



## Mobile phone use while driving—literary review



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### ABSTRACT

This paper analysis published results of the research into the connection between mobile phone use while driving and traffic safety. Ever since the introduction of the first mobile phones, the authors have been examining the risks associated with its use in traffic, namely: prevalence or frequency of mobile phone use while driving, characteristics of drivers who make more frequent use of mobile phones, the connection between mobile phone use while driving and a car crash risk, a link between mobile phone use while driving and perception of risk, effects on driving performance of using various modes of mobile phones while driving (“hands-free” or “hand-held”), psychological factors influencing driver’s decision to use a mobile phone while driving, etc.

It is important to point out that the results of some studies indicate that using a hands-free mobile phone while driving does not provide greater safety as compared to the use of hand-held mobile phones while driving. Generally speaking, younger male drivers tend to use mobile phones more often while driving than women and older males.

This paper analyses the results of studies which were published in 60 papers from 1994 to 2013.

The analysis of the papers selected for research confirms detrimental effects of mobile phone use while driving. Also, four phases in the process of understanding the issue of mobile phone use impacts while driving have been established or identified. The first phase gives the analysis of the prevalence or frequency of mobile phone use while driving. The second phase identifies the characteristics of drivers who tend to use mobile phones more frequently while driving. The third phase concerns research into impacts of using different modes of mobile phones while driving on driving performance (“hands-free” or “hand-held”). Finally, the fourth phase deals with research into risks of mobile phone use while driving (“hands-free” or “hand-held”). The importance of this paper is reflected in that it can help traffic safety policy makers, on the basis of better understanding of the issue of mobile phone use impact while driving, to develop effective strategies aimed at reducing the extent of mobile phone use while driving.

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## 1. Introduction

Research conducted in the area of traffic safety indicates that about 25% of car crashes have been caused by driver distraction. Furthermore, this problem is exacerbated by use of new technologies and provision of new services while driving. Today, mobile phones have been used to a large extent while driving, and taking into account that mobile network operators are constantly seeking to improve existing and to develop new services that drivers may find useful (web browsing, sending, receiving or reading text messages, etc.), overall time and exposure to the risk of mobile phone use while driving increases. Thus, for example, about 85% of American drivers (Goodman et al., 1997), and two thirds of Finish drivers (Lamble, Rajalin, & Summala, 2002), use mobile phones while driving.

Mobile phone use while driving may be as dangerous as impaired driving, which is why this issue has become the subject of numerous studies that focused on the connection between mobile phone use and the risk of car crash occurrence, as well as on the examination of the influence mobile phone use has on driving performance. Given that “mobile phone use while driving”, has been recognized as a factor which has negative effect on driving performance and contributes to the occurrence of a car crash, large number of countries (Norway, Australia, etc.), have banned the use of hand-held mobile phones while driving. These countries have permitted the use of hands-free mobile phone while driving (Ronggang, Changxu, Rau, & Zhang, 2009).

This paper aims to confirm the thesis on the negative impact of mobile phone use while driving and to identify phases in the process of understanding mobile phone use while driving, as well as to draw certain conclusions with regard to the frequency of mobile phone use while driving, characteristics of persons who tend to use mobile phones more often while driving, impacts of using different modes of mobile phones on driving performance while driving (“hands-free” or “hand-held”), and linkage between mobile phones use while driving and the risk of car crash occurrence.

Numerous studies have shown that mobile phone use while driving may be considered as one of the main distracting factors, which can lead to the increased risk of car crash occurrence with serious consequences (Lamble et al., 2002; McEvoy, Stevenson, & Woodward, 2006; Nadeau et al., 2003; Violanti, 1999; Violanti & Marshall, 1996). Categories of distraction which may be associated with mobile phone use can be defined as follows:

- (a) Physical distraction occurs when a driver needs to use one or both hands in order to operate a mobile phone when dialing a number or answering or rejecting an incoming call, instead of focusing on physical tasks required to drive such as steering, shifting gears, giving light or sound signals.
- (b) Visual distraction involves looking away from the road to a mobile phone, as well as a loss of visual “attentiveness”, often referred to as “looked, but did not see”, when drivers, although their eyes are on the road, fail to see what is in front of them.
- (c) Auditory distraction occurs during the ringing of the mobile phone or during a conversation on the mobile phone, when a driver is focused on the sounds not related to driving.
- (d) Cognitive distraction involves lapses in attention and judgement. This type of distraction occurs when two or more mental tasks are performed at the same time.

Driver distraction can be defined as a diversion of driver's attention away from activities critical for safe driving (Lee, Choi, Hong, Son, & Yu, 2008). In spite of certain studies suggesting that mobile phone use while driving increases crash risk, the results of the studies by the following authors (McCartt, Hellinga, & Bratiman, 2006; Svenson & Patten, 2005), show that a lot of drivers worldwide still use mobile phones while driving.

## 2. Methods and procedures

This literary review covers 60 studies published from 1994 onward examining the connection between mobile phone use while driving and a risk of car crash occurrence, frequency of mobile phone use while driving, characteristics of persons inclined to use mobile phones more often while driving, impacts of using various modes of mobile phones while driving on driving performance (“hands-free” or “hand-held”), and factors predicting behavior, that is, a tendency among drivers to use mobile phones while driving.

Research studies analysed in this paper were selected through online databases of scientific journals, namely: “ScienceDirect” (<http://www.google.com>), “PubMed” (<http://www.ncbi.nlm.nih.gov/pubmed>), Transportation Research Board (<http://trrjournalonline.trb.org>). The search phases used for research included the following words: mobile phone use and driving, driving distraction, conversation while driving, writing sms messages while driving, driving and a hand-held mobile phone and driving and a hands-free mobile phone.

During the search the accent was on the following journals: Accident Analysis Prevention, Transportation Research, Safety Science, Journal of Safety Research, Human Factors, Computers in Human Behavior, Journal of Public Health and New England Journal of Medicine. Apart from the mentioned journals, some of the studies were carried out by research centers, such as for example: National Highway Traffic Safety Administration, SWOV-Dutch Institute for road safety research and the Association for European Transport. For the purpose of the analysis, the papers published in the following journals covering the following periods were used: “Accident Analysis Prevention”, 1994–2013; “Transportation Research”, 2000–2012; “Safety Science”, 2007–2012; “Journal of Safety Research”, 2004–2009; “Human Factors”, 2006; “Computers in

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