distraction		Male		Female		Total	
		N	%	N	%	N	%
1	Mobile phone - Talking (phone to ear)	-	-	-	-	-	-
2	Mobile phone - Active touching (texting etc)	2	0.8	-	-	2	0.6
3	Mobile phone - Hands-free (touching in cradle)	1	0.4	-	-	1	0.3
4	Mobile phone - Holding	5	2.0	2	2.3	7	2.1
5	Mobile phone – On lap (passive)	1	0.4	-	-	1	0.3
6	Touching navigation system /other tech	-	-	-	-	-	-
7	Adjusting controls	-	-	-	-	-	-
8	Wearing headphones	2	0.8	1	1.2	3	0.9
9	Eating/drinking	6	2.5	1	1.2	7	2.1
10	Smoking	3	1.2	-	-	3	0.9
11	Searching for (or holding) object	4	1.6	2	2.3	6	1.8
12	Reading	-	-	1	1.2	1	0.3
13	Grooming (& looking away)	-	-	2	2.3	2	0.6
14	Attending to/touching passengers or animals	1	0.4	-	-	1	0.3
15	Likely/possible distraction (nature unknown)	6	2.5	1	1.2	7	2.1
99	Unknown	20	8.2	1	1.2	21	6.3
0	No Distraction	194	79.2	75	87.2	269	81.3
	TOTAL	245	100.0	86	100.0	331	100.0

Note: The driver that was observed touching his mobile phone in a cradle also had a cigarette in his hand, but this was coded only once.

Figure 2.5
Examples of eating, drinking and smoking, respectively at Location 3.

The results from CASR were reasonably similar to those from One Task for total counts (325 vehicle compared to 331 vehicles). However, CASR counted ten more distracted drivers compared to One Task. This may have been because two CASR researchers examined the 30-minute footage in considerable detail and both had to agree on the distracted behaviour, compared to a single One Task reviewer, who processed the footage quicker and had to code distractions independently. The differences in coding by category is show below in Table 2.7. These differences in coding highlight that there is still some subjective judgement required when viewing the recorded footage.

Table 2.7
A comparison of distractions coded by One Task and CASR

Distraction	One Task	CASR	Difference
Mobile phone - Talking (phone to ear)	-	-	-
Mobile phone - Active touching (texting etc)	1	2	1
Mobile phone - Hands-free (touching in cradle)	4	1	-3
Mobile phone - Holding	6	7	1
Mobile phone – On lap (passive)	2	1	-1
Touching navigation system /other tech	-	-	-
Adjusting controls	-	-	-
Wearing headphones	3	3	-
Eating/drinking	6	7	1
Smoking	1	3	2
Searching for (or holding) object	5	6	1
Reading	-	1	1
Grooming (& looking away)	-	2	2
Attending to/touching passengers or animals	-	1	1
Likely/possible distraction (nature unknown)	3	7	4
Other	-	-	-
Unknown	-	21	21
No Distraction	294	269	-25
TOTAL	325	331	6

Note: The driver that was observed by CASR touching his mobile phone in a cradle also had a cigarette in his hand, but this was coded only once.

3 Discussion

There is no doubt that the use of specialised video cameras to view and record the behaviours of drivers inside their vehicle, while on the public road network, can give insights into the prevalence of distracting behaviours. This has been clearly demonstrated in this pilot study. However, the process is not simple.

Careful set-up is required to ensure the best, focussed view is obtained for a majority of vehicles. Vehicles with vertically angled windscreens (e.g. trucks and vans) are more difficult to deal with and harder to see inside. The ability to get a clear view inside a vehicle at different angles is made difficult due the reflective nature of vehicle windscreens, and sometimes cloud cover or other reflections on the windscreen obscure details within the vehicle. Because of this, it is important to have several cameras recording different angles, to ensure that at least one or two views are recorded that have no reflective obstructions. The quality of the recorded images is also very important to be able to accurately detect in-vehicle distractions. A camera with good quality resolution and image capture frame rate is required, and the cameras used in this study (provided by One Task) were more than adequate for day-time video captures.

It was found in this study that, indeed, the optimal approach for determining distractions within vehicles was to use the camera set-up undertaken by One Task. If a distracted behaviour was identified in the video record from one camera, it could be verified using one or both of the other camera video records. Additionally, if footage from one camera was negatively affected by a reflection, one or both of the other cameras could be used to identify a distraction within a vehicle.

Unfortunately, in this study, there was an intermittent recording failure in two of the cameras used. All footage was consistently recorded on one camera (the approach view), but as seen in some of the images shown above, the approach view is not the best view for determining whether a driver was distracted. Despite the technical failure, it was still possible to determine a conservative estimate of distracted driving among our sample of vehicles assessed.

In terms of the labour required, only one person is needed to set-up and monitor the cameras while they are recording on site. However, the analysis of the data is still labour intensive. While it is anticipated that in the future machine learning algorithms will enable computers to identify the distractions automatically from the video footage, at present the recording from each of the three cameras needs to be reviewed during real time.

One Task has the capability to extract all images of vehicles from recorded video footage automatically (and discarding those images containing no vehicles). This eliminates the need to view several hours of footage that might not contain any vehicles but still requires some component of labour for the analysis of potential distracted behaviour in each image. Recording more variables such as gender, passenger status and age will also require additional processing time.

In summary, this pilot study has indicated that the technology is suitable for observing distracted driving behaviour among drivers in moving traffic on public roads in South Australia. This method provides a reasonably objective snapshot of distracted behaviour, noting that there is still some judgement required when viewing the footage and a small number of instances in which the observer/reviewers may not have a clear view of the distraction (e.g. in trucks, during cloudy/inclement weather). The process still requires some labour but it is anticipated this will decrease as technology progresses through automated detection, machine learning and artificial intelligence. If a larger study were undertaken, location selection would be dependent on appropriate elevated positions.

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