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Cognitive biases in aggressive drivers: Does illusion of control drive us off the road?



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ABSTRACT

Anger has been shown to be a motivating factor in aggression and it is widely accepted that driving anger may lead to aggressive driving. However, the link between anger and aggressive driving is likely to be mediated by drivers' pre-existing cognitive biases and the subsequent situational evaluations made. This study investigated the extent to which optimism bias, illusion of control beliefs and driver anger predict self-reported hostile driving behaviours. A total of 220 licensed drivers (106 men; 114 women) completed a self-report questionnaire measuring trait driving anger, optimism bias, illusion of control and driving behaviour. Structural Equation Modelling showed that trait driving anger and illusion of control beliefs account for 37% of the variance in hostile driving behaviour scores. Optimism biases were unrelated to hostile driving behaviours. Thus, driving anger propensities and feelings of control over the situation, but not a general tendency to underestimate the likelihood of adverse outcomes, predict aggressive driving.

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1. Introduction

1.1. Cognitive evaluations and emotion

The influence of emotion on behaviour is often mediated by cognitive evaluations. For example, Lerner and Keltner's (2001) appraisal theory suggests that individuals predisposed to anger are more optimistic about risk. This is particularly evident when risk assessments are compared between self-evaluation of own risk likelihood and that of others. Lerner and Keltner stipulate that the key appraisal tendencies for individuals prone to anger are a sense of individual control over the situation and certainty over the outcomes. They have shown that angry disposition or trait anger is positively related to optimism and it relates to risky choices. Recently, Pietruska and Armony (2013) also demonstrated a relationship between trait anger and optimism, but were unable to link optimism directly to risk behaviour.

Other well-regarded affective-cognitive-behavioural theories have shown expressions of state anger are mediated by appraisals that include assessments of risk (Berkowitz, 1990; Lazarus, 1991). For example, Berkowitz's (1990) cognitive neoassociation model suggests that anger becomes aggression after assessments

of illegitimate goal impediments have been met and are coupled with an individual's belief that they can control the outcome of their reaction. Lazarus (1991) also suggests that the secondary appraisal process, which mediates the experiences and expression of emotion, involves assessments of an individual's ability to cope with the situation and expectations about the outcome.

Arguably, biases in the cognitive appraisals relating to control or risk and optimism about the outcome, are likely to exacerbate the influence of anger on aggression. For example, both *optimism bias* (Weinstein, 1980) and *illusion of control* (Langer, 1975) are biases that have been empirically linked to poorer judgments and increased risk-taking behaviour. Optimism bias is a tendency to overestimate the probability of positive events and underestimate the likelihood of negative events occurring to oneself. This can be an adaptive measure that reduces anxiety (Weinstein, 1980; Weinstein & Klein, 1995). Illusion of control beliefs are defined as the tendency to view chances for success as higher than the probability warrants (Langer, 1975). Individuals with high illusion of control beliefs tend to falsely attribute a chance outcome to their own skill. Both optimism bias and illusion of control have been widely used in psychological research, and both have been found to predict risky behaviour particularly in health (Weinstein, 1980) and gambling (Moore & Ohtsuka, 1997, 1999a, 1999b; Ohtsuka, 2013; Ohtsuka & Ohtsuka, 2010).

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1.2. Optimism bias, illusion of control and aggressive driving

Optimism bias and illusion of control beliefs have also been identified as factors in risky driving. Risky driving behaviours include speeding, tailgating and driving under the influence of drugs or alcohol (Dejoy, 1989; Hammond & Horswill, 2002; Harre & Sibley, 2007; Horswill & McKenna, 1999; Shinar, 1998). As risky driving behaviour is commonly observed in aggressive driving, biases toward unrealistic optimism and illusory control beliefs are also likely to predict aggressive driving. Drivers with optimism bias may be less inclined to fear negative repercussions of their aggressive driving acts, as they believe they are less likely than other drivers to experience negative outcomes. Illusion of control beliefs may also contribute to aggressive driving behaviour because in a driving context, drivers with higher illusions of control are likely to (incorrectly) attribute driving successes to their driving ability (Hammond & Horswill, 2002; Horswill & McKenna, 1999). Aggressive driving may, at least in part, rely on incorrect assessments of control. Recently in a self-report study, Sümer, Özkan, and Lajunen (2006) found positive relationships between driver overconfidence, operationalised by variables resembling optimism bias and illusion of control, and risky driving behaviours. However, while the relationship between self-enhancement and risky driving was clear, it is less clear how these relate to aggressive driving behaviour.

It is commonly accepted that anger prone drivers are also more aggressive drivers (Deffenbacher, Oetting, & Lynch, 1994; Stephens & Sullman, under review; Sullman & Stephens, 2013). Deffenbacher et al. (1994) propose the trait of 'driving anger' which is the extrapolation of trait anger into context-specific driving situations. Although a link between driving anger and aggressive driving is indisputable, not all angry drivers will become aggressive drivers. When other triggers for aggressive driving have been examined, situational predictors including presence of aggressive stimuli such as rude bumper stickers or weapons (Turner, Layton, & Simons, 1975), traffic congestion (Hennessy & Wiesenhal, 1999; Shinar, 1998) and status of other vehicles (McGarva & Steiner, 2000; Stephens & Groeger, 2014) have all been highlighted. However, each of these rely on some assessment of the situation and it is this assessment that is likely to lead to reactive behaviour. For example, Stephens and Groeger (2014) examined Berkowitz's hostile aggression theory in a simulated driving environment by subjecting drivers to impediment by slower lead drivers. The impediment was manipulated in terms of behavioural culpability and status of the lead driver. They found that impediment by lower status drivers provoked more anger and aggressive reaction even when these drivers were not culpable for their actions. Further, noting differences in anger expression by high anger drivers (Stephens & Groeger, 2009), cognitive biases, such as those identified in the appraisal tendency framework (Lerner & Keltner, 2001) may determine the degree to which anger contributes to aggressive driving.

The aim of the current study was to examine the contribution of driving anger, optimism bias and illusory control beliefs in predicting self-reported aggressive driving behaviour. It was expected that scores for trait driving anger (Hypothesis 1), Illusion of Control (Hypothesis 2) and Optimism bias (Hypothesis 3) would predict self-reported aggressive driving behaviours.

2. Method

2.1. Participants

A total of 220 drivers (106 men; 114 women) were recruited from a community sample in Melbourne, Victoria ($n = 182$: 99 men, 83 women) and from first-year psychology classes at Victoria

University ($n = 38$; 7 men, 31 women). Participants' age ranged from 18 to over 60, with 52% of the sample aged between 18 and 30. The length of holding a license ranged between 1 year and over 30 years, with an even split for years licensed. For example, approximately 25% of the sample had been driving less than 3 years; approximately 25% had been driving 4–10 years; approximately 25% had been driving 11–20 years and the remaining 25% had been driving over 21 years.

2.2. Measures

2.2.1. Driving anger scale (DAS)

The 14-item DAS was used to provide an overall measure of driving anger (Deffenbacher et al., 1994). The scale presents 14 different situations and asks participants to rate how angry each situation would make them feel. Ratings are measured on a five-point Likert-type scale (1 = not at all, 5 = very much). Item scores are combined to form a total DAS score with higher scores indicating greater propensities to become angered while driving. The DAS has demonstrated good internal consistency (Cronbach's $\alpha = .80$; Deffenbacher et al., 1994) and has been found to have good 10 week test–retest reliability (Cronbach's $\alpha = .84$; Deffenbacher, Filetti, Lynch, Dahlen, & Oetting, 2002). The validity of the measure has been demonstrated through correlations with the Trait Anger Scale (Deffenbacher et al., 1994; Villieux & Delhomme, 2007).

2.2.2. Optimism bias (OB)

OB was measured with Dejoy's (1989) 10 scenarios regarding accident risk. Each short scenario describes a crash-related situation that may occur while driving. For example, "losing control of your vehicle at high speed and crashing into another vehicle". Participants rate the likelihood of each scenario happening to them when compared to the average driver. Ratings are on 5-point Likert-type scale (1 = much higher, 5 = much lower). Higher scores indicate higher levels of OB. The scale had good internal reliability in the current study (Cronbach's $\alpha = .82$).

2.2.3. Illusion of control beliefs (IoC)

IoC were also measured using Dejoy's (1989) 10 scenarios of accident risk. IoC beliefs occur in predominantly chance based situations, therefore, participants were asked to rate the amount of control they would have over each scenario. Ratings were on a 5-point Likert-type scale (1 = no control, it's up to chance, 5 = completely controllable). Higher scores on the scale indicate stronger IoC beliefs. The scale had acceptable reliability in the current study (Cronbach's $\alpha = .66$).

2.2.4. Aggressive driving behaviours (ADB)

ADB were measured using 29 scenarios from the hostile behaviour continuum of James and Nahl (2000). Participants were asked to rate on a 5-point Likert-type scale (1 = never; 5 = always) how frequently in the past year they had engaged in each driving behaviour (e.g. "made obscene gestures at other drivers"). Factor analysis on this scale showed two separate factors: *hostile aggressive driving behaviour*, containing 16 items (Cronbach's $\alpha = .92$) and *extreme aggression* containing 9 items (Cronbach's $\alpha = .85$). After dropping four items, the ADB scale provides high internal consistency on *hostile aggressive driving behaviour and extreme aggression*.

2.3. Procedure

The study was approved by the University ethics committee. Participants were recruited by convenience sampling methods. Prospective participants who had agreed to take part received a letter of invitation to participate that outlined the purpose of the

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