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Mobile phone use and driving: the message is just not getting through

by Peter Rowden and Barry Watson

Centre for Accident Research and Road Safety – QLD (CARRS-Q)
Queensland University of Technology

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Abstract

Previous research has shown that mobile phone use while driving can increase crash risk fourfold while texting results in 23 times greater crash risk for heavy vehicle drivers. However, mobile phone use has changed in recent years with the functional capabilities of smart phones to now also include a range of other common behaviours while driving such as using Facebook, emailing, the use of ‘apps’ and GPS. Research continues to show performance decrements for many such behaviours while driving, however many Australians still openly admit to illegal mobile phone use while driving despite ongoing enforcement efforts and public awareness campaigns. Of most concern are young drivers. ‘Apps’ available to restrict mobile phone use while in motion do not prevent use while a driver is stopped at traffic lights, so are therefore not a wholly viable solution. Vehicle manufacturers continue to develop in-vehicle technology to minimise distraction, however communication with the ‘outside world’ while driving is also perhaps a strong selling point for vehicles. Hence, the safety message that drivers should focus on the driving task solely and not use communication devices is unlikely to ever be internalised by many drivers. This paper reviews

the available literature on the topic and argues that a better understanding of perceptions of mobile phone use while driving and motives for use are required to inform public awareness campaign development for specific road user groups. Additionally, illegal phone use while driving may be reinforced by not being apprehended (punishment avoidance); therefore stronger deterrence-focussed messages may also be beneficial.

Keywords

Mobile phone; Cell phone; Road safety; Enforcement; Public education

Introduction

The level of crash involvement from using a mobile phone while driving is difficult to establish from data commonly collated by transport authorities. This is due to the under-reporting of mobile phone use during crash events. Unless a police officer or witness expressly notes that mobile phone use contributed to a crash, it is unlikely that it will be reported. Elvik [6] noted that there is a lack of firm evidence to accurately quantify the degree of crash

involvement from mobile phone use and that most studies suffered from methodological limitations. Hence, while some research estimates that mobile phone use may be implicated in up to 25% of all road crashes in the United States (see review by the Governors Highway Safety Association [8]), this cannot be asserted with certainty.

Research using case-crossover designs to examine driver distraction from mobile phones showed a fourfold increase in crash risk for hand-held phone use, and a similar result for hands-free phone use [14, 21]. However, these relatively early studies did not discriminate between the range of behaviours that were able to be performed on mobile phones while driving, such as the differential risk posed by making a call, receiving a call, sending a text message, or reading a text message. In a naturalistic study using on-board cameras to observe driver behaviour, the Virginia Tech Transportation Institute found in 2009 that sending a text represented 23 times greater crash risk for heavy vehicle drivers [28].

More recently, mobile phone use has changed from calling or text messaging to now also include a range of other common behaviours linked to the internet capabilities of smart phones such as using Facebook, emailing, gaming, the use of various ‘apps’ and the use of Global Positioning Systems (GPS) [16]. The various behaviours differ in the type and likely level of distraction posed to the user when

engaging in these secondary tasks while also in control of a motor vehicle [18], or while walking [10, 15, 24], or cycling [5, 24].

Commonly these distractions are recognised as being manual (tactile/psychomotor), cognitive, visual, and/or auditory in nature. It is logical that behaviours that divert the gaze of users (i.e. visual distraction) *and* require manual manipulation would present a higher crash risk in association with the amount of time spent on the secondary task [16]. Texting, emailing, and using Facebook are examples where this may be most prominent. Additionally, situational demands of the traffic environment may impact on the level of distraction posed by a secondary task. For example, the level of distraction posed by using a particular function of a mobile phone while driving at 110kmh on a motorway may vary to that posed while using the same function when driving at 50kmh in heavy traffic. Perceptions of crash risk by individuals across a range of driving situations need to be established through research, as these perceptions may motivate their decision to use the mobile phone or not. That is, people may self-regulate their behaviour depending on the perceived risk of certain traffic situations or the cognitive demand associated with the traffic situation. For example, do people think that it is dangerous to text while stopped at traffic lights and/or do they know that this constitutes a traffic offence in Australian states?

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Decrements in driving performance are well established for using mobile phones while driving. Naturalistic studies and driving simulator studies have established that poor lane control, poor speed control, increased reaction times (e.g. late braking), and increased headway by way of driver compensation for reaction times, are all linked to distraction caused by mobile phone use while driving [8,9].

The road user group of most concern are P1 Provisional licence holders [4] who are restricted by legislation in all Australian states and territories from using a mobile phone in any manner while driving. This is due to the lack of driving experience when combined with the risk that using a mobile phone while driving presents in general. The Australian Community Attitudes to Road Safety Report [20] noted that 59% of drivers surveyed use a mobile phone in some manner while driving; however usage was 70% for Provisional licence holders which were the highest of all licence classes. Given that P1 Provisional licence holders are banned from using a mobile phone in any manner while driving, and that 25-39 year olds were the highest user group by age, it may be that P2 Provisional licence holders should be a key target group as well as P1 licence holders. Drivers aged 17-29 have been found to more frequently send texts while driving than other age groups [16] and this is arguably one of the most dangerous of all behaviours relating to mobile phone use while driving. Petroulias [20] reported a declining trend for the percentage of active drivers making phone calls, with 27% found in 2011 compared to 34% in 2009. More than half of the drivers surveyed in 2011 used hands free mode to make calls. It must be kept in mind however that the overall risk for behaviours related to mobile phone use while driving also depends upon how frequently each behaviour is performed and for how long it is performed on each occasion, as well as the driving situation and the road user.

In essence, a conundrum for road safety practitioners is that while the vast majority of road users acknowledge that there is some level of increased crash risk from using a mobile phone in some capacity while driving, they continue to do so [4, 18]. For instance, Petroulias [20] found that 86% of drivers surveyed thought that talking on a mobile phone while driving increases their crash risk, yet the majority of these people admitted to recently performing the behaviour. Hence, mobile phone use while driving remains of major concern for road safety in Australia and internationally. This paper outlines the key issues of concern related to mobile phone use while driving and, more specifically, comments on how the development of public education campaigns on the topic can be informed by research.

Look, no hands!

Hands free mobile phone use, while legal for most drivers in Australia, has not conclusively been shown to be safer than hand held mobile phone use while driving [1]. This is

due to the cognitive distraction caused by holding a phone conversation as a secondary task to driving. However there is some conjecture in the literature regarding this issue. Early research [14] found little difference in crash risk between hands free and hand held operation of a mobile phone regarding making and receiving calls. However, naturalistic study methods offer more definitive observation of explicit behaviours that are performed concurrently with the driving task. Such research has found that using a hand held mobile phone presents a higher risk (due to the combination of cognitive and manual distraction) than using hands free mode [12]. For driver performance, a recent program of experimental studies using a driving simulator and an instrumented vehicle found little difference between hand held and hands free mobile phone use for eye glance, brake reaction time, or following distance [23]. Hence, the likely differences in risk between using a hand held or hands free mobile phone remain clouded.

New technology from vehicle manufacturers provides the driver with the option of converting speech to text rather than manually texting. On face value this may appear to be a worthwhile initiative for road safety. However, this may not be the case. For example, the AAA Foundation for Traffic Safety [1] on page two noted the following when reviewing cognitive distraction while driving:

“The principal finding that driver use of in-vehicle speech-to-text technologies is the most distracting of the six tasks has important implications given the skyrocketing growth in voice-activated infotainment and other dashboard systems available to consumers. The findings also challenge prevailing public assumptions that hands-free devices are safer than their hand-held counterparts.”

Work-related driving may be more likely to require the use of a mobile phone to conduct business [22]. Employers have a responsibility to ensure that mobile phone use only occurs in hands free mode to comply with legislative requirements¹. However, the aforementioned research findings suggest that laws allowing hands free mobile phone use may be misguided and still place road users at risk. To this end, the legal implications for employers of requiring hands free mobile phone use by staff require further investigation.

Motives for mobile phone use while driving

The illegality of using a hand held phone while driving may be superseded by the need to fulfil other motives for some people. By examining the various motives for performing specific behaviours while driving such as sending a text, making a phone call, or using the internet on smart phones,

¹Note: P1 Provisional licence holders in Australia are restricted from using a mobile phone even in hands free mode.

we may gain a greater understanding of how to reduce the likelihood of such behaviours being performed. To this end, various road users groups may be motivated in different ways to perform the same behaviour.

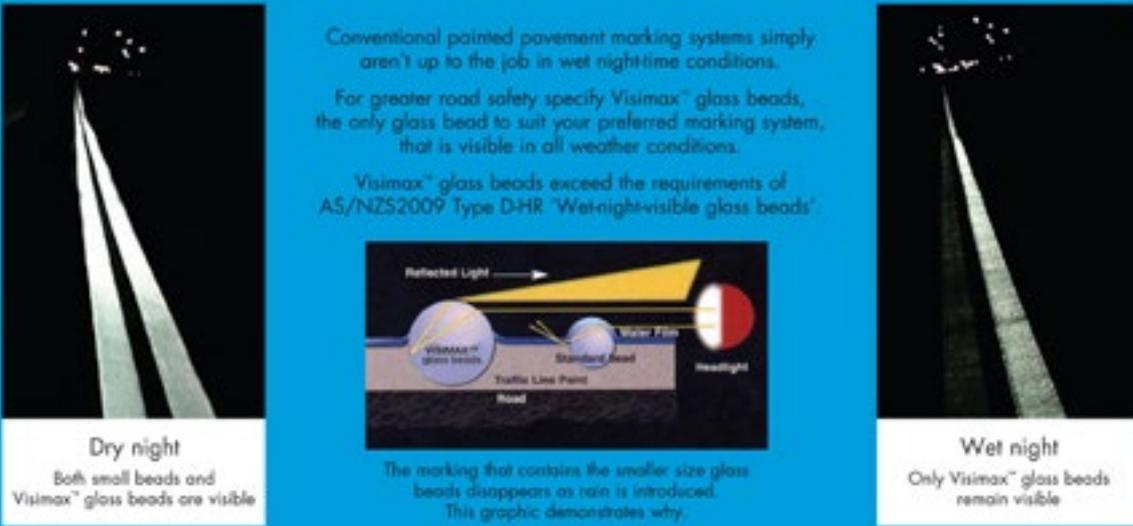
For instance, young drivers may feel a social expectation among their peer group to communicate at all times, including while driving [25]. That is, for young people, the mobile phone may represent a means by which to feel socially included within their immediate peer group and they will use their mobile phones in bed, in classrooms, or while driving to fulfil their perceived need for social inclusion. Hence, to some degree social acceptability of using a mobile phone while driving may contribute to the behaviour for this group. To some degree it may also perhaps be that individuals have performed the behaviour so often and the behaviour has been sufficiently reinforced socially, that it has become habitual [27]. Young drivers may also be motivated to use other functions of their phones for entertainment (e.g. accessing music play lists) or for information access.

Long haul truck drivers may perhaps call or send a text while driving in order to keep in touch with friends and family as the drivers are often away from home and drive for a substantial portion of their day. Other individuals may

use mobile phones while driving to conduct business and feel that they would be at a competitive disadvantage if they couldn't use their phones while driving. The use of mobile phones while driving in general may also be motivated by instrumental needs, for example, to call emergency services, access route information/maps, or to advise someone else that the person is running late for a meeting.

Psychological theory can provide a framework for assessing the underlying motives for using various functions of mobile phones while driving. For example, the Theory of Planned Behaviour [2] asserts that an individual's intentions are the greatest influence on behaviour. In turn, attitudes, social norms, and perceived behavioural control are all factors that influence intentions. Perceived behavioural control may also have a direct influence on behaviour within the theory. Deterrence Theory has been used in road safety for behaviours such as drink driving [11] and may also be used to provide insight into why using a mobile phone while driving appears to be so prevalent within Australia. Classical deterrence is used to dissuade the performance of illegal behaviours in the broader population by inducing the perception that being apprehended is likely, and that punishment will be swift and severe [26]. Specific deterrence targets offenders to ensure that they feel that the consequences of reoffending are sufficiently unattractive

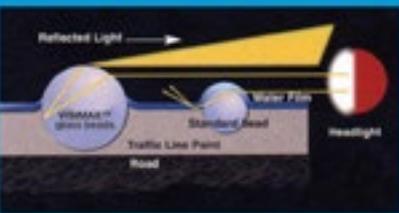
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in terms of the swiftness and severity of punishment. The following section comments further on how punishment avoidance (not suffering any negative consequences for the action) has been shown to have a greater effect on using a mobile phone while driving than classical deterrence (which is based on an individual's perception that they are likely to be apprehended and punished).

Enforcement and Deterrence

Enforcement efforts by police continue to regularly detect illegal mobile phone use while driving. For instance, the NSW State Debt Recovery Office [19] note that 42,377 infringement notices for illegal mobile phone use while driving were issued in NSW for the financial year 2011/2012. Fines and demerit points vary from state to state in Australia for such offences but fines are generally upward from \$300. Despite enforcement efforts, the behaviours continue. This suggests that there is little general deterrence relating to illegal mobile phone use while driving. It is possible however that some road users are simply ignorant to the laws regarding mobile phone use on the roads. Little research has been conducted to examine public knowledge of these laws, and public education is vital to inform people of the exact nature of the legislation (and any legislative changes). For example, people may believe that it is satisfactory to text at traffic lights as their vehicle is stopped, however this behaviour is illegal.

Where people are aware that their behaviour is illegal, yet still continue to perform the behaviour and are not detected by police, punishment avoidance may be a strong reinforcer for performing the behaviour in the future. Watson [26] found that punishment avoidance was a stronger predictor of illegal traffic behaviour than classical deterrence. This suggests that deterrence for illegally using a mobile phone while driving is being undermined by a substantive lack of detection and punishment. Hence, more enforcement is required in relation to these behaviours or the development of new methods of enforcement that enhance the perception of being apprehended and punished would be beneficial. The apparent reality that motives for illegally using a mobile phone while driving may outweigh the concern for being punished for some individuals, and also that individuals behaviour may be reinforced through punishment avoidance, are both issues that require the immediate attention of authorities.

Mobile phone apps

Mobile phone applications (Apps) are available to prevent phone use while in motion. However, these generally also prevent phone use while in other situations where travel is involved, such as when travelling on a train or when a passenger in a car. Hence, there are some practical limitations that may influence people not to use such apps and they do not represent a wholly viable solution to

preventing mobile phone use while driving. The apps also generally do not preclude use while stopped at traffic lights and therefore may imply that such behaviour is both legal and safe.

How public education campaign development can be informed by research

Many Australians still openly admit to illegal mobile phone use while driving despite ongoing enforcement efforts and public awareness campaigns. So how do we get the message through in order to reduce such behaviour? Firstly, the message that drivers should focus on the driving task solely and not use communication devices while driving (or at the very least only use mobile phones in accordance with the law) is unlikely to ever be internalised by all drivers. Therefore it is argued here that a harm minimisation approach to the problem is the best strategy to adopt. Targeting the highest risk groups (such as young drivers) and the highest risk behaviours (such as sending text messages) when designing public education campaigns may achieve the best 'bang for your buck' in colloquial terms for well-designed campaigns. Such campaigns in road safety are also likely to achieve better results if applied in combination with targeted enforcement, as has been evidenced in the past with highly successful Random Breath Testing (RBT) initiatives. Altering perceptions of enforcement and punishment for illegal use of mobile phones while driving would also be useful in a holistic strategy for public education campaigns. As discussed in a previous section of this paper, punishment avoidance may undermine such efforts if there is not alignment of drivers' perceptions of enforcement and punishment with their actual experiences on road [26, 7, 3]. It is therefore important that the deterrence approach only be used if actual enforcement for laws regarding mobile phone use is ubiquitous and ample.

Secondly, using research regarding the target groups' perceptions of the issue and their motives for using mobile phones while driving may be able to best address the underlying factors that influence or reinforce the behaviour. For young drivers in particular this may require ongoing campaigns aimed at addressing the social culture regarding the perceived need for immediate communication, with specific reference to peer influence and the level of acceptability of using a mobile phone while driving. Attitudes to mobile phone use while driving have been shown to be a significant predictor of future intentions to perform the behaviour [27], hence for cultural change to be achieved, such attitudes need to be targeted in countermeasure development along with enforcement measures that aim to directly address the undesirable behaviour. Additionally, providing options for alternate actions is part of many psychological interventions when addressing such behaviours. Displaying these alternate actions as a solution to the undesirable action is also likely to be useful in designing successful public education

campaigns for road safety [13]. For example, drivers can be encouraged to turn their mobile phones off before each trip and/or place their phone somewhere that it cannot readily be accessed while driving, such as in the boot of their car. Drivers may then perceive greater control over performing alternate actions and confidence that these actions will be socially reinforced if campaign strategies include such issues.

Lastly, the medium used to convey the message is a key issue of importance. The media used must suit the target group in order for the reach of the message to be maximised. For example, young people are highly targeted in marketing through social media as they are a high user group for media such as Facebook, Twitter and YouTube. The recent NSW *'Get Your Hand Off It'* campaign utilised such media.

Summary and conclusions

Mobile phone use while driving remains a major issue for driver distraction and road safety in general. While many drivers acknowledge that using a mobile phone while driving is likely to increase their crash risk, efforts to reduce the range of associated behaviours must be increased as current countermeasures do not appear to be reducing the extent of the problem. Strategic approaches to dealing with mobile phone use by a range of road users must be of a multidimensional nature. Public education campaigns are one way of addressing the problem, however they must be complemented with enforcement and technological solutions in order to minimise the potential harm. The design of public education campaigns may be best to consider specific target groups and their underlying perceptions of the issue and motives for mobile phone use. Development of such campaigns can be further informed by research to guide content development and message delivery for the specific target audience.

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Contributed articles

Safer speeds: an evaluation of public education materials

By *SJ Raftery¹, CN Kloeden¹, and Jaime Royals¹*

¹*Centre for Automotive Safety Research, The University of Adelaide, South Australia*

Abstract

The association between speed and road safety outcomes is well documented, yet reductions in speed limits continue to meet with resistance from the public. This paper outlines the findings of a review of speed education resources undertaken in order to identify those that may be used to increase public acceptance of reduced speed limits. Relevant agencies throughout Australia were contacted and web searches were conducted in order to find speed education resources. Public media campaigns were excluded from the review. An initial search identified 203 potential resources; of these 70 were included in the study. All were evidence-based drawing on one or more of 27 central arguments. Based on consideration of the use of evidence, ease of understanding, potential to influence the general public, and the extent to which the resource supported the speed management principles of the National Road Safety Strategy, nine resources were identified as providing the best examples of speed education. In general the speed education resources were found to adopt predominantly safety-based arguments for reduced speed limits. It is suggested that the efficacy of these materials may be improved further by addressing the ways in which drivers rationalise their speeding behaviour.

Keywords

Evaluation, Speed, Speed limit, Road safety, Road user education

Introduction

The current Australian National Road Safety Strategy (NRSS) based on the Safe System approach to road safety has identified the setting of speed limits as an important measure. The NRSS aims to achieve “speed limits that reflect a better balance between safety and mobility”; that is speed limits that reduce the likelihood of a crash occurring and mitigate the consequences when they do with as little effect on travel time as possible. One of the aims of the strategy with regard to safe speeds is to increase community acceptance by explaining the rationale for lower speed limits and providing information about the safety, economic, and environmental benefits of lower speeds. The National Road Safety Council¹ commissioned the Centre for Automotive Safety Research to identify, collate and review speed education materials used by road agencies and government insurance agencies/commissions throughout Australia.

Background on speed

Within the field of road safety, the reduction of vehicle travelling speeds through the setting of appropriate speed limits is recognised as one of the simplest but most effective measures for reducing road trauma. Research has consistently demonstrated that vehicle travelling speeds affect both the likelihood of collisions occurring; (e.g., increased stopping distances and increased the likelihood of losing control of a vehicle at higher speeds); and the