

**Summary:**

# **Traffic and telephones: A literature review of studies on mobile phone use and driving**

## **Background**

In spite of being a large area within traffic research, there are still unsolved puzzles in the field of mobile phone use and its effects on driving, perception etc. Reviewing the literature will suggest on what specific topics more research is required. Thus, the present report presents empirical studies on mobile phone use and driving published after 2001. More specifically, the following areas are reviewed:

- extent of mobile phone use while driving
- effect of mobile phone use on driving behaviour and attention
- mobile phone use and accident risk
- mobile phone use versus other sorts of distraction
- effect of different types of mobile phones

## **Extent of mobile phone use while driving**

There are no recent updates on the extent of mobile phone use while driving in Norway. At the end of the 1990s approximately 50 percent of Norwegian drivers who owned a mobile phone used this while driving. Since then, there has been a steady increase in mobile phone use in general, which in turn indicates an increase in use of mobile phones also while driving. This is supported by studies conducted in USA. Moreover, research suggests that young drivers, males, and persons who drive a lot, are the most susceptible to use mobile phones while driving.

## **Highly controlled experiments suggest that there is an effect of mobile phone use on driving behaviour**

The studies reviewed suggest that using a mobile phone while driving has effect on several measures of driving behaviour; for instance reduced reaction time, reduced distance to the car in front, and increased variations in speed. Both simulator studies and experiments with “artificial” tasks, as well as studies seeking to increase the ecological validity, suggest effects on different measures of driving behaviour and perception. However, some of the studies show that there might be a stronger effect in so called “artificial” experiments than in more

ecological, natural experiments. Moreover, it is suggested in one of the studies that learning may be a positive moderator of the effect of mobile phone use on driving behaviour and perception.

### **Few studies on accident risk and mobile phone use**

Only few studies exist on mobile phone use and accident risk, but the research done suggests that speaking in a mobile phone while driving is associated with increased risk of being involved in an accident. Four studies found a significant increase in accident risk, whereas one study found a similar tendency, however not significant.

### **Mobile phone use versus other types of distraction**

The studies reviewed show that distractions like eating and drinking are associated with physical demands intervening with the driving process, whereas talking in a mobile phone is associated with cognitive distractions. Furthermore, engaging in a conversation – whether on a mobile phone or with a passenger – is related to reduced attention and increased accident risk. However, it is not clear if mobile phone conversations differ significantly in effect from conversations with passengers.

### **Small difference between handsfree and handheld phones**

The studies investigating effect of different types of mobile phones show only small or no differences between handsfree and handheld phones with regard to driving behaviour, mental work load and accident risk. These findings support the hypothesis that the distracting mechanism at work is cognitive rather than physical. It is, however, interesting that talking on a handheld phone seems to be associated with a reduction in speed, which can be explained as behavioural adaptation.

### **Further research**

In order to properly investigate any effect of mobile phone use on driving behaviour, perception, etc., an experiment with high control over the experimental situation is required. Only in this way one can conclude that the observed effects are most probably caused by the investigated factor – in this case; mobile phone use. In line with this, most studies on mobile phone use and driving have relied on highly controlled experiments. The problem is, however, that such experiments tend to be “artificial” or “non-natural” to some degree. Due to this problem, recent studies have strived towards more natural or ecological valid experiments. Results suggest that there might be a stronger effect in so called “artificial” experiments than in more ecological, natural experiments. Thus, it is possible that, based on knowledge from experimental studies, it may seem as if mobile phones have a more detrimental effect than what they actually have.

Another problem related to the highly controlled experiments is that they do not tell us anything about the accident risk associated with using a mobile phone

while driving. If there is no such risk, it is less interesting whether or not mobile phones have an effect on driving behaviour, perception, and subjective work load. More research on mobile phone use and accident risk is crucial, as only few studies have investigated this relationship.

Moreover, research on accident risk should distinguish between different types of mobile phones. In Norway, talking on a handheld phone has been forbidden since 2000. At the same time, the extent of mobile phone use in general has increased, and it is reasonable to expect an increase in mobile phone use while driving as well. Thus, it is interesting to investigate accident risk related to different kinds of mobile phones. Knowledge from such studies may also contribute to the ongoing discussion of what represents the disturbing factors (physical or cognitive) when a mobile phone is used during driving.