

# Don't poke me I'm driving:

a simulator study on  
smartphone use



# About the IAM

The IAM (Institute of Advanced Motorists) is the UK's largest independent road safety charity. We are dedicated to improving standards and safety in driving, motorcycling and cycling. The IAM has more than 200 local volunteer groups and over 100,000 members in the UK and Ireland; we are best known for the advanced driving test and the advanced driving, motorcycling and cycling courses. We also offer driver training to businesses through our commercial arm Drive and Survive. The IAM's policy and research division offers advice and expertise on road safety, and publishes original research on road safety issues.

# Introduction

Over the last few years mobile phones have become significantly more developed, allowing people to access social networking sites, browse the internet, use maps and play music. Complex applications can now be used on the move anywhere in the world. As technology advances further we need to understand how it impacts on driver behaviour.

Mobile phones create a significant risk to road safety; half of motorists know at least a few people who use a mobile phone without a hands-free kit. Previous studies have shown that using a phone significantly increases drivers' reaction times and creates risks. Some studies have examined the difference between texting and calling, and the use of handheld or hands-free phones behind the wheel. However, no research has been carried out on the use of web applications which are now available via smartphones.

The IAM commissioned TRL (Transport Research Laboratory) to analyse whether using a smartphone to access social networking sites affects driving. The full results can be found in 'Smartphone use while driving - a simulator study', published separately on the IAM's website.

This summary paper discusses the IAM's response to the results and some of the wider issues around mobile phone use. The views expressed here are those of the IAM and are not necessarily held by the Transport Research Laboratory, or its staff members.

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## Mobile phones and driving

Between 2006 and 2010 distraction from mobile phones was a contributory factor in 1,690 road accidents which resulted in injuries; this figure includes 110 fatal accidents. Accidents caused by mobile phones which did not cause injury are not included in police statistics; this figure is likely to be far greater.

It is often difficult for the police to ascertain if a driver has been checking or using a phone before a collision. Peter Rodger, Chief Examiner at the IAM explains 'Police usually only report road collisions where someone has been injured. Mobile phone users often slow down to compensate for their unsafe driving behaviour which may mean their actions cause less severe crashes and incidents, leading to a lower level of reporting'.

There is also a widely held belief that the involvement of mobile phones in serious crashes is underreported. Peter Rodger states that 'Mobile phone records are not routinely checked for activity prior to a collision unless it involves serious injuries. The precise time of an incident, to within a few seconds, can be very difficult to establish, so proving that a phone was in use before the crash can be tricky, if the driver says the call was made as a result of the crash instead. It is also impossible to check for activity which has not resulted in a phone record, for example simply unlocking the screen to check for messages.'

## The IAM simulator study

The likely under reporting of accidents involving mobile phones means that police accident data is not ideal for in-depth analysis; this makes it difficult to determine the risk posed by mobile phones using accident statistics. In the absence of reliable accident data driving simulators and academic research play a vital role in evaluating risk. Researchers can use a driving simulator to measure reaction times to events and stimuli and analyse how mobile phones impact on driver behaviour.

There have been several previous simulator studies on the distraction caused by mobile phones while driving. However, none of them have covered the use of smartphones. In order to fill this gap in road safety evidence and build on previous research the IAM commissioned TRL to carry out a simulator study on the use of smartphones. TRL were chosen for their previous experience in evaluating driver behaviour and in-car distractions.

The simulator study set out to investigate the extent that using facebook via a smartphone impacted on driving performance. Facebook was selected for use in the study due to its popularity (there are around 30 million facebook users in the UK).

TRL designed a test drive scenario which mimicked natural driving situations; participants were asked to drive on a motorway and a two lane loop. At different stages they were asked to react to visual and audio stimuli by pressing the clutch pedal as quickly as possible. Participants were also asked to remain a safe distance behind the car in front which varied its speeds.

Twenty eight young male and female participants took part in the study; all had previous experience of using facebook via a smartphone. The participants completed one drive to familiarise themselves with the simulator, a control drive and a drive while using facebook. The order of the control drive and the drive using the smartphone was alternated between participants so that familiarisation with the route would not impact on results.

Participants were asked to send and check messages via facebook and update their statuses. Researchers monitored participants' lane position, speed and reaction times. They also monitored the amount of time spent looking at the road, as well as the ability to perform the smartphone task.

## Simulator results

The results of the experiment clearly show that participants' driving performance was impaired by the smartphone task. There was a significant impact on:

- Time spent looking at the road
- Reaction times to stimuli
- Lane position
- Speed

When using facebook participants spent between 40 per cent and 60 per cent of their time looking down while using a smartphone to write or read messages, compared with about 10 per cent of the time looking down normally.

Reaction times to visual and auditory stimuli were found to increase by approximately 37.6% when using a smartphone to send and receive messages on facebook, and participants often missed events completely.

Participants using facebook were unable to maintain a central lane position and this resulted in an increased number of unintentional lane departures, they were also unable to respond as quickly to a lead vehicle gradually changing speed. There was a tendency to reduce speed to use the smartphone, however, this did not prevent driving performance from deteriorating.

These results suggest that participants' driving was significantly impaired when they were using a smartphone while driving. The researchers concluded that three types of distraction impacted on driver behaviour; having to concentrate on the smartphone task (cognitive), holding the phone (physical), and the significant increase in time spent looking at the phone (visual) in order to interact with it.

## Comparison with other distraction studies

The results clearly show that using facebook via a smartphone while driving is dangerous. Its relative danger to other impairment is also high. Previous studies of driver impairment conducted by TRL have used similar methods to this research. This makes it possible to compare the relative impairment of using a smartphone for social networking to the following:

- Having a mobile phone conversation and being at the legal limit for alcohol consumption (Burns et al, 2002)
- Being under the influence of cannabis (Sexton et al, 2000)
- Sending and receiving text messages while driving (Reed and Robbins, 2008)

The texting study and the current study are almost identical in methodology, allowing a comparison across a broader range of measures.

The Burns et al study (2002) on alcohol impairment looked only at the legal limit for driving. The reaction times from a meta-analysis of alcohol by Mayler (1993) have also been added to the table below in order to show the effects of going over the limit. This study is not directly comparable as it did not involve a driving simulator; however it gathers a wide range of statistical data which suggests that being above the UK driving limit but below a 100mg per 100ml blood alcohol level increases reaction times by 6 to 15 per cent. The Institute of Alcohol Studies also estimates that reaction times under the influence of alcohol can vary between 10-30 per cent.

Using a smartphone for social networking resulted in a greater impairment to reaction times than alcohol, cannabis, and texting; while using a hand-held mobile phone increased reaction times by 45.9 per cent.

## Comparison with other distraction studies

Distraction/impairment	Increase in reaction times
Hand-held mobile phone conversation increased reaction times	45.9%
Using a smartphone for social networking	37.6%
Texting	37.4%
Alcohol (Institute of Alcohol Studies estimate)	10-30%
Hands-free mobile phone conversation	26.5%
Cannabis	21%
Alcohol (above UK driving limit but below 100mg per 100ml) (Mayler et al, 1993)	6 to 15%
Alcohol (alcohol at the UK limit approx 80mg per 100ml )	12.5%

There is scope for further research on impairment caused by the influence of substances and in-car distractions, particularly as the government has plans to introduce drugalysers to tackle drug driving.

## Conclusion

The ban on using handheld mobile phones in 2003 was met with a mixed response, and enforcement continues to be an issue. However, the simulator study clearly shows that using a smartphone to access social networking sites is dangerous.

The IAM believes that all drivers should be aware of the risks they are taking when using any mobile whilst driving. Even drivers who refrain from making calls may be tempted to use a smartphone to check a message, map, update their status, or look for traffic updates. More needs to be done to educate drivers, and encourage safe behaviour.

Drivers convicted of speeding offences are often offered the option of attending a speed awareness course. These can be an effective way of educating drivers and promoting awareness. Courses on the dangers of using a mobile phone are not as widely used and more could be done to promote their use. More analysis and information on repeat offences would help ascertain whether driver education courses are more effective than fines.

The government currently has plans to increase fines for motoring offences including mobile phone use. The Ministry of Justice consultation 'Getting it right for victims and witnesses' sets out plans to use motoring fines to fund victims' services for serious offences. The IAM believes that there may be a



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case for some increases in fines, however, fines should be linked to funding preventative road safety activity and should not be used to fund other public expenditure. It is important that drivers associate fines with the offence and do not view them as a source for boosting government funds.

The IAM is pushing for government and road safety organisations to work closely together to highlight the issue of smartphones and to challenge perceptions. The government should increase its awareness campaign for mobile phone use, with targeted activity for young people. Phone manufacturers and social network providers also have a key role to play in spreading the message. Encouraging social networking sites to highlight the dangers of driving while accessing web applications could be extremely beneficial.

Attitudes to seatbelts and drink driving have changed dramatically over the last thirty years, and, with the right information, the use of smartphones could become a similar success story.

### Further information on mobile phones and driving

The use of the internet via mobile phones has dramatically increased in the last few years. In 2011 there were 17.6 million mobile phone internet users this is a 107 per cent increase from 2009, it means that 45 per cent of internet users now access the web from a mobile device .

Since February 2007 drivers caught using a mobile phone while driving can be given three penalty points alongside the £60 fine; this is likely to be increased under government proposals to review motoring fines. However, the introduction of penalty points does not appear to have dramatically impacted on the use of hand held mobile phones as recent surveys show that the use of hand held mobile phones continues to be widespread. A Department for Transport survey conducted as part of the THINK! campaign found that half of motorists (50%) claimed to know at least a few people who use a mobile phone without a hands-free kit, while four in ten (41%) knew people who text whilst driving.

In terms of personal use the THINK! survey showed that 15 per cent of motorists admitted to using a mobile without a hands-free kit while driving, and 14 per cent admitted to texting while driving. The RAC produced a similar result in their survey on motorists' views with 12 per cent using a hand held mobile. When the RAC included people who only used their phone while stationary at traffic lights the figure rose to 27 percent; this activity is also illegal.

With such widespread use it is clear that enforcement continues to be an issue, although approximately 171,000

drivers were caught using hand held mobile phones while driving in 2010/11 . Funding changes may reduce police capacity to enforce the law in the future, although it is not yet clear what the impact of fewer police officers will be.

The Think! survey measures views on different activities while driving and assesses their perceived level of acceptability. It found that 99 per cent of motorists felt that it was extremely unacceptable to text while driving; this was very similar to the percentage of people who thought that taking Class A drugs while driving was unacceptable. However, only one per cent of people admit to being under the influence of Class A drugs while driving, while 14 per cent admit to texting while driving. This means that when it comes to mobile phones drivers are willing to behave in a way that they do not actually consider to be acceptable.

### The prevalence of smartphone use among young people

There are some significant age differences in attitudes and use of mobile phones. Young people were less likely than older respondents to believe that texting while driving was extremely unacceptable (79 per cent of 16-29 year old men and 87 per cent of 16-29 year old women).

The RAC found that young people were also far more likely to admit to using their mobile phone for all forms of communication. Twenty four per cent of 17-24 year olds admitted to accessing email, facebook or other social networking sites, as shown in the table below.

Activity	17-24 years olds	All respondents
Texting while driving	53%	27%
Using mobile without hands free	38%	27%
Accessing email, facebook or other social networking sites	24%	8%
Accessing other mobile apps	20%	9%
Doing make up or shaving	21%	9%

Source: 'RAC Report on Motoring 2011: Divided we drive' (2011)

The 8 per cent of drivers admitting to using email, facebook or other social networking sites while driving accounts for around 3.5million driving licence holders.

The prevalence of smartphone use should continue to be carefully monitored and checked; this will give an indication of the impacts of campaigns and enforcement activity.

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