



Editorial

Letter from the Editors



The *Journal of Safety Research* is pleased to publish in this special issue the proceedings of several papers presented at the 4th International Conference on Road Safety and Simulation convened at Roma Tre University in Rome, Italy, October 2013. This conference serves as an interdisciplinary forum for the exchange of ideas, methodologies, research, and applications aimed at improving road safety globally.

Conference proceedings provide the opportunity for research in its formative stages to be shared, allowing our readers to gain early insights in the type of work currently being conducted and for the researchers to receive valuable feedback to help inform ongoing activities. This conference in particular offers an array of research topics not often covered by this journal from researchers practicing in over 11 countries. As is common with publishing conference proceedings, the papers published in this issue did not go through the normal *JSR* review process. Each paper included in this issue did meet the Road Safety and Simulation conference review requirements. They reflect varying degrees of scientific rigor, methodological design, and groundbreaking application.

The proceedings published in this special issue of *JSR* draw from the following road safety research sectors represented at the conference: driving simulation, crash causality, naturalistic driving, and new research methods.

It is our hope that the publication of these important proceedings will stimulate vigorous dialogue, rigorous research, and continuing innovative initiatives and applications, leading, ultimately, to fewer traffic fatalities, injuries, and crashes.

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Divided attention in young drivers under the influence of alcohol



C. Freydier^{a,b,*}, C. Berthelon^a, M. Bastien-Toniazzo^b, G. Gineyt^c

^a IFSTTAR, LMA – French Institute of Science and Technology for Transport, Development and Networks (Mechanisms of Accidents Laboratory), 304 Chemin de la Croix Blanche, 13300 Salon de Provence, France

^b CNRS, LPL – National Center for Scientific Research (Laboratoire Parole & Langage – UMR 7309), 5 Avenue Pasteur, 13100 Aix en Provence, France

^c Department of Medical Information, Hospital Center, 207 Avenue Julien Fabre, 13300 Salon de Provence, France

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ABSTRACT

Introduction: The present research evaluates driving impairment linked to divided attention task and alcohol and determines whether it is higher for novice drivers than for experienced drivers. **Method:** Novice and experienced drivers participated in three experimental sessions in which blood alcohol concentrations (BACs) were 0.0 g/L, 0.2 g/L, and 0.5 g/L. They performed a divided attention task with a main task of car-following task and an additional task of number parity identification. Driving performance, response time and accuracy on the additional task were measured. **Results:** ANOVA showed a driving impairment and a decrease in additional task performance from a BAC of 0.5 g/L, particularly for novice drivers. Indeed, the latter adopt more risky behavior such as tailgating. In the divided attention task, driving impairment was found for all drivers and impairment on information processing accuracy was highlighted, notably in peripheral vision. **Practical applications:** The divided attention task used here provides a relevant method for identifying the effects of alcohol on cognitive functions and could be used in psychopharmacological research.

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1. Introduction

Driving is a complex dynamic process control activity that requires accurate diagnosis of the situation and relevant decision making. Drivers have to select relevant information in traffic in order to anticipate and react effectively to sudden events. Many factors can influence a driver's behavior and lead to crashes.

Among them, alcohol is recognized as one major factor of driving impairment and a linear relationship has been demonstrated between blood alcohol concentration (BAC) and crash risk, notably for young drivers (Peck, Gebers, Voas, & Romano, 2008; Zador, Krawchuk, & Voas, 2000). Alcohol consumption impairs the skills necessary for safe driving (Moskowitz & Fiorentino, 2000) and disrupts information processing (Fillmore, 2003; Harrison & Fillmore, 2011). Driving performance is traditionally evaluated by measuring the standard deviation of lateral position (SDLP), which is defined as an indicator of the degree of adjustment that a driver implements to maintain a desired position within a lane (Harrison & Fillmore, 2011). Studies indicate that, after alcohol intake, an increase in SDLP, a delay in reaction time to sudden events, and an impairment of vigilance, visual, and divided attention may occur (Koelaga, 1995; Meskali et al., 2009; Rakauskas et al., 2008).

The lack of experience is also recognized as a main factor of crash. Indeed, young drivers are widely over-represented in road accidents: in France for example, the lack of experience is the first cause of death among young drivers (ONISR, 2011). Many studies showed that the skills necessary for safe driving improve significantly with experience (Mayhew & Simpson, 1995; McCart, Mayhew, Braitman, Ferguson, & Simpson, 2009). The ability to control a vehicle is one of the first skills acquired by training and it is mastered in a few hours (Hall & West, 1996), and then the perceptive and cognitive abilities can be developed. They are slower processes that include attentional allocation (Crundall & Underwood, 1998), matching between task demands and driving skills (Brown & Groeger, 1988), and contribute to drivers' potential ability to detect hazards. These crucial skills improve with experience (Deery, 1999; Underwood, 2007).

Another factor of crash is driver distraction (Klauer, Dingus, Neale, Sudweeks, & Ramsey, 2006), which can occur when the driver's attention is captured, intentionally or not, by a secondary task unrelated to the driving task (Regan, Hallett, & Gordon, 2011). Actually, 19% of drivers are engaged in an additional task like speaking, eating, drinking, smoking, or using the mobile phone while driving (Gras et al., 2010). Performing an additional task is known to reduce driving performance and to increase reaction time (Andersen, Ni, Bian, & Kang, 2011; Bian, Kang, & Andersen, 2010; Cantin, Lavallière, Simoneau, & Teasdale, 2009). For example, using a mobile phone during a car-following task increases the mental load, which causes a delay in brake reaction time (Lamble, Kauranen, Laakso, & Summala, 1999) and in the reaction time to headway changes (Brookhuis & De Waard, 1994). Driver

* Corresponding author at: Aix-Marseille Université, Pôle Psychologie, 29 Avenue Robert Schuman, 13621 Aix en Provence, France. Tel.: +33 4 13 55 37 21.

E-mail addresses: chloe.freydier@lpl-aix.fr (C. Freydier), catherine.berthelon@ifsttar.fr (C. Berthelon), mireille.bastien@lpl-aix.fr (M. Bastien-Toniazzo), gineyt@ch-salon.fr (G. Gineyt).

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