



HAL
open science

Effects of driver anger state on driving performance and attention

Franck Techer, Christophe Jallais, Yves Corson, Alexandra Fort

► To cite this version:

Franck Techer, Christophe Jallais, Yves Corson, Alexandra Fort. Effects of driver anger state on driving performance and attention. 5th International Conference on Driver Distraction and Inattention, Mar 2017, PARIS, France. 1 p. hal-01677963

HAL Id: hal-01677963

<https://hal.science/hal-01677963v1>

Submitted on 8 Jan 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Effects of driver anger state on driving performance and attention

F. Techer^{1,2}, C. Jallais¹, Y. Corson² and A. Fort¹

¹University of Lyon, French Institute of Science and Technology for Transport, Development and Networks (IFSTTAR)-TS2-LESCOT, Bron France

²University of Nantes, LPPL (Laboratoire de Psychologie des Pays de la Loire-EA 4638), Nantes, France

Author email: christophe.jallais@ifsttar.fr

Keywords: Anger; Event-Related Potentials; Visual N1; Lateral variations; Car simulator; Mind-wandering

Driver internal state, including emotion, can have negative impacts on road safety. Studies have shown that an anger state can provoke aggressive behaviour and impair driving performance. Indeed, it is known that negative emotions (Smallwood *et al.*, 2009) are commonly associated with attentional disruptions and mind-wandering so that they may interfere with driving performance. In another hand, anger could lead to a positive impact on the alerting network efficiency (Techer *et al.*, 2015) and so may become useful when driving with advanced driving assistance systems providing alerting cues. However, to our knowledge, no prior event-related potentials study has assessed the impact of anger on attention during simulated driving. Therefore, the aim of this study was to investigate the impact of anger on attentional processing and its consequences on driving performance. For this purpose, 33 participants completed a simulated driving scenario once in an anger state and once during a control session. This scenario consisted in a motorcycle-following task on a simulated straight rural road. A warning system informed participants about imminent motorcycle braking. Event-related potentials (ERP) were recorded so as to reflect attentional modulations that may be undetectable with behavioural data. Results indicated that anger impacted driving performance and attention, provoking an increase in lateral variations while reducing the amplitude of the visual N1 peak. The observed effects were discussed as a result of high arousal and mind-wandering associated with anger. This kind of physiological data may be used to monitor a driver's internal state and provide specific assistance corresponding to their current needs.

Techer F., Jallais C., Fort A. and Corson, Y. (2015) *Emotion*, 15(3), 276-280.

Smallwood J, Fitzgerald A, Miles LK, Phillips LH. (2009) *Emotion*, 9(2), 271-276