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“Teaching them a lesson?” A qualitative exploration of underlying motivations for driver aggression

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Highlights

Aggressive driving was used as a way to ‘correct’ the driving of others

Recipients of mild aggressive behaviours experienced these as personal criticism

Drivers perceived deliberate aggressive driving as justification for retaliation in kind

Apparently mild aggressive driving interactions may thus lead to escalation

Potential for escalation implies milder aggressive driving warrants greater attention

Abstract

Aggressive driving is increasingly a concern for drivers in highly motorised countries. However, the role of driver intent in this behaviour is problematic and there is little research on driver cognitions in relation to aggressive driving incidents. In addition, while drivers who admit to behaving aggressively on the road also frequently report being recipients of similar behaviours, little is known about the relationship between perpetration and victimisation or about how road incidents escalate into the more serious events that feature in capture media attention. The current study used qualitative interviews to explore driver cognitions and underlying motivations for aggressive behaviours on the road. A total of 30 drivers aged 18-49 years were interviewed about their experiences with aggressive driving. A key theme identified in responses was driver aggression as an attempt to manage or modify the behaviour of other road users. Two subthemes were identified and appeared related to separate motivations for aggressive responses: ‘teaching them a lesson’ referred to situations where respondents intended to convey criticism or disapproval, usually of unintended behaviours by the other driver, and thus encourage self-correction; and ‘justified retaliation’ which referred to situations where respondents perceived deliberate intent on the part of the other driver and responded aggressively in return. Mildly aggressive driver behaviour appears to be common. Moreover such behaviour has a sufficiently negative impact on other drivers that it may be worth addressing because of its potential for triggering retaliation in kind or escalation of aggression, thus compromising safety.

Key words

Aggressive driving; interviews; qualitative research; psychological motivation

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1 Introduction

In highly motorised countries aggressive driving is increasingly cited as a concern for motorists (AAA Foundation for Traffic Safety, 2009; Beirness, Simpson, Mayhew & Pak, 2001; Mizell, 1997). Moreover, findings from the USA, UK and Australia suggest that driver aggression is associated with elevated crash involvement (Beirness, 1993; Chliaoutakis et al., 2002; King & Parker, 2008; Mann et al., 2007; Wells-Parker et al., 2002). The exact contribution of driver aggression to crash incidence and crash risk remains unclear (Dula & Geller, 2003; Marshall & Thomas, 2000; Smith, 2006; Tasca, 2000) due to variation between studies in the definition of aggressive driving and the precise behaviours regarded as driver aggression as well as their operationalisation (Dula & Geller, 2003). Nonetheless, the available evidence suggests that the issue of driver aggression is important, with non-trivial consequences for road safety (see Mizell, 1997 and AAA Foundation for Traffic Safety, 2009 for estimates of prevalence).

Although research and official data sources suggest that severe incidents of driver violence, such as homicide or assault, are relatively rare, milder forms of behaviours normally regarded as driver aggression, such as tailgating, horn-honking and obscene gestures, appear to be much more common (Galovski, Malta, & Blanchard, 2006). Results from self-report studies suggest that the majority of drivers in the US and UK are affected by these milder behaviours, either as a recipient or perpetrator (Hemenway, Vriniotis, & Miller, 2006; Joint, 1997; Miller, Azrael, Hemenway, & Solop, 2002; Walters, Pezoldt, Womack, Cooner, & Kuhn, 2000; Wells-Parker et al., 2002). Australian surveys report similar figures to those of the UK, with a national survey of 2,380 drivers finding that 82% of drivers reported having ever been recipients of mild forms of driver aggression and around 30% reporting having been followed or chased by another driver. More than half (57%) of these drivers admitted having been the instigators of mild driver aggression (AAMI, 2007). Moreover, there appears to be a strong positive relationship between these two roles, such that those who admit to engaging in aggressive driving behaviours are significantly more likely to report having been recipients and vice versa (Asbridge et al., 2003; Roberts & Indermaur, 2005a; Smart & Mann, 2002; Smart et al., 2003; Smart et al., 2005; VCCA, 1999).

Some of the personal and situational factors associated with aggressive driving are now well established. Being male or being younger have consistently been shown to have strong associations with greater tendency for involvement in aggressive driving incidents or self-reported aggressive driving behaviours (Hennessy & Wiesenthal, 2001, 2002, 2004; Krahe & Fenske, 2002; Lajunen et al., 1998; Lonczak, Neighbors, & Donovan, 2007; Tasca, 2000; Westerman & Haigney, 2000). Similarly, higher levels of trait stress, trait and state anger, and negative affect are each positively associated with driver aggression (Deffenbacher, Deffenbacher, Lynch, & Richards, 2003; Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003; Deffenbacher, Lynch, Oetting, & Yingling, 2001; Hennessy & Wiesenthal, 1997; Hennessy, Wiesenthal, & Kohn, 2000; Kontogiannis, 2006; Matthews, Dorn, & Glendon,

1991; Nesbit, Conger, & Conger, 2007). Personality characteristics such as propensity to sensation seeking and risk-taking have been shown to be significant predictors of aggressive driving (Bone & Mowen, 2006; Dahlen & White, 2006; Jonah, Thiessen, & Au-Yeung, 2001; Lonczak et al., 2007), as has narcissism and inflated self-esteem (Britt & Garrity, 2006; Schreer, 2002). In addition, several situational factors appear to be influential including the relative anonymity of the driving context (Ellison-Potter, 2003; Ellison-Potter, Bell, & Deffenbacher, 2001; Ellison, Govern, Petri, & Figler, 1995; Lowenstein, 1997), stress of the driving task (Matthews, Tsuda, Xin, & Ozeki, Hennessy & Wiesenthal, 1997, 1999; Hennessy et al., 2000; 1999; Wickens & Wiesenthal, 2005) and presence of life stresses (Lowenstein, 1997).

As well as focussing on the personal and situational factors associated with driver aggression, recent research has led to several theoretical explanations of driver aggression, including social maladjustment theory and personal maladjustment theory (Galovski et al., 2002; Galovski et al., 2006; Hennessy & Wiesenthal, 1997; Hennessy, Wiesenthal, & Kohn, 2000; Kontogiannis, 2006). These models suggest that driver aggression is a product of antisocial disorders (such as conduct disorder, intermittent explosive disorder) or high levels of anger, negative affect or stress. While these models appear to account reasonably well for more extreme driver acts such as violence, they do not offer an explanation for the milder, more commonly reported driver aggression behaviours which are arguably more likely to contribute to a larger number of crashes. One traffic-specific attempt to account for driver aggression is Shinar's frustration-aggression model (Shinar, 1998; Shinar & Compton, 2004). In this approach, it is argued that the increasing levels of congestion, and therefore frustration, on modern roadways has led to greater levels of aggression among drivers as their individual frustration tolerance levels are exceeded more regularly. While this model has appeal and provides an explanation of milder as well as more serious driver violence, there has been evidence that greater congestion does not necessarily lead to greater frustration (Lajunen et al.) and the view that frustration generally leads to aggression has been refuted in research on general aggression within psychology (Baron & Richardson, 1994).

Despite the quantity of research that has been carried out in relation to aggressive driving, understanding of the motivations underlying this behaviour is poor. In part this has been hampered by the lack of a universally accepted definition for aggressive driving (as mentioned above) though there are signs that there is progress on this issue with the growing agreement about the importance of including the intentions of drivers in any definition (Dula & Geller, 2003; Tasca, 2000). The inclusion of intent to harm or cause a negative impact is in keeping with views and definitions of aggression in the general psychology literature (see Baron & Richardson, 1994; Anderson & Bushman, 2002) and is a departure from previous descriptive discussions of driver aggression where particular behaviours may be regarded as aggressive while being ambiguous in intent. However, while researchers may be beginning to reach consensus, as yet little is known about how drivers conceptualise their own behaviour when they behave aggressively towards others on the road. While there has been research that has explored the relationship between self-reported anger and driving aggression (Deffenbacher et al., 2003; Deffenbacher et al., 2001; Nesbit et al., 2007), such

relationships are less well elaborated for other negative emotions. There is also a paucity of research exploring the role of cognitions in aggressive driving incidents, though recently there has been growing attention to the kinds of attributions that drivers make about other drivers (Britt & Garrity, 2006; Lennon, Watson, Arlidge & Fraine, 2011; Matthews & Norris, 2002; Parker, Lajunen, & Stradling, 1998; Roseborough, Wiesenthal, Flett & Cribbie, 2011; Vallieres, Bergeron, & Vallerand, 2005). In addition, little is known about the relationship between perpetration and victimisation or about how road incidents escalate into the more serious events that capture media attention. Understanding these aspects of driving aggression may help illuminate how drivers deal with the aggressive driving behaviour of others and how they respond to potential triggers for aggression on the road. All of these questions suggest that fundamental research is needed to inform our understanding of the phenomenon.

The study described below forms part of a larger program of research that is aimed at developing a more comprehensive model of aggressive driving than has been applied in the road safety area to date and which incorporates current mainstream psychological understanding of aggression. Thus the model is based in large part on the General Aggression Model (Anderson & Bushman, 2002). In this model, trigger events on-road are perceived (or not) by a driver who then makes cognitive and affective appraisals which form the basis for his/her behavioural choices (see Figure 1). A driver's particular cognitive and affective appraisals are influenced by his/her personal characteristics (such as personality or propensity to hostility) and aspects of the situation (such as the level of congestion). The current study was designed to explore drivers' self-reports of cognitions and affect in order to elaborate and refine this aspect of the model. The model and its theoretical underpinnings have been described in more detail elsewhere and the interested reader is referred to Soole, Lennon, Watson and Bingham (in press).

For the current study, a starting definition of aggressive behaviour based on the general aggression literature was adopted. Aggressive driving was defined as comprising three essential qualities: that the behaviour is intentional in nature; that it is intended to have an impact on the other driver; and that this impact is intended to be negative. The intensity of the intended impact can vary from fairly mild, for instance psychological discomfort, to the very severe, which might be potentially life threatening (eg. forcing someone off the road). The way that this definition was used in the research is discussed in more detail below.

Aim

This study aimed to explore driver experiences of aggressive behaviours on the road from an interactive perspective encompassing the experiences of drivers traditionally identified as perpetrators and victims. The primary focus of the research was to investigate driver motivations for behaving aggressively through exploring their thoughts/cognitions and emotions/affect. However, other interests were to gain more insight into how drivers deal with the aggressive behaviours of others as well as how they manage their own frustration, anger or other negative affect on the road.

Insert figure 1 about here

2. Method

In order to examine the lived experience of participants more closely and to obtain detailed descriptions of internal processes, particularly the thoughts and emotions associated with episodes of driving conflict and the motives drivers express in relation to their responses, qualitative methods were chosen for this study. .

2.1 Sample recruitment

A convenience sample (n = 30) of drivers in two age groups (18-24 years; 25-60 years) was recruited via several different means in Brisbane, Queensland, during March-May 2010. Students (n = 12; 4 men aged 18-24 years; 2 women aged 18-24 years, 3 men aged 25-60; 3 women aged 25-60) enrolled in first year psychology courses were recruited via broadcast email in exchange for course credit. Community participants (n = 18; 5 men aged 18-24 years; 5 women aged 18-24 years, 3 men aged 25-60; 5 women aged 25-60) were invited to participate via posters at local shopping areas, approaches to a technical training college and word of mouth. Community participants were offered gift vouchers to the values of AU\$40 in recognition of their time and associated travel costs.

Though theory on qualitative data collection recommends sampling to the point of thematic saturation (Bowen, 2008), in practice funds are sought for specific sample sizes that generally have to be argued and justified prior to receipt of funds and any recruitment of participants. Hence the number of drivers to interview in this study was initially based on prior studies of this nature. Saturation, that is, the point at which a predetermined number of consecutive interviews (often set at 2 or 3) cease to yield new material of interest, may be reached as early as after 6 interviews (Guest, Bunce & Arwen, 2006) and thus this number was used as the basis for the sample size for each age group in this study. In practice, there was the opportunity to carry out extra interviews in most of the age groups (an additional 5 overall), however, saturation was already evident for most themes prior to these extra interviews.

In all of the promotions to participate the study was described as being about “driving conflict.” The primary eligibility criterion was that participants held a current valid Queensland drivers’ licence (open or provisional, but not learner’s licence). However, since the focus of the study was on “driving conflict”, in practice, participants were asked to recall incidents of conflict between themselves and another road user. Thus a second eligibility criterion was the ability to recall examples of this. One participant was unable to recollect

having ever been in conflict with another road user and the interview was terminated after 5 minutes as a result.

2.2 Materials and procedure

In-depth, semi-structured interviews lasted between 35 and 45 minutes, with the majority lasting around 40 minutes. All interviews were conducted by the first author and were audio-taped for later transcription by professional typists. Written permission for the recording was sought from participants prior to the interview.

For the purposes of later interpretation of the material, a starting definition of aggressive behaviour based on the general aggression literature was adopted. As mentioned above, aggressive driving was defined as driving behaviour that is intended to have a negative impact (physical or emotional/psychological) on another road user. These behaviours vary along a continuum from mild to more extreme behaviours.

Due to the exploratory nature of the research, and in order to capture the broadest range of experiences as well as to minimise researcher influence over the incidents that participants chose to recount, the definition was not introduced into the sessions with participants. Instead, drivers were asked to talk about 'driving conflict' (as described above) which also was not predefined. Where respondents asked what was meant by 'conflict', they were told they could interpret this in whatever way was most relevant for them when driving. This approach appeared to be effective in generating a variety of recollections, with only a few accounts of incidents where interpersonal conflict could not be readily discerned. For all but one of these accounts of non-conflict driving situations, the participant verbally acknowledged (unprompted) that it probably wasn't an example of conflict and moved on to recall other conflict-related examples.

To facilitate rapport and to encourage respondents to think about their driving experiences generally, interviews began by asking participants to talk about the kind of driving that they normally did and what they liked and disliked about driving. Following this, the interviewer asked participants to focus on the most recent occasion where they had realised they were in conflict with another driver or road user and to describe what had happened. Drivers were asked to think in this way in order to encourage accounts of both the victim and perpetrator role. Probe questions then focussed on encouraging a detailed description of the respondent's recollections of the event sequence, and the thoughts and emotions associated with each of the incidents recounted.

2.3 Analysis

Thematic analysis (Braun & Clarke, 2006), using an interpretive framework, was conducted by the first author on the transcripts of the interviews. Analysis began early in the interviewing process and continued simultaneously with on-going interviews, allowing later

interviews to explore key themes identified in the earlier interviews. In the first step of this process, each transcript was carefully examined in order to identify text discussing concepts that appeared to be critical or interesting, which were then given labels (Braun & Clarke, 2006). As the examination of the transcripts progressed there was also a search for broad patterns of experience (Aronson, 1994) appearing across the interviews both in relation to the specific research interests as well as other, unanticipated or emergent issues. Considering and interpreting these together allowed the identification of the key themes. After this, the second step was the identification of those portions of each transcript that related to these broad themes, followed by identification of key subthemes and concepts within each main theme. Within this process, any one piece of text could be categorised as belonging to more than one theme or sub-theme since the text portions were at the level of whole sentences or paragraphs. As identification of the themes was based upon the initial research interests in driver thoughts and emotions connected with episodes of conflict on the road, the analysis was partially deductive (Braun & Clarke, 2006). However, as mentioned above, themes were permitted to evolve throughout the interview process, thus introducing semi-inductive analysis.

As mentioned previously, respondent behaviours were regarded as aggressive if they met the three criteria of intentionality, anticipated impact on another driver, and that this impact was intended to be negative.

3. Findings

In terms of the overall model of aggressive driving, driver comments suggested that the main trigger for aggressive driving was perceived provocation, consistent with literature in the general aggression area. Thus driver descriptions of the initiation of conflict involved perceptions that they or another driver had been deliberately rude or inconsiderate, had performed a risky or dangerous manoeuvre, or were impeding other people's progress in some way.

Three main themes emerged in the interviews in relation to driver thoughts and feelings. These were: the role of anger and other negative emotions in driver aggression; management of self-emotions and behaviour in relation to the perceived aggression of others; and ways in which drivers try to manage or modify the behaviour of other road users. It is beyond the scope of this paper to describe all three of these themes in detail. Instead, the focus of the current paper is on the last: drivers' attempts to modify the driving of others. This theme was chosen because the material categorised under it offers insight into the motivations underlying aggressive driver behaviours, and the cognitions and affect associated with them, the primary research interest.

Findings are organised according to two sub-themes and are supported with quotes from the transcripts. Descriptive details in relation to the respondents have already been given above. In the excerpts that appear below, gender and age of the respondent are given at the end of each quote in order that the reader can have a sense of the 'voice' of the participant.

3.1 Teaching them a lesson

The first subtheme has been labelled “teaching them a lesson”. In the material that was categorised under this theme, respondents described their thoughts, emotions and behaviour in response to another driver’s unintentional mistake or error, or intentional driving violation. While the descriptions respondents gave contained details of the impact of the other’s behaviour on the respondent, there was an apparent recognition that the other driver had probably not intended for this to happen. In this type of situation, respondents described their own intentions in terms of ‘informing’ the other driver or providing a prompt to the other driver. This prompt was intended to cause self-reflection and/or self-correction of a particular behaviour on the part of the other driver. The behavioural responses respondents reported engaging in to achieve this were presented by them as being benign in nature and, as such, not intended to have a negative impact on the other driver. However, though these responses were presented as non-aggressive, respondents’ descriptions suggested that they were intended as subtle (and arguably potentially misinterpretable at the mildest end of the range) or overt (at the most intense and unmistakable end of the range) criticisms or denigrations and as such could be anticipated to have a negative impact on the recipient driver. Thus, though these behavioural responses were not dangerous or physically aggressive, they still meet the criteria being used here to identify aggression.

These behaviours ranged in intensity. Some were quite mild behaviours, as here:

So it’s one of those things [non-rude gestures] where you’re making them aware that you’re aware of what they just did sort of thing. That makes me feel a little bit better maybe...Yeah because, you’re questioning their driving habits. The etiquette I suppose, that no one really teaches you...Sometimes I play a bit of a game with it, like if somebody does something quite wrong like they are not looking, whatever, I tend to-I don’t beep the horn-I deliberately sort of like I’ll wave to them. Like it’s friendly. But it makes them wonder “why is he waving to me?” and it’s more of a “Hi! You see me now?” and then I move on...Show them that their driving habits aren’t very good and people get annoyed with them. I think that’s why you do it. Man, 33.

I mean no one needs more danger when they’re on the roads, and when someone does something like that [dangerous/careless manoeuvre] you want to let them know, hopefully so they...will avoid doing similar things in the future. Like if you create a little incident [by flashing lights] in someone’s mind they might think a little more carefully about things they do in the future. Man, 23.

As illustrated in the quotes above, they often chose to convey this criticism using the milder forms of driver aggression such as horn honking and lights flashing as well as apparently ‘non-offensive’ gestures (eg shoulder shrugging), but where the pairing with the events would suggest that the ‘offending’ driver should infer criticism of his/her driving behaviour. Here the kind of flashing of the lights appeared quite distinct from use of headlights to try to pressure or intimidate a driver to move out of the way (that is, by speeding and/or tailgating while flashing the headlights or keeping them on full-beam). Some of the accounts contained a dual, and probably ambiguous, purpose from the point of view of the other driver. However, the respondent’s intention to convey criticism can still be discerned, as in these examples:

I flashed my lights....to let him know that...I was there and also it [cutting me off] wasn't exactly the right thing to do. Man, 22.

Probably like at night time if a driver sort of pulls in front of you or sort of cuts you off without enough room I probably flash my lights or something like that just to let them know that you're there and that they did cut you off. Woman, 19.

Respondents reported attempting to influence other drivers' future driving even when they also appeared to be aware that their efforts might be completely ineffective, as indicated by the following:

[L]ast night like someone's cut me off and I...flicked my lights at them...[put] the high beam on them. It's almost as if, like, you need to make them aware that...they've done this to you...[and in the past I would just] press on the horn and let them know that "hey you just cut me off!...are you aware of it?"...I don't know whether it's...thinking that if you let them know, that maybe they might think twice before doing something like that again. But I mean that kind of seems a bit silly, like, if that person does it all the time. So it probably made no difference but it's almost like it made me feel better, as if like, possibly they might have, you know, realised. Woman, 30.

Although most of the accounts, as illustrated above, described mild behaviours, there appeared to be a continuum of potential behaviours. Some respondents gave examples that were at the more serious end of the continuum. In these cases respondents appeared to have overstepped the line into behaviour that arguably while not dangerous (as in tailgating) was of a more intense nature designed to be difficult to ignore as well as indicating a greater degree of disapproval or criticism of the other driver, as illustrated here:

I think I probably beeped at them and flashed my lights at them, like probably the whole length of the road which is incredibly juvenile and puerile but they really annoyed me...but it's almost like that you want to get the message across to them that they've done something stupid and it was potentially a very dangerous thing to do. Which you know, if I hadn't been, if I hadn't been quick on putting the brakes on would have ended up with me and them actually touching...but there's that part of me that just kind of goes "No, they need to be taught a lesson" or they need to know how badly I feel. And I think that's actually why I did that. It's basically letting them know that "I was really pissed off by your actions." Because I mean I didn't actually harm them in any way apart from just be an absolute idiot and make a lot of noise. Woman, 49

It appears in this account that the non-risky nature of the chosen response allows the respondent to deny or at least minimise the negative impact on the other driver, even claiming that the harm (feeling criticised or judged) falls more on herself (in the form of looking foolish) than on the other driver.

For some of the respondents there appeared to be a hierarchy to the kinds of behaviours available to communicate one's disapproval or attempts to influence other driver's behaviour. The mildest and most acceptable seemed to be gestures that normally have non-offensive meaning, closely followed by flashing the headlights. Horn-honking was regarded as a level up in terms of its potential for giving offense or being interpreted as rude or aggressive:

I flashed my lights...I guess I didn't want to seem to rude or anything like that and the lights are probably more of a simpler way of putting it instead of going a bit crazy with the horn. Man, 22

Moreover, for some drivers this hierarchy was used to choose a response so that the level of disapproval being expressed matched the perceived seriousness of the 'transgression', something consistent with a notion of commensurate action. For instance:

I think the honking the horn is acknowledging that someone has done something like pretty [bad]...It's [honking the horn] one of the worst things but flashing lights is like "I see that you've done something wrong and you shouldn't have done it" but I'm just like acknowledging it but I don't, like yeah, say if it was on a scale of one to ten somewhere along like eight to ten would be honking and five to seven would be light flashing. And something other, something minor other than that would be-I wouldn't do anything because I just wouldn't care enough. Man, 19.

When respondents were asked how they felt about being the recipients of similar behaviours from other drivers, their responses were consistent with an experience of being criticised or chastised. That is, communications such as having someone's lights flashed at them or the horn honked were interpreted as messages about their driving and appeared to prompt a search for what error or mistake the respondent (as recipient) had made. However, their accounts also suggested that they perceived the implied negative criticism from the other driver and that this evoked emotional responses as well:

I believe I'm a good driver and I don't sort of often make mistakes and so if somebody does sort of hoot at me then I immediately think to myself, "What's their problem?" I don't do things, you know, "I don't do anything wrong." And then it will sort of, it will hang around with me for a while till I've actually worked out and got to the bottom of what I've done wrong so I can understand why they've done this thing to me....[and] sometimes I just can't work it out [even if] I think it through really carefully...the point I'm trying to make is that I take it very personally if somebody effectively comments on my driving through any of those ways [horn honking, lights flashing, hand gestures etc] because I feel it's a criticism and I don't feel that...I should be criticised when I'm driving you know, because it's-I think I'm a good driver. So it's immediately I will feel defensive and it will upset me, yeah. Woman, 47.

If I'm in that situation [where someone flashes their lights] I know that I've done the wrong thing...like, oh, I didn't see the car or I just wasn't paying enough attention...[and] I know that I'm in the wrong and it's just someone doing that sort of makes me feel more guilty in a way...[and] Embarrassment, I always feel embarrassed...Because someone's acknowledging that I've done wrong and then there's lots of people who are staring at me and then I feel like "ohhh I just want to get out of here" Man, 19.

Though most of the behaviours described under this sub-theme were not dangerous in themselves, three respondents gave examples of more extreme responses. These descriptions were characterised by a stated intention of intimidating other drivers or of choosing to express irritation and anger through risky or dangerous driving. All three referred to this behaviour as how they 'used to drive' when younger. As all three of these respondents were aged less than 36 years at the time of the interviews, where it was unclear, they were asked to indicate what they meant by 'younger'. For the men, this meant when they were aged under 25 years. For the woman, it meant prior to having children. Effectively, this was also when

she was under 25 years but it is unclear whether the behaviours she was referring to may have persisted until a later age if she not had children when she did.

In speaking of their aggressive behaviours, all three of these respondents recognised (unprompted) that these had been high risk for others as well as themselves, as illustrated in the following:

If someone had really, really bothered me, I can remember occasions when I would have tail gated them and like, gone right up behind them. Because that was my way of letting them know “you just, you know, almost wiped me out!” So somehow in retaliation for that I’m going to endanger both of us by making you nervous by being right up the back of your car....and when you sort of sit and rationalise it you go “geez that’s stupid [behaviour]”. Woman, 35

As well as acknowledging in hindsight the inherent unwisdom of their behaviour, there was also evidence that these respondents recognised their own responsibility for creating the situations in which they had responded aggressively to other drivers, as articulated by one of the men:

You know I was just angry [as a young driver]...I think it was just my personality. I was just one of those people everything has to be perfect maybe....And [if] this person has just cut me off or it’s ruined my timing to get to work and all sorts of reasons you come up with if somebody does something wrong you blame them for it. You know “that person’s making me late” or “that person made me not be able to get into the lane that I wanted to get into.” You know, silly things like that, which are not silly back then but [are] now. Man, 33.

In addition to these three aggressive drivers, there were many accounts that involved tailgating another driver from other respondents. However, none of these was in response to prior aggression from the other driver. That is, none was an example of retaliation as it is discussed below. Rather, respondents reported that they tailgated exclusively to convey their frustration or anger about the impact of another driver’s behaviour on them, such as being inadvertently cut off, being impeded by a slower driver or a near-miss crash situation, thus making them examples of “teaching them a lesson”. In this sense, this was the one dangerous aggressive behaviour that many respondents admitted to engaging in.

But you know in my own mind I’m thinking...“I’m tail gating. I’m too close to them but I’m going to let them know that they have really revved me up.”I always, when people do the wrong thing, I want them to go “oohhh hang on that’s because I just cut her off at that last intersection and so I’ve done the wrong thing so I’d better remember that in the future.”....I’m pretty sure that’s not what’s going through their head. [but] That’s what I would like them to think. I would like them to realise that oh “back about five hundred metres back there I did this and obviously that’s upset this person that I did that to.” Woman, 35.

3.2 Justified retaliation

The second subtheme discerned in the accounts was where respondents described being on the ‘receiving end’ of perceived intentional, and often serious or dangerous aggression from another driver and had chosen to respond in kind or retaliate. This has been labelled “justified retaliation”. In material categorised under this theme, respondents described themselves as choosing actions with the deliberate intention of frustrating, angering,

insulting, or denigrating the other driver, or venting their own anger or frustration as a result of another driver's intentional aggression. In most cases, the respondent felt justified in retaliating against what they experienced as an injustice or an infringement of their rights as a road user, their dignity as a person, or their safety. This sense of rightness/wrongness and justice was articulated very clearly by the following respondent:

...and he made a [rude] gesture. He flipped me the bird, he stuck his finger up at me...[so] I basically gave it back to him. Stuck my finger up at him and just kept on driving...[and] I guess, I felt an injustice against me I suppose is the best way to describe it.... it was [my thoughts were] "you're in the wrong. You have no right to react that way to me." Man, 30

In addition, a few of the justifications referred to preventing the other from 'winning' or succeeding in intimidating the respondent.

I'm not going to let them [driver who is being aggressive] win...if they're speeding to overtake and tailgating me and whatever else then I'm not going to give them the satisfaction of winning but then I'm not going to break the law either. Man, 24.

Accounts of this type often referred to more passive and resistant behaviours that were intended to thwart or frustrate the other by being uncooperative or passively obstructive while not behaving in a risky or illegal manner.

Most of the retaliatory behaviours were rude or inconsiderate rather than dangerous or risky. They included rude gestures (as above), verbal abuse or yelling at the other driver, horn honking and flashing the headlights, and passively preventing the other driver from moving in front or overtaking by refusing to speed up, slow down or voluntarily give way. However, some behaviours, while not being dangerous in themselves, clearly involved a lack of due care and attention on the part of both drivers, and thus presented elevated risk of a crash, as illustrated in this account:

I just thought "you idiot!" and belted my horn at him. And his response was to slow down and as we were going onto the [freeway] on ramp he was shouting at me and I wound down my window and I shouted back at him and for the first hundred, two hundred yards...[we] were just shouting back and forth, me calling him a pillock, [and shouting] What was he playing at? Did he not realise he could have got killed? Him telling me that I had no respect...My thought was that "if this bloke wants an argument I'll express my opinions to him. I'll tell him what I think whether he likes it or not."...I'm not going to hold back. Man, 35.

There was also evidence that some respondents experienced very strong responses to the perceived infringement of their safety or rights. One woman was so incensed by another driver's aggression towards her that she was prepared to confront him, apparently without much consideration for the possible consequences to her own safety:

[in response to tailgating from another driver] I got out at the traffic lights. He was behind me. I got out and took down his registration plate and I just clearly said to him, "what do you think you're trying to do?" Wrote down his rego, went home and called the police and just reported him for dangerous driving. I'm not really one to put up with any of that sort of nonsense....if you don't report these sort of people they just do it all the time and sooner or later they'll kill someone....It [other driver's tailgating] was very

intimidating and I don't really respond very well to people who try to intimidate me. I don't tend to sort of-I'm not the shrinking violet type. I sort of will stand up to people. Woman, 42

There were a few people who admitted that they had felt uncomfortable retaliating. There were also instances where respondents attached negative evaluations to their own responses and behaviours, suggesting that they regretted choosing to retaliate. One person described his experience as follows:

I don't like conflict and when that sort of thing [driving conflict] happens to me I feel like "This is ridiculous! I've let myself down. Why did I? What else could I have done there?" When you just-I don't know-When you just know someone who has been an absolute tosser. It doesn't have to be driving. [it could be] Just an obnoxious person watching the football near you...I remember feeling sort of disappointed, as I do on occasion if other things happen, that I've allowed it to upset me where I got to the point where I did the hand signal to him [the other driver]. Man, 49.

Similarly, negative evaluation is illustrated in this driver's words:

...and basically I sort of made a [rude] gesture [in response] like, you know, being immature and silly at the time. Woman, 30.

4. Discussion

These findings provide the beginnings of an explanation for several features of driver aggression that have not previously been well delineated in the literature: the apparent prevalence of milder forms of aggression amongst otherwise ordinary drivers; the underlying intentions of drivers in responding to other drivers' behaviour; the overlap between perpetration and victimisation of driver aggression; and the way that driver aggression can potentially escalate into serious road incidents.

Taking the prevalence of mild forms of driver aggression first, evidence from the respondents in this study suggests that the use of behaviours such as horn honking, lights flashing, and gestures was wide-spread amongst these drivers, consistent with results reported in other studies cited above. What the current study adds is that these behaviours are *intended* to have a negative impact on the other, that is, to be aggressive under the definition used in this study, even though some respondents minimised the level of negative impact. Almost all respondents admitted to using one or more of these methods to get messages across to other drivers about their driving behaviour (that is, not as a warning of impending collision) and some described using particular behaviours fairly regularly in this way. It thus appears that many drivers are prepared to act in mild aggressive ways as part of their normal repertoire of driving behaviours. Moreover, drivers apparently see little harm in their actions, and may indeed feel their behaviour is justified or even a necessary part of helping others to learn to be better drivers (as elaborated above and below). From a road safety point of view, what makes this of such concern is that the recipients of these actions are likely to feel provoked by them and may respond in ways that escalate the conflict and expression of the aggression (as we discuss further below).

In terms of the underlying motivation for their aggressive responses to the driving behaviours of others, respondents' descriptions of responses have been distinguished into two types based on whether the other's intent was perceived as deliberately aggressive or not.

"Justified retaliation" was associated with circumstances where respondents perceived the other driver's behaviour as intentionally trying to harm them, put them at greater risk, or infringe upon their rights as a road user and is consistent with a view of the driving situation as one where there are both potentially incompatible goals (getting to where they are going as quickly as desired) as well as some level of interdependence (relying on the other to share the roadway safely) which allows for interference with the attainment of the goal(s) (Hocker and Wilmot, 1985). Respondents appeared to feel their responses were proportionate to the other driver's behaviour and justified by it, even when their descriptions contained evidence that their responses had been risky. These behaviours were also wide-spread rather than confined to a few drivers. While most of the behaviours described were not dangerous in themselves, all had the potential to escalate the situation as discussed below.

Where the other driver's intentions were less clear or where respondents perceived that the behaviour was a result of careless or inattentive driving or poor driving skill, they described a continuum of responses ranging from very mildly aggressive, and perhaps ambiguous actions (eg. waving), through to more overt and unmistakable behaviours that were intended as criticism of the other driver and aimed at correcting the behaviour or "teaching them a lesson". The most extreme of these were intentionally intimidating and clearly aggressive behaviours. Most of these accounts generally denied the negative impact on the other driver and claimed to be in the other's interests. This was especially the case for the mild and ambiguous behaviours. However, respondents appeared sensitive to the implied criticism in relation to being on the receiving end of these milder forms of aggression, giving evidence that they experienced embarrassment in response to 'corrective' communications. The willingness of some drivers to tailgate others to get their message across is of some concern since this behaviour in itself exposes both drivers to greater risk of a crash and possible injury.

Probably not surprisingly, given that the study was described as being about 'driving conflict', all respondents gave at least one account of being the recipient of some form of driver aggression, some of them involving dangerous behaviours. Thus a large proportion of the drivers in this study were both recipients and instigators (as described above) of driver aggression, though often not during the same incident. Although this was a restricted and non-random sample of ordinary drivers, the findings are supportive of previous self-report survey results that recipients of driver aggression are also likely to be involved in instigating aggressive behaviours or incidents. Some of these respondents spoke in ways that suggested some self awareness of the aggressive intent behind their behaviour. Others dismissed, denied or minimised their aggressive intent. This is an interesting finding in itself in that aggressive intent is not a particularly socially acceptable quality and might be expected to be something that most individuals would be reluctant to admit. In acknowledgement of this, research that attempts to explore aggressive behaviour often uses indirect measures or methods. In this study, respondents tended to be open about their behaviours, though as

detailed above, some denied the likely impact of their actions on the recipient. It may be that either this self deception or the perceived provocation they described in many of the incidents facilitate admission of socially less acceptable behaviours or intentions. As the driving context is one where encounters are likely to be fleeting, a self-protective explanation of one's own behaviour is less open to challenge from other drivers, rendering minimisation or denial of negative intent or impact easier. The admission to overt, intentional aggressive driving and intimidation of other drivers by three of the respondents also runs counter to social conventions. These drivers may have found it easier to admit their behaviours because in describing them they were also able to distance themselves from these behaviours through referring to them as something that they "used to" do rather than as something that they currently do.

4.1 Escalation

The implied and stated criticisms inherent in the responses to other people's driving that were described by the respondents in this study suggest a reason and potential mechanism for the escalation of driving conflict into serious incidents. Previous studies in retaliatory aggression have suggested that aggression is more likely where individuals are provoked or experience an ego threat, usually delivered in such studies in the form of an insult or negative evaluation (Baron & Richardson, 1994; Bushman & Baumeister, 1998; Bettencourt, Talley & Benjamin, 2006). Other researchers in the aggression area have argued that conflict inherently produces ego threat (De Dreu & van Knippenberg, 2005). Thus, for the driving context, if a driver behaves towards others in a way that is interpreted as deliberately infringing their safety or rights (ie creating conflict), then recipients of this behaviour may experience this as an ego threat or provocation. Descriptions from the drivers in this study support the idea that such behaviour was interpreted as provocative and some of the respondents felt justified in retaliating in overtly aggressive ways (eg. rude gesture, horn-honking, flashing the headlights). Their retaliation is arguably experienced by the 'offending' driver as deliberately insulting or critical, thus provocative and an ego threat. If the original 'offending' driver at this point decides to retaliate also, then a cycle of action and retaliation can be set in motion facilitating the escalation of the situation potentially to the point of violence or serious harm. Even the milder forms of aggression that respondents admitted engaging in appear to hold the potential for escalation in that they may be experienced as negative evaluations by the recipient driver and thus as an ego threat.

In addition to the effect of insult or ego-threat, the driving context is one in which interpersonal communication is necessary, but the type and quality of this interaction is restricted. A minor conflict situation that might lend itself to easy and non-aggressive resolution through verbal communication in other circumstances, such as who in a group of customers should be served first at a service counter in a shop, becomes more difficult to resolve and arguably much more open to problematic interpretation, when arising on the road, where a potentially complex communication must occur largely non-verbally and relatively quickly.

Of course the factors influencing whether drivers feel the need to retaliate or justified in doing so are complex and worthy of greater exploration. However, the applicability of the experimental findings to this area is intriguing and suggests an avenue for fruitful future research.

4.2 Implications for road safety and intervention

The main implication from this study is that apparently mild aggressive behaviours may warrant much more attention than they have previously been accorded. Rather than simply being inconvenient and annoying, mild but deliberately critical driver behaviours are often experienced as provocative by recipients and may make the likelihood of retaliation in kind or escalation greater, thus compromising the safety of the drivers concerned. This suggests that it may be worthwhile addressing common and low level aggressive driving as well as attempting to counteract more extreme behaviours exhibited by arguably deviant drivers.

Accounts from these drivers suggest that interventions could attempt to activate drivers' appreciation of the impact of their behaviour on others particularly regarding the potential for escalation. Interventions could also attempt to reframe conflict in driving interactions as opportunities for drivers to gain non-tangible rewards from safer behaviours/responses to the driving of others, as alluded to by respondents in this study. That is, interventions should focus on driver rewards such as perceptions of improved social standing, improved sense of personal maturity or 'being bigger', and the avoidance of disappointment-in-self or regret. Evidence in the recent road safety literature, especially in relation to mass advertising/education campaigns in Australia, suggests that such appeals may have greater potential for impact, especially on men, who appear better motivated by humour rather than fear in such campaigns (Lewis, Watson & White, 2009; 2010).

4.3 Limitations

As this study relied on qualitative self-report, the caveats that apply to these forms of information apply to the findings reported here. Thus it may be inappropriate to attempt to generalise the findings to other situations and driver groups. Moreover, there was no attempt to control for variables that have traditionally been associated with examining aggressive driving, such as trait anger, trait aggression, previous crash history and so on. These variables may have affected the tendency for participants to recall particular incidents more than others or may have altered their descriptions of these in more or less socially desirable ways. As a qualitative study, the sample is small compared to studies using other methodologies and this should be borne in mind in the interpretation of the findings and the application of them. However, as discussed above, mitigating these limitations is the fact that respondents appeared to be candid about behaviours that are likely to be at the negative end of the socially desirability scale and this lends credibility to their statements.

4.4 Conclusions

The findings from this study provide evidence that driver behaviours which appear similar to the observer may have different underlying motives. Thus the same behaviour may be

aggressive in some circumstances while in others it is not. The implication of this for interventions is that attempts to reduce aggressive driving may be more likely to be effective if they attempt to address overarching aggressive motivations rather than the specific observable behaviours. In addition, this study provides further evidence that aggressive behaviours are widespread among ordinary, everyday drivers and that many may use milder forms frequently in order to try to influence the driving of others through criticism or expression of disapproval. Moreover, such drivers often feel perfectly justified in doing so, even where the potential for escalating a mild conflict situation into a serious one is high. This has implications for countermeasure design, suggesting that it is important to address mild forms of driver aggression and to raise driver awareness of the negative impact of their own behaviour on other road users.

5. References

- AAA Foundation for Traffic Safety. (2009). Aggressive driving: Research update. Retrieved 2009 from <http://www.aaafoundation.org/pdf/AggressiveDrivingResearchUpdate2009>
- AAMI. (2007). Crash Index: Annual Road Safety Index: AAMI.
- Aronson, J. (1994) A pragmatic view of thematic analysis. *The Qualitative Report*, 2 retrieved Mar 2011 from <http://www.nova.edu/ssss/QR/BackIssues/QR2-1/aronson.html>
- Anderson, C. A., Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, 53, 27-51.
- Asbridge, M., Smart, R. G., Mann, R. E. (2003). The 'homogamy' of road rage: Understanding the relationship between victimization and offending among aggressive and violent motorists. *Violence and Victims*, 18(5), 517-531.
- Baron, R.A., Richardson, D.R. (1994). *Human aggression* (2nd ed). NY: Plenum Press
- Beirness, D. J. (1993). Do we really drive as we live? The role of personality factors in road crashes. *Alcohol, Drugs and Driving*, 9(4), 129-143.
- Bushman, B. J., Baumeister, R. F. (1998). Threatened egotism, narcissism, self-esteem and direct and displaced aggression: does self-love or self-hate lead to violence? *Journal of Personality and Social Psychology*, 75(1), 219-229.
- Bettencourt, B. A., Talley, A., Benjamin, A. J. (2006). Personality and aggressive behaviour under provoking and neutral conditions: a meta-analytic review. *Psychological Bulletin*, 132(5), 751-777.
- Braun, V. Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 77-101
- Britt, T. W., Garrity, M. J. (2006). Attributions and personality as predictors of the road rage response. *British Journal of Social Psychology*, 45(1), 127-147.
- Beirness, D. J., Simpson, H. M., Mayhew, D. R., Pak, A. (2002). The Road Safety Monitor, Aggressive Driving.
- Bone, S. A., Mowen, J. C. (2006). Identifying the traits of aggressive and distracted drivers: A hierarchical trait model approach. *Journal of Consumer Behaviour*, 5(5), 454-464.
- Bowen, G. (2008). Naturalistic enquiry and the saturation concept: a research note. *Qualitative Research*, 8, 137-152.
- Chliaoutakis, J. E., Demakakos, P., Tzamalouka, G., Bakou, V., Koumaki, M., Darviri, C. (2002). Aggressive behavior while driving as predictor of self-reported car crashes. *Journal of Safety Research*, 33(4), 431-443.
- Dahlen, E. R., White, R. P. (2006). The Big Five factors, sensation seeking, and driving anger in the prediction of unsafe driving. *Personality and Individual Differences*, 41(5), 903-915.
- Dula, C. S., Geller, E. S. (2003). Risky, aggressive, or emotional driving: Addressing the need for consistent communication in research. *Journal of Safety Research*, 34(5), 559-566.
- De Dreu, CKW., van Knippenberg, D., (2005) The Possessive Self as a Barrier to Conflict Resolution: Effects of Mere Ownership, Process Accountability, and Self-Concept Clarity on Competitive Cognitions and Behavior. *JPers & Soc Psyc* 89, 345-357.

- Deffenbacher, J. L., Deffenbacher, D. M., Lynch, R. S., Richards, T. L. (2003). Anger, aggression, and risky behavior: a comparison of high and low anger drivers. *Behaviour Research and Therapy*, 41(6), 701-718.
- Deffenbacher, J. L., Lynch, R. S., Filetti, L. B., Dahlen, E. R., Oetting, E. R. (2003). Anger, aggression, risky behavior, and crash-related outcomes in three groups of drivers. *Behaviour Research and Therapy*, 41, 333-349.
- Deffenbacher, J. L., Lynch, R. S., Oetting, E. R., Yingling, D. A. (2001). Driving anger: correlates and a test of state-trait theory. *Personality and Individual Differences*, 31(8), 1321-1331.
- 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.
- Ellison-Potter, P. A., Bell, P., Deffenbacher, J. (2001). The effects of trait driving anger, anonymity, and aggressive stimuli on aggressive driving behavior. *Journal of Applied Social Psychology*, 31(2), 431-443.
- Ellison, P. A., Govern, J. M., Petri, H. L., Figler, M. H. (1995). Anonymity and aggressive driving behavior: A field study. *Journal of Social Behavior and Personality*, 10(1), 265-272.
- Galovski, T. E., Malta, L. S., Blanchard, E. B. (2006). *Road rage: Assessment and treatment of the angry, aggressive driver*. Washington, DC US: American Psychological Association.
- Guest, G., Bunce, A., Johnson, L. (2006) How many interviews are enough?: An experiment with data saturation. *Field Methods*, 18, 59-82.
- Hemenway, D., Vriniotis, M., Miller, M. (2006). Is an armed society a polite society? Guns and road rage. *Accident Analysis and Prevention*, 38(4), 687-695.
- Hennessy, D. A., Wiesenthal, D. L. (1997). The relationship between traffic congestion, driver stress and direct versus indirect coping behaviours. *Ergonomics*, 40(3), 348-361.
- Hennessy, D. A., Wiesenthal, D. L. (1999). Traffic congestion, driver stress, and driver aggression. *Aggressive Behavior*, 25(6), 409-423.
- Hennessy, D. A., Wiesenthal, D. L. (2001). Gender, driver aggression, and driver violence: An applied evaluation. *Sex Roles*, 44(11), 661-676.
- Hennessy, D. A., Wiesenthal, D. L. (2002). Aggression, violence and vengeance among male and female drivers. *Transportation Quarterly*, 56(4), 65-75.
- Hennessy, D. A., Wiesenthal, D. L. (2004). Age and Vengeance as Predictors of Mild Driver Aggression. *Violence and Victims*, 19(4), 469-477.
- Hennessy, D. A., Wiesenthal, D. L., Kohn, P. M. (2000). The influence of traffic congestion, daily hassles, and trait stress susceptibility on state driver stress: An interactive perspective. *Journal of Applied Biobehavioral Research*, 5(2), 162-179.
- Hocker, JL Wilmot, WW, (1985) *Interpersonal conflict* (2nd ed). Dubuque, Iowa: WmBrown Publishers.
- Joint, M. (1997). *Road Rage: AAA Foundation for Traffic Safety*.
- Jonah, B. A., Thiessen, R., Au-Yeung, E. (2001). Sensation seeking, risky driving and behavioral adaptation. *Accident Analysis and Prevention*, 33(5), 679-684.

- Kontogiannis, T. (2006). Patterns of driver stress and coping strategies in a Greek sample and their relationship to aberrant behaviors and traffic accidents. *Accident Analysis & Prevention*, 38(5), 913-924.
- Krahe, B., Fenske, I. (2002). Predicting aggressive driving behavior: The role of macho personality, age, and power of car. *Aggressive Behavior*, 28(1), 21-29.
- King, Y., Parker, D. (2008). Driving violations, aggression and perceived consensus. *Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology*, 58(1), 43-49.
- Lajunen, T., Parker, D., Stradling, S. G. (1998). Dimensions of driver anger, aggressive and highway code violations and their mediation by safety orientation in UK drivers. *Transportation Research Part F: Traffic Psychology and Behaviour*, 1(2), 107-121.
- Lennon, A., Watson, B., Arlidge, C., Fraine, G. (2011). 'You're a bad driver but I just made a mistake': Attribution differences between the 'victims' and 'perpetrators' of scenario-based aggressive driving incidents. *Transportation Research Part F 14*
- Lewis, I.M., Watson, B.C., White, K.M. (2009) What do we really know about designing and evaluating road safety advertising?: Current knowledge and future challenges. *Proceedings of Australasian Road Safety Research Policing and Education Conference: Smarter, Safer Directions*. Road Transport Authority: Sydney
- Lewis, I.M., Watson, B.C., White, K.M. (2010) Response efficacy: the key to minimising rejection and maximising acceptance of emotion-based anti-speeding messages. *Accident Analysis & Prevention*, 2010; 42, 459-467.
- Lonczak, H. S., Neighbors, C., Donovan, D. M. (2007). Predicting risky and angry driving as a function of gender. *Accident Analysis and Prevention*, 39(3), 536-545.
- Lowenstein, L. F. (1997). Research into causes and manifestations of aggression in car driving. *Police Journal*, 70(3), 263-270.
- Mann, R. E., Zhao, J., Stoduto, G., Adlaf, E. M., Smart, R. G., Donovan, J. E. (2007). Road rage and collision involvement. *American Journal of Health Behavior*, 31(4), 384-391.
- Marshall, E., Thomas, N. (2000). *Traffic Calming: The Reality of 'Road Rage'*: Home Office.
- Matthews, G., Dorn, L., Glendon, IA. (1991). Personality correlates of driver stress. *Personality and Individual Differences*, 12(6), 535-549.
- Matthews, B. A., Norris, F. H. (2002). When is believing 'seeing'? Hostile attribution bias as a function of self-reported aggression. *Journal of Applied Social Psychology*, 32(1), 1-32.
- Matthews, G., Tsuda, A., Xin, G., Ozeki, Y. (1999). Individual differences in driver stress vulnerability in a Japanese sample. *Ergonomics*, 42(3), 401-415.
- Miller, M., Azrael, D., Hemenway, D., Solop, F. I. (2002). 'Road rage' in Arizona: armed and dangerous. *Accident Analysis and Prevention*, 34(6), 807-814.
- Mizell, L. (1997). *Aggressive Driving*: AAA Foundation for Traffic Safety.
- Nesbit, S. M., Conger, J. C., Conger, A. J. (2007). A quantitative review of the relationship between anger and aggressive driving. *Aggression and Violent Behavior*, 12(2), 156-176.
- Parker, D., Lajunen, T., Stradling, S. (1998). Attitudinal predictors of interpersonally aggressive violations on the road. *Transportation Research Part F: Traffic Psychology and Behaviour*, 1(1), 11-24.

- Roberts, L., Indermaur, D. (2005). Boys and Road Rage: Driving-Related Violence and Aggression in Western Australia. *Australian and New Zealand Journal of Criminology*, 38(3), 361-380.
- Roseborough, J. Weisenthal, D., Flett, G. & Cribbie, R. (2011) The belief in an unjust world and narcissism-the influence of personality on perceptions of injustice, driving anger and aggressive driving. *Proceedings of the XXI Canadian Multidisciplinary Road Safety Conference*. Canada: Transport Canada and Canadian Association of Road Safety Professionals.
- Schreer, G. E. (2002). Narcissism and aggression: Is inflated self-esteem related to aggressive driving? *North American Journal of Psychology*, 4(3), 333-341.
- Shinar, D. (1998). Aggressive driving: the contribution of the drivers and the situation. *Transportation Research Part F: Traffic Psychology and Behaviour*, 1(2), 137-160.
- Shinar, D., Compton, R. (2004). Aggressive driving: an observational study of driver, vehicle, and situational variables. *Accident Analysis & Prevention*, 36(3), 429-437.
- Smith, R. G. (2006). *Impediments to the Measurement of Road Violence: Australian Institute of Criminology*, No. 311.
- Smart, R. G., Mann, R. E. (2002). Is road rage a serious traffic problem? *Traffic Injury Prevention*, 3(3), 183-189.
- Smart, R. G., Mann, R. E., Stoduto, G. (2003). The prevalence of road rage: Estimates from Ontario. *Canadian Journal of Public Health*, 94(4), 247-250.
- Smart, R. G., Mann, R. E., Zhao, J., Stoduto, G. (2005). Is road rage increasing? Results of a repeated survey. *Journal of Safety Research*, 36(2), 195-201.
- Soole, D., Lennon, A., Watson, B., Bingham, C.R. (2011) Towards a comprehensive model of driver aggression: a review of the literature and directions for the future. In Ferraro, C.N. (Ed) *Traffic Safety*. Nova Science Publishers
- Vallieres, E. F., Bergeron, J., Vallerand, R. J. (2005). The Role of Attributions and Anger in Aggressive Driving Behaviours. *Paper presented at the International Conference of Traffic and Transport Psychology*.
- Victorian Community Council Against Violence. (1999). *Aggression and/or violence associated with motor vehicle use*. Melbourne: Victorian Community Council Against Violence.
- Walters, C. H., Pezoldt, V. J., Womack, K. N., Cooner, S. A., Kuhn, B. T. (2000). Understanding Road Rage: Summary of First-Year Project Activities.
- Wells-Parker, E., Ceminsky, J., Hallberg, V., Snow, R. W., Dunaway, G., Guiling, S., et al. (2002). An exploratory study of the relationship between road rage and crash experience in a representative sample of US drivers. *Accident Analysis and Prevention*, 34(3), 271-278.
- Westerman, S. J., Haigney, D. (2000). Individual differences in driver stress, error and violation. *Personality and Individual Differences*, 29(5), 981-998.
- Wickens, C. M., Wiesenthal, D. L. (2005). State Driver Stress as a Function of Occupational Stress, Traffic Congestion, and Trait Stress Susceptibility. *Journal of Applied Biobehavioral Research*, 10(2), 83-97.