

Emotional states of drivers and the impact on driving behaviour – a simulator study

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Abstract

Statistics indicate that in 2009 more than 400,000 traffic accidents occurred on German roads inflicting almost 4,100 casualties. One important factor in those incidents was maladjusted driving behaviour caused by strong emotions in the driver (e.g. aggressive driving or delayed reactions). Several situational appraisal factors like blame, goal congruence and goal relevance are held responsible for the nature and intensity of emotions experienced. Based on two online studies, a framework of emotion eliciting situations was developed and transferred to a driving-simulator context. The aim was to explore the impact of several different emotions on actual driving behaviour. Eighty-seven participants completed a track consisting of four situations. These situations typically raise emotions of different types and intensities, for example anger, anxiety or surprise. Half of the participants were confronted with positive (goal congruent) and half with negative (goal incongruent) situations. The dependant variables consisted of observed driving behaviour and its sub-facets like driving speed, acceleration and lateral position on the street. The findings indicate that negative emotions like anger lead to higher speed and stronger acceleration by the driver, whereas anxiety causes stronger deceleration and lower speeds. Implications of these results will be discussed.

Introduction

In 2009, more than 436.000 persons were involved in traffic accidents in Germany. Almost 5.000 died in those situations (Destatis, 2010). One important cause could be the presence of strong emotions in the traffic participant and the resulting maladaptive driving behaviours within a traffic situation (Nesbit, Conger & Conger, 2007; Dula & Ballard, 2003). Emotions create a motivational tendency (and therefore an increased probability) to perform a class of driving behaviours. This could be devastating for all traffic participants when, for example, aggressive driving occurs in situations like dense city traffic or sharp curves on a country road. Several studies in the past examined the connection between the frequency of elicited emotions and their potential consequences (e.g. Deffenbacher, Petrilli, Lynch, Oetting & Swain, 2003; Shinar & Compton, 2004; Underwood, 1999). Those studies focused on the personal characteristics of the driver including driving anger (Deffenbacher et al., 2003). They found evidence for the maladaptive power of emotions, but most of them failed to describe an emotional object: the traffic

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