Effects of driver anger state on driving performance and attention

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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.

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