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Investigating the self-reported behavior of drivers and their attitudes to traffic violations

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ABSTRACT

Introduction: Driving behavior theoretical models consider attitudes as an important determinant of driver behavior. Moreover, the association between the self-reported tendency to commit violations and accident involvement is widely recognized. This research investigates drivers' self-reported behavior and attitudes to risky behaviors related to the traffic violations of speeding, drink-driving, and cell phone use using cluster analysis. *Method:* A sample of 601 Greek drivers participating at the SARTRE 4 pan-European survey is utilized. The analysis identified three clusters of drivers. Drivers in Cluster 1 commit traffic violations more often; drivers in Cluster 2 favor traffic violation countermeasures while having moderate views toward compliance with traffic rules; and drivers in Cluster 3 strongly support traffic violation countermeasures and also have strong views toward compliance with traffic rules. Risky behaviors and related attitudes that differentiate the three distinct groups of drivers (clusters) were determined. *Results:* The findings indicate that differences in attitudes and behaviors may be attributed to factors such as age, gender, and area of residence. The research findings also provided some insight about the current level of drivers' attitudes to traffic violations, especially those that negatively affect traffic safety. The pattern of their views on violations may form the basis of risk behavior-related interventions tailored to the identified groups, aiming at informing, educating, and raising the awareness of the public. *Impact on Industry:* Agencies focused on safety interventions could exploit this information in designing and implementing education campaigns, enforcement programs and in defining relevant priorities.

1. Introduction

Speeding and driving impairment are road safety issues that have been researched extensively while also being priorities of road safety education and enforcement programs. As speed increases, the probability of a crash and the consequences of injury increase as well (Aarts & Van Schagen, 2006). In the United States, about 3 of every 10 crash fatalities are speeding-related (Transportation Research Board [TRB], 2010a). Impairment, particularly due to alcohol use, is also highly represented in fatal crashes. About one-third of all fatal crashes in the United States involve an alcohol-impaired driver (TRB, 2010b).

Speeding-related crashes are defined as crashes where a driver is charged with a speeding-related offense or where the officer notes a contributing factor that is speeding-related (racing, driving too fast for the conditions or exceeding the posted speed limit). However, while speeding is an important contributing factor in 30% of crashes in the United States and in a similar percentage in Australia and New Zealand (Lahausse, van Nes, Fildes, & Keall, 2010), it is a common and a socially-accepted behavior (TRB, 2010a). It is worth noting that although drivers generally acknowledge that speeding is dangerous, speeding remains prevalent, in large part because the perceived risk of a speeding-related crash is low relative to the perceived benefits of driving fast (e.g., saving time, enjoyment of speed). Regarding the demographic factors of speeding, younger drivers and males are particularly likely to report speeding behavior and enjoyment of speed. Inexperience, poor judgment, and enjoyment of speed can have a detrimental effect on young drivers' safety. The issue is further complicated by the fact that factors such as the non-use of restraint systems, road type, time of day and particularly alcohol impairment play a contributing role in speeding-related fatalities (TRB, 2010a).

Cell phone use is an important source of drivers' distraction (Drews & Strayer, 2008). Most notably, an increasing trend in driver distraction has been reported with distracted-driving fatalities increasing from 2004 to 2008. Cell phones are often used while driving, particularly by younger age groups, who are more prone to multitasking and resist attempts to alter this pattern (TRB, 2010a, Young & Regan, 2007). According to the epidemiological study of Drews and Strayer (2008), an increase in accident risk is associated with the use of cell phones, which ranges from four-fold to nine-fold. Furthermore, drivers who are engaged in a cell phone conversation are 10 times more likely to fail to stop at a stop sign. Regarding the legalized use of hands-free cell phones and banned use of handheld phones by laws, they note that "there seems to be little doubt that interaction with a handheld

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cell phone increases the risk of crash involvement," and also that there is "a strong body of evidence that indicates that the difference between handheld and hands-free cell phone conversations is minimal and potentially negligible in terms of accident risks." Recent research indicates that the use of hands-free devices is associated with significant impairment while there is increasing evidence that conversing impairs the visual processing of information, with drivers exhibiting inattention blindness (Drews & Strayer, 2008).

Driver crash involvement can also be understood through investigation of attitudes, goals, and priorities of drivers – factors with important role in determining driver behavior and with a significant influence on driving safety (Moeckli & Lee, 2007).

1.1. Attitudes and behaviors

The SARTRE (Social attitudes to Road Traffic Risk in Europe) pan-European surveys among drivers (SARTRE 4, 2012) comprise a series of studies of attitudes conducted across European countries since 1993. The SARTRE surveys allowed for the investigation and comparison between countries of attitudes, self-reported behaviors and support for safety countermeasures. According to Valnaar and Yannis (2006), drivers (respondents in the SARTRE 3 survey) might underestimate the danger of using their mobile phone – either hand-held or hands-free – while driving. A study using the SARTRE 2 database covering most European countries linked the self-assessment dimensions to a set of explanatory variables such as age, gender, region, and income. The results indicate that drivers who rate themselves as both more dangerous and faster than others are generally younger men with higher incomes, who break the speed limit more frequently, avoid wearing seat belts, and have been involved in more accidents in the past than other drivers. In addition, more experienced and more highly educated drivers assess their driving as less dangerous but admit to driving faster than other drivers (Karlaftis, Kotzampassakis, & Kanellaidis, 2003).

The results of the Traffic Safety Culture Index (telephone survey) are particularly revealing of attitudes and behaviors of American drivers in respect to drinking and driving, speeding, and cell phone use (AAA Foundation for Traffic Safety, 2012). According to the Traffic Safety Culture Index, speeding on freeways is widespread, although driving 15 mph over the speed limit on residential streets is much less common and is rated as one of the most unacceptable things that a driver can do. Drinking and driving is viewed as a very serious threat; nearly all drivers disapprove of drinking and driving and acknowledge that others also disapprove of it. Furthermore, 14% admit to drinking and driving at least once in the past year and 3% said they had done so in the past month. There is broad support for requiring alcohol-ignition interlocks for drivers convicted of DWI (driving while intoxicated) more than once, and more than 3 in 4 Americans support interlocks for first-time DWI offenders (AAA Foundation for Traffic Safety, 2012).

The results of the survey indicate that cell phone use while driving has become widespread. They also reveal that there is somewhat strong social disapproval toward using a handheld cell phone while driving, but nearly half of all drivers believe incorrectly that most others actually approve of it. People are generally accepting of hands-free cell phone use. Nearly 3 in 4 Americans support restricting the use of handheld cell phones while driving, but a small majority (53%) support an outright ban on using any type of cell phone (including hands-free) while driving (AAA Foundation for Traffic Safety, 2012).

The theoretical models of driving behavior that have been developed emphasize different determinants of behavior and provide guidance to efforts to improve traffic safety. When considered together, they suggest a number of factors that are likely to be particularly important determinants of behavior.

Attitudes are a key influence on behavior but the important role of subconscious norms, emotions, habits as well as external conditions has been also recognized (Department for Transport, 2011). The theory of planned behavior is a commonly used framework to describe the underlying process of belief structures - behavioral beliefs, normative beliefs, control beliefs - that influence intentional health-related behaviors. Attitudes, subjective norms, and perceived behavioral control that develop from these belief structures, determine intention which, in turn, is a key determinant of behavior (Forward, 2009; Horvath, Lewis, & Watson, 2012; TRB, 2010c; Ward, 2007). These belief structures may arise from the personality of the individual and the culture of the community emerging from the relationships engendered by the demographic and social structures of the region. This model suggests that safety interventions based on the social-cultural context should modify driver belief structures in order to naturally support safe decisions by reducing the acceptability of risk (Ward, 2007).

1.2. Traffic Violations

Various human error models and classification schemes can be found in the literature (Austroads, 2011; Stanton & Salmon, 2009). According to the dominant, higher-level error classification system developed by Reason (1990, 1997), as referenced in Austroads (2011) and Stanton and Salmon (2009), errors are identified as slips, lapses, mistakes, and violations. Violations are a complex category of error and are categorized behaviors that deviate from accepted procedures, standards, and rules. Violations, either deliberate (individuals deliberately breaking rules), or unintentional (individuals unknowingly breaking rules), pose definite risk to others (Reason, Manstead, Stradling, Baxter, & Campbell 1990, as referenced in Stanton & Salmon, 2009). Furthermore, errors (slips and mistakes) as well as violations have been found to decrease with age. Violations can be divided into those related to personal protection (e.g., seat belt use), and violations that increase other road users' risk as well (e.g., speeding in an urban area; Delhomme, 1997, as referenced in Karlaftis, Kotzampassakis, & Kanellaidis, 2003). Interestingly, most drivers, independently of whether they consider themselves better, the same, or worse than others, believe that they generally commit violations less frequently than other drivers do (Karlaftis, Kotzampassakis, & Kanellaidis, 2003).

As referenced in Stanton and Salmon (2009), Parker, Reason, Manstead, and Stradling (1995) have found a clear link between the self-reported tendency to commit violations and accident involvement, even after the effects of exposure, age and gender have been controlled. Although they recognize that the association between violations and accidents is complicated, they stress that from the point of view of those concerned with road safety, the crucial point is that the commission of violations co-varies with accidents (Stanton & Salmon, 2009).

Human behaviors are influenced to some degree by biological factors such as gender and age-related conditions (Foss, 2007) and indeed, studies examining demographic factors relating to dangerous driving show that gender and age are related to risky driving. Younger drivers violate the law more often than older drivers (Groeger & Brown 1989; Parker et al., 1995). Research has also shown that younger drivers and male drivers express a lower level of normative motivation to comply with traffic laws (on the basis of voluntary compliance) than female and older drivers (Yagil, 1998). Furthermore, the perceived danger involved in the commission of a driving violation was found to be much more of a factor among women than among men before the commission of traffic violations (Yagil, 1998).

In their study on errors and violations in a sample of Greek drivers, Kontogiannis, Kossiavelou, and Marmaras (2002) recognize varieties of aberrant driving behavior and violations. Violations (defined as "deliberate circumventions of traffic rules and socially approved codes of behavior" which are "understood in relation to the social and societal context of driving") are categorized as "situational," "aggressive," and "highway–code" violations. Highway-code and aggressive violations differ significantly as a function of age and gender in the sense that younger drivers and males are more likely to report engaging in such violations than are older drivers and females. The tendency to commit