

## **Why Sweden should not do as everybody else does**

Katja Kircher, Christer Ahlström, Nils Petter Gregersen, Christopher Patten  
VTI (Swedish National Road and Transport Research Institute), S-581 95  
Linköping, Sweden

### **Abstract**

Sweden is the only country in Europe that does not outlaw handheld phone use while driving. This puts some political pressure on Sweden. The Swedish Government commissioned VTI to conduct a literature review on the effects of mobile communication on driving performance, on the legal situation in other countries, and whether there were any documented effects of a legislation. The literature showed that mobile communication does influence driving behaviour, but there appears to be no increased crash risk in real traffic. Also, laws do not have a lasting effect on how much drivers use their telephones. Therefore, the Swedish Government commissioned VTI to suggest countermeasures against the dangerous use of communication devices. Several countermeasures were presented, ranging from technical solutions over monetary incentives to education and information. It was stressed that no single countermeasure was expected to be satisfactory in itself, and that it is paramount to work with a human centred perspective. While the government proposed in December 2012 not to outlaw handheld phone use, the united political opposition, via its majority in the parliament, mandated the government in March 2013 to pass such a law. Besides that, the government proposed amendments to the current regulations for quick action.

### **Background**

Driver distraction has become a very popular topic, both with researchers and in the general public, and especially one form of distraction has received an enormous amount of attention – the use of mobile phones. A vast amount of research has been published on the effects of different types of mobile phone use on driver behaviour and also on crash risk, while other potential sources of driver distraction, like eating, tending to children or grooming have been neglected in comparison.

We assume that the great interest for mobile telephones is a consequence of their being a relatively new phenomenon which is highly visible, but in the present article we will not focus on the “why”. Rather, we would like to show how Sweden deals with the issue, and why the country, at least up to spring 2013, chose to follow a different route than all other countries in Europe and many other countries in the world.

Around the year 2000, when mobile phones started to become widespread, the first countries passed laws requiring the use of handsfree units. Instead of just following suit, the Swedish government commissioned the Swedish National Road Administration (SNRA) in 2002 to broadly investigate the road traffic safety effects of mobile phone use when driving. The main focus was on mobile phone conversations; text messaging barely existed and was therefore, at the time, not a road safety issue. The functionality

of a mobile phone around the year 2000 was for conversations and bore no resemblance to the functionality found in current (2013) smart phones. One of the burning questions at the time was whether there was a difference between a conversation with or without a handsfree set when driving, all else being equal. The question was particularly pertinent because many countries had already banned handheld use but allowed handsfree use on the grounds that handsfree conversations were safer. The SNRA was tasked with finding the evidence for such a supposition.

Based on the results (Patten, Ceci, Malmström, & Rehnberg, 2003) of this first investigation the Swedish Government arrived at the conclusion that there was no scientific reason to pass a law that specifically bans the use of hand held phones while driving. This does not mean, however, that Sweden has no regulations at all pertaining to phone use while driving – as well as any other possible secondary activity. The traffic regulation SFS 1998:1276 states that to avoid crashes, a road user must show the care and attention that is demanded by the circumstances (Chapter 2, 1§). Further, it is stipulated that a vehicle may not be driven by anybody who due to illness, sleepiness, intoxication with alcohol or other drugs, or due to any other reason cannot control the vehicle in a safe and reassuring manner (SFS 1998:1276, Chapter 3, 1§). This regulation therefore only allows the use of mobile telephones or any other device, or, for that matter, the execution of any non-driving related activity if the circumstances admit it.

During the first decade of the 21st century more and more countries adopted handsfree requirements for mobile phones, even though the exact constraints vary between countries. Complete bans of mobile phone use are rare. In India there is a debate on banning all use of mobile phones, including handsfree units, and some states in the US ban all phone use while driving for teenagers and/or learner drivers (Insurance Institute for Highway Safety, 2013). In 2011 there was a demand for a Europe-wide ban of texting while driving (Banks, 2011). The new surge of discussions around the topic, together with the demand from the EU prompted the Swedish Government to ask for a new evaluation of the topic. Therefore, in summer 2011 the Swedish National Road and Transport Research Institute (VTI) was commissioned to make a thorough review of the existing literature on how drivers use communication devices while driving, how other countries deal with the topic, and whether there were any documented effects of legislation on traffic safety.

## **Government Commission I – Facts and Figures**

Before we set out on the endeavour to review the more than 400 relatively recent publications found via an extensive search of different databases, we considered some fundamental questions. One is of logical nature and investigates the preconditions necessary for a law to be able to have an effect, and the other is of psychological and almost philosophical nature, considering the concept of attention, and how drivers can, want to, and do direct their attention.

### *Preconditions for a law to have an effect*

For a law prohibiting the use of hand held phones to be able to have a positive effect on traffic safety, several preconditions have to be met. Furthermore, it must be made certain that such a law does not have unintended side effects that cancel out a possible positive effect. These side effects may be more indirect and therefore more difficult to

assess than the direct preconditions and effects, which are already difficult enough to put into numbers. Of course, there may also be positive side effects.

First of all, if a ban of hand held phone use should have a chance to reduce crash risk, there must be an association between such phone use and an increased crash risk in the first place. Furthermore, the crash risk must be higher for drivers using hand held phones than for drivers using handsfree units, if the assumption is made that all hand held calls will be replaced by handsfree calls. If it is assumed instead that fewer phone calls will be made in general, a decrease in crash risk can only occur if drivers fill the time with activities that are less risky than using their hand held phone. It is by no means guaranteed that a driver who does not make a call instead pays attention to the road. He or she might just as well focus on a passenger, food, a book or anything else in reach.

It is important not to forget about side effects that are not quite as obvious. Drivers who cannot be reached on their phones cannot be reminded to pick up something on their way, which may lead to more travels and, thus, an increased exposure to traffic. Not being able to let somebody know one will be late (without stopping, which would increase the delay even more) can be stressful and can therefore lead to deteriorated driving. Even having the phone switched off and knowing that one is unreachable can preoccupy drivers, who might wonder whether somebody tried to reach them and could not.

#### *Attention, inattention and distraction*

Attention has long been a topic of great interest in psychology (Kahneman, 1973; Pashler, 1998; Wickens & McCarley, 2008), and more recently it has also come into focus in relation to driving (Regan, Lee, & Victor, 2013; Regan, Lee, & Young, 2008). Within traffic research it is common to define distraction, not attention, and a host of different definitions are in use. For a discussion of a number of those, see for example Regan, Hallett, and Gordon (2011).

It is common to consider “focus on something else” as distraction when it leads to (potentially) unsafe driving (as in the definition of Regan et al., 2011, but also in many others). This is unfortunate, as it invariably introduces hindsight bias, and also because it makes it very easy to blame driver distraction as being the source of practically all crashes. An extreme example is the classification of glances to the mirror or the speedometer as distraction, when it happens in close conjunction with a critical incident (Dingus et al., 2006).

Here we cannot attempt to provide yet another definition, but we want to discuss our viewpoint on the surrounding conditions for a meaningful and hindsight-bias free definition. Biology and evolution tell us that the ability to redirect attention quickly to important stimuli is a precondition for survival, and as such this ability is an integral part of being human. We would like to refer to the famous definition of attention by James (1890), who states that “it is the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalisation, concentration, of consciousness are of its essence. It implies withdrawal from some things in order to deal effectively with others, and is a condition which has a real opposite in the confused, dazed, scatterbrained state [...]”. According

to this definition the opposite of attention is not focusing on “something else”, but not focusing at all.

In this sense attending to “something else” is still attention. It actually depends on an arbiter to judge whether the attention is directed to the right or the wrong thing, where the latter would be termed “distraction”. In most definitions of driver distraction everything not connected to the driving task is considered to be the “wrong thing”. Here the arbiter is the traffic safety researcher, whose higher goal usually is the safety of the single road user and the traffic system. If the driver instead of the accident analyst or researcher is the arbiter, it may very well be that in many cases driving is seen as the “distracting activity”, which explains why drivers very often execute other activities in addition to driving their vehicle (see Hancock, Mouloua, & Senders, 2009, for a few examples). Furthermore, usually the drivers’ judgement seems to be that they see themselves capable of executing both activities in conjunction sufficiently well, and given that crashes are rare events (Elvik, 2006), in most cases they are right, not least due to their ability to self-regulate their behaviour (K. L. Young, Regan, & Lee, 2009).

#### *Starting point for literature review*

With these considerations in mind we formulated a set of questions which we needed to answer, in order to be able to respond to the government. These questions cover different aspects of mobile phone use while driving, and no study can give an answer to all of the questions at once. Different methods are needed for different questions, and it has to be kept in mind that the results obtained from controlled studies are fundamentally unlike those that are obtained in naturalistic settings. The big difference lies basically in whether the participant or the experimenter selects what type of activity is executed when or where.

The nine questions we asked are listed in Table 1, together with very short and somewhat simplified answers, as we found them in our extensive literature review.

**Table 1. The nine questions with their short answers as presented in the first government commission on communication devices and their impact on traffic safety.**

Question	Short answer with a selection of references
In what way are drivers affected when talking or texting?	Mobile phone conversation increases reaction times and missed events. In addition, texting and dialling require the driver to look at the device and away from the road leading to reduced vehicle control and an increase in missed events.  Refs: Drews, Yazdani, Godfrey, Cooper, and Strayer (2009); Horrey and Wickens (2006); Hosking, Young, and Regan (2006)
Does practice improve the ability to drive while handling a mobile phone?	The small body of available data indicates that practice of simultaneous driving and telephone use has at best a very limited effect. There seems to be some agreement, however, that more experienced drivers have better strategies to handle telephone usage.  Refs: Brookhuis, Devries, and De Waard (1991); Chisholm,

	Caird, and Lockhart (2008); Cooper and Strayer (2008); Shinar, Tractinsky, and Compton (2005)
Do handsfree and hand held mobile phones affect driving performance in a different manner?	<p>Cell phone conversations during driving have a negative impact on driving performance regardless of whether a handheld or a hands-free phone is used.</p> <p>Refs: Burns, Parkes, Burton, Smith, and Burch (2002); Ishigami and Klein (2009); Patten, Kircher, Östlund, Nilsson, and Svenson (2006); Törnros and Bolling (2005)</p>
What are drivers' attitudes to mobile phone usage when driving?	<p>Drivers are generally aware of the risks involved with texting and talking while driving. However, perceived social norms, attitude, perception of control and believed importance of the call are more indicative of phone use than perceived risk.</p> <p>Refs: Gallup Organisation (2010); White, Hyde, Walsh, and Watson (2010)</p>
How do drivers use their mobile communication devices?	<p>Around 2–6 per cent of all drivers use mobile phones at any given moment. Most of them use handheld devices. Younger males are most likely to both call and text. Frequent drivers and drivers alone in their car are more likely to use their telephone while driving.</p> <p>Refs: Glassbrenner and Ye (2007); NHTSA (2010); Vivoda, Eby, St. Louis, and Kostyniuk (2008)</p>
Do drivers adapt their driving behaviour to device usage?	<p>Drivers choose when and where to use their telephones, and also during a call there are indications for compensatory driving behaviour. How successful the adaptation strategies are depends largely on the driver's capabilities and motivations, but also on the predictability of the situation.</p> <p>Refs:</p> <p>Cooper, Vladislavljevic, Medeiros-Ward, Martin, and Strayer (2009); Fitch and Hanowski (2011); O'Brien, Goodwin, and Foss (2010)</p>
How dangerous is it for drivers to talk or text?	<p>It depends on the situational context and the driver's capabilities. Recent naturalistic research on commercial truck drivers indicates that the occurrence of crashes, near-crashes and safety critical events is correlated with handling the telephone (dialling, texting), but not with just talking on a phone. This does not mean, however, that talking on the phone while driving is safe in all situations and for all drivers. It is more likely to be at least in part a sign that drivers have capabilities to self-regulate their telephoning behaviour.</p> <p>Refs: Elvik (2011); Hickman, Hanowski, and Bocanegra (2010); Olson, Hanowski, Hickman, and Bocanegra (2009); R. A. Young (2011)</p>
Does a ban on hand	No, because any reductions in mobile phone use generally

held mobile phones work with respect to compliance?	dissipate within a year or so of the new legislation being introduced. It is interesting to note that compliance with bans or tendencies to use mobile phones for talking and texting etc. is that drivers in highly regulated countries were just as likely to send text messages as drivers in countries with no bans at all.  Refs: Godinho (2007); Jamson (2011); Janitzek, Brenck, Jamson, Carsten, and Eksler (2010); Rajalin, Summala, Pöysti, Anteroinen, and Porter (2005)
Do bans have a positive effect on road traffic safety?	No, not in terms of reduced number of crashes, possibly because the bans that are in place are only requirements for hands-free equipment and are not total bans. Moreover, there are many studies that suggest that hands-free usage is no better than handheld.  Refs: Highway Loss Data Institute (2009); Highway Loss Data Institute (2010); Janitzek et al. (2010)

To summarise, even though controlled experimental studies indicate that driving behaviour is affected by the addition of a secondary task, there is no evidence for a direct connection to an increase in crashes in the real world. This is due to the presence of a number of possible mediating factors, like drivers' self-regulation and the compensatory behaviour by other drivers. Also, the usage of mobile phones while driving can consist of visual, manual and verbal/auditory tasks, which were shown to have different effects on driving and on odds ratios for becoming involved in safety critical events (Ahlstrom et al., 2012; Hickman et al., 2010; Klauer, Dingus, Neale, Sudweeks, & Ramsey, 2006). Still, we claim that more research is necessary to establish whether crash risk really is influenced differently by different task types. For the remainder of this paper we therefore discuss mobile phone use in general.

Of course, no research findings are better than the data they are based upon. Especially data on the prevalence of mobile phone use, and, for that matter, of other non-driving related activities, during normal driving are exceedingly rare. The data on prevalence of such behaviour during crashes are not always very reliable either. Even if they were, the way how the data are tabulated and presented can greatly influence the results (R. A. Young, 2013).

Faced with the evidence in the reviewed publications, together with the uncertainty about the question whether using a mobile phone increases the crash risk in the first place, we came to the conclusion that there are no scientific grounds to recommend a ban of mobile phones while driving, and even less, to single out hand held phones only. Instead, we suggested to improve road safety by investigating the employment of countermeasures that helps drivers to exert "due care and attention", that is, adequate attention for the situation at hand, at all times. We presented these findings to the minister for infrastructure in October 2011.

## **Government Commission II – Countermeasures**

In response to this, VTI was commissioned by the government to suggest countermeasures against the dangerous use of communication devices while driving. While it was possible to refer to the literature to some extent, it was considered necessary to broaden the input channel by inviting members from different stakeholder groups as reference group. By doing so we gained access to unpublished views of the industry (manufacturers of telephones, passenger cars and trucks), the Transport Workers Union, the transport administration, a provider of mobile services, and an independent research institute. The authors of the second government commission were ten researchers with different backgrounds and areas of expertise, who, together with the reference group members, collected possible countermeasures and provided descriptions and indications for how and when they might be implemented, who would be the main responsible actor, who would be early adopters, and so on.

The different types of countermeasures were subsumed under the categories “technology”, “education and information”, “financial incentives” and “legislation”. The time span to implementation ranged from practically immediate to long-term, and also requiring further research efforts. Suggestions in the technology domain were diverse and included a real-time assessment of the driver’s state and attention level, guidelines for user friendly HMI design, an objective testing method for communication devices comparable to EuroNCAP, cooperative systems, a personal assistant and partial or fully automated driving. In terms of education and information it was suggested to include the topic in driver education, to educate the management in transport companies and organisation and the personnel responsible for procurement of transport, and to use information campaigns. Monetary incentives include adaptive rates for insurances – these would most likely need to be combined with some technical solution – and to introduce a penalty point system. Legal actions were also proposed, even though not in the form of a hand held ban, but rather as an improvement of the existing legislation on careless driving (VTI Expertgrupp, 2012). Another law was proposed, which would be targeted more to procurers than to the drivers. It’s purpose is to promote safe technology by including certain safety demands, corresponding to what is done today with EuroNCAP ratings.

Our insight from this collaborative effort was that only one countermeasure on its own is not likely able to have a major and especially a lasting effect. Instead, for most countermeasures, suitable combinations are recommended. Another important message is to keep regulations in a language independent of technology, as technology develops and changes much faster than any legislation or regulation can do.

Obviously, the road to improved traffic safety via optimised or at least improved communication devices is hard and stony, and a number of countermeasures can be difficult to implement not so much due to technical difficulties, but for other reasons. When third party information is to be presented via the vehicle’s interfaces it is not always clear who bears responsibility for the information. Also, a number of technical countermeasures require collecting information about road users, which can be ethically questionable. Especially countermeasures that are based on technical solutions should preferably work globally, which can meet cultural, legal, economical and technical obstacles. According to the Vienna Convention (Economic Commission for Europe -

Inland Transport Committee, 1968) the driver is always responsible for driving safely, which conflicts with the goal of fully automated driving. Also, drivers can use systems in ways that were not originally intended by the designer. This is not always a problem, but there is a potential for negative side effects that are hard to predict. This is not only valid for technical solutions – an increased insurance rate might also lead to an increase in uninsured vehicles. Finally, for a solution to have a chance to get implemented and to have a lasting effect, there needs to be a sound business case. If no gains can be made, chances are that it will be hard to find an investor, which boils down to having to make the countermeasure obligatory, which is not always the best promotion.

## Consequences

Presented with the findings from *Government Commission I* and the list of possible countermeasures from *Government Commission II* the Ministry of Enterprise, Energy and Communications announced that it wanted to base its decisions on research, and therefore did not see a good reason for passing a law banning hand held phone use (Björklund, 2013; Erlandsson, 2013; Zachariasson, 2013). Instead, the ministry announced that the existing legislation against careless driving should be improved and made clearer (Näringsdepartementet, 2012). In addition it was suggested that the Swedish Transport Agency might be commissioned to develop a plan for suitable other countermeasures that can improve the drivers' risk awareness over time.

After some political and public debate the political opposition in the parliament reacted by passing a declaration to the government demanding a law against handheld phone use (Björklund, 2013; TT, 2013; Zachariasson, 2013). One of the main arguments was that there is no other country in Europe without such a regulation. Another argument is to make a statement that it is not acceptable to use a handheld phone while driving. The expectation of the political opposition is that passing a law requiring handsfree equipment will increase traffic safety.

Independently from the mandate of the parliament to the government to come with a legislative proposal, which will be treated in due course, the government also suggested changes to the traffic regulation, which can be implemented comparatively quickly (Gisby, 2013). The proposed changes contained the inclusion of a general rule demanding that drivers "avoid activities that can interfere with controlling the vehicle or with the driver's concentration on traffic". It is stated explicitly that all kinds of activities are targeted, not only the handling of a handheld phone. It is suggested that fines can be imposed for an infringement of that rule. The proposal was sent to 21 public authorities for comment.

## Discussion

The question whether handheld mobile phone use should be banned while driving or not caused and causes quite a stir. In many discussions it is not specified exactly what is meant by a handsfree requirement – according to the legislation in other countries it may or may not include other functions than the phone function, it may or may not be required for the phone to be placed in a cradle and ear plugs may or may not be accepted (Janitzek et al., 2010). In many cases a handsfree set still entails manual and visual interaction with the communication device during dialling and hanging up. As technology develops and "gestures" become more common, it may become harder and



harder to define exactly what is meant by manual interaction with the phone, and it will be even harder for the police to establish whether a certain hand movement was directed at the phone or not.

A discussion of these details misses the point anyway, as it has not even been shown conclusively that the use of mobile phones and other communication devices is associated with an increased crash risk. As shown by Elvik (2011), it is difficult to obtain precise information on whether a phone was used during a crash or not, and not all published studies succeeded well, making odds ratio calculations unreliable. Contributing to this is the difficulty to obtain good “baseline” data. Without knowledge on how much and in which situations people use their communication devices during normal driving, there is no way to establish whether the use of communication devices is overrepresented in crashes. Previously, most prevalence counts were conducted in daylight at intersections (e. g. Glassbrenner & Ye, 2007), making generalisation to other situations uncertain. Naturalistic driving studies are currently the most promising method for a prevalence assessment, but even with extensive instrumentation it is not guaranteed that all hands free calls can be detected (e. g. in Olson et al., 2009, hands-free phone use was coded when a driver talked into an ear piece). This lack of sufficient and reliable data, and the difficulties in interpreting the existing data (Carsten, Kircher, & Jamson, 2013; R. A. Young, 2013), paired with strong opinions in politics and in the general public complicates an objective discussion.

In the USA the National Highway Traffic Safety Administration published the “Visual-Manual NHTSA Driver Distraction Guidelines”, in which it is stated that counteracting those types of secondary tasks should receive higher priority than verbal/cognitive tasks, due to the perceived higher impact on traffic safety (NHTSA, 2012). There is some evidence, however, that voice control that simply replaces manual interaction does not necessarily have less of an impact on driving performance (Yager, 2013), even though this does not allow any conclusions on crash risk.

To counter our statement that laws do not tend to have a lasting effect on compliance and safety, a descriptive analysis of traffic fatalities and injuries before and after California’s banning of hand held mobile phone use while driving is cited (Ragland, 2012). The memo was released on the 2nd of March 2012, such that it was too late to be included in any of our government commissions due to time constraints. The method and data description in the memo are rather sparse, but it was shown that the decline in fatalities and injuries in the two years after legislation was approximately equal for hand held and handsfree phone use, and about twice as large as the overall decline in fatalities. It was only hand held telephones that were outlawed, however, suggesting that the increased information and on-going public debate, and possibly also an increased enforcement, that led to the reported decrease in fatalities. It appears quite clear that it cannot have been the outlawing of hand held telephone use alone.

Interestingly, it is reported that law officers in California issued 425 041 tickets during 2012 for mobile phone infractions, and more than 21 000 texting and driving citations (Hands-Free Info, 2013). In Denmark, where hand held mobile phone use is banned for drivers of any kind of vehicle, down to bicyclists, more than 40 000 tickets are issued yearly, and the numbers are increasing (Motormännenn, 2012). At the same time the number of fatalities is decreasing. Of course it is not possible to attribute cause

and effect in any way, but it appears clear that there appears to be a substantial number of Californian and Danish drivers, who do not heed the law, just as can be expected based on reports from other countries (Janitzek et al., 2010). As road fatalities are on the decrease in general, both in countries with and without texting and hand held bans, it is not logical to suggest an association with the introduction of the ban.

New research from the USA, which is based on fatality reports and an assumed likelihood that a crash was caused by a texting driver, when the driver was alone in the car and hit a non-vehicular object, indicates that a law prohibiting texting while driving reduces crashes significantly only when it is universally applied and treated as a primary offence, meaning that a driver can be pulled over for the reason of suspected texting. However, the effect was found to disappear at the latest four months after the introduction of the ban, and there are indications that the return to previous levels of texting frequency happens faster in states where the ban is more difficult to enforce, due to the prevailing legislation. The conclusions are that stricter enforcement would reduce texting related crashes, but then again, a stronger police presence is likely to reduce the prevalence of traffic offences in general, but of course it comes at a cost (Abouk & Adams, 2013).

Another argument that is often used is the comparison of the effects of texting to driving drunk. The frequently cited “research” behind this is a trial conducted by the magazine Car and Driver, with the magazine’s editor and an intern as the only two test subjects. They had to text while driving on a deserted air strip and react to a red light on the windscreen that was lit by the experimenter in the passenger seat. The same trial was then conducted with the same two participants with a BAC of .08 per cent. The only dependent variable measured was brake reaction time, which was longer when texting than when drunk (Austin, 2009). We find it alarming that such a “fun test” quickly appears to gain the same status as scientifically conducted studies, and that the one result found is generalised to “texting is more dangerous than driving drunk”. While we do not debate that texting increases reaction times (see e. g. Drews et al., 2009), and while we do not encourage texting while driving, we would like to point out that there is a fundamental difference between texting and drunk driving. In the former case, the driver can choose when to text, while in the latter case the driver is drunk in any situation he or she encounters. Experiments that do not give the driver a choice when to execute a certain task can establish how a certain factor would affect behaviour in a certain situation, but can never establish whether a person actually would have done so in reality. There has been more serious research on the comparison of driving drunk with talking on mobile phones (Burns et al., 2002; Strayer, Drews, & Crouch, 2003, 2006), which actually showed that driving drunk and using the phone produced different driving profiles. In addition, the above mentioned reasoning on the driver’s choice is equally valid here.

The argument that is perhaps used the most is “all other countries have bans”. However, with this argumentation one could easily argue for turning child restraints to forward facing again, and to stop building the so-called 2+1-roads, that turn relatively dangerous rural roads into much safer roads with physically separated lanes. Researchers in other countries are just as critical against the handheld ban as we are (see e. g. Expertise collective, 2011; GHSA, 2011), so here it would be wise for Sweden to learn from others’ mistakes.

As mentioned above, the debate in the parliament on the 27th of March 2013 was followed by a mandate to the government to pass a law against hand held phones and texting while driving. This shows how opinions weigh stronger than facts, and it is very unfortunate for Sweden, who will now miss a chance to employ innovative solutions that are built on the knowledge obtained so far. We should now seize the chance and plan for a scientifically sound evaluation study that considers both the period before the ban and the period after, and we should make sure that we obtain reliable prevalence data in normal driving that are much needed as a basis to compare critical events against.

## References

- Abouk, Rahi, & Adams, Scott. (2013). Texting bans and fatal accidents on roadways: Do they work? Or do drivers just react to announcements of bans? *American Economic Journal: Applied Economics*, 5(2), 179-199. doi: <http://dx.doi.org/10.1257/app.5.2.179>
- Ahlstrom, Christer, Kircher, Katja, Rydström, Annie, Nåbo, Arne, Almgren, Susanne, & Ricknäs, Daniel. (2012). *Effects of visual, cognitive and haptic tasks on driving performance indicators*. Paper presented at the Advances in Human Factors and Ergonomics, San Francisco, USA.
- Austin, Michael. (2009). Texting while driving: How dangerous is it?, *Car and Driver*. Retrieved from <http://www.caranddriver.com/features/texting-while-driving-how-dangerous-is-it>
- Banks, Martin. (2011). MEPs call for EU-wide ban on texting while driving. Retrieved April 30, 2013, from <http://www.theparliament.com/policy-focus/economic-affairs/economics-article/newsarticle/meps-call-for-eu-wide-ban-on-texting-while-driving/#.UX-pacrkgGI>
- Björklund, Felix. (2013). S vill förbjuda mobilsamtal i bilen. Retrieved April 30, 2013, from <http://www.bytbil.com/nyheter/yvuskyyg>
- Brookhuis, Karel A, Devries, G, & De Waard, Dick. (1991). The effects of mobile telephoning on driving performance. *Accident Analysis and Prevention*, 23(4), 309-316.
- Burns, Peter C, Parkes, Andrew M, Burton, S, Smith, R K, & Burch, D. (2002). How dangerous is driving with a mobile phone? Benchmarking the impairment to alcohol. Berkshire.
- Carsten, Oliver M J, Kircher, Katja, & Jamson, Samantha. (2013). Vehicle-based studies of driving in the real world: the hard truth? *Accident Analysis & Prevention*. doi: 10.1016/j.aap.2013.06.006
- Chisholm, S. L., Caird, J. K., & Lockhart, J. (2008). The effects of practice with MP3 players on driving performance. *Accident Analysis and Prevention*, 40(2), 704-713. doi: 10.1016/j.aap.2007.09.014
- Cooper, J M, & Strayer, David L. (2008). Effects of simulator practice and real-world experience on cell-phone-related driver distraction. *Human Factors*, 50(6), 893-902. doi: 10.1518/001872008x374983
- Cooper, J M, Vladislavjevic, I, Medeiros-Ward, N, Martin, P T, & Strayer, D L. (2009). An investigation of driver distraction near the tipping point of traffic flow stability. *Human Factors*, 51(2), 261-268. doi: 10.1177/0018720809337503
- Dingus, Thomas A, Klauer, Sheila G, Neale, Vicki L, Petersen, A, Lee, Suzanne E, Sudweeks, Jeremy, . . . Knipling, R R. (2006). The 100-car naturalistic driving study, phase II - results of the 100-car field experiment (pp. 352). Washington, DC: NHTSA.
- Drews, Frank A, Yazdani, Hina, Godfrey, Celeste N, Cooper, Joel M, & Strayer, David L. (2009). Text messaging during simulated driving. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 51(5), 762-770. doi: 10.1177/0018720809353319

- Economic Commission for Europe - Inland Transport Committee. (1968). Convention on road traffic, done at Vienna on 8 November 1968: United Nations.
- Elvik, Rune. (2006). Laws of accident causation. *Accident Analysis & Prevention*, 38(4), 742-747. doi: <http://dx.doi.org/10.1016/j.aap.2006.01.005>
- Elvik, Rune. (2011). *Effects on accident risk of using mobile phones: Problems of meta-analysis when studies are few and bad*. Paper presented at the TRB Annual Meeting, Washington DC.
- Erlandsson, Thomas. (2013). Infrastrukturministern invigde Transportforum. Retrieved from <http://www.naringsbloggen.se/transport/transporter/infrastrukturministern-invigde-transportforum/>
- Expertise collective. (2011). Téléphone et sécurité routière. Paris: Inserm.
- Fitch, Gregory M, & Hanowski, Richard J. (2011). *The risk of a safety-critical event associated with mobile device use as a function of driving task demands*. Paper presented at the Second Conference on Driver Distraction and Inattention, Gothenburg, Sweden.
- Gallup Organisation. (2010). Road safety: Analytical report: EC Directorate-General Communication.
- GHS. (2011). Distracted driving - What research shows and what states can do. Washington, DC: GHS (Government Highway Safety Association).
- Gisby, Catarina. (2013). Rakning bakom ratten lika farligt som sms? *Mitt i trafiken*, 2, 20-21.
- Glassbrenner, Donna, & Ye, Tony Jianqiang. (2007). Driver cell phone use in 2006 - overall results. Washington, DC.
- Godinho, Mario B. (2007). *Long-term effects of more punitive legislation concerning the use of mobile phone during driving in Portugal*. Paper presented at the Fourth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design.
- Hancock, Peter A, Mouloua, Mustapha, & Senders, John W. (2009). On the philosophical foundations of the distracted driver and driving distraction. In M. A. Regan, J. D. Lee & K. L. Young (Eds.), *Driver distraction. Theory, effects and mitigation* (pp. 11-30). Boca Raton: CRC Press.
- Hands-Free Info. (2013, April 22, 2013). California: Cell phone laws, legislation. *Hands-free info*. Retrieved April 30, 2013, from <http://handsfreeinfo.com/california-cell-phone-laws-legislation>
- Hickman, Jeffrey S, Hanowski, R. J., & Bocanegra, J. (2010). Distraction in commercial trucks and buses: Assessing prevalence and risk in conjunction with crashes and near-crashes. Blacksburg, VA: Virginia Tech Transportation Institute.
- Highway Loss Data Institute. (2009). Hand-held cellphone laws and collision claim frequencies *Loss bulletin* (Vol. 26). Arlington, VA.
- Highway Loss Data Institute. (2010). Texting laws and collision claim frequencies (Vol. 27). Arlington, VA.
- Horrey, W J, & Wickens, Christopher D. (2006). Examining the impact of cell phone conversations on driving using meta-analytic techniques. *Human Factors*, 48(1), 196-205. doi: 10.1518/001872006776412135
- Hosking, S. G., Young, K. L., & Regan, M. (2006). The effects of text messaging on young novice driver performance. Melbourne: MUARC.
- Insurance Institute for Highway Safety. (2013). Cellphone and texting laws. Retrieved April 2013, 2013, from <http://www.iihs.org/laws/mapyoungcellbans.aspx>
- Ishigami, Y., & Klein, R. M. (2009). Is a hands-free phone safer than a handheld phone? *Journal of Safety Research*, 40(2), 157-164. doi: 10.1016/j.jsr.2009.02.006
- James, William. (1890). *The principles of psychology*: Harvard University Press, 1983 paperback.
- Jamson, Samantha. (2011). *Legislation has minimal impact on drivers' in-vehicle use of nomadic devices*. Paper presented at the Second Conference on Driver Distraction and Inattention, Gothenburg, Sweden.

- Janitzek, Timmo, Brenck, Andreas, Jamson, Samantha, Carsten, Oliver M J, & Eksler, Wojtech. (2010). Study on the regulatory situation in the member states regarding brought-in (i. e. nomadic) devices and their use in vehicles.
- Kahneman, D. (1973). *Attention and effort*. Englewood Cliffs, NJ: Prentice Hall.
- Klauer, Sheila G, Dingus, Thomas A, Neale, Vicki L, Sudweeks, Jeremy, & Ramsey, D. (2006). The impact of driver inattention on near-crash/crash risk: An analysis using the 100-car naturalistic driving study data (pp. 226). Washington DC: NHTSA.
- Motormännen. (2012). Rekordmånga mobilpratare bötfällda i Danmark. Retrieved April 30, 2013, from <http://news.cision.com/se/motormannens-riksforbund/r/rekordmanga-mobilpratare-botfallda-i-danmark,c9342943>
- NHTSA. (2010). Driver electronic device use in 2009. Washington, DC.
- NHTSA. (2012). Visual-manual NHTSA driver distraction guidelines for in-vehicle electronic devices. In D. o. Transportation (Ed.): NHTSA.
- Näringsdepartementet. (2012). Regeringen vill förhindra vårdslös användning av mobiltelefon under körning. *Pressmeddelande*. Retrieved April 30, 2013, from <http://www.regeringen.se/sb/d/16659/a/206530>
- O'Brien, N. P., Goodwin, A. H., & Foss, R. D. (2010). Talking and texting among teenage drivers: A glass half empty or half full? *Traffic Injury Prevention*, 11(6), 549-554. doi: 10.1080/15389588.2010.516036
- Olson, Rebecca L, Hanowski, Richard J, Hickman, J S, & Bocanegra, J. (2009). Driver distraction in commercial vehicle operations. In U. Federal Motor Carrier Safety Administration (Ed.).
- Pashler, Harold. (1998). *Attention*. East Sussex, UK: Psychology Press Ltd.
- Patten, Christopher J D, Ceci, Ruggero, Malmström, Therese, & Rehnberg, Klas. (2003). Mobiltelefonerande i trafiken - Vägverkets utredning om användning av mobiltelefoner och andra IT-system under körning. Borlänge: Vägverket.
- Patten, Christopher J D, Kircher, Albert, Östlund, Joakim, Nilsson, Lena, & Svenson, Ola. (2006). Driver experience and cognitive workload in different traffic environments. *Accident Analysis & Prevention*, 38(5), 887-894.
- Ragland, David. (2012). Descriptive analyses of traffic fatalities and injuries before and after California's law banning hand-held cell phone use while driving was implemented on July 1, 2008. University of California, Berkeley: Safe Transportation Research and Education Center (SafeTREC).
- Rajalin, S., Summala, H., Pöysti, L., Anteroinen, P., & Porter, B. E. (2005). In-car cell phone use and hazards following hands free legislation. *Traffic Injury Prevention*, 6(3), 225-229. doi: 10.1080/15389580590969166
- Regan, Michael A, Hallett, Charlene, & Gordon, Craig P. (2011). Driver distraction and driver inattention: Definition, relationship and taxonomy. *Accident Analysis and Prevention*, 43(5), 1771-1781. doi: 10.1016/j.aap.2011.04.008
- Regan, Michael A, Lee, John D, & Victor, Trent. (2013). *Driver distraction and inattention. Advances in research and countermeasures* (Vol. 1). Farnham, Surrey, UK: Ashgate.
- Regan, Michael A, Lee, John D, & Young, Kristie (Eds.). (2008). *Driver distraction. Theory, effects and mitigation*. Boca Raton, London, New York: CRC Press.
- Shinar, D., Tractinsky, N., & Compton, R. (2005). Effects of practice, age, and task demands, on interference from a phone task while driving. *Accident Analysis and Prevention*, 37(2), 315-326. doi: 10.1016/j.aap.2004.09.007
- Strayer, David L, Drews, Frank A, & Crouch, Dennis J. (2003). *Fatal distraction? A comparison of the cell-phone driver and the drunk driver*. Paper presented at the Second International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design, Park City, Utah.
- Strayer, David L, Drews, Frank A, & Crouch, Dennis J. (2006). A comparison of the cell phone driver and the drunk driver. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 48, 381-391. doi: 10.1518/00187200677724471

- TT. (2013). Nytt krav på mobilförbud i bil, *Dagens Nyheter (DN)*. Retrieved from <http://www.dn.se/nyheter/sverige/nytt-krav-pa-mobilforbud-i-bil>
- Törnros, Jan E B, & Bolling, Anne K. (2005). Mobile phone use - Effects of handheld and handsfree phones on driving performance. *Accident Analysis and Prevention*, 37(5), 902-909. doi: 10.1016/j.aap.2005.04.007
- White, Katherine M., Hyde, Melissa K., Walsh, Shari P., & Watson, Barry. (2010). Mobile phone use while driving: An investigation of the beliefs influencing drivers' hands-free and hand-held mobile phone use. *Transportation Research Part F: Traffic Psychology and Behaviour*, 13(1), 9-20. doi: 10.1016/j.trf.2009.09.004
- Wickens, Christopher D, & McCarley, Jason S. (2008). *Applied attention theory*. Boca Raton, FL: CRC Press, Taylor & Francis Group.
- Vivoda, J. M., Eby, D. W., St. Louis, R. M., & Kostyniuk, L. P. (2008). Cellular phone use while driving at night. *Traffic Injury Prevention*, 9(1), 37-41. doi: 10.1080/15389580701737603
- VTI Expertgrupp. (2012). Åtgärder mot trafikfarlig användning av kommunikationsutrustning under körning. En verktygslåda. Linköping: VTI.
- Yager, Christine. (2013). An evaluation of the effectiveness of voice-to-text programs at reducing incidences of distracted driving. College Station, Texas 77843-3135: Texas A&M Transportation Institute, The Texas A&M University System.
- Young, Kristie L, Regan, Michael A, & Lee, John D. (2009). Factors moderating the impact of distraction on driving performance and safety. In M. A. Regan, J. D. Lee & K. L. Young (Eds.), *Driver distraction: Theory, effects and mitigation* (pp. 335-351). Florida, USA: CRC Press.
- Young, Richard A. (2011). *Driving consistency errors overestimate crash risk from cellular conversation in two case-crossover studies*. Paper presented at the Driving Assessment 2011: 6th International Driving Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design, Olympic Valley - Lake Tahoe CA. Conference Paper retrieved from [http://drivingassessment.uiowa.edu/sites/default/files/DA2011/Papers/043\\_Young.pdf](http://drivingassessment.uiowa.edu/sites/default/files/DA2011/Papers/043_Young.pdf)
- Young, Richard A. (2013). *Naturalistic studies of driver inattention: Effects of analysis methods on odds ratios and population attributable risk*. Paper presented at the 7th International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design, Bolton Landing, New York.
- Zachariasson, Helena. (2013). Mobilförbud i bilen snart här. Retrieved April 30, 2013, from <http://www.svt.se/nyheter/sverige/mobilforbud-i-bilen-snart-har>