An Investigation into Serious Violence Associated with Motor Vehicle Use:

Is 'Road Rage' a Valid or Useful Construct ?

Final Report for Criminology Research Council

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Summary

This study examined data from convicted offenders in Victoria to examine whether the perpetrators of, and interpersonal triggers for, violence occurring on the roads differ between road and non-road contexts. A case-control methodology was used to compare data from 31 cases of road violence with 31 cases of violence against strangers which resulted in similar charges but which occurred in non-road contexts. Information regarding perpetrators and the triggering incidents leading to the violence was obtained from prosecution legal files. Psychiatric contact information was obtained from the Victorian public mental health database on both cases and controls. There were no significant differences between cases and controls on any demographic, criminological or psychiatric variables, except for ethnicity. Although a sizeable proportion of incidents of road violence were perpetrated by persons who had not previously been criminally violent, this proportion was not significantly different from that found in the controls. Within the road violence sample, those with no prior criminal violence were more likely to be in employment than those with a past history of violent offending. In the road context, the triggering incident was most likely to be coded as an act of recklessness, which appeared to pose a threat to the safety of the other party. Off the roads, the most common trigger was an apparent threat to the other party's status. In both contexts, the initial trigger was as likely to be perpetrated by the eventual victim as the offender. The study provides support for causal models of road violence that emphasise personological rather than environmental factors, and also has implications for preventative strategies.

Introduction

'Road rage' and road violence

With its origins in the realm of popular journalism rather than empirical research, the term "road rage" owes its popularity more to alliteration than to scientific validity. The term appears to be a new way of labelling an old crime (L. D. Roberts & D. Indermaur, 2005), one which has inherently high 'news value'. It has been applied to a vast range of behaviours on the road, from cursing at traffic lights all the way to multiple homicide. It is indeed a "catch all expression for any calamity on concrete" (Bowles & Overberg, 1999).

A recent inquiry commissioned by the State Parliament of Victoria (*Inquiry into Violence associated with Motor Vehicle Use by the Drugs and Crime Prevention Committee*, 2004) advocated the abandonment of the term - a call which is unlikely to be widely heeded by the media, but which should guide future empirical work in the field. The inquiry distinguished between three categories of behaviour, all of which have attracted the label of "road rage", namely:

1. *Selfish Driving*: "time urgent or self-oriented driving behaviour, which is committed at the expense of other drivers in general, but which is not specifically targeted at particular individuals."
2. *Road Hostility*: "Spontaneous, driving-related non-violent but hostile acts that are specifically targeted at strangers, or where strangers reasonably feel they are being targeted."
3. *Road Violence*: "Spontaneous, driving-related acts of violence that are specifically targeted at strangers, or where strangers reasonably feel they are being targeted."

While there is still some overlap at the margins between these categories, they provide a useful framework. The literature in the field often fails to distinguish between such categories and, moreover, often assumes that findings related to less serious behaviours can be extrapolated to the more violent. Not surprisingly, serious *road violence* is the least well-researched category in terms of both quantity and quality of previous studies.

The present study is exclusively concerned with *road violence,* as defined above; the background discussion however draws on the literature relating to selfish driving and road hostility as well. The potential problems with extrapolating from these other categories of behaviour are acknowledged.

The extent of the problem

Media portrayals of road violence generally emphasize its high frequency and report that its incidence is on the increase. The empirical data underlying these assertions is limited. There are various factors that make measurement of the incidence of road violence problematic (R. G. Smith, 2006). These include:

- the fact that in most jurisdictions there is no specific "road rage" offence and so criminal history databases do not specifically record their occurrence;
- for a number of reasons, victims often fail to report incidents to police (91% of victims of even 'severe' road rage do not report the incidents to police (*Aggression and/or violence associated with motor vehicle use*, 1999));
- alleged offences are often difficult to successfully prosecute because of lack of evidence.

Self-report victimisation data provides some indication as to the extent of the problem of serious road user violence. In a recent survey (*Crash Index: Tenth annual road safety report*, 2004) some 5% of Australian drivers reported ever having been

physically assaulted by another driver; a figure of 4% was reported in an earlier survey (Dean, 1998). The rate was 13% in a recent Western Australian survey in which threats of violence and vehicular damage were also included (L. Roberts & D. Indermaur, 2005). These figures are commensurate with other Anglophone countries: a British survey (Marshall & Thomas, 2000) found that 3% of drivers reported that another driver had ever got out of a car and threatened them with violence; 2.7% of respondents to a telephone survey in the USA (Wells-Parker et al., 2002) reported having had a serious confrontational incident on the roads; in Canada, 7.2% reported being threatened with personal injury or damage to their vehicle over a one year period (Smart, Mann, & Stoduto, 2003).

Applying these figures to the whole driving population would suggest that road user violence, or threats thereof, is a very significant problem in terms of frequency of incidents, even if this is not necessarily reflected in official crime statistics.

The commonly held belief in the public's mind (L. Roberts & D. Indermaur, 2005) that road rage is on the increase however has little empirical support. Papers which do report a temporal trend for an increase in road user violence have either simply based this on number of episodes reported in the media (*Road rage: How to avoid aggressive driving*, 1997) or have failed to distinguish between selfish, reckless driving (such as speeding) from actual road user violence (*Volume II: Driver Attitudes and Behaviour*, 1998). A recent telephone survey in Canada (Smart, Mann, Zhao, & Stoduto, 2005) found that self-reported victimisation (using a broad definition, including hostile driving as well as road violence) had actually *decreased* from 2001 to 2003, while self-reported perpetration rates were stable.

A recent analysis of police data (with all its inherent limitations) in Victoria (*The incidence of road violence in Victoria*, 2005) found no trend for an increase in road

user violence in recent years. Analysis of similar data in Western Australia (Roberts & Indermaur, 2003) did find an increase in incidence of driving-related threats and assaults per 100,000 vehicles from 1991 to 2000, but this increase was not significantly greater than the increase seen in *all* stranger assaults over the same period.

Hence, despite the ever-increasing amount of traffic on the roads there is no clear evidence that serious road user violence is increasing disproportionately to other violent offending.

The significance of road violence

None of this minimises the importance of road violence: whatever the true incidence, it is clear that the problem has a significant impact on public behaviour, safety and well-being, and so has significant public policy implications.

In surveys, the general public consider road rage to be a significant problem (Lupton, 2002; L. Roberts & D. Indermaur, 2005). It is possible that this belief, whether well founded or not, may discourage people from using the roads. Moreover, it has been asserted that more environmentally friendly road usage such as cycling may be disproportionately discouraged (*Inquiry into Violence associated with Motor Vehicle Use by the Drugs and Crime Prevention Committee*, 2004).

Left unchecked, the stressors related to road usage may be readily translated into other settings such as the home. There is some evidence for such an "interdomain transfer effect" (Novaco, 1991) related to stress due to traffic congestion. As a corollary of this, it has been claimed that effective management of the psychological impact of road-related stressors may result in parallel improvements across all areas of functioning both on and off the road (Galovski & Blanchard, 2004).

It has long been recognized that those engaging in selfish and hostile driving are at high risk of being involved in motor vehicle accidents (Tillman & Hobbs, 1949) and recent data supports this (*Crash Index: Ninth annual road safety report*, 2003). Hence, examination of the problem of road violence may also contribute to broader efforts to reduce morbidity and mortality from road traffic accidents.

Causal models for road violence

Violent behaviour in any context is usually the end point of a diverse range of environmental and personologic factors (McGuire, 2004b). Previous models of the aetiology of "road rage" (Galovski & Blanchard, 2004; , *Inquiry into Violence associated with Motor Vehicle Use by the Drugs and Crime Prevention Committee*, 2004) have generally acknowledged its diverse underpinnings; some have emphasised environmental factors (Shinar, 1998), others have emphasised factors relating to the person (Van Rooy, Rotton, & Burns, 2006).

Previously proposed models have often failed to adequately distinguish between selfish driving, hostile driving and road violence. Sometimes an unwarranted assumption is made that factors relating to selfish driving (such as for example traffic congestion) also increase the risk of serious road violence (Slovenko, 2001). The following discussion will draw on evidence from the "road rage" literature in general but with special emphasis on acts of *serious violence,* which are the focus of this research.

Any model of serious road violence must take into account *both* the relevant longstanding personological factors and acute situational/environmental factors, and consider the interplay between them. Like any overt behaviour it can be viewed as the "end product of individual tendencies in the presence of environmental catalysts" (Shinar, 1998). Using similar language, Novaco (1998) has referred to the driving

environment as a “catalytic context” where key determinants of aggressive behaviour (such as enduring beliefs and attitudes) can readily become activated.

There is of course a long-standing debate in the criminological literature regarding the degree of emphasis which should be given to situational factors in comparison to dispositional factors (Birkbeck & LaFree, 1993; McGuire, 2004a; Sutherland, 1947). Analogous discourse in the field of accident research distinguishes between “latent conditions” and “proximal errors” (Reason, 2000) and some useful findings relevant to the problem of road violence stem from the transport accident research field.

Personological factors

This section will consider those longstanding (“latent”) dispositional factors, which apply both in *and out* of the car environment, and which may be relevant to the risk of committing acts of road violence.

It is has long been asserted in the accident literature (and by insurance companies) that there are certain relatively stable factors which make some individuals ‘accident prone’ (Haight, 2001; Mayer & Treat, 1977; Parker & Manstead, 1996). In a similar way, certain enduring factors may make some individuals more prone than others to acts of “road rage” including road violence. These will be considered under the following headings:

- Demographic factors
- Driving Experience
- General personality traits
- Driving-Related Attitudes
- Mental Disorder
- Criminal History

Demographic factors

Although self-reported anger from driving situations does not consistently differ according to gender (Deffenbacher, Deffenbacher, Lynch, & Richards, 2003; Lajunen, Parker, & Stradling, 1998), for serious acts of violence based both on self-report (Butters, Smart, Mann, & Asbridge, 2005; Deffenbacher, Deffenbacher, Lynch, & Richards, 2003) and offender data (Harding, Morgan, Indermaur, Ferrante, & Blagg, 1998), males are over-represented. Research on offenders in Western Australia (Harding, Morgan, Indermaur, Ferrante, & Blagg, 1998) found 93% of serious road violence perpetrators to be male, a figure which suggests that maleness is a risk factor even when the greater preponderance of males driving on the roads is taken into account. This finding of course reflects the data from the violent offending literature in general (Archer, 1994).

Although some studies (Butters, Smart, Mann, & Asbridge, 2005; Harding, Morgan, Indermaur, Ferrante, & Blagg, 1998) have found that road violence is committed by older males rather more frequently than "street violence" in general, youthful age (below 30) generally appears to be a risk factor for road violence and for other dangerous behaviours on the roads. A relationship with youthfulness has been found in studies examining: self-reported driving aggression (Hemenway, Vriniotis, & Miller, 2006; Krahe & Fenske, 2002; Lajunen & Parker, 2001; Lajunen, Parker, & Stradling, 1998; Mann, Smart, Stoduto, Adlaf, & Ialomiteanu, 2004; Parker, Lajunen, & Stradling, 1998); crashes caused by aggressive driving (Bowles & Overberg, 1999); and analysis of media reports of 'road rage' (Marshall & Thomas, 2000). There is tentative evidence (Forward, 2004) that young drivers are more readily provoked by slow or hostile drivers, whereas older drivers are more angered by rule violation by other drivers. One study found that as many as a quarter of drivers aged

between 17-25 admit to chasing another driver if they feel offended (Marsh & Collett, 1986).

Relationships between increased risk of road violence and being unmarried (Hemenway & Solnick, 1993; Mann, Smart, Stoduto, Adlaf, & Ialomiteanu, 2004; Smart, Asbridge, Mann, & Adlaf, 2003) and lower income levels (Hemenway & Solnick, 1993; Shinar, 1998; Smart, Asbridge, Mann, & Adlaf, 2003) may well be artefactual, relating to these factors being correlated with younger age.

Educational status has been little studied in perpetrators, although one study has found *higher* educational levels to be a risk factor for road violence (Smart, Asbridge, Mann, & Adlaf, 2003).

Driving Experience

There is little evidence relating years of driving experience to risk of serious violence on the roads. Milder expressions of "road rage" (selfish or hostile driving) have however been found to diminish with experience (*Aggression and/or violence associated with motor vehicle use*, 1999; Lajunen, Parker, & Stradling, 1998) and anger levels appear to be correspondingly higher in low mileage drivers (Lajunen, Parker, & Stradling, 1998).

General personality traits

Trait-based models of road violence emphasise the role of enduring personality features. Such models suggest that people who are violent on the roads are also likely to be violent elsewhere and that "man drives as he lives" (Tillman & Hobbs, 1949). Unfortunately, most of the research examining the validity of such causal models for road violence has been derived from self reports of aggressive driving (much of it not seriously violent in nature) rather than examining convicted road violence offenders (Deffenbacher, Filetti, Richards, Lynch, & Oetting, 2003; Deffenbacher, Lynch,

Oetting, & Yingling, 2001; Van Rooy, Rotton, & Burns, 2006). Nevertheless, such work has generated useful findings in determining which sorts of driver may be at higher risk of violence, and in suggesting treatment targets (Deffenbacher, Filetti, Lynch, Dahlen, & Oetting, 2002; Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000).

The validity or otherwise of the trait model of road violence has important implications for prevention, in particular the relevant emphasis that should be given to environmental modification, correctional approaches and psychological approaches.

'State-based' models suggest that a great many individuals develop distinctive and potentially dangerous mental states and behaviours when driving compared to other situations. For example, it is asserted that normally meek people may express displaced anger (stemming from other sources such as recent stressful life events) only when they are driving. This 'Jekyll and Hyde' model of road violence is frequently promulgated in the media (Herrick, 2006; Teitell, 1996) and perhaps reflects the common human tendency to blame situational rather than characterological factors for negative behaviours (Lupton, 2002; Plous, 1993). There is only limited evidence to support strong versions of such 'state' models, particularly in the context of more serious road violence. Questionnaire studies have found that approximately one in six of respondents report the combination of low *general* anger but high *driving* anger, suggesting that there may be some "mild-mannered people who turn into animals when they get behind the wheel of a car" (Byrne, 2000). Other studies have found evidence for such a phenomenon only in congested driving conditions (Deffenbacher, Deffenbacher, Lynch, & Richards, 2003; Lawton & Nutter, 2002). Such studies, relying on self-report of anger, and examining

voluntary participants rather than convicted offenders, are of uncertain relevance to actual acts of violence on the roads.

One early study (Selzer & Vinokur, 1974) similarly emphasized the impact of acute stressors, as opposed to enduring personality factors, on road accident risk, but its finding of a lack of relationship between such risk and personality factors may have been an artefact due to a lumping together all the personality variables considered: a careful analysis showed that aggressive traits *were* actually related to higher risk even in that study.

Certain *specific* personality traits have been consistently correlated with both anger and actual violent behaviour on the roads. These personality traits can be considered under two broad categories: 'vengefulness' and 'impulsivity'.

Vengefulness

The concept of "*vengeance*": a tendency to exert power and control and/or provide emotional relief by purposeful retaliatory harm in response to perceived injustice, has received much attention in the 'road rage' literature; a questionnaire has even been developed to measure vengeful attitudes when driving (Hennessy & Wiesenthal, 2002; Wiesenthal, Hennessy, & Gibson, 2000). Not surprisingly, it has been found that self-reports of violence on the roads correlate with higher scores on this measure (Hennessy & Wiesenthal, 2002).

Tillman and Hobbs' classic 1949 study (1949) similarly found that accident-prone drivers were "readily annoyed at other motorists on the road, often criticising their own mistakes in others." Such narcissistic responses to others' behaviours may also have great relevance to road violence.

More generally, it is well established social psychology (Plous, 1993) that people tend to view their own negative behaviours as being due to situational factors, while

attributing others' behaviour to dispositional, characterological factors. The extent to which others' behaviour, when adversely impacting on self, is attributed to *malevolent* intent on their part, so-called '*hostile* attributional bias' varies considerably in the population. In the driving context, it has been shown that drivers high in aggressive traits score highly on this measure (Matthews & Norris, 2002): under ambiguous driving conditions they tend to attribute hostile intent to other drivers rather than viewing their actions as justifiable or accidental. Such biases may encourage vengeful responses to others' behaviours. Ambiguity of course is commonly encountered in driving contexts, where communication of intent is inherently limited (see later).

A range of other similar concepts relating to interpersonal style have been found to correlate with risk of aggressive driving. Aggressive driving has been correlated with *competitiveness* combined with time urgency (Lowenstein, 1997) and with higher scores on measures of "*macho*" attitudes (Krahe & Fenske, 2002). Self reports of aggressive driving have also been correlated in males with a '*sense of entitlement*' and in females with a 'tendency to *exhibitionist* behaviour' (Schreer, 2002). Not surprisingly, a *lack of empathy* has also been found to relate to risk of aggression on the roads (Parkinson, 2001). A tendency to *react angrily* to perceived challenges from other drivers has been related to the risk of engaging in "road rage", particularly in young males, (Maiuro, 1998).

Hence there is tentative, but convergent, evidence that risk of road violence may relate to a narcissistic tendency to both readily attribute blame to others and to vengefully aggress on the basis of such attributions.

Impulsivity

The finding that risk-taking, susceptibility to boredom, and sensation-seeking are related to higher risk of reckless driving, traffic accidents and traffic violations (Donovan, Umlauf, & Salzberg, 1988; Furnham & Saipe, 1993; Schwebel, Severson, Ball, & Rizzo, 2006; Tillman & Hobbs, 1949) is unsurprising. However, it also appears that a willingness to engage in violations of roadway rules and a tendency to take risks, for example by impulsively racing with other cars, is also correlated with risk of *violence* on the roads (Deffenbacher, Lynch, Oetting, & Yingling, 2001; Hennessy & Wiesenthal, 2002; Maiuro, 1998; Wells-Parker et al., 2002). This may relate to underlying personality traits of poor affect regulation and/or sensation seeking which increase the likelihood of both kinds of behaviour, and of other problem behaviours (Jessor, 1987). Again, the extent to which such characteristics are found in actual serious road violence offenders is unkown.

The personality features discussed under the headings of 'vengefulness' and 'impulsivity' can of course co-occur, and it might be expected that in these circumstances the risk of violence on the roads is especially high, although there is no direct evidence to support this.

Driving-Related Attitudes

Beliefs held and feelings experienced by a given individual specifically in relation to driving are influenced by a number of factors, including general personality traits and cultural and sub-cultural influences. It has been argued that exposure to aggressive role models as a child, and societal views of violence which condone aggressive behaviour in certain circumstances may be of relevance to the likelihood of indulging in violence on the roads (Lajunen, Mesken, Parker, & Summala, 1999; , *Road rage:*

Driving related violence in Western Australia, 1997). The influence of the media, including advertisements put out by the automotive industry which emphasise power and freedom, have also come in for blame for adversely modifying driving-related attitudes (Herrick, 2006).

Empirical work has examined how attitudes and beliefs regarding *other* drivers impact on the risk of aggressive driving behaviours. Studies using responses to hypothetical scenarios (Gulian, Debney, Glendon, Davies, & Matthews, 1989; Parker, Lajunen, & Stradling, 1998) have found them to be a significant factor. In general terms, there are two driving-related attitudes which appear to be correlated with increased risk of violence on the roads: driving as *contest* and driving as *thrill*. The possible relationships of these constructs to the aforementioned personality features of 'vengefulness' and 'impulsivity' are clear, although not well explored in the literature.

Those who view driving as a *contest* tend to see the world as a competitive place and driving as a means for getting to a destination with minimum delay. If other drivers cause delay, or signal a desire to compete, then the "cognitive script" of the "status contest" will be activated (Novaco, 1998; , *Road rage: Driving related violence in Western Australia*, 1997): acquiescence to the other driver would result in an intolerable loss of perceived status and self-esteem. A related tendency to emphasise the importance of perceptuo-motor driving skills (which are erroneously seen as a guarantee against accidents) has been correlated with a similar tendency to become angry if other drivers are believed to be hostile or frustrating (Parker, Lajunen, & Stradling, 1998).

Those who view driving as a contest readily become engaged in potentially rapidly escalating conflict with other drivers, as their own aggressive driving leads to more hostility from other road users which in turn feeds a tendency to react in a more

aggressive way (Forward, 2004). Although case histories suggest that such status contests can occasionally result in extreme violence (Batten, Penn, & Bloom, 2000) there is a paucity of high quality empirical data on this issue. One could speculate that those who see driving as a contest may also have aggressive and narcissistic personality features, although no hard data exists on this question.

Those who view driving as an opportunity for *thrill* seeking may have impulsive, sensation-seeking personality attributes. The so-called "hoon" sub-culture emphasises the role of high-powered cars, speed and sportiness, all of which have been correlated with aggressive driving (Krahe & Fenske, 2002), may attract such people.

Mental Disorder

Although some have actually sought to reclassify, or perhaps reify, "road rage" as a mental illness of sorts (Galovski & Blanchard, 2002; Maiuro, 1998), such attempts appear to be based on circular reasoning: a valid diagnosis cannot be made purely on the basis of the occurrence of a behaviour which defines the disorder. In general such medicalisation of the phenomenon has not been helpful.

General levels of psychiatric distress have been found to be elevated in perpetrators of aggressive driving and actual road violence (Fong, Frost, & Stansfeld, 2001; Mann, Smart, Stoduto, Adlaf, & Ialomiteanu, 2004), but there are no studies examining current or past diagnosable major mental illness or personality disorder in perpetrators.

Not surprisingly, given its established role as a risk factor for violence in general, problems with substance misuse have been related to aggressive driving and violence on the roads (Butters, Smart, Mann, & Asbridge, 2005; Fong, Frost, & Stansfeld, 2001; Galovski & Blanchard, 2004; Hemenway, Vriniotis, & Miller, 2006;

Lowenstein, 1997; Mann, Smart, Stoduto, Adlaf, & Ialomiteanu, 2004): it is unclear whether such episodes have been directly related to substance misuse as a proximal factor, or whether a substance use history is a marker of underlying impulse control deficits which increase the risk for both violence on the roads and substance misuse (Yu, Evans, & Perfetti, 2004).

Criminal History

Although the popular 'state model' of road rage (Maiuro, 1998) proposes that many perpetrators are otherwise law-abiding citizens, there is in fact little work examining the past offending behaviours of perpetrators. Although a study in Western Australia (Harding, Morgan, Indermaur, Ferrante, & Blagg, 1998) found that the *demographic* profile (in terms of age at least) of road violence perpetrators differed slightly from that of other types of violence, it did not examine the past criminal histories of the perpetrators and so it is unclear whether the subpopulation of older offenders who affected this age profile were previously law-abiding or not. Data on road violence offenders in New Zealand found that over 70% have a past criminal history (Parsons, 1978). A history of past traffic violations (Hennessy & Wiesenthal, 2002) and self-reported general offending history (Hemenway, Vriniotis, & Miller, 2006) have also been related to (less serious) hostile driving.

Criminal history is relevant in determining whether state-based or trait-based factors are more relevant in determining the risk of road violence: a state model would suggest that many road violence perpetrators would be free of violent offending in other contexts.

Situational Factors

As discussed, different theories place different degrees of emphasis on the role of situational factors (to do with the driving environment itself) versus personological

variables (to do with the perpetrator). Not surprisingly, the most sophisticated contemporary models of violence on the roads recognise the dynamic interplay between environment and person. Some have adopted an ecological perspective recognising the "mediational role" played by psychological factors in dealing with stressors such as travel impedence (Stokols & Novaco, 1981). Others have asserted that exposure to stressors on the road can "bring about an effect where persons who do not otherwise fall within the category of violent offenders can cross that boundary" (Harding, Morgan, Indermaur, Ferrante, & Blagg, 1998). The evidence for such an effect, at least as applied to road violence (as distinct from selfish driving or road hostility) is not strong, although the claim has been made in a rather polemical editorial in a leading forensic psychology journal that "the automobile is driving people mad" (Slovenko, 2001).

Situational factors affecting violence on the road can be usefully considered under the subheadings of:

- Car Factors
- Road Factors
- Proximal Triggers
- Transient Perpetrator States
- Victim Characteristics

Car Factors

The notion that otherwise mild-mannered individuals become potentially violent when driving is predicated on the notion that there are specific variables about the car and/or road environment itself that adversely affect behaviour.

Some have emphasised the role of physiological arousal due to driving (Novaco, 1998) and there is some evidence that aggressive drivers show elevated levels of

autonomic activation when exposed to driving vignettes (Galovski, Blanchard, Malta, & Freidenberg, 2003). However, there is also evidence that *lower* levels of negative affect (which might be expected to correlate with arousal level) are present prior to incidents of anger in driving contexts as compared to non-driving contexts (Parkinson, 2001). The extent to which this evidence can be translated to actual violent offences on the road is uncertain.

Journalistic pieces on road rage often make much of the notion of 'territoriality', claiming that the car environment enhances feelings of power and entitlement to unimpeded progress, hence predisposing to anger when frustrated or threatened (Herrick, 2006; Marsh & Collett, 1986; Teitell, 1996). The extent to which these suppositions apply to the general population, as opposed to a small subset with certain maladaptive personality features is unclear.

Possibly the most distinctive feature of the driving environment is that it entails complex acts of negotiation and reciprocal demands between people who are both strangers and, at least partly, hidden from each other. Drivers often do not see each others' faces and even more rarely are they able to pick out subtle changes in each others' facial expression; verbal communication is also difficult. These factors have profound implications for ease of communication between potential perpetrators and victims of violence. Facial cues appear to be particularly important in facilitating empathy (Eslinger, 1998) and their absence, along with lack of verbal interchange, not surprisingly inhibits reciprocal transmission of emotional states such as anger. It is difficult to coordinate perspectives in the driving situation and correspondingly easier to project blame onto an anonymous other, even for those without a narcissistic predisposition to do so. This impaired "communicative receipt" of emotional states

has been mooted as a possible factor in the sometimes dramatic escalation of interpersonal disputes in road situations (Parkinson, 2001).

There is some evidence that the anonymity of potential victims may also reduce inhibitions against aggression: for example the elderly may be (unusually) victims of aggression, because perpetrators make the assumption that an unseen driver is not elderly (Byrne, 2000; Ellison, Govern, Petri, & Figler, 1995; O'Brien, Tay, & Watson, 2004).

The anonymity of the *perpetrator* has been mooted as a possible disinhibitory factor. Some (Novaco, 1998) have posited "deindividuation" (an internal sense of reduced societal constraints on behaviour) as a key factor, although direct evidence for this phenomenon in road violence situations is lacking. More simply of course, anonymity also reduces the risk of recrimination (provided the perpetrator flees the scene) as compared to acts of violence off the roads.

Discomfort within the motor vehicle environment has been suggested as a possible risk factor for 'road rage', particularly that due to heat and humidity (Boyanowsky, 1999; Galovski & Blanchard, 2004; Rathbone & Huckabee, 1999) although this relationship has not been demonstrated for serious road violence (Arnett, Offer, & Fine, 1997).

Presence of passengers within the vehicle may influence propensity to violence in either direction, perhaps by affecting the behavioural response to apparent insults from other drivers. There is some evidence that, for males at least, the presence of peers in the vehicle encourages more risky driving (Arnett, Offer, & Fine, 1997; Jackson & Gray, 1976) but this effect has not been demonstrated with respect to road violence.

Road Factors

Folk wisdom tends to attribute 'road rage' and all its manifestations to the frustrations caused by traffic congestion (Lupton, 2002). Whilst there is some evidence that less serious hostile acts, such as honking horns, are related to such factors (Lajunen, Parker, & Summala, 1999; Parker, Lajunen, & Summala, 2002; Shinar, 1998), there is little evidence that this is a major factor for more serious acts of violence on the roads. Personological variables will of course *mediate* the reactions to the stress caused by traffic congestion or 'travel impedance' (Stokols & Novaco, 1981); models of road rage entirely based on a presumed causative role for traffic congestion appear to be based on outdated models of aggressive behaviour (Dollard, Doob, Miller, Mowrer, & Sears, 1939), which insufficiently consider such cognitive factors and are unlikely to explain more serious acts of violence.

An alternative explanation for the higher levels of 'road rage' incidents in congested traffic and in metropolitan areas (Asbridge, Smart, & Mann, 2003; Rathbone & Huckabee, 1999) draws on 'Routine Activities Theory' explanations for crime (Wilcox, Land, & Hunt, 2003): put simply, busier traffic means more *opportunities* for coming into conflict with other vehicles, irrespective of whether the this has resulted in actual impedance of progress. There is some tentative evidence that this may be a more relevant factor than frustration due to impedance, since the highest risk type of traffic for road rage incidents is actually dense but *fast* moving urban traffic (*Aggression and/or violence associated with motor vehicle use*, 1999), where more vehicular interactions per unit time will occur.

There are many good reasons for public policy to aim to reduce traffic congestion by measures such as better road layouts, encouragement of increased use of public transport and flexible working hours. The argument that this would significantly impact on serious violence on the roads however is not strong.

Proximal Triggers

The phenomenon of interpersonal violence very rarely lends itself to simple causal models. The above has addressed the relatively enduring environmental and personological variables which may heighten the risk of road violence. The actual occurrence of serious acts of violence however, is generally preceded by some kind of 'triggering' proximal event. Often, perpetrators see these triggers as the single "cause" of their behaviour and tend to explain their aggressive driving as being the result of being initially wronged by another party (Lupton, 2002). An acknowledgement of the role of proximal triggers does not of course exculpate perpetrators from responsibility for their actions.

One of the key aspects of road rage which thus far has been little considered in the literature is the way in which relatively trivial proximal triggering incidents can escalate very rapidly into life-threatening violence (Batten, Penn, & Bloom, 2000; O'Brien, Tay, & Watson, 2004; Parkinson, 2001). A model developed by Luckenbill (Luckenbill, 1977) describing the structure of disputes leading up to homicides appears to be of relevance. According to this model, the key stages are:

1. Victim presents to offender a set of actions or non-compliance relevant to the offender
2. Offender interprets victim's actions as offensive
3. Offender retaliates with a challenge or violence
4. Victim retaliates or resists the offender's direction
5. Both parties are committed to the confrontation.

Note the importance of both the offender's *interpretation* (appraisal) of the victim's actions and also the offender's *decision* to retaliate. Novaco (1998) has similarly stressed the importance of 'cognitive scripts': subroutines which are activated by particular interpretations of situational 'cues'. One such script suggested to be of

particular relevance to road violence, is that of 'challenge' leading to 'retaliation' and then to 'dominance'.

These processes of interpretation of the other's actions and activation of violent responding directly relate to background personological factors such as personality. Hence, such processes act as a bridge between long term background variables and the acute proximal triggers relevant to acts of serious violence. There is some evidence suggesting that personality variables such as irritability and competitiveness do indeed mediate the relationship between aggressive behaviour on the roads and particular triggering circumstances (Yagil, 2001).

Contemporary models of anger (Berkowitz, 1990; C. A. Smith & Lazarus, 1993) attribute its elicitation by a potential victim not simply to frustration *per se*[4] but rather to blaming another party who is felt to be *accountable and responsible* for bringing about a state of affairs which *conflicts* with current goals or concerns. Once triggered, anger-related feelings can enhance anger-related thoughts (Berkowitz, 1990), particularly in those with a personality structure low in agreeableness (Berkowitz, 1990; Meier, Robinson, & Wilkowski, 2006). This process, depending on the presence or absence of other inhibiting factors, may subsequently result in some form of aggressive response. If such a response is extreme then the interpersonal situation may come to an end there, but if less serious it can trigger similar responses from the other party and so on until the situation escalates (Tedeschi & Felson, 1994).

'Current concerns' which may be adversely affected by the violation of perceived normative behaviours by others in the road context include : reaching a destination on time (impeded progress leading to frustration); one's personal safety (threat to safety); and one's self-esteem (threat to status or 'ego'). When considering the psychological

[4] As with the classical 'Frustration Aggression' Model (Dollard, Doob, Miller, Mowrer, & Sears, 1939)

factors relevant to road violence it is useful to consider triggers in such psychological terms[5], even if this involves some assumptions with respect to the interpretations of behaviours made by the parties involved.

Impeded progress

Although unlikely to be the full explanation for serious road violence, there is no doubt that feelings one's progress on the roads impeded by a culpable identifiable source may lead to anger, and even violent responding in those so predisposed (Forward, 2004; Roberts & Indermaur, 2003; Ward, Waterman, & Joint, 1998). Drivers under time pressure may be at particular risk of feeling angry under these circumstances (O'Brien, Tay, & Watson, 2004).

Threat to safety

Reckless, inconsiderate or otherwise dangerous driving on the parts of others may elicit angry responses from those who feel at risk. In vignette studies, the likelihood of serious aggression in response to reckless driving has been reported as higher than that in response to traffic impeding progress (Dukes, Clayton, Jenkins, Miller, & Rodgers, 2001).

Threat to status

Direct hostility amounting to an attack on 'status' may trigger serious road violence (Batten, Penn, & Bloom, 2000; Forward, 2004; Hennessy & Wiesenthal, 2002; Lajunen & Parker, 2001; Ward, Waterman, & Joint, 1998; Wright, Gaulton, & Miller, 1997). It may be that serious acts of violence on the roads are essentially no different from other acts of violence between strangers, where the importance of defence and enhancement of status or 'reputation' have long been recognised as critical (Harding, Morgan, Indermaur, Ferrante, & Blagg, 1998; Tedeschi & Felson, 1994). Depending

[5] Although defining triggers in 'traffic language' (e.g. 'tailgating', 'failure to indicate', 'near collision') is arguably more objective and reliable.

on the personality structure and cognitive biases of the parties involved, once an 'honour' or 'status contest' develops, violence is not only excused but may be perceived to be essentially mandated (Tedeschi & Felson, 1994).

Transient Perpetrator States

There is some evidence from the accident literature that *transient states* such as low mood and other effects of non-road related life stressors may increase the risk of unsafe driving and driving violations (Donovan, Umlauf, & Salzberg, 1988; Gulian, Debney, Glendon, Davies, & Matthews, 1989; Joint, 1995; Mizell, 1997; Selzer & Vinokur, 1974). As discussed above, there is debate as to whether at least some people have a circumscribed anger problem, whereby their residual anger from non-road situations only becomes manifest as a (transient) mental state behind the wheel of a car. Whilst there is some evidence that a proportion of the population do display more anger behind the wheel then elsewhere (Byrne, 2000), the extent to which this translates into actual enactment of serious violence, rather than simply hostile or selfish driving, has not yet been addressed in the literature.

Victim Characteristics

Incidents of serious violence by definition have a victim as well as a perpetrator. Aside from their actual behaviours (for example, by bringing about a 'triggering incident') such victims also have particular demographic and other characteristics that may place them at particular risk.

Most serious road violence is male versus male (Wright, Gaulton, & Miller, 1997). Being female, particularly of older age, appears to be protective against being victimised (O'Brien, Tay, & Watson, 2004; Yagil, 2001), although other 'vignette' based work has found such characteristics (in other drivers) to be irrelevant to (self-

reported) responses to reckless or frustrating behaviour by other drivers (Dukes, Clayton, Jenkins, Miller, & Rodgers, 2001).

Driving a car of high status may be a protective factor, at least against lesser levels of road rage such as horn honking (Doob & Gross, 1968), although the evidence on this is mixed (Diekmann, Jungbauer-Gans, Krassnig, & Lorenz, 1996).

The "principle of homogamy", whereby similarities are found between perpetrators and victims is generally supported for acts of violence on the roads. Demographically both offenders and victims tend to be younger males (*Aggression and/or violence associated with motor vehicle use*, 1999; Hemenway, Vriniotis, & Miller, 2006; Mann, Smart, Stoduto, Adlaf, & Ialomiteanu, 2004). Similarly, levels of general psychiatric morbidity (Fong, Frost, & Stansfeld, 2001; Smart, Asbridge, Mann, & Adlaf, 2003), alcohol problems (Hemenway, Vriniotis, & Miller, 2006; Mann, Smart, Stoduto, Adlaf, & Ialomiteanu, 2004; Wright, Gaulton, & Miller, 1997), and past criminal offending (Hemenway, Vriniotis, & Miller, 2006; Wright, Gaulton, & Miller, 1997) are elevated in both offender and victim populations. A study in Canada (Smart, Asbridge, Mann, & Adlaf, 2003) found that serious road rage offenders are not only likely to have considerable psychological morbidity, but are also likely to describe having been victims of road rage. In the same study 75% of road rage *victims* admitted to perpetrating acts of road rage in the previous year. A telephone survey in the U.S. (Hemenway, Vriniotis, & Miller, 2006) similarly found that perpetration of and victimisation by obscene gestures and aggressive following were highly associated.

Moving from the demographic scale to that of individual conflicts, it may be that serious acts of road rage occur when people with some overlapping personological characteristics happen to come into conflict with each other on the roads (Batten,

Penn, & Bloom, 2000). In any given case, the party who starts off as the initial 'victim' is often eventually prosecuted as the (legal) offender (R. G. Smith, 2006): this may relate to how such incidents escalate in their seriousness, as insults ricochet back and forth and the honour contest escalates out of all proportion to the initial triggering incidents (Harding, Morgan, Indermaur, Ferrante, & Blagg, 1998).

Aims

As discussed above, most of the current literature on “road rage” relates to less serious behaviours and relies on self report from selected non-offender populations. Self-report data is inevitably affected by inaccuracies due to social desirability responses, recall bias, intentional distortions and non-candid responses (Aday, 1996). There is a relative dearth of research on the characteristics of serious road violence perpetrators. The key question therefore of whether such violence relates more to road-related ‘state’ factors or to person-related ‘trait’ factors, with all the attendant implications for prevention, remains unanswered. Extrapolation of conclusions from research on ‘selfish’ and ‘hostile’ driving behaviours to road violence is unlikely to be a valid approach to this question.

There have also been few attempts to develop empirical typologies of serious road violence offenders.

The aims of the current study were:

1. To describe the demographic, criminological and psychiatric profile of a set of perpetrators convicted of serious road violence.
2. To compare these characteristics with a matched set of offenders convicted of similar offences, also against strangers, but not in a road context.
3. To ascertain the relative frequencies of different types of triggering incidents (threats to safety; threats to status; frustration) in acts of road violence, and compare these with triggering incidents in non-road violence.
4. To develop a rudimentary typology of serious road violence perpetrators based on criminological profile.

It was hypothesised that the characteristics of the road violence offenders would not differ significantly from those of other violent offenders who aggress against strangers. It was also hypothesised that the relative frequencies of different types of triggering incidents would not significantly differ between the road and non-road context.

Methods

The study used a case-control methodology, using information from files held by the Victorian Office of Public Prosecutions (OPP). These files only relate to matters serious enough to be heard in the Higher (County or Supreme) Courts in Victoria; lesser charges heard summarily at the Magistrates' Court level are held locally by police. The study focussed on serious road violence and hence only utilised the OPP files, relating to the Higher Court matters.

Criteria for inclusion as a case were:

- A violent offence resulting in conviction in the Higher Courts
- Victim was previously unknown to offender, and was not a police officer or other law-maintaining official (e.g. RSPCA inspector) conducting operational duties.
- At commencement of the interpersonal exchange which culminated in violence, the eventual offender and/or victim was in a motor vehicle on the road

The major methodological challenge of the study was case ascertainment: there are no specific charges relating to 'road violence' (in distinction to violence elsewhere) and so information beyond the charge category was required to determine whether a case met these criteria. Two separate search techniques were utilised to maximise the yield of road violence cases.

Firstly, the Victorian Office of Public Prosecutions conducted a search of their electronic database of prosecution matters ('PRISM') between January 1996 to June 2003, using the keyword "road rage" as the search criterion. Eighteen cases were identified, and 15 of these could be retrieved from their records; three cases could not

be perused as the matters related to minor offences which did not progress beyond Magistrates' Court and the relevant files had been returned earlier to Victoria Police. The initial 15 available cases were perused to identify the range of demographic, criminological, and incident data available.

The convictions in these 15 cases all included one or more of the following offences:

- Murder
- Attempted Murder
- Intentionally Causing Serious Injury
- Recklessly Causing Serious Injury
- Reckless Conduct Endangering Life
- Reckless Conduct Endangering Serious Injury
- Affray
- Common Law Assault

At our request, OPP staff then conducted a search of PRISM for all prosecution matters during 1996 and 2003 in which any of the above offence categories was listed. This yielded 3,197 matters. A manual database search of the offence details noted on PRISM in connection with these matters was undertaken to identify further potential cases of serious road-user violence. The relevant files were retrieved and another 16 incidents of serious road-user violence were identified by this method.

One of the aims of the study was to compare the cases of road violence with controls who displayed similar levels of violence against strangers in non-road contexts. For each case therefore, PRISM was searched in temporal sequential order for the next matter involving a potential control offence which matched the most serious conviction of the road violence case. This was *excluded* if: the victim was previously known to the perpetrator; the victim was a police officer, or other law-

maintaining official conducting operational duties; or, at commencement of the interpersonal exchange which culminated in violence, the eventual offender and/or victim was in a motor vehicle on the road.

At total of 1,489 matters were searched. Of these, 75 files were retrieved to obtain 31 control offences which fulfilled the relevant criteria.

For both cases and controls, if the prosecution files indicated more than one charge against the same offender, the offences were carefully examined to determine whether they all related to a single incident (in which case it was counted once) or to clearly distinct incidents, in which case each was coded separately. In practice, only one instance was uncovered involving multiple distinct incidents by the same offender – a road violence offender who perpetrated 3 distinct offences.

For purposes of analysis, 'victim' and 'offender' were coded according to legal status rather than by considering which party appeared to be responsible for triggering the incident.

Information relating to the incident itself and to evidence of drug or alcohol misuse on the day of the offence were obtained from the various sources within the file, including police forensic evidence and witness statements. One of the researchers (AD) coded the initial 'norm violation' involved in the interpersonal exchange culminating in the offence (for both cases and controls), according to :

- source
    - eventual victim
    - eventual offender
    - third party
- trigger type
    - 'threat to safety' (e.g. reckless driving)

- ‘threat to status’ (e.g. hostile remark)
- ‘frustration’ (e.g. slow to move off at a junction)

Information relating to past offending was contained in the prosecution files in the form of a printout from the relevant police departments, most usually Victoria. Where no such records were included in the file, it was assumed that there was no prior criminal history, since OPP policy is to always include such information in their records (where there is a prior history), to assist with sentencing submissions.

The history of contact with public psychiatric services in Victoria of all cases and controls was ascertained by checking the ‘RAPID’ database held by the Victorian Department of Human Services. For those who had such a history, the primary diagnosis was obtained.

Analyses were carried out using SPSS Software (*SPSS for Windows 13.0*, 2005).

Ethical approval for the study was obtained from the Victorian Department of Human Services HREC and Monash University HREC.

Results

Characteristics of offenders

The demographic, criminological and psychiatric data on both the cases (road violence) and controls (other stranger violence) is shown in Tables 1 and 2.

The sample of offenders in this study was almost exclusively male and relatively young. Only ethnicity distinguished cases from controls, with road violence cases being slightly more likely to be of non-Anglo-Celtic background.

Both cases and controls had a high rate of previous offending behaviours, both violent and non-violent. A majority of both cases and of controls had a prior offending history, in many cases including violence. It was not possible to ascertain whether such previous violent offending took place in non-road related contexts. Offence history did not differ significantly between the cases and controls.

A small number of both cases and controls involved perpetration by persons with a psychiatric history. The majority of these involved only brief contact with psychiatric services, apparently at times of crisis. Of the road violence group, none had been diagnosed with a psychotic or major affective disorder, or ever been subject to prolonged compulsory psychiatric treatment under the Mental Health Act.

Comparison with other stranger violence offenders

There were no significant differences between cases and controls on any demographic, criminological or psychiatric variables, except for ethnicity. Although a significant proportion of incidents of road violence were perpetrated by persons who had not previously been violent, the proportion was **not** significantly different from that found in the control sample whose violence occurred off the roads.

Thus, the data was consistent with the hypothesis that the characteristics of road violence offenders do not differ significantly from those of other violent offenders who aggress against strangers.

Triggering incidents

Tables 3 and 4 show the data on 'triggering incidents' relating to both cases and controls. In both groups, the initiating 'norm violation' was as likely to be perpetrated by the (legally defined) victim as by the offender. The nature of the triggers differed significantly between the 'road' and 'non-road' groups. In the driving context, the triggering incident was most likely to be coded as an act of recklessness, which appeared to pose a threat to the *safety* of the other party. Off the roads, the most common trigger was a direct threat to the other party's *status*. Thus, the hypothesis that the relative distribution of type of triggering incident would not differ between contexts was not supported. The difference between cases and controls with respect to nature of trigger was significant.

Drug or alcohol use was also more commonly noted in the control group, possibly relating to the fact that many such offences occurred in drinking establishments.

Typology

Given the small sample size, only a very simple typological analysis was possible. The criminological variable of 'previous violent offending' versus 'no previous violent offending' was chosen as the determining factor. From the limited information available in this study, this seemed to be the factor most able to address the issue of the relative validity of 'state' versus 'trait' models of road violence. In the absence of any data on personality factors, it acts as the best available 'proxy' measure for presumed dispositional variables.

Simple exploratory comparisons were made within the 'road' violence sample, comparing those with and without prior violent offending on a range of variables, as shown in Table 6. Similar comparisons were made within the 'non-road' violence sample, using the same dichotomy, as shown in Table 7.

The data showed that, within the road violence sample, those with **no** prior violence were more likely to be in employment and also had fewer total prior offences. They were also less likely to have a record of past non-violent offences. Within the controls (non-road violence) group, those with no prior violence also had had fewer total prior offences, and were also less likely to have a record of past non-violent or driving offences.

Examining the situational variables relevant to the incidents involving those with and without prior violence, as shown in Tables 8-11, the only significant finding related to trigger *source* in the control group. Those with no prior offending were less likely (than those with past violent offending) to be the initial perpetrator of the norm violation which was coded as the triggering incident.

Table 1. Offender characteristics

	Cases n (%)	Controls n (%)	χ^2 or t (df) statistic	p (two-tailed)
Male gender	28 (90.3)	31 (100)	$\chi^2_{(1)} = 3.15$	.24‡
Mean age in years	28.21 (S.D. =8.0)	24.97 (S.D.=7.98)	$t_{(60)} = 1.80$	.08
Partnered	11 (36.7)	6 (19.4)	$\chi^2_{(1)} = 2.27$	.16
Employed	19 (70.4)	16 (57.1)	$\chi^2_{(1)} = 1.04$	.40
Completed secondary education	4 (13.3)	4 (13.8)	$\chi^2_{(1)} = .00$	1.00‡
AngloCeltic ethnicity	10 (32.3)	18 (60.0)	$\chi^2_{(1)} = 4.72$	**.04**
Known public mental health contact	6 (19.4)	8 (25.8)	$\chi^2_{(1)} = 0.36$	0.54
Any prior criminal history	23 (74.2)	20 (54.5)	$\chi^2_{(1)} = .68$	.58
Previous violent offending	18 (58.1)	13 (41.9)	$\chi^2_{(1)} = 1.61$	.31
Previous non-violent offending	11 (84.6)	20 (6.45)	$\chi^2_{(1)} = 1.78$	.28‡
Previous driving offences	13 (41.9)	10 (32.3)	$\chi^2_{(1)} = .62$	.60
Previous drug-related offences	11 (35.5)	12 (38.7)	$\chi^2_{(1)} = .07$	1.00

Note: Counts and percentages are based on available data. Due to missing data, the count does not always equal the total possible number of cases.

‡ Due to cells with expected count less than 5, Fisher Exact Test was calculated for significance.

Table 2. Age distributions

	Cases n (%)	Controls n (%)
< 18 years	0 (0)	4 (12.9)
18-25 years	16 (51.6)	15 48.4)
26-35 years	8 (25.8)	8 (25.8)
36-45 years	6 (19.4)	3 (9.7)
46-55 years	1 (3.2)	1 (3.2)

Table 3. Triggering incidents: perpetrator of initial norm violation

	Cases n (%)	Controls n (%)	Chi-Square	*p*
Offender	16 (51.6)	16 (51.6)	$\chi^2_{(1)} = .00$	1.00
Not offender	15 (48.4)	15 (48.4)		

Table 4. Triggering incidents: nature of initial norm violation

	Cases n (%)	Controls n (%)	Chi-Square	*p*
Threat to status	8 (25.8)	23 (74.2)	$\chi^2_{(2)} = 15.28$	**<.001**‡
Threat to safety	18 (58.1)	5 (16.1)		
Frustration	5 (16.1)	3 (9.7)		

Note: Counts and percentages are based on available data. Due to missing data, the count does not always equal the total possible number of cases.

‡ Due to cells with expected count less than 5, Fisher Exact Test was calculated for significance.

Table 5. Triggering incidents: drug/alcohol use by perpetrator at time

	Cases n (%)	Controls n (%)	Chi-Square	*p*
Drug/alcohol use noted at time	8 (27.6)	22 (71.0)	$\chi^2_{(1)} = 11.27$	**.002**

Note: Counts and percentages are based on available data. Due to missing data, the count does not always equal the total possible number of cases.

Table 6. Comparison of 'Previously Violent' vs. 'Not Previously Violent' types within Road Violence sample

	Previously Violent n (%)	Not Previously Violent n (%)	χ^2 or *t* statistic (df)	*p*
Male gender	17 (94.4)	11 (84.6)	.83	.56‡
Mean age	28.33 (SD = 7.43)	26.62 (SD = 9.26)	$t_{(29)} = .09$	.93
Partnered	6 (33.3)	5 (41.7)	$\chi^2_{(1)} = .22$	.71‡
Employed	8 (50)	11 (100)	$\chi^2_{(1)} = 7.82$	**.006**‡
Completed secondary education	2 (11.1)	2 (16.7)	$\chi^2_{(1)} = .19$	1.00
Anglo Celtic ethnicity	6 (33.3)	4 (30.8)	$\chi^2_{(1)} = .02$	1.00‡
Mean number of prior offences	19.67 (SD = 22.35)	3.46 (SD = 6.08)	$t_{(29)} = .09$	**.008**
Previous non-violent offending	18 (100)	5 (38.5)	$\chi^2_{(1)} = 14.93$	**<.001**‡
Previous driving offences	10 (55.6)	3 (23.1)	$\chi^2_{(1)} = 3.27$	.14
Previous drug-related offences	7 (38.9)	4 (30.8)	$\chi^2_{(1)} = .22$	.72‡

Note: Counts and percentages are based on available data. Due to missing data, the count does not always equal the total possible number of cases.

‡ Due to cells with expected count less than 5, Fisher Exact Test was calculated for significance.

Table 7. Comparison of 'Previously Violent' vs. 'Not Previously Violent' types within Control sample

	Previously Violent n (%)	Not Previously Violent n (%)	χ^2 or *t* statistic (df)	*p*
Male gender	13 (100)	18 (100)	-	NS
Mean age	26.92 (SD = 9.22)	23.28 (SD = 6.49)	$t_{(29)} = -1.29$	.21
Partnered	3 (23.1)	3 (16.7)	$\chi^2_{(1)} = .20$	.68‡
Employed	4 (33.3)	12 (75.0)	$\chi^2_{(1)} = 4.86$	.053
Completed secondary education	1 (7.7)	3 (18.8)	$\chi^2_{(1)} = .74$	.61‡
Anglo Celtic ethnicity	5 (41.7)	13 (72.2)	$\chi^2_{(1)} = 2.80$	.14
Mean number of prior offences	39.31 (SD = 46.17)	4.06 (SD = 10.14)	$t_{(29)} = -2.71$	**.02**
Previous non-violent offending	13 (100)	7 (38.9)	$\chi^2_{(1)} = 12.31$	**<0.001**‡
Previous driving offences	7 (53.8)	3 (16.7)	$\chi^2_{(1)} = 4.78$	**<.05**‡
Previous drug-related offences	7 (53.8)	5 (27.8)	$\chi^2_{(1)} =$	.26

Table 8. ‘Previously Violent’ vs. ‘Not Previously Violent’ types within Road Violence sample compared by trigger type

	Violent n (%)	Nonviolent n (%)	Chi square	*p*
Frustration	3 (16.7)	2 (15.4)	$\chi^2_{(2)} = 2.27$	.36‡
Threat to safety (Reckless)	12 (66.7)	6 (46.2)		
Threat to status (challenge)	3 (16.7)	5 (38.5)		

Note: Counts and percentages are based on available data. Due to missing data, the count does not always equal the total possible number of cases.
‡ Due to cells with expected count less than 5, Fisher Exact Test was calculated for significance.

Table 9. ‘Previously Violent’ vs. ‘Not Previously Violent’ types within control sample compared by trigger

	Violent	Nonviolent	Chi square	*p*
Frustration	0	3 (16.7)	$\chi^2_{(2)} = 2.86$	.28‡
Threat to safety (Reckless)	3 (23.1)	2 (11.1)		
Threat to status (challenge)	10 (76.9)	13 (72.2)		

Note: Counts and percentages are based on available data. Due to missing data, the count does not always equal the total possible number of cases.

‡ Due to cells with expected count less than 5, Fisher Exact Test was calculated for significance.

Table 10. ‘Previously Violent’ vs. ‘Not Previously Violent’ types within Road Violence sample compared by trigger source

	Previously Violent n (%)	Not Previously Violent n (%)	Chi sq	*p*
Offender	11 (61.1)	5 (38.5)	$\chi^2_{(1)} = 1.55$	.29
Non-offender (ie victim or third party)	7 (38.9)	8 (61.5)		

Note: Counts and percentages are based on available data. Due to missing data, the count does not always equal the total possible number of cases.

Table 11. ‘Previously Violent’ vs. ‘Not Previously Violent’ types within control sample compared by trigger source

	Violent	Nonviolent	Chi sq	*p*
Offender	11 (84.6)	5 (27.8)	$\chi^2_{(1)} = 9.76$	**.003**
Non-offender (ie victim or third party)	2 (15.4)	13 (72.2)		

Conclusions

Offender characteristics

The key findings of the study are consistent with previous work (Wright, Gaulton, & Miller, 1997) in finding no major difference between the general characteristics of 'road violence' offenders compared to violent offenders in general. Thus, when the most serious end of the spectrum of 'road rage' (i.e. that which has been defined as 'road violence') is considered, road rage offenders resemble other perpetrators of violence against strangers. This suggests that a 'trait' rather than 'state' based explanatory model for such violence is more appropriate. Such enduring factors do not however appear likely to include major mental illness (psychotic or major affective disorders), which did not feature to a significant extent in either cases or controls.

The results however do not entirely refute the idea that a small proportion of road violence may be perpetrated by people who have different behaviour patterns behind the wheel, as compared with elsewhere. This 'state' based ('Jekyll and Hyde') model of road violence is partially supported by the finding that a significant proportion of road violence offenders had no previous violent convictions. However, a similar proportion of such offenders were found in the control group. These results therefore do not support the proposition that factors encountered in road contexts (as opposed to non-road contexts) are especially conducive to such 'uncharacteristic' violence. Rather, it appears that a significant proportion of *all* violence against strangers is carried out by people with no prior violent offending. Hence the 'state' model may apply to a small but significant proportion of *all* violence carried out against strangers – uncharacteristic 'rage' is not confined to the road. The contribution of 'road'

factors is no more compelling than that of environmental factors found in other contexts.

Triggering incidents

The types of 'norm violation' which appeared to act as the initiating trigger to the violent incident varied significantly between road and non-road contexts: on the roads, perceived threat to safety was significantly more likely than threats to status or frustration to be the primary norm violation; off the roads, threats to status were the most common type of trigger. This finding, which is consistent with self-report vignette based research (Dukes, Clayton, Jenkins, Miller, & Rodgers, 2001) probably partly reflects the dangers inherent in the driving context, where even minor transgressions of generally accepted behaviour can endanger life. In non-road contexts, reckless behaviour is seldom so dangerous.

Note that *after* the initial norm violation, the situation on the roads likely also involved threats to status (such as an obscene gesture or other insult): the data analysis in this study only pertains to the *initial* step ('norm violation') in the social encounter. It is possible that acts of reckless driving threatening others' safety lead to anxiety on the part of the other driver, as well as a degree of resentful hostility, particularly if that driver is prone to attributing hostile intent on the part of others who violate norms. Given the effect of anxiety on information processing and behaviour, it is possible that the heightened arousal due to anxiety makes 'primitive' responses, such as a vengeful obscene gesture more likely to occur. Depending on the responses of the other driver, the stage may then be set for an escalating 'status contest' (even where the primary trigger was not a threat to status) with potentially catastrophic consequences.

In this study, the person responsible for the initial norm violation was just as likely to be the eventual victim as the eventual offender, in both road and non-road contexts. This is consistent with earlier work on road violence (Asbridge, Smart, & Mann, 2003) and on stranger violence in general (Luckenbill, 1977). On the roads, one party may respond to an initially fairly minor act of (selfish or hostile) reckless driving in such a way that the other party feels affronted, endangered or frustrated, or conversely may fail to acknowledge their own initial minor violation, preferring to precipitate a status contest which then rapidly escalates to serious violence. This highlights the important roles of victim behaviour and of *escalation* in stranger violence (Luckenbill, 1977): it is more often the result of a complex transaction, a sequential social encounter, rather than a simple linear event of an offender attacking a victim 'out of the blue'.

Typology

The rudimentary typology applied to both the cases and controls was derived using the objective data of past criminal history: presence or absence of past violent offending. The subset with no prior violent crime may simply represent a group of first time offenders whose first offence simply happens to have been against a stranger. However, the fact that they are generally better adjusted socially (in terms of employment at least) suggests that there may be a less trivial explanation for this finding. They may for example be a group who were subject to overwhelming life stressors at the time of the offence which prompted an out of character response. The potential effects of drugs or alcohol, or unusually provocative victim behaviour (as suggested perhaps by the findings relating to source of initial trigger for the control group) are other possibilities, which could not be explored in this study due to inherent limitations in the data. The subgroup is indeed worthy of further study, but

these findings do not support the proposition that there is anything necessarily "road-related" about the subgroup, rather it seems to be a phenomenon found in all violence against strangers.

It would be useful to test this typology on another sample and relate to more detailed idiographic features such as personality style, concurrent life stressors and the nature of the triggering incident and its trajectory into full blown violence.

Limitations of study

The sample size in this study was small. This small sample size reflected both logistical limitations in case ascertainment and also the fact that serious road related violence of sufficient severity to reach the higher courts in Victoria is not a common phenomenon. The capacity to carry out sophisticated statistical analyses was correspondingly limited. It is also possible that the findings of few significant differences in characteristics between road versus non-road offenders was a type II error, and that more such differences would emerge if larger populations could be sampled.

There were also limitations on the quality of data. With respect to psychiatric factors, few of the subjects had independent mental health evaluations in their files and so we were reliant on the public mental health database as the only source of psychiatric data. It seems likely that many perpetrators of violence had mental health problems which had never come to the attention of public psychiatric services in Victoria and hence were not recorded on this database. Although the information regarding admissions and compulsory treatment under the Mental Health Act is reliable, diagnostic information is often limited in quality and reliability on this system.

The availability of information regarding demographic factors, particularly education, was limited and unavailable for some subjects.

The quality of data about the nature of the incidents involved was dependent on prosecution files, which were variable in level of detail. The statements to the police contained therein are inevitably coloured by recall bias. The coding by the researcher regarding nature and source of trigger was not carried out blind with respect to nature of offence (road vs. non-road) or past criminal history of offender. There was also obviously a degree of subjectivity involved in determining which act should be coded as the initiating 'norm violation', and on coding particular violations as being threats to status, threats to safety or frustration.

The assumption underlying the typological analysis, that an absence of prior violent crimes reflects an absence of prior actual significant violence, is questionable. Much violence never reaches the attention of the police or does not lead to a successful prosecution. It is therefore possible that a proportion of those analysed as 'not previously violent' did in fact have a history of violence, which was not accessible using this file-based methodology.

Implications for public policy

This study is consistent with other recent work (L. Roberts & D. Indermaur, 2005) which suggests that for road *violence,* broad based public education and improvements to road systems, which have been advocated as an antidote to 'road rage' in the past (Shinar, 1998) and are predicated on a 'state' model of causation, are likely to be of limited value (Parker & Manstead, 1996). Rather, given the likely importance of trait factors for this group, a more individualised focus is likely to be required involving a combination of criminal sanctions and clinical interventions tailored to the particular needs of the offender. As with all impulsive violence, where offenders can be persuaded to engage with treatment there well may be some value in psychological (Howells & Day, 2002) and in selected cases pharmacological (Barratt,

Stanford, Felthous, & Kent, 1997) management strategies. Given that many road violence offenders are also likely to have been violent elsewhere, it is unlikely that sanctions which purely focus on the driving situation, such as limitations on licence or size of motor vehicle engine (L. Roberts & D. Indermaur, 2005) would be fully effective in reducing future risk: rather it may simply shift the problem off the roads into other domains. However, given their likely personality, an appeal to self-interest may be needed to obtain initial engagement in treatment, and conditional revocation of driving licenses may provide leverage to encourage this.

The data on triggering 'norm violations' suggests that a cultural shift away from seeing impulsive, reactive violence in response to threats (to safety or status) as being a marker of high male status may reduce the risk of such offending both on and off the roads, as suggested elsewhere (L. Roberts & D. Indermaur, 2005). One useful model for this might be the emphasis on self control which is emphasised in some martial arts training (Kano, 1994).

Given the critical role of escalation, and the fact that eventual victims are often responsible for initial norm violation, broader based education, perhaps as part of driver training and testing may actually be of more benefit not to potential perpetrators (so-called 'at-risk drivers' (Sharkin, 2004)) but to potential *victims*. Whilst many victims do indeed appear to be similar in characteristics to perpetrators (Asbridge, Smart, & Mann, 2003), it may be that a sizeable subset are unwitting parties to road violence who get more than they bargained for when engaging in a status contest with another driver (who may of course have a considerable predisposition for violence). This may be because they responded to an initially fairly minor act of selfish or hostile driving in such a way that the other party felt endangered, affronted or frustrated, or that they failed to acknowledge their own

initial minor violation, preferring to precipitate a status contest, which then rapidly escalated to serious violence. If more of the driving population can be encouraged to disengage from embarking on such 'tit for tat' contests on the road at an early stage in the piece, then this may significantly reduce the number of violent incidents on the roads. It is in this broader group of potential victims, rather than in 'at risk drivers', where encouraging a "sense of community, civility, altruism and social responsibility" (Matthews & Norris, 2002; Sharkin, 2004) is likely to be fruitful. Thus, the most important broad-based intervention may relate more to victimisation-avoidance rather than to attempting the more difficult task of attitudinal shift in potential road violence offenders. This has significant implications for driver training and education.

Directions for future research

This study concurs with recent moves (*Inquiry into Violence associated with Motor Vehicle Use by the Drugs and Crime Prevention Committee*, 2004; L. Roberts & D. Indermaur, 2005) to distinguish between work on road violence and studies on lesser forms of 'road rage' ('hostile' or 'selfish' driving). Whereas studies on volunteers from the general public or from universities may tell us something about hostile and selfish driving, this study shows that the perpetrators of serious road violence need to be treated as a qualitatively distinct group. There remains a pressing need to examine this group in more detail moving from file based research, such as that presented here, to clinical research involving interviews, personality assessment, psychiatric evaluation, substance use patterns, life stressors, detailed analysis of precipitating triggers, and possibly even neurobiological evaluation. The paradigm presented here of comparing such offenders with other stranger violence offenders is useful in terms of teasing out how much of the risk relates to *road* related factors and how much to idiographic personological traits which are applicable in all contexts.

Similar analysis of victims of road violence would also be of potential value in testing the hypothesis that there may be certain dispositional characteristics and response patterns which render some persons 'at risk' of victimisation. The existence of such a phenomenon and the extent to which it may overlap with 'at risk' status for *perpetration* of road violence, and possibly even for accident-proneness, is an intriguing possibility with great potential importance for prevention work. Ultimately, further research on road violence will be of great value in devising targeted management strategies addressing the specific characteristics of offenders. The development of typologies and of corresponding treatment modalities spanning correctional and mental health domains has been of great value in other problem behaviours such as stalking (Mullen, Pathe, & Purcell, 2001), domestic violence (Maiuro & Avery, 1996) and fire setting (Canter & Almond, 2002). A focus on the development of strategies to enhance the safety of potential victims[6] has also been valuable in these fields (see for example Pathe, 2002). Similar developments would hold great promise for the future management of road violence, with great benefits for the community as a whole.

[6] Or potential 'targets' in the case of fire-setting.

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