Abstract

Being as a relatively new approach of signalling, moving-block scheme significantly increases line capacity, especially on congested railways. This paper describes a simulation system for multi-train operation under moving-block signalling scheme. The simulator can be used to calculate minimum headways and safety characteristics under pre-set timetables or headways and different geographic an


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‘You’re a bad driver but I just made a mistake’: attribution differences between the ‘victims’ and ‘perpetrators’ of scenario-based aggressive driving incidents

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‘You’re a bad driver but I just made a mistake’: attribution differences between the ‘victims’ and ‘perpetrators’ of scenario-based aggressive driving incidents

ABSTRACT

Driver aggression is an increasing concern for motorists, with some research suggesting that drivers who behave aggressively perceive their actions as justified by the poor driving of others. Thus attributions may play an important role in understanding driver aggression. A convenience sample of 193 drivers (aged 17-36) randomly assigned to two separate roles (‘perpetrators’ and ‘victims’) responded to eight scenarios of driver aggression. Drivers also completed the Aggression Questionnaire and Driving Anger Scale. Consistent with the actor-observer bias, ‘victims’ (or recipients) in this study were significantly more likely than ‘perpetrators’ (or instigators) to endorse inadequacies in the instigator’s driving skills as the cause of driver aggression. Instigators were significantly more likely attribute the depicted behaviours to external but temporary causes (lapses in judgement or errors) rather than stable causes. This suggests that instigators recognised drivers as responsible for driving aggressively but downplayed this somewhat in comparison to ‘victims’/recipients. Recipients and instigators agreed that the behaviours were examples of aggressive driving but instigators appeared to focus on the degree of intentionality of the driver in making their assessments while recipients appeared to focus on the safety implications. Contrary to expectations, instigators gave mean ratings of the emotional impact of driving aggression on recipients that were higher in all cases than the mean ratings given by the recipients. Drivers appear to perceive aggressive behaviours as modifiable, with the implication that interventions could appeal to drivers’ sense of self-efficacy to suggest strategies for
overcoming plausible and modifiable attributions (e.g. lapses in judgement; errors) underpinning behaviours perceived as aggressive.

**Keywords**: Driver aggression; actor-observer bias; attributions; driving scenarios
1. INTRODUCTION

Aggressive driving is increasingly regarded as a serious problem or traffic safety concern for drivers in many countries with 40-65% of respondents identifying this issue as a primary concern (AAA Foundation for Traffic Safety, 2009; Beirness, Simpson, Mayhew & Pak, 2001; Mizell, 1997). It is also identified as a factor contributing to crashes on the road (Dula & Ballard, 2003; King & Parker, 2008; Wells-Parker et al 2002). This level of motorist concern is not without some foundation: results from driver surveys indicate that between 47% and 75% of drivers have experienced mild forms of aggression from other drivers (e.g. verbal abuse, rude gestures, horn honking), while smaller proportions (7.5 - 35%) report being the victim of more dangerous forms of aggression such as being tailgated, cut off, forced off the road or chased. Between 2% and 13% of respondents in such surveys have reported being assaulted as a result of a driving incident (AAMI, 2003, 2004; Roberts & Indermaur, 2005; Smart, Mann & Studoto, 2003; VCCAV, 1999).

There has been considerable disagreement over what constitutes aggressive driving in the literature. This has been exacerbated by a lack of distinction between this term and so called ‘road rage’ (Dula & Geller, 2003; Elliott, 2000; Rathbone & Huckabee, 1999) Perhaps unsurprisingly, the lack of agreement among researchers and theorists about what constitutes an aggressive act while driving is paralleled in driver perceptions and interpretations regarding the behaviour of other drivers. For example, the same act of merging in congested or rapidly moving traffic may be perceived by some drivers as assertive but as aggressive or dangerous by others. For the purposes of this research, and following recommendations by Dula and Geller (2003), driving acts will be regarded as aggressive if they are intentional and intended to have a negative impact (whether physical or psychological) on another road user.
Although the driver surveys cited above have focussed on the victim or recipient point of view, particularly in relation to the prevalence of aggressive driving, this has not been typical in research using other methodologies. Many studies examining aggressive driving have taken the perpetrator as the focus of attention with the aim of identifying the factors that would facilitate identification of aggressive drivers in much the same way that general aggression research has been concerned with identifying individuals with a tendency to become violent (see National Committee on Violence, 1990; Chappell, Grabowski & Strang, 1991; Reiss & Roth, 1993). Such studies have varied from purely empirical to highly theoretical. As a result, it is now fairly well established that age and gender are important demographic determinants of aggressive driving, with younger drivers and men the most likely to engage in behaviours defined as aggressive (e.g. tailgating, rude gestures, verbal abuse) (Beck, Wang & Moser, 2006; Glendon, 2007; Mizell, 1997; Roberts & Indermaur, 2005; Shinar & Compton, 2004) and younger drivers more likely to report higher levels of driving anger (Smith, Waterman & Ward, 2006). Similarly, high levels of driving anger (Gallovski, Malta & Blanchard, 2006; O’Brien, Tay & Watson, 2004) and general hostility (Dahlen & Ragan, 2004; Deffenbacher, White & Lynch, 2004) are robust correlates of driving aggression. In terms of the personality factors that appear to be associated with aggressive driving, the evidence is less clear, though some studies have found that aggressive drivers exhibit a greater prevalence of some psychiatric and psychological disorders such as conduct disorder, intermittent explosive disorder and attention deficit hyperactivity disorder (Gallovski, Blanchard & Veazey, 2002; Malta, Blanchard & Friedenberg, 2005). In addition, situational factors such as the deindividuated roadway environment or the relatively low probability of future contact with other drivers have been shown to increase the likelihood of aggressive responses to on-road events (Ellison-Potter,
There are a number of models and theories that have been applied to understanding aggressive driving. Within the psychosocial approaches, the three dominant perspectives are social maladjustment theory, personal maladjustment theory, and an application of the frustration-aggression hypothesis (Galovski et al., 2006). Social maladjustment theory maintains that people drive as they live and thus someone who is generally aggressive in everyday life is likely to extend this to behaving in an aggressive way on the road. Evidence for this explanation comes from several sources. Recent studies with drivers seeking treatment for their behaviour have shown aggressive drivers to have greater prevalence of antisocial disorders, as mentioned above (Galovski et al., 2002). In addition, higher levels of general aggression, hostility and competitiveness have been shown to predict crash involvement at 2 years follow-up (McGuire, 1976, cited in Galovski, et al., 2006). Studies examining the validity of measures of aggressive driving have found that these are highly correlated with measures of general trait aggression (Rotton, Gregory & Van Rooy, 2005; Van Rooy, Rotton & Burns, 2006) suggesting that driving may indeed be merely one instance in which aggressive people manifest their aggression. Such results suggest that the social maladjustment approach may be useful in describing or identifying those individuals who are likely to commit the more extreme or violent road-related offences (e.g. assault) that road safety experts consider to lie more in the domain of criminal activity rather than general driving behaviour (Elliott, 2000). However, this theory does not appear to account very well for the milder forms of aggressive driving that are reported in apparently otherwise law abiding driving populations.

Personal maladjustment theory suggests that acute and chronic stressful life events and/or psychopathology result in elevated levels of crash risk. Several authors have found a
relationship between trait stress and negative affect and driver aggression (Hennessy & Wiesenthal, 1997; Hennessy, Wiesenthal, & Kohn, 2000; Kontogiannis, 2006). In addition, individuals with greater levels of anger or stress are also more likely to rely on ineffective coping strategies (Deffenbacher, Filetti, Richards, Lynch, & Oetting, 2003; Kontogiannis, 2006) and react aggressively to situations typically not considered by others to be provocative (Stephens & Groeger, 2008). However, overall the evidence supporting this explanation is mixed and much of it derives from studies of drivers who have already been involved in crashes, possibly biasing the results (Galovski et al., 2006).

A more comprehensive approach examining the role of stress in driving is the transactional model of driver stress (Matthews 2002; 2001). This model proposes an interrelation between personality factors (such as aggressiveness) and stressors in the environment (such as congestion) to affect cognitive stress processes (consisting of appraisal of the personal relevance of the stimuli and the choice of behaviours to manage it). There are then two forms of outcome: subjective outcomes (e.g. anxiety, tiredness); and performance outcomes (such as reduced psychomotor control) (Matthews, 2002). Aggressive driving is explained in this model as an initial proneness to aggression (personality) which in the presence of environmental stressors (e.g. a risky manoeuvre by another driver) leads to a hostile appraisal (e.g. deliberately targeted at self) and thus the adoption of an aggressive coping strategy and retaliatory behaviour (e.g. tailgate the ‘offending’ driver).

Within the frustration-aggression perspective, some researchers, most notably, Shinar (1998) and Shinar and Compton (2004) have proposed a model that emphasises the role of increasing congestion in the modern driving context. These authors maintain that as roads have become increasingly congested, driving frustration levels have also increased, with many driving situations now exceeding individuals’ thresholds for overt expression of aggression. As a result, driving aggression has increased in more modern times and is more
prevalent among a wider range of drivers, many of whom are not aggressive in everyday life (Shinar, 1998). While some studies have shown support for this model, other researchers have found results that challenge this explanation and suggest that frustration does not necessarily increase as congestion increases (Lajunen, Parker & Summala, 1999). Moreover, the view that frustration generally leads to aggression has been refuted in the general aggression research (Baron & Richardson, 1994).

An avenue that may offer a way of understanding driver aggression across the spectrum of drivers as well as the manifestations of behaviours is that of causal attribution theory Weiner (1986), that is, the way that people attempt to explain why the events around them happen. Causal attribution theory posits that the perception of the cause of behaviour (either one’s own behaviour or that of someone else) varies according to two dimensions¹: locus of causality (internal or external to the actor), and stability (unstable or enduring) (McAuley & Duncan, 1990; Weiner 1986). Moreover, how a person responds to another person’s behaviour is influenced by the attributions that he or she makes about the causes of that behaviour (Weiner, 1986).

Schematically the internal-external dimension and the stable-unstable dimension can be represented by a two by two table with cells corresponding to internal-stable, internal-unstable, external-stable and external-unstable causes (see Table 1). Particular causes are more likely to be ascribed to particular kinds of observed outcomes. For instance, the outcome of a test or job application (success or failure) is likely to be ascribed to internal

¹ In his earlier work, Weiner also referred to a third dimension relating to whether the cause can be controlled or not and termed it ‘controllability’. Weiner (1986) described this dimension as applicable to either or both the internal-external dimension or the stable-unstable dimension. In later work he added two further dimensions, Intentionality and Globality (Weiner, 1996). Intentionality related to the degree to which the behaviour was intentional while Globality attempted to capture perceptions that a behaviour generalises to other areas of a person’s life (ie the ‘type’ of person). While these may be useful to an eventual model of attribution, for practical purposes, not every possible combination of the dimensions is likely to generate causes that would be considered plausible when making an attribution about the cause of driving behaviours. For instance, most external causes are likely to be perceived as uncontrollable, at least from the actor’s point of view because the actor usually cannot exert any control over them.
causes such as aptitude or ability as well as to effort or preparation. In addition, external factors such as the level of difficulty or competition may also be relevant. This example is depicted in Table 1.

Weiner (1986) proposed that these dimensions and their mediation by affective reactions as well as future expectancies have important impacts on a person’s future behaviour. Where a cause is deemed to be internal and unstable, it is perceived as one that is open to modification in order to influence a future outcome. Thus a failure that is attributed to lack of effort might conceivably be overcome by applying greater effort next time. Attributions of an outcome to internal and stable causes however, are unlikely to be perceived as modifiable. Similarly, if an outcome is given an external attribution the attributor is less likely to conclude that there is any way of personally modifying this.

<table>
<thead>
<tr>
<th>Locus</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>Stability</td>
<td></td>
<td></td>
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<tr>
<td>Stable</td>
<td>Aptitude or Ability</td>
<td>Task characteristics (e.g. difficulty)</td>
</tr>
<tr>
<td>Unstable</td>
<td>Exertion or Effort</td>
<td>Chance, Luck (e.g. environmental determinants)</td>
</tr>
</tbody>
</table>

Table 1: Causal attributions as a function of Locus and Stability (Weiner, 1986, p. 47).
Within attribution theory, the actor-observer bias is the tendency for people to attribute their own behaviour to circumstances or situations but other people’s behaviour to dispositional causes, or the ‘kind of person’, that he/she is. Attribution and the actor-observer bias have been used to try to explain different perspectives towards road events, specifically the causes of road crashes (Martin, Price, & Fisher, 1991) and aggressive driver responses to road events such as tailgating, blocking overtaking and cutting others off (Britt & Garrity, 2003, 2006). Such studies have suggested that when drivers attribute another driver’s tailgating or cutting off behaviour to an internal and stable cause, that this evokes greater reported anger and aggressive responses towards that driver (Britt & Garrity, 2006). In real driving situations this might be expected to increase the likelihood of an aggressive counter-responses and hence the possibility of the situation escalating.

This actor-observer bias appears, at least in part, to be a product of the visual perspective difference between an actor and an observer. Hennessy, Jakubowski and Benedetti (2005) used the situation of a near collision in a driving simulator task to show that observers whose visual perspective was from inside the vehicle that crossed the centre line were more likely than observers outside the vehicle to make certain situational attributions about the causes. Observers viewing the incident from the perspective of outside the vehicle were more likely to see the “offending” driver as less skilled and as taking more risks than were the observers with a viewing perspective inside the vehicle.

Results from survey studies can also be interpreted as supporting the applicability of attribution theory to driver aggression. For instance, it appears that perceptions of aggressive driving depend to some degree on whether one is the victim or perpetrator of the behaviour (VCCAV, 1999). A representative survey of Victorian drivers (VCCAV, 1999) found that those who reported having been the victim of aggressive driving gave explanations of the aggressive driver’s behaviour in terms of his/her responses to frustrations caused by the
normal course of driving (such as slower drivers, others changing lanes or merging, someone tooting the horn, overtaking manoeuvres). Drivers who admitted to driving aggressively were more likely to account for their frustration (and response) in terms of the poor driving behaviour of others (e.g. failure to indicate, rule breaking, poor road manners etc.), that is, to causes that were internal and stable. A recent survey of drivers Australia-wide (AAMI, 2007) reported a similar perspective for drivers who admitted to having driven aggressively. The majority of these drivers thought their actions were justified by the (perceived) behaviour of other drivers (AAMI, 2007).

Given the high reported prevalence of being a victim of aggressive driving behaviours (if only minor in nature), one of the interests of this study was in how driver perceptions of arguably aggressive driving acts might differ according to whether an individual is a perpetrator/instigator or victim/recipient, particularly in terms of the perceived causes of the behaviour. Furthermore, this study aimed to explore whether there were any differences in perceptions about the level of expressed aggression or of the emotional impact of aggressive driving on recipients between the two groups. Such information may assist in better understanding the mechanisms underpinning aggressive driving and in the design of interventions aimed at reducing aggressive driving acts.

Using the internal-external and stable-unstable dimensions of Weiner’s (1986) causal attribution theory, a set of driving contexts (scenarios) depicting driving behaviours that are typically regarded as aggressive (e.g. rude gestures, tailgating, flashing one’s lights) were written for this study. Scenarios were written from the perspective of either the perpetrator/instigator of the aggressive behaviour or from that of the victim/recipient of the behaviour. This addition of the recipient perspective is important to development of theoretical understanding of aggressive driving as well as having implications for practice: it is possible that recipients become instigators of aggressive acts when they retaliate towards
other drivers as a result of making hostile attributions about those other drivers (and their intentions). The scenarios are described in greater detail below.

Consistent with the actor-observer bias, it was hypothesised that instigators would be more likely to attribute their own driving behaviour to external factors (road or traffic conditions, bad luck) than internal factors, while recipients would perceive the same behaviour to be due to factors internal to the instigator (poor driving, a mistake in judgement) rather than external factors (Hypothesis 1). In keeping with the notion that instigators would be more likely to attribute their behaviour to external factors, that is, responding to driving circumstances beyond their control rather than intent to cause another harm, it was anticipated that instigators of the behaviours would be less likely than recipients to rate such acts as aggressive (Hypothesis 2). Consistent with this, instigators were expected to rate the emotional impact of these acts on the recipients as less intense than recipients themselves would rate it (Hypothesis 3).

2. METHOD

2.1 Participants

A convenience sample of 193 drivers (85 men, 108 women) aged 17 to 36 years participated in this study. As identified above, it is younger drivers who are most likely to manifest aggressive driving and hence the sampling strategy adopted was aimed at securing a younger aged sample. Of the 193 participants, 48 were first year psychology students (9 men, 39 women) who gained credit as part of their course requirement. The additional 145 (76 men, 69 women) participants were recruited through snowball sampling. Participation was voluntary and the sole criterion for inclusion was to be the holder of a current Queensland driver’s licence.

Characteristics of participants. Ages of participants ranged from 17 years to over 36 years, with the mean age falling in the 22-25 years category. The majority of participants
(67.4%) had not committed a traffic offence in the previous 3 years. Income ranged from under AU$10,000 per year to more than AU$70,000. As noted earlier, participants were randomly assigned to the perpetrator and victim conditions, though as mentioned, these labels were not used with either group nor did they appear in the materials describing the scenarios. Tests conducted to check for differences between the instigator and recipient groups in terms of socio-demographic characteristics, general levels of aggression, or previous driving history revealed no significant differences. A gender difference in scores for the Aggression Questionnaire (AQ), (Buss & Perry, 1992), a measure of general aggression, was detected such that men reported greater levels of aggression than women (see Table 2). However, scores for men still fell in the range corresponding to low levels of aggression. Differences were also detected in the mean scores for driving anger for recipients (M = 90.79) and instigators (M = 100.86) such that instigators reported higher levels of overall driving anger than recipients (t = 3.41, p < .01, see Table 2). Similarly to the gender differences for the AQ, both instigator and recipient scores were equivalent to low to moderate driving anger.
### Table 2: Reliabilities, mean scores, standard deviations and ranges for the Aggression Questionnaire and Driving Anger Scale scores according to gender and driver perspective

<table>
<thead>
<tr>
<th></th>
<th>Cronbach’s Alpha</th>
<th>Mean (SD)</th>
<th>t values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aggression Questionnaire: 29 items (possible range 29-145)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole sample (range 34-114)</td>
<td>.886</td>
<td>60.86 (15.17)</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>.867</td>
<td>64.79 (14.66)</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>.895</td>
<td>57.72 (14.94)</td>
<td>t = 3.192 p &lt; .01</td>
</tr>
<tr>
<td>Instigators</td>
<td>.894</td>
<td>62.57 (16.20)</td>
<td></td>
</tr>
<tr>
<td>Recipients</td>
<td>.875</td>
<td>59.27 (14.04)</td>
<td>t = -1.48 ns</td>
</tr>
<tr>
<td><strong>Driving Anger Scale: 33 items (possible range 33-165)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole sample (range 40-146)</td>
<td>.938</td>
<td>95.74 (20.62)</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>.941</td>
<td>96.51 (20.80)</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>.938</td>
<td>95.01 (20.49)</td>
<td>t = .49 ns</td>
</tr>
<tr>
<td>Instigators</td>
<td>.914</td>
<td>100.86 (17.88)</td>
<td></td>
</tr>
<tr>
<td>Recipients</td>
<td>.947</td>
<td>90.79 (21.95)</td>
<td>t = -3.41, p &lt; .001</td>
</tr>
</tbody>
</table>

2.2 Design and materials

A 78 item questionnaire was used to collect the data for this study. In order to examine the effect of driver perspective on attributions about aggressive driving behaviour, two versions of the survey were created: a ‘perpetrator’ or instigator version and a ‘victim’ or recipient version. The questionnaire for both versions consisted of three sections. Section 1 detailed eight driving scenarios depicting behaviours identified in the literature as examples of aggressive driving. In the perpetrator version of the study questionnaire, the driving scenarios (discussed later in detail) were presented from an instigator perspective, while in the victim version these scenarios were presented from the recipient’s perspective. Sections 2 and 3 were the same for both versions of the questionnaire.
2.2.1 The driving scenarios. Section 1 of the questionnaire detailed eight driving scenarios depicting behaviours identified in the literature as examples of aggressive driving. The final eight scenarios were mainly adapted from prior research conducted in developing the Propensity for Angry Driving Scale (PADS) (DePasquale, Geller, Clarke & Littleton, 2001) and generally selected to reflect the characteristics identified by Dula and Geller (2003) cited above. The PADS consists of 19 scenarios designed to reflect those that elicit anger and frustration for drivers. Responses to the scenarios in the PADS measure the level of intensity in response to each scenario and the total score gives a measure of the propensity for an individual to respond with aggression or anger to other drivers. The adaptations for this study retained the frustrating aspect of the original scenarios but altered wording and elements to match the Australian context (use of terms such as motorway, kilometres, speed limit etc). The exception to this was Scenario Two. This scenario, describing a driving incident at a roundabout, was created by the researchers to depict a situation common to the local driving conditions in urban Queensland. Following each scenario, participants were asked a series of 3 questions (described further below).

Each scenario described two main vehicles and the same basic events. The two different versions were worded so that the story of the events was told either from an instigator or a recipient point of view although these labels did not appear on any of the materials to avoid priming that participants (see Table 3 for examples of the wording of scenarios). Particular attention was given to the wording of the driving scenarios, so that only those that were deemed to be realistically common, non-evaluative, and/or predictive were selected. This was done to minimise any cues in the scenario that would suggest an obvious ‘cause’ of the aggressive situation. Wording of the scenarios between the two versions was kept as similar as possible while still altering the driver perspective.
### Scenario 1 (recipient perspective)
You are driving on a two-way road in a 100 km zone and are stuck behind a truck travelling at around 80 km/h for a number of kilometres. You know that there is no overtaking lane for at least a further five kilometres. At the first opportunity to overtake you put on your indicator and begin to pull out when a car behind you suddenly begins to overtake you, forcing you to retreat and lose your opportunity to pass.

### Scenario 1 (instigator perspective)
You are driving on a two-way road in a 100 km zone and come up behind a car which is stuck behind a truck travelling at around 80 km/h. You know that there is no overtaking lane for at least a further five kilometres. At the first opportunity to overtake you put on your indicator and pull out. At about the same time the car in front of you also pulls out to overtake, sees you, and retreats back behind the truck, losing his/her opportunity to pass.

### Scenario 2 (recipient perspective)
You are driving in a congested right hand lane. The left hand lane is not as busy. You are approaching a roundabout wanting to go right. As you enter the roundabout you indicate right and a car from the left hand lane cuts in front of you forcing you to brake heavily.

### Scenario 2 (instigator perspective)
You are driving in a congested right hand lane. The left hand lane is not as busy so you change into the left hand lane. You are approaching a roundabout wanting to go right. As you enter the roundabout you indicate right and cut in front of the car in the right hand lane, forcing him/her to brake heavily.

### Scenario 3 (recipient perspective)
You are driving in heavy traffic in the middle lane of a three lane motorway and you are in a hurry. All lanes are quite busy. You are driving at the speed limit, as are most of the cars around you. A car comes up behind you driving faster than the other traffic. The car overtakes you in the left hand lane and indicates right to get in front of you. You further observe the car indicating to the right again and overtaking the car in front on the right. You observe the car continuing to weave in and out of traffic ahead of you for a number of kilometres.

### Scenario 3 (instigator perspective)
You are driving in heavy traffic in the middle of a three-lane motorway and you are in a hurry. You are driving slightly faster than most of the cars around you. You come up behind a car and see the opportunity to get ahead by overtaking in the left lane. Your next opportunity is to pass the next car by moving into the right lane. You proceed in this manner for a number of kilometres.

### Scenario 4 (recipient perspective)
You are driving in light to moderate traffic in the middle lane of a three lane motorway and you are in a hurry. All lanes are flowing quite freely. You are driving at the speed limit, as are most of the cars around you. A car comes up behind you driving faster than the other traffic. The car overtakes you in the left hand lane and indicates right to get in front of you. You further observe the car indicating to the right again and overtaking the car in front on the right. You observe the car continuing to weave in and out of traffic ahead of you for a number of kilometres.

### Scenario 4 (instigator perspective)
You are driving in light to moderate traffic in the middle lane of a three lane motorway and you are in a hurry. All lanes are flowing quite freely. You are driving slightly faster than most of the cars around you. You come up behind a car and see the opportunity to get ahead by overtaking the vehicle in front of you by changing into the left lane. Your next opportunity is to pass the next car by moving into the right lane. You proceed in this manner for a number of kilometres.

### Scenario 5 (recipient perspective)
You are on the motorway in moderate traffic, driving at the speed limit. You are in the overtaking lane after overtaking a car and see the opportunity to get ahead by overtaking the car in front of you. 

### Scenario 5 (instigator perspective)
You are on the motorway in moderate traffic, driving at a little above the speed limit and you are in the overtaking lane. You come up behind a car driving slower than you. You flash your lights a number of times for it to move over.

### Scenario 6 (recipient perspective)
You come behind a car on the highway and although you could overtake, you are happy to remain behind. You follow the car for some time at a reasonable distance when you notice the driver giving you the finger.

### Scenario 6 (instigator perspective)
You are driving on the highway in the left lane. A car comes up behind you and follows you for some time, even though there are many opportunities to overtake. You give the car behind you the finger.

### Scenario 7 (recipient perspective)
You are travelling on a road late at night and the vehicle coming at you from the other direction has its lights on high beam. You dim your lights but the bright lights of the other vehicle do not change.

### Scenario 7 (instigator perspective)
You are travelling on a road late at night with your lights on high beam. A vehicle approaching you dims its lights, but you do not turn down your high beams.

### Scenario 8 (recipient perspective)
You are in the left lane behind another vehicle. When the left turn arrow light is given, the vehicle does not move because the driver is not paying attention. You tap on the horn to get his/her attention and he/she gives you the middle finger in their rearview mirror.

### Scenario 8 (instigator perspective)
You are in the left lane waiting for a green arrow. When the left turn arrow light is given, you do not move because you are not paying attention. The driver behind you taps his/her horn to get your attention and you give him/her the middle finger in your rearview mirror.

Table 3: Examples of the wording and differences between recipient and instigator versions of scenarios of aggressive driving.
2.2.2 Causal attribution. In order to measure causal attributions, the first question following each of the scenarios asked participants to choose the most likely cause of the perpetrator’s behaviour from the four options given (adapted from Martin, 1995). The response options for this question were worded so that they gave a plausible example of each of the four categories of attribution discussed above while still allowing the same response options to be used for the instigator and recipient roles. Thus participants in recipient role were instructed as follows: “Thinking about the actions of the other car driver in the situation, which of the following descriptions would best explain their behaviour? (please circle only one)”. For the instigators, the wording was as follows: “Thinking about your actions in relation to the other car driver in the above situation, which of the following descriptions would best explain your behaviour? (please circle only one)”. In this study these response options were: ‘bad luck’ (external, unstable); ‘the road or traffic conditions’ or ‘the road-sign and road markings’ (external, stable); ‘a mistake in your/their judgement at the time’ (internal, unstable); and ‘shortcomings in your/their driving ability’ (internal, stable). In an attempt to minimise response bias (Shaughnessy & Zechmeister, 1997), the order of the response options were rotated on each scenario.

2.2.3 Perceptions of what actions constitute aggressive driving. For each scenario, the second question asked participants to rate the extent to which they agreed that the behaviour depicted in the scenario was an example of aggressive driving (1 = “Strongly disagree” to 5 = “Strongly agree”).

2.2.4 Perceived emotional impact of aggressive driving on the recipient. The final question related to the perceived emotional impact of the depicted incident on the recipient
(though as mentioned previously, the labels instigator and recipient were not used in the materials). Both instigators and recipients were asked to rate how strongly they thought the recipient would experience each of four different emotions (anger, frustration, fear, intimidation) as a result of the instigator’s behaviour using a 5-point scale (1 = “not at all” to 5 = “very strongly”).

2.2.5 Control variables. In order to examine participants’ general levels of aggression and driving anger, Section 2 of the questionnaire consisted of the 29 item Aggression Questionnaire (Buss & Perry, 1992) and the 33 item Driving Anger Scale (DAS) (Deffenbacher et al, 1994).

Lastly, Section 3 collected demographic information relating to gender; age, income, current driver's licence, number of years driving; number of hours/week driving. A final item related to prior driving history, asking respondents how many crashes and traffic offences they had been involved in as driver over the previous 3 years.

2.3 Procedure

After random assignment to either a instigator group or a recipient group, participants received the corresponding version of the survey with the driving scenarios presented from the perspective of the instigator or recipient respectively. Student participants completed the survey at a prearranged time and location on campus. The other participants completed their questionnaires in their own homes and returned them to the researchers.

3. Results

3.1 Causal attributions of aggressive driving incidents
Mean attribution scores for each of the four causes were derived based on the frequency of their selection over the eight scenarios. These were calculated separately for the recipient and instigator groups (see Table 4). In addition, to address whether there were any overall differences between the groups in their attributions of external versus internal causes, a new variable was created. This first required the creation of “total internal causes” and “total external causes” scores from the counts of endorsements of these two causal types. From these the new variable represented the difference between the endorsement scores of internal versus external attributions for each group.

Overall, as can be seen in Table 4, the results indicated that recipients were significantly more likely than instigators to report the aggressive behaviour depicted in the eight scenarios as internally caused, (that is, due to shortcomings in driving skills or mistakes in judgement) than externally caused ($M = 5.23$, $SD = 3.03$; $M = 3.08$ $SD = 3.27$; $t (191) = -4.72$, $p < .001$, $\eta^2 = 0.10$). This supports Hypothesis 1. Nevertheless, both groups were more likely to endorse internal causes rather than external causes as reflected in the higher mean scores for internal causes than for external causes for recipients and for instigators. However, they differed significantly in the degree to which they did this as well as in the extent to which they thought this reflected stable versus unstable factors. That is, both instigators and recipients more often attributed the aggressive behaviours to either a mistake in judgement (internal, unstable) or shortcomings in driving ability (internal, stable) ($M = 5.51$, $SD = 1.63$; $M = 6.54$ $SD = 1.66$ respectively). Consistent with the actor-observer bias, recipients ($M = 3.60$, $SD = 2.01$) were more likely than instigators ($M = 2.50$, $SD = 1.83$) to endorse shortcomings in driving skills (stable) as the cause ($t (191) = 4.00$, $p < .001$). When external attributions were examined separately, instigators ($M = 2.42$, $SD = 1.65$) were more likely than recipients ($M = 1.30$, $SD = 1.47$) to attribute the depicted aggressive driving to the
stable external causes of the road or traffic conditions ($t(191) = -5.00, p < .001$). The external unstable cause of bad luck was seldom endorsed by either group.

<table>
<thead>
<tr>
<th>Attributed cause</th>
<th>‘Recipient’ group</th>
<th>‘Instigator’ group</th>
<th>$t$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mistake in judgement</td>
<td>2.94 (1.55)</td>
<td>3.02 (1.62) ns</td>
<td>$t(191) = -0.36, ns$</td>
</tr>
<tr>
<td>Shortcomings in driving skills</td>
<td>3.60 (2.01)</td>
<td>2.50 (1.83)**</td>
<td>$t(191) = 4.00, p &lt; .001$</td>
</tr>
<tr>
<td><strong>External</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bad luck</td>
<td>0.40 (0.77)</td>
<td>0.52 (1.01) ns</td>
<td>$t(191) = -0.91 ns$</td>
</tr>
<tr>
<td>Road conditions</td>
<td>0.90 (1.17)</td>
<td>1.90 (1.40)**</td>
<td>$t(191) = -5.42, p &lt; .001$</td>
</tr>
<tr>
<td>Total internal causes (mistake or shortfalling in skills)</td>
<td>6.54 (1.66)</td>
<td>5.51 (1.63)**</td>
<td>$t(191) = 4.31, p &lt; .001$</td>
</tr>
<tr>
<td>Total external causes (bad luck or road conditions)</td>
<td>1.30 (1.47)</td>
<td>2.42 (1.65)**</td>
<td>$t(191) = -5.00, p &lt; .001$</td>
</tr>
<tr>
<td>Difference scores for attribution source (total internal – total external rating)</td>
<td>5.23 (3.03)</td>
<td>3.08 (3.27)**</td>
<td>$t(191) = 4.72, p &lt; .001$</td>
</tr>
</tbody>
</table>

*** $p < .001$

Table 4: Recipient and instigator mean attribution scores for four different causes (internal-stable, internal-unstable, external-stable, external-unstable) over eight aggressive driving scenarios.

3.2 Perceptions of aggressiveness of the scenarios

To test whether the recipients of aggressive driving acts would be more likely to perceive the behaviour as aggressive than would the instigators, a repeated measures MANOVA procedure was used, with driver group (recipient, instigator) as the independent variable and driving situation (the 8 scenarios) as the dependent variable. This revealed a significant main effect for scenario $\Lambda = .37, F(7,183) = 44.48, p < .001, \eta^2 = 0.63$ and a significant interaction of driver type x scenario $\Lambda = .69, F(7,183) = 11.35, p < .001, \eta^2 = 0.30$. 

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Post hoc testing of the mean ratings of agreement using Fisher’s Least Significant Differences test revealed that there were significant differences between recipients and instigators for specific scenarios (see Table 5). While this was expected, the pattern of differences was more complex than anticipated.

Generally, both recipients and instigators agreed that all the scenarios were examples of aggressive driving (i.e. rated them higher than 2.5 on the 5 point scale). The results were partially supportive of Hypothesis 2, in that recipients agreed more strongly than instigators that Scenarios 1 (preventing overtaking), 3 (weaving in heavy traffic), and 4 (weaving in light to moderate traffic) were aggressive. However, for Scenarios 2 (cutting off at roundabout), 7 (lights on full beam) and 8 (rude gesture at lights), the instigators gave significantly higher mean ratings of agreement than did the recipients.

Scenario 5, which involved flashing lights from behind the recipient, appeared to be a special case of aggressive behaviour. There was no significant difference between recipients and instigators in the levels of agreement for this scenario. However, this scenario was the one that recipients agreed most strongly was aggressive and it ranked second highest amongst the instigator ratings.
Table 5: Mean ratings of agreement that the driving instance in each scenario was an example of aggressive driving

<table>
<thead>
<tr>
<th>Situation</th>
<th>Driver type</th>
<th>Recipients</th>
<th>Instigators</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1: prevent recipient overtaking truck</td>
<td>3.45</td>
<td>2.95*</td>
<td>0.44, (p &lt; .05)</td>
<td></td>
</tr>
<tr>
<td>Scenario 3: weaving in traffic on motorway (heavy traffic)</td>
<td>4.1</td>
<td>3.55**</td>
<td>0.55, (p &lt; .01)</td>
<td></td>
</tr>
<tr>
<td>Scenario 4: weaving in traffic (light/moderate traffic)</td>
<td>3.6</td>
<td>2.9**</td>
<td>0.73, (p &lt; .01)</td>
<td></td>
</tr>
<tr>
<td>Scenario 5: flashing headlights from behind recipient</td>
<td>4.45</td>
<td>4.1</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Scenario 6: rude gesture to car that has followed for some time</td>
<td>3.55</td>
<td>3.8</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Scenario 2: cutting off recipient at roundabout (heavy traffic)</td>
<td>3.6</td>
<td>4.2**</td>
<td>0.49, (p &lt; .01)</td>
<td></td>
</tr>
<tr>
<td>Scenario 7: failure to dim headlights for oncoming traffic at night</td>
<td>2.6</td>
<td>3.5**</td>
<td>0.84, (p &lt; .01)</td>
<td></td>
</tr>
<tr>
<td>Scenario 8: rude gesture to recipient honking to get your attention</td>
<td>3.2</td>
<td>3.8**</td>
<td>0.60, (p &lt; .01)</td>
<td></td>
</tr>
</tbody>
</table>

*\(p < .05\); ** \(p < .01\)

3.4 Perceptions of the emotional impact of aggressive driving

A MANOVA procedure with repeated measures was used to assess whether there were any differences between the perceptions of recipients and instigators in relation to the emotional experiences of recipients of aggressive driving (Hypothesis 3). Again, driver type (recipient, instigator) was the independent variable with driving situation (the 8 scenarios) as the dependent variable.

Significant main effects for scenario \(A = .17, F(28,155) = 28.04, p = .001, \eta^2 = 0.85\) and for driver type were obtained, \(A = .67, F(4,179) = 22.06, p = .001, \eta^2 = 0.33\). The interaction of scenario x driver type was also significant, \(A = .60, F(28,155) = 3.74, p = .001, \eta^2 = 0.40\). Figures 1 to 4 display the recipient and instigator mean ratings for recipient anger, frustration, fear and intimidation respectively, across the eight scenarios.
Contrary to expectations, instigators gave mean ratings of the recipients’ emotional experience that were higher across all 8 scenarios than the mean ratings given by the recipients. More particularly, as can be seen in Figures 1 and 2, the instigators perceived that recipients would experience anger and frustration at higher than moderate levels for all scenarios except Scenarios 3 (weaving in heavy traffic) and 4 (weaving in light to moderate traffic). Post hoc testing revealed that differences for both anger and frustration were significant (p < .01 or p < .05) for all scenarios except Scenarios 1 (preventing overtaking) and 4 (weaving in light to moderate traffic). Recipients rated their own likely anger and frustration responses at a moderate level for all scenarios except Scenarios 3 (weaving in heavy traffic) and 4 (weaving in light to moderate traffic), which received lower ratings. For recipients, Scenarios 1 (preventing overtaking) and 2 (cutting off at roundabout) were perceived as likely to evoke moderate to strong anger, while Scenarios 2 and 5 (flashing lights from behind) were perceived as likely to evoke moderate to strong frustration.

Figure 1: Mean ratings of recipient's anger for aggressive scenario-based driving incident

![Figure 1: Mean ratings of recipient's anger for aggressive scenario-based driving incident](image)
Both instigators and recipients gave lower mean ratings for fear and intimidation than they gave for anger and frustration across all the scenarios (with the exception of Scenario 5). Although instigators were inclined to give significantly higher ratings for each of these emotions for most scenarios, their ratings still indicated an expectation that recipient responses would be mostly mild for these two emotions. The exceptions to this were Scenarios 3 (weaving in heavy traffic) and 5 (flashing lights from behind) for fear and Scenario 5 for intimidation. For these exceptions, instigator mean ratings equated to a perception that the recipients would experience moderate levels of fear (Scenarios 3 and 5) and strong levels of intimidation (Scenario 5 only). Recipients also thought Scenario 5 (flashing lights from behind) would be experienced as intimidating though their ratings equated to a mild response.
Figure 3: Mean ratings of recipient's experience of fear for aggressive scenario-based driving incident

Figure 4: Mean ratings of recipient's experience of intimidation for aggressive scenario-based driving incident
4. DISCUSSION

Consistent with the actor-observer bias, and findings of other driving studies (e.g., Baxter, et al, 1990; Hennessy, et al, 2005) the participants assigned to the recipient role in this study were significantly more likely than those assigned to the instigator role to endorse inadequacies in the instigators’ driving skills (internal-stable) as the cause of the aggressive driving acts depicted in the scenarios. Similarly, the instigators were significantly more likely than recipients to attribute the depicted driving acts to external causes. While the actor-observer bias would predict that instigators would be more inclined to attribute their behaviour to external rather than internal causes, this was actually not the case in our study as perpetrators were more likely to endorse lapses in judgement or errors (internal-unstable) as the cause of the aggressive act rather than road conditions or bad luck (external causes) albeit to a lesser extent than the recipients. This suggests that far from being unaware that aggressive driving acts are under the control of the driver, the instigators did see the perpetrating driver as having responsibility, but downplayed this somewhat in comparison to the recipients by attributing the behaviour to temporary lapses in judgement. Such attributions could be seen to be self-esteem preserving for the instigators in that they allow drivers to acknowledge the behaviour without regarding it as a permanent flaw in character or in driving ability. It may also be that for these driving situations the idea that traffic or road conditions caused the behaviour were implausible to instigators and are inconsistent with a sense of being in control of their driving. There are positive implications for intervention from the instigators’ attributions since errors and lapses may be perceived as causes that are open to modification by the driver, an interpretation that is consistent with Weiner’s (1986) propositions. Thus drivers who interpret their behaviour as a mistake might be more receptive to messages emphasising the unintended outcomes of such behaviour on self and others and better able to think of, or act on, suggested remedial actions.
In terms of the perceptions of whether the driving scenarios were aggressive or not, the results were complex. Again, consistent with what might be expected under the actor-observer bias, recipients agreed that all of the driving acts depicted were aggressive. While the instigators also perceived the behaviours as aggressive, the two groups differed in their levels of agreement for different driving scenarios. One explanation for this may lie in differences in the perceptual focus of the two groups. When asked to imagine themselves in the driving scenarios of the study, the two groups appeared to focus on different aspects of the scenario. Instigators appeared to consider the apparent degree of deliberateness of the act as well as its potential consequences, agreeing more strongly that those acts which were arguably more deliberate were aggressive in nature. Thus instigators tended to agree more strongly that scenarios depicting cutting other drivers off, flashing lights, rude gestures and horn honking were aggressive. This suggests that the significance of the perceived intentionality of driving acts differs depending on the point of view of the driver, with drivers in the actor position (that is the instigators) more inclined to consider driver aggression in terms of intent to harm, if we interpret harm broadly as including emotional, self-esteem or psychological harm. Observers, on the other hand (the recipients in our study), appeared to consider driver aggression more in terms of outcome than intent, leading them to rate as aggressive those acts where intent was more ambiguous. Thus recipients agreed more strongly that potentially dangerous acts such as weaving in traffic and preventing overtaking were more aggressive.

The results for Scenario 5, flashing lights from behind the recipient, suggest that this behaviour is a ‘special case’. For recipients it may be that flashing one’s lights from behind another driver to get that person to move out of the way was perceived as the most aggressive behaviour because in real life, this behaviour is generally accompanied by tailgating and a sense of urgency to respond which may be felt as threatening to one’s safety. For instigators
the high agreement that this behaviour is aggressive may have resulted from their apparent
focus on the deliberateness of the behaviour: it would be difficult to argue that flashing one’s
lights is not a deliberate behaviour. The similar, but lower, ratings of agreement between the
two groups about the aggressiveness of Scenario 6 (rude gesture) would tend to support this
interpretation. For recipients, a rude gesture is not exactly a threat to safety while for
instigators it is certainly a deliberate act. Taken together, these results suggest that it is
important to address the issue of intentionality in the way that driver aggression is defined
and researched.

In keeping with these previous two findings, the ratings of the emotional impact of the
aggressive acts on the recipients were not in line with expectations. Recipients appeared to
think that most of the depicted behaviours would evoke milder responses for them than the
‘perpetrators’ thought would be the case. Both groups were inclined to see anger and
frustration as more likely responses than fear or intimidation, and gave ratings of moderate to
strong anger and frustration for Scenarios 2, 5, 7 and 8. Scenario 5 (flashing lights) appeared
to be a special case for the instigators, who gave this scenario the highest rating for
intimidation of the recipient and also ratings equivalent to moderately strong responses for
anger, frustration and fear. As mentioned above, these perceptions may be due to the
deliberateness of this behaviour and the likelihood that it is accompanied by tailgating. It is
unclear why recipients did not perceive it as likely to result in emotions of fear or
intimidation. This may be an accurate portrayal of how the participants would really respond
on the road. Alternatively, it may be that recipients are unwilling to admit that they might
actually feel afraid or intimidated under the circumstances depicted for fear of being
evaluated negatively. It may also be that the scenarios were too artificial for recipients to
imagine their real life responses.
In line with protecting themselves psychologically, it was expected that instigators would see their aggressive behaviours as less likely to have an impact on the recipients than would the recipients themselves. This was clearly not the case, and instigators gave ratings for recipient anger or frustration on some scenarios that were considerably greater than those of the supposed recipients. Again it appears that instigators did not attempt to deny responsibility for the behaviours they were depicted as engaging in. However, as with their ratings of agreement of scenarios as aggressive, instigators appeared to consider the intentionality of the behaviour in their assessments of the impact on the recipients: the more deliberate acts attracting higher ratings of the effect on the recipient. It could be argued that the instigators felt more responsible for the acts they perceived as deliberate and thus gave higher estimates of their impact. Another interpretation is that these findings may reflect the hypothetical nature of the scenarios and this may have increased the instigators willingness to accept responsibility for the perceived outcomes.

The recipients’ ratings are less easy to explain. Though they agreed that the scenarios were aggressive, and the extent of their agreement appeared to depend on the possible safety consequences of the behaviour depicted, paradoxically they did not give higher ratings than those of the instigators, and some ratings suggest that they did not think they would feel affected by the behaviour. As with the results for emotional impact, it may be that the artificial nature of the scenarios made it difficult for the recipients to accurately assess their likely emotional response. Alternatively, it may be a general reluctance on the part of participants to endorse strong emotions in relation to the behaviour of others for reasons of social desirability.

There appeared to be differences in the scores on the DAS for instigators and recipients such that instigators reported higher levels of driving anger. However, instigator scores still fell in the low-to-moderate driving anger range and thus have not been regarded as
representing a meaningful difference in usual driving anger. Moreover, it is possible that this
difference resulted from the presentation order of the materials. Instigators may have been
somewhat primed to report slightly more anger in response to the DAS items because they
read and responded in an instigator role to the driving scenarios first. Alternatively, it may be
that recipients, in reading the scenarios first, may have been primed to suppress their anger
somewhat in responding to the DAS.

4.1 Limitations

This study relied heavily on hypothetical scenarios, and as discussed above, some
participants may have had difficulty imagining themselves as the driver in the scenarios thus
making their responses less realistic. Moreover, there was no manipulation check conducted
to estimate the extent to which participants were able to identify with the two roles. This
would be vital to include in future studies.

The nature of the description of the scenarios was simplistic in nature and in real on-
road driving there are obviously many more variables that can have an influence on a
person’s driving behaviour. Hence the results may not be readily generalised to real road
driving. However, it is likely that the scenarios used here were not unfamiliar to participants
whether in the victim role or the perpetrator role, and most drivers would probably have
encountered each of these situations in the victim role at some time during their driving
experience. If the surveys of drivers are to be believed, a large proportion of the participants
will also have carried out the perpetrator behaviours as well, lending some level of
authenticity to the approach.

A further limitation was the relatively small sample size and the convenience basis of
sampling used and so caution should be exercised in generalising to wider populations.
5. CONCLUSIONS and IMPLICATIONS

While some of the results found in this study confirmed the effect of the actor-observer bias on recipient perspectives, results for instigators were only partially consistent with initial expectations. However, the findings do suggest a range of significant differences in the perspectives of recipients and instigators, which have important implications for defining, researching and managing driver aggression. In real on-road situations these may have implications for whether incidents of conflict escalate into serious episodes of driver aggression. For instance, the recipient perspectives towards the driving scenarios suggest that actions by other drivers that appear to threaten safety are more likely to be of concern than those indicating rudeness. Thus it may be that drivers are more likely to feel angry in those situations in which they feel another driver has placed them at greater risk as opposed to where the other driver has acted in a discourteous way.

The finding that instigators, rather than dismissing the depicted acts as completely beyond their control did attribute them to internal but unstable causes is a positive one as it suggests that such behaviours may be perceived by drivers as modifiable. This leaves open the possibility that interventions could appeal to drivers’ sense of self-efficacy to suggest strategies for overcoming plausible and modifiable attributions such as lapses in judgement or errors that might be perceived as underlying aggressive driving acts. Messages such as these are amenable to delivery in media campaigns and through other forms of public education. While such approaches may not have an impact on the more extreme forms of aggression such as road violence, they may be entirely appropriate and effective with the milder, and arguably much more common, forms of aggressive driver behaviour likely to be perpetrated by the everyday driver.
References


Dula, CS & Geller, ES. (2003). Risky, aggressive or emotional driving: addressing the need for consistent communication in research. *J of Safety Research 34* 559-566


Ellison-Potter, P. A. (2003). *The effects of anonymity, aggressive stimuli, and trait anger on aggressive driving behavior: A laboratory simulation.* ProQuest Information and Learning, US.


National Committee on Violence, 1990 *Violence: Directions for Australia* Australian Institute of Criminology: Canberra


Raub, RA., Wark, RL., & Luck, RE. (2001). Seeking a reduction in aggressive driving through different strategies. *Transportation Research Record, 1803*: 22-29


