Situational (state) anger and driving

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ARTICLE INFO

ABSTRACT

Aggression and anger have been related to crash involvement, but the direct causal relation between situational anger and driving choices and abilities has not been examined empirically. In this study, 15 licensed drivers drove twice in a driving simulator, each time following one of two emotion inductions based on event recall: angry and neutral. Following anger induction, the drivers crossed more yellow traffic lights ($p < .01$) and tended to drive faster (non-significant). However, performance on emergency manoeuvres were unaffected by anger. In conclusion, it appears that state anger affects driving behaviour by increasing risk taking, without necessarily compromising the skilled driving behaviour, at least as far as these behaviours were evaluated in emergency situations in simulated driving.

1. Introduction

Road rage and aggressive driving seem to play a major role in road safety. Studies (e.g. Li, Li, Long, Zhan, & Hennessy, 2004) show a connection between aggressive driving and general tendency of being involved in an accident or performing a violation. In an extensive Gallup survey (EOS Gallup Europe, 2003), of 13,673 drivers, 75% of American drivers and 80% of the European and Australian drivers indicated that the aggressiveness of drivers has increased in the past few years. In the same Gallup survey, 66% of the American participants claimed that they were subjected to aggressive driving in the last year.

Shinar (2007, p. 328) defines *aggressive driving* as:

> Aggressive driving is defined as a syndrome of frustration-driven instrumental behaviors which are manifested in (a) inconsiderateness towards or annoyance of other drivers (tailgating, flashing lights, and honking at other drivers), and (b) deliberate dangerous driving to save time at the expense of others (purposefully running red lights and stop signs, obstructing path of others, weaving).

On the basis of the "Driving Anger Scale" (Deffenbacher, Oetting, & Lynch, 1994), Sullman (2006) defines four main categories of driving-related anger provoking situations: progress impeded, risky driving, hostile gestures, and discourteous driving. Other studies show evidence that aggressive driving is influenced by: (1) the driving environment, day of the week, and time of the day (see Shinar (1998) for a review), (2) the car type, with drivers of high performance cars tending to perform more aggressive actions (Smart, Stoduto, Mann, & Adlaf, 2004), and (3) individual differences such as age and gender, as younger males tend to perform more aggressive manoeuvres (e.g. Smart et al., 2004; Van Rooy, Rotton, & Burns, 2006; Özkan

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& Lajunen, 2005). Additionally, there is evidence that mildly aggressive driving is common to most drivers (Wells-Parker et al., 2002). Nesbit, Conger, and Conger (2007) maintain that unlike other manifestations of anger, expression of driving anger seems to be a frequent and relatively socially acceptable outlet for negative emotions.

Most of the studies that deal with aggression and driving focus on 'Trait Driving Anger', which is ones' general tendency to become angry while driving (Deffenbacher, Lynch, Oetting, & Swaim, 2001) as opposed to 'State Driving Anger' which is a driver's current level of anger (e.g. Stephens & Groeger, 2008). This distinction is based on a widely accepted distinction in psychology between state-related and trait-related behaviours. Cattell and Scheier (1961) were first to define the general State-Trait model which posits that emotions can be experienced in one of these two ways: either as a temporary mood state (labelled 'State') or as a more continuous, stable personality dimension (a 'Trait'). This definition was initially developed to describe anxiety. However, in emotion research it is vastly utilized to explain anger (Stradling & Parker, 1996). Matthews (2002), in his *transactional model of driver stress*, maintains that drivers show anger (reflected in aggressive tendencies) in specific situations and drive accordingly. The model maintains that drivers with high Trait-Anger are more likely to make hostile traffic situation evaluations and therefore drive faster, more erroneously and in a riskier manner. Other studies support this model. For example, trait driving anger has been shown to be associated with the frequency of being involved in accidents, aggressive and risky driving, anger towards other road users, and edginess when driving a car in traffic (Dahlen, Martin, Ragan, & Kuhlman, 2004). Relative to low Trait-Anger, drivers with high Trait-Anger levels have been shown to prefer higher driving speeds (Sullman, 2006), experience more near-accidents, lose their concentration more often, and drive in a less-controlled manner (Deffenbacher et al., 2001).

Despite the clear connection between Trait-Anger and driving behaviours, driving is probably seriously affected by State-Anger as well (Matthews, 2002; Nesbit et al., 2007). Moreover, trait-related information may not be very useful for policy makers. The reason is that except in extreme situations it would be publicly unacceptable to deny individuals with high Trait-Anger the right to have a driving license. In contrast, understanding how State Anger affects driving is more likely to affect policy and other preventive changes that would reduce the causes for anger. One potential outcome was found in a work done by Lerner and Keltner (2001) in which the authors show that angry people tended to express optimistic risk estimates and to take risk-seeking choices. Despite that, very little is known about the influence of State-Anger on driving behaviour. Below we review in brief the extant literature on this topic.

James and Nahl (1998) noted 23 aggressive behaviours (such as speeding and crossing intersections in yellow light) that are expressed when driving while angry. These behaviours were based on content analysis of self-reports taped by drivers while driving. Underwood, Chapman, Wright, and Crundall (1999) showed that drivers who have relatively frequent angry feelings while driving also recorded a greater number of near-accidents that resulted from their own behaviour. A potential shortcoming of these studies is that they were based on self reports. This aspect poses a problem because recalled or imagined behaviours may not be valid representations of actual driving. Moreover, self-reports of driving behaviour, like other self reports, may be influenced by demand characteristics and social desirability. Mesken, Hagenzieker, Rothengatter, and de Waard (2007) had drivers provide verbal ratings of anger, anxiety or happiness while driving in real traffic. The results showed that drivers reporting anger drove faster and exceeded the posted speed limit more often than drivers who did not report feelings of anger, but only in high speed zones (more than 100 km/h). This study, although done in real traffic, also suffers from several shortcomings such as lack of control over the driving situation, the influence of concurrent questioning on driving performance, and being correlational in nature, meaning that it is difficult to know if the angry state influenced driving behaviour, vice versa, or if both driving and anger resulted from a common factor such as Trait-Anger. The latter shortcoming is especially likely given the fact that Trait-Anger has been shown to influence driving behaviour.

Stephens and Groeger (2008) did a simulation-based study, in which drivers encountered different on-road mood stimulating situations. The measure of state anger was based on self-reports of the drivers while driving rather than manipulated as part of the study design. As such, it is difficult to know the cause-and-effect relationship between the phenomena. Nonetheless, they found that anger-prone drivers drove relatively fast, and reported relatively high levels of anger in low anger-provoking situations. In addition they found an association between high levels of state anger and behaviours such as harsh acceleration and reduced steering. However, the authors did not find a significant relationship between the overall measures of driving behaviour and State-Anger. Stephens and Groeger speculated that the rating task itself may have affected the drivers' mood, causing them to drive in a manner consistent with their stated mood.

To summarize, there are some studies suggesting that situational anger compromises driving performance. Still, these studies fall short of establishing a cause-and-effect relationship that demonstrates that the angry state is the cause for the reckless driving. To establish this cause-and-effect relationship, we manipulated anger and examined how this manipulation influenced actual driving behaviour in simulated driving. To enable strict comparison between the conditions we employed a within-subjects experimental design in which each participant was examined in both the angry and the neutral state. Thus, this design focuses on how individuals change their own driving behaviour when angry. Another notable advantage of using this design is the relatively high statistical power, which means that effects can be reliably detected even with relatively small samples. Moreover, because we used a relatively homogenous sample we maximized the statistical power. We hypothesized, in accordance with Shinar's definitions, that inducing anger will cause relatively risky driving behaviours.