

# PSYCHOMETRIC PARADIGM OF DRIVERS' – MOBILE PHONE USAGE WHILE DRIVING

Dr, Soundria S M  
Assistant Professor

Department of Management Studies  
Bishop Heber College, Trichirappalli, Tamil Nadu, India

**Abstract:** The study evaluates the influence of different risk characteristics on perceptions using the psychometric paradigm. In addition, it identifies the effective risk characteristics associated with mobile phone usage while driving. These were followed by dialing and receiving a call from a hand-held mobile and talking with a passenger. In contrast, listening to the radio/music, putting on a seat belt and receiving a call on a hands-free mobile phone were perceived as being the least risky. Factor 1 appeared in relation to high-risk distracting activities such as checking social media, taking photos or recording video with a mobile phone, writing or reading a text message and searching for music using a phone or an MP3. These activities were perceived among respondents as being 'unfair' because they are considered uncontrollable activities, illegal, requiring a lot of mental concentration and have a severe consequences. In addition, those engaging in these activities are considering as being unfair because the respondents know about the associated risk yet they voluntarily engage on it. A random sampling method was used and the sample of the study consisted of 422 participants who included students, administrative staff and teaching faculties from the University of Madras, Chennai.

## Key words:

Perception, Distraction, Decision –Making, Communication and management

## I. INTRODUCTION

In order to adopt a risk management plan it is important to improve communication between risk managers and laypeople. According to Renn (2005), risk managers include a wide range of stakeholders who play a role in creating, evaluating, implementing and monitoring a chosen option to initiate or change a human activity in order to benefit human society and prevent harm. In the Kingdom of Saudi Arabia, risk managers may include the government in general or specifically the Ministry of Interior or the traffic department, etc. On the other hand, laypeople are those who are exposed to the risks of using mobile phones while driving and must live with the consequences which can include injury to or the death of drivers, passengers and pedestrians. This research will explore drivers' psychometric paradigm towards using mobile phones while driving, including new technology that enables the taking of photos, checking of social media and using a phone as an MP3 which have not been considered in the empirical research. Respondents might perceive risk differently; the differences could be caused by a number of factors such as knowledge, predicted exposure or benefit, or the severity of consequences etc. This gap, which is often described as a 'knowledge discrepancy', has emerged in various risk perception studies that have been conducted as a consequence of the general public's concerns about nuclear technology (Slovic 1999; Sjöberg 2002). Understanding risk perceptions will certainly result in the emergence of a better risk management plan.

### 1.1 Psychometric paradigm:

In order to adopt a risk management plan it is important to improve communication between risk managers and laypeople. According to Renn (2005), risk managers include a wide range of stakeholders who play a role in creating, evaluating, implementing and monitoring a chosen option to initiate or change a human activity in order to benefit human society and prevent harm. In the Kingdom of Saudi Arabia, risk managers may include the government in general or specifically the Ministry of Interior or the traffic department, etc. On the other hand, laypeople are those who are exposed to the risks of using mobile phones while driving and must live with the consequences which can include injury to or the death of drivers, passengers and pedestrians. This research will explore drivers' perceptions towards using mobile phones while driving, including new technology that enables the taking of photos, checking of social media and using a phone as an MP3 which have not been considered in the empirical research. Respondents might perceive risk differently; the differences could be caused by a number of factors such as knowledge, predicted exposure or benefit, or the severity of consequences etc. This gap, which is often described as a 'knowledge discrepancy', has emerged in various risk perception studies that have been conducted as a consequence of the general public's concerns about nuclear technology (Slovic 1999; Sjöberg 2002). Understanding risk perceptions will certainly result in the emergence of a better risk management plan.

### 1.2 Statement of the problem:

Furthermore, the risk perceptions and cultural aspects that cause people to use mobile phones while driving have never been examined in Chennai. In addition, there is a lack of research investigating drivers' perceptions of using the new technology of mobile phones such as taking photos and checking social media while driving. Therefore, this study will comprehensively investigate the risk characteristics influencing mobile phone use while driving by application of the psychometric paradigm. Understanding these elements is important because the success of any legislation depends on widespread public acceptance. This study's findings will provide valuable information to enhance risk management plans and reduce mobile phone use while driving.

The research objectives include:

1. To identify the effective risk characteristics associated with mobile phone usage while driving using the psychometric paradigm

## 2.0 REVIEW OF LITERATURE

### 2.1 Mobile phone usage while driving

Driving is a complicated task that requires various cognitive, physical, sensory and psychomotor skills. Despite this complexity it is not unusual to see drivers using a mobile phone while driving. Some can explain that using a mobile phone while driving has benefits; for instance by enabling people to call for emergency services if a road accident occurs. However, many studies have addressed the negative effects of using a mobile phone while driving both in actual car driving and in simulated driving as summarized by Svenson and Patten (2003).

### 2.2 Statistics of mobile phone usage while driving

Studies have shown that using a mobile phone while driving is associated with a four-fold increase in the likelihood of having an accident (McEvoy *et al.*, 2007b). According to a case-controlled study comparing mobile phone users and non-users, there may be as much as a nine-fold greater likelihood of becoming involved in an accident when using a mobile phone while driving (Violanti, 1998). Beck *et al.* (2007) noted that people who use a mobile phone while driving were also more likely to engage in other risky behaviours that increased their risk of crashing, compared to non-mobile-using drivers.

Epidemiological research has shown that using a mobile phone while driving for as little as one hour per month could increase a driver's risk of crashing by between 400% and 900% (et al McEvoy, 2005; Violanti, 1998; Violanti and Marshall, 1996). In addition, a case crossover study showed that the risk involved in mobile phone usage by drivers is comparable to a level of 0.08 blood alcohol concentration, which is consider the maximum legal limit in many countries (Redelmeier and Tibshirani, 1997, 2001).

Mobile phone usage while driving is a common behaviour in a wide range of countries. Gharaibeh and Abu Abdo (2011) found that a high percentage (85%) of young drivers in Al-Ahsa, KSA, use their mobile phone while driving and only 7% of these drivers always used hands free mobile phone devices. 1.6% of all drivers in England and Scotland were observed using mobile phones while driving. Out of this total, 1.1% of the drivers were noted holding mobile phones in their hands, compared to 0.5% of drivers who were observed holding mobile phones to their ears (Department of Transportation, 2014). The incidence of holding a mobile phone by hand while driving is becoming increasingly common and must be addressed. It has been concluded that the negative impact in this behaviour exceeded the impact of conversing on a mobile phone while driving (Hallett *et al.*, 2012; Atchley, 2011; Nemme, 2010). In Australia, a survey found that almost half of mobile phone owners reported using their mobile phone while driving. The survey also found that a large amount of mobile phone use while driving was conducted on hand-held mobiles (CARRS, 2011).

An annual survey conducted by the US National Highway Traffic Safety Administration (NHTSA) in 2009 showed that a total of 995 fatal crashes and 24,000 injuries were caused by phone-based distraction while driving. Another study using American trends in distracted driving fatalities estimated that text messaging while driving caused more than 16,000 fatalities between 2001 and 2007 (Wilson and Stimpson, 2010). However, there might be under-representation because the act of using a mobile phone can't be detected in all cases.

### 3.0 RESEARCH METHODOLOGY

The instrument was originally developed by Fischhoff *et al.* (1978) and was used to measure perceptions of risk in hazards and activities. The first part was used to identify the overall perceived risk of driver distraction activities (from 1 = notrisky, to 5 = extremely risky). There are a large number of possible driving distractions but only sixteen in-vehicle driving distraction activities were used in this questionnaire in order to prevent a lack of cooperation from the respondents (see Table 1). In addition, following Patel *et al.*'s (2008) study, the word 'risk' was not defined in the instrument in order to leave space for the participant to define it in their own way. Participants could define the word 'risk' in different levels such as having accidents, being caught by the police or death.

In addition, due to the various perceptions regarding different mobile phone functions, the modified questionnaire examined perceptions towards each phone application. New mobile phone technologies were introduced such as checking social media, searching for music using a phone and taking photos or recording video using a mobile phone. In order to clarify these things for the respondents, some of the listed distractions were followed by examples.

The second part of the survey instrument was modified from previous research articles (Fischhoff *et al.*, 1978; Marris, *et al.*, 1997; Patel *et al.*, 2008; White *et al.*, 2004). Participants were asked to rate all sixteen distraction activities on a further scale of eight qualitative characteristics.

The qualitative characteristics were: Knowledge, Severity, Control, Fairness, Mental Concentration, Voluntariness, Legality and Exposure. These were selected on the basis of frequent identification in previous studies (e.g. Patel *et al.* 2008; White *et al.* 2004; Titchener and Wong, 2010; Slovic, MacGregor, and Kraus 1987). The eight risk characteristics were ranked in relation to the sixteen driver distractions using a five-point Likert scale (see Table 2). The Likert technique (Likert 1932) is consider to be a common method for measuring risk perceptions within such surveys (i.e. Patel 2008; Marris, *et al.*, 1997)

Table 1 Description of Perceived Risk Characteristics and Overall Risk

Risk characteristic	Explanation	Rating scale (1-5)
Overall perceived risk	How risky is it to engage in this activity?	(not risky); 5 (extremely risky)
Knowledge	How much do drivers know about the associated risk?	(a lot); 5 (very little)
Severity of consequences	How severe is the effect of participating in this activity?	(not severe); 5 (extremely severe)
Control	Can the driver control the associated distraction?	(controllable); 5 (not controllable)
Fairness of the risk	How reasonable is it for drivers to engage in this Activity?	(entirely fair); 5 (very unfair)
Mental concentration	How much concentration is required by the driver?	(not much); 5 (a lot)
Voluntariness of risk	Is the hazard voluntary or imposed?	(voluntary); 5 (imposed)
Exposure to risk	How often do drivers encounter to the distraction?	(never); 5 (always)
Legality	Is it legal to engage in this activity?	(legal); 5 (illegal)

#### 4.0 DISCUSSION AND CONCLUSION OF THE RESULTS

This research helps to provide insight into drivers' perceptions of using new mobile phone technologies while driving which is a vital component for designing successful awareness campaigns.

This study provides a good insight of the large proportion of Chennai drivers' perception toward mobile phone usage while driving since the selected sample size consider a reasonable representation of drivers in Madras University. However, it is perhaps more difficult to extrapolate to the underestimated portion of drivers with less education and hand manual roles.

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