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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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Driver's behavioral adaptation to Adaptive Cruise Control (ACC): The case of speed and time headway

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ABSTRACT

Problem: The Adaptive Cruise Control is an Advanced Driver Assistance System (ADAS) that allows maintaining given headway and speed, according to settings pre-defined by the users. Despite the potential benefits associated to the utilization of ACC, previous studies warned against negative behavioral adaptations that might occur while driving with the system activated. Unfortunately, up to now, there are no unanimous results about the effects induced by the usage of ACC on speed and time headway to the vehicle in front. Also, few studies were performed including actual users of ACC among the subjects. *Objectives:* This research aimed to investigate the effect of the experience gained with ACC on speed and time headway for a group of users of the system. In addition, it explored the impact of ACC usage on speed and time headway for ACC users and regular drivers. *Method:* A matched sample driving simulator study was planned as a two-way (2 × 2) repeated measures mixed design, with the experience with ACC as between-subjects factor and the driving condition (with ACC and manually) as within-subjects factor. *Results:* The results show that the usage of ACC brought a small but not significant reduction of speed and, especially, the maintenance of safer time headways, being the latter result greater for ACC users, probably as a consequence of their experience in using the system. *Summary:* The usage of ACC did not cause any negative behavioral adaptations to the system regarding speed and time headway. *Practical applications:* Based on this research work, the Adaptive Cruise Control showed the potential to improve road safety for what concerns the speed and the time headway maintained by the drivers. The speed of the surrounding traffic and the minimum time headway settable through the ACC seem to have an important effect on the road safety improvement achievable with the system.

1. Introduction

1.1. Adaptive Cruise Control

Advanced Driver Assistance Systems (ADAS) are devices that assist the drivers during the primary driving task. The ADAS 'inform and warn the driver, provide feedback on driver actions, increase comfort and reduce the workload by actively stabilizing or maneuvering the car' (PREVENT, 2006).

Among the ADAS available in the market, Adaptive Cruise Control (ACC) is a system that became, at first, accessible in Japan and, later, in the USA and Europe (Dickie, 2010), mainly on high-class vehicles but whose market penetration is continuously increasing even in vehicles of lower grade (Young, 2012).

The working principle of the ACC modulates adaptively the speed and the headway to a forward vehicle, according to the settings predefined by the users. During the usage of ACC, the driver can select the desired speed and headway, using the buttons placed on the steering wheel (Fig. 1). In reaction to the settings imposed by the user, the ACC operates based on the following logic: if no vehicle is detected ahead, the speed of the car equipped with ACC is maintained equal to the value specified by the driver. On the other hand, when the system detects a vehicle in its trajectory, the system adjusts the speed in order to keep the value of time headway pre-determined by the driver.

The ACC has, as declared objective, the partial automation of the vehicle's longitudinal control and the alleviation of driver's workload in a convenient manner (ISO, 2010). As a matter of fact, previous studies conducted on the topic confirmed that, while driving with ACC activated, participants revealed a lower workload level (e.g., Hoedemaeker & Brookhuis, 1998; Stanton, Young, & McCaulder,

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