



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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# The combination of short rest and energy drink consumption as fatigue countermeasures during a prolonged drive of professional truck drivers



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## ABSTRACT

One of the major concerns for professional drivers is fatigue. Many studies evaluated specific fatigue countermeasures, in many cases comparing the efficiency of each method separately. The present study evaluated the effectiveness of rest areas combined with consumption of energy drinks on professional truck drivers during a prolonged simulated drive. Fifteen professional truck drivers participated in three experimental sessions: control-drivers were asked to drink 500 ml of a placebo drink prior to the beginning of the drive. Energy drink-drivers were asked to drink 500 ml of an energy drink containing 160 mg of caffeine prior to the beginning of the drive, and an Energy drink + Rest session – where the drivers were asked to drink 500 ml of an energy drink prior to driving, and rest for 10 min at a designated rest area zone 100 min into the drive. For all sessions, driving duration was approximately 150 min and consisted of driving on a monotonous, two-way rural road. In addition to driving performance measures, subjective measures, and heart rate variability were obtained. Results indicated that consumption of an energy drink (in both sessions) facilitated lower lane position deviations and reduced steering wheel deviations during the first 80–100 min of the drive relative to the control sessions. Resting after 100 min of driving, in addition to the energy drink that was consumed before the drive, enabled the drivers to maintain these abilities throughout the remainder of the driving session. *Practical applications:* Practical applications arising from the results of this research may give indication on the possible added value of combining fatigue countermeasures methods during a prolonged drive and the importance of the timing of the use for each method.

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## 1. Introduction

One of the major factors that may impact driving ability is fatigue, especially while engaging in long monotonous drives. Driver fatigue is a major cause of road accidents (Lal & Craig, 2001) and sleepiness may constitute a major role for human error and accidents (Dinges, 1995). Sabbagh-Ehrlich, Friedman, and Richter (2005) mentioned the role fatigue has in truck crashes mainly among long haul carriers. Stutts, Wilkins, Osberg, and Vaughn (2003) also mentioned that commercial vehicle operators are at increased risk for sleep-related crash involvement. Fatigue is also likely to occur much earlier when driving in a monotonous, low demanding road environment (as tested in a simulator by Thiffault & Bergeron, 2003). Research conducted in the last decades on fatigue countermeasures found short naps and caffeine consumption to be relatively effective in delaying fatigue to some extent while driving a prolonged drive (see McKernon, 2008 for a review). In a report of an

NCSDR/NHTSA (1998) expert panel about drowsy driving and automobile crashes it is mentioned that taking a short nap and consuming caffeine equivalent to two cups of coffee may have short term beneficial effects to elevate alertness.

An advantage of using a driving simulator to test fatigue countermeasures is that in monotonous road scenarios, participants tend to accumulate fatigue at a relatively short period and that this can be apparent in performance, subjective, and physiological measures as seen in previous studies (Gershon, Ronen, Oron-Gilad, & Shinar, 2009; Oron-Gilad & Ronen, 2007; Oron-Gilad, Ronen, & Shinar, 2008; Thiffault & Bergeron, 2003). Signs of fatigue and impaired driving were observed in a simulator study that tested drivers stopping in rest areas on a freeway (Philip et al., 2003). Thus, it is possible to use a driving simulator for testing the effects of different countermeasures as well as more complex aspects of use of countermeasures such as manipulating the location of intake or occurrence and/or the time of administration of a substance, all this in addition to examining the possible effects of combining countermeasures. The present study used the simulator to create resting areas aiming to test the combined effects of consuming energy drinks prior to a prolonged monotonous drive and resting in a designated rest area location more than an hour into the drive.

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