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SITUATIONAL FACTORS CONTRIBUTING TO THE EXPRESSION OF AGGRESSION ON THE ROADS

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Abstract

This study explored the influence of situational factors on aggressive driving from within the framework of a frustration-aggression model of aggressive driving. Through the use of driving scenarios, a number of situational characteristics were manipulated to examine their effect on the level of anger reported by participants and their likely behavioural response. The situational characteristics examined included the age, gender and anonymity of the offending driver, and the sense of time pressure as well as the gender of the participants. The results confirmed that the situational characteristics of a potentially frustrating road event can influence both the anger reported by participating drivers and their likely behavioural response.

Keywords: road safety, road rage, aggressive driving, anonymity, time pressure.

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1. INTRODUCTION

The American Automobile Association Foundation for Traffic Safety reviewed newspapers, police reports and insurance reports, and found that 10,037 incidents of aggressive driving occurred in the United States between 1990 and 1996¹. The report also acknowledged that this was but a small percentage of those that actually occurred. Similarly, in a survey of 800 drivers in the Australian State of Victoria conducted by the Victorian Community Council Against Violence, it was found that 91% of the respondents who had experienced 'severe road rage' did not report it to the authorities². Also, 41% of those surveyed admitted to committing some form of 'road rage' in the last 12 months.

The term 'road rage' has been used extensively by the media to refer to a wide variety of behaviours on the road, although traffic researchers prefer to use the term 'aggressive driving', which accommodates a wider range of road behaviour that may be considered aberrant. Extreme cases of aggressive driving often receive media attention due to their sensational nature. However, the majority of aggressive driving incidences do not culminate in sensational, legally reportable road incidents, and therefore, fail to attract the attention of the media and traffic researchers. Nevertheless, there is a sense in many communities that the prevalence of road rage has been increasing over the last decade.

In terms of aggressive driving, the types of behaviour involved appear to occur on a continuum, ranging from relatively benign acts of swearing under one's breath to violent acts of physical harm to person or property. Shinar differentiates between instrumental and hostile aggression³. Hostile aggression is defined as behaviour that is primarily aimed at physically or psychologically harming the source of frustration. Such behaviours include verbal abuse, physical attacks and hand gestures. Instrumental aggression refers to driving behaviours that are intended to assist the aggressor to reach their destination or overcome a source of

frustration. Examples of such behaviours are horn honking, weaving, running red lights and tailgating.

1.1 Frustration-Aggression Model of Aggressive Driving Behaviour

Frustration-aggression theory maintains that aggression is always a consequence of frustration⁴. However, in his reformulation of the frustration-aggression hypothesis, Berkowitz suggests that aggression will result from frustration only when the frustrator is unpleasant enough to produce an intense emotion such as anger⁵. Further, he specifies that despite the presence of anger, aggressive behaviour may not necessarily result⁵. This latter hypothesis has been supported by studies that have found that anger experienced as a result of exposure to an anger-provoking road incident does not always lead to an aggressive behavioural response^{6,7}. Some researchers further suggested that the expression of aggression may be mediated by some form of cognitive assessment of the situation^{3,7}.

In a multi-factorial approach to aggressive driving, Shinar proposed that frustrating road situations, such as congestion and delays, mitigated by an individual's disposition for aggression and influenced by situational factors, contributed to a driver's aggressive disposition³. In accordance with frustration-aggression theory, increases in levels of frustration experienced will reduce the aggression threshold thereby increasing the likelihood of road aggression^{4,5}. However, subsequent research has found conflicting evidence that congestion per se increases the likelihood of aggressive behaviour^{7,8}.

Shinar also proposed that the fast pace of modern living, urbanisation and instantaneous communication technology had increased the sense of time pressure in the population³. In the traffic environment, this was measured in terms of duration of traffic signals, traffic congestion, time of day and day of the week, which may vary significantly across social, economic and cultural environments. Using an alternative approach, this study

will conceptualise time pressure as the sense of urgency related to a specific road journey, such as running late for an important meeting.

1.2 Other Causes of Aggression on the Roads

Whether aggression will be displayed on the road is influenced by a person's interpretation of situational factors and other aspects such as cultural norms^{3,9}. Further, Berkowitz stipulates that the amount of anger experienced in a frustrating situation not only depends on individual interpretation of situational factors, but also on the characteristics of the situation itself⁵. To date, a large number of situational characteristics found to influence driver behaviour have been identified by traffic researchers. These characteristics appear to be context dependent in their ability to generate aberrant driving behaviour^{10,11}.

Two of the most widely examined factors are the age and gender of the drivers involved. Shinar found that as age increased, aggressive driving appeared to decrease³. He also reported that aggressive driving was more common among men than women, particularly the more severe expressions of aggressive driving. Furthermore, Lajunen and Parker found that with increased age, there appeared to be a decrease in the amount of anger experienced and the severity of any behavioural response among males⁶. These findings suggest that age and gender appear to influence both the subjective experience of anger and the associated behavioural response to an anger-provoking situation. These results were also supported by an Australian survey which found that young males were over-represented in New South Wales police records of reported aggressive driving incidents¹². More interestingly, this study examined aggressive driving from the dual perspective, of the victim and the perpetrator.

This duality in aggressive driving can partially be explained by the social information processing theory¹³. Applied to the context of aggressive driving, this theory incorporates the

interpretation of the behaviour of other drivers in a negative or positive manner. A more positive image will lead to a more lenient interpretation of the behaviour of other drivers and reduces the likelihood of an aggressive behavioural response¹⁴. For the purpose of this study, the 'other driver' would be referred to as the offending driver.

In a study of cognitive antecedents to aggressive road behaviour, Yagil found that negative attributions applied to another driver were likely to increase the amount of frustration and anger experienced while driving, and male offending drivers were found to attract more negative attributions and emotional responses than female drivers⁴. Further, such negative beliefs and expectations about another driver were more likely to result in evaluations of their behaviour as being inconsiderate and aggressive¹⁴.

In a field study, Ellison and colleagues found that when participants were anonymous due to the enclosed design of their vehicle, they displayed more frequent horn-honking for longer periods¹⁵. The authors suggest that when a driver can not be identified by others, they can not to be evaluated or judged by others, resulting in more aggressive driving by these drivers¹⁵. As an extension, this study will explore whether an evaluation and judgement process appears to be applied to the 'other' or the offending driver.

1.3 Hypotheses

The focus of this research is on the manipulation of situational characteristics in a potentially frustrating and anger-provoking scenario to examine the anger aroused and the likely behavioural responses of participants. It will adopt a dual perspective and examine the characteristics of both the participants and the offending driver. In terms of the offending driver, it is hypothesised that:

- (1) an elderly female offender will elicit less anger and a milder behavioural response from participants than a young female offender;

- (2) a young female offender will elicit less anger and a milder behavioural response from participants than a young male offender;
- (3) an anonymous offender will contribute to higher levels of anger and a more extreme behavioural response from participants than an offending driver who is identifiable.

In terms of the participants, this study will examine the differences in the anger experienced and their likely behavioural responses due to differences in their gender and sense of time pressure. Specifically, it is hypothesized that:

- (4) a sense of time pressure among participants will result in the reporting of higher levels of anger and more extreme levels of aggressive behaviour;
- (5) male participants will report higher levels of anger and will be more likely to engage in more severe aggressive behavioural responses.

2. METHOD

A questionnaire survey was administered to a convenient sample of 166 participants. The majority of the participants were staff and students from a university in the Australian State of Queensland. Approximately 63% of the participants were females and the sample has the following age distribution: 17-18 years old (10.8%), 19-21 years old (22.9%), 22-25 years old (15.1%), 26-35 (19.3%) and above 35 years old (31.9%). Since there is no easy way to check on the extent of sample selection bias, the results obtained in this exploratory study should be treated as preliminary and further research using a broader sample should be conducted to confirm some of the findings.

In addition to the usual demographic data, the survey gathered information on the participants' reactions to five potentially anger-provoking scenarios. Whilst the driving circumstances were held constant, the situational characteristics (shown in parentheses

below) were manipulated across the five scenarios (see Table 1 for a list of the scenarios). An example of the scenarios is:

“You are driving somewhere and you are (running on time or late for an important meeting). You are approaching an intersection and the light changes from green to orange. You come to a stop behind another car. (Your view of the other driver is obscured or you see that the driver is an elderly woman / young woman / young male). The light takes about 3 minutes to change back to ‘green’. When it changes, the driver in front does not move, he/she does not seem to have noticed the light change. The light changes back to red very quickly, preventing you from moving forward. You will have to wait another 3 minutes before continuing on your journey.”

To minimise order effects, the participants were randomly allocated to two different versions of the questionnaire in which the order of presentation of the scenarios was reversed. As a preliminary check, between-groups ANOVA's were conducted to assess whether the order in which the scenarios were administered affected the mean amount of anger reported by participants or the mean reported behavioural response. These tests found no significant ($\alpha = 0.05$) order effect.

Immediately following each scenario, participants were asked to report, using a 5-point Likert Scale (1 = not at all angry, 5 = very angry), the level of anger they would experience in the situation and the likelihood of them engaging in each of the nine behavioural response. Again, the likelihood were recorded using a 5-point Likert Scale (1 = extremely unlikely, 5 = extremely likely). The behavioural response set used with each scenario (see Table 2) was adapted from two previous studies and consisted of nine behaviours that were treated as occurring on a continuum from mild to severe^{3,6}. A composite score was obtained by summing the responses of the items in the behavioural set.

3. RESULTS

A series of paired sample t-tests were conducted to evaluate the effects of the manipulated factors within the scenarios (see Tables 3 and 4). The first set of paired sample t-test compared the scenario where the offending driver was a young female with the one where the offending driver was an elderly female. In both scenarios, the participants were not experiencing any time pressure. The tests revealed no significant difference in the amount of anger experienced, even at $\alpha = 0.10$ (see Table 3), but found a significant difference ($\alpha = 0.01$) in the severity of participants' responses. The mean score for aggressive response towards a young female was 18.61 while the corresponding score for elderly female was 17.48, suggesting that participants were less likely to have a severe behavioural response towards an older offending driver than a young offender.

The effect of the offending driver's gender was tested by comparison of the mean scores for the scenario where the offending driver was a young female with the corresponding score where the offending driver was a young male. Again, time pressure was absent in both scenarios. The tests yielded a significant difference ($\alpha = 0.05$) in the amount of anger experienced. The mean anger score elicited by young female offenders was 2.90 and 2.99 for young male offenders, suggesting that the male offending drivers aroused more anger in the participants than female offenders. However, no significant difference in the severity of the behavioural response was found, although the results were in the direction hypothesised (higher mean response for males).

Third, a family of t-tests were conducted in order to test anonymity against young male, young female and elderly female (see Table 3). Again, time pressure was absent in the scenarios tested. As anticipated, an elderly female offender aroused the least amount of anger ($\alpha = 0.01$) and elicited the least aggressive response ($\alpha = 0.01$) compared to an anonymous

offender. Also as expected, a young female offender aroused less anger ($\alpha = 0.05$) and elicited a less severe response ($\alpha = 0.01$) than an anonymous offender. Finally, the young male offender did not arouse more anger or elicit more of an aggressive response compared to an anonymous offender.

Next, a set of paired samples t-tests compared the scenario where time pressure was absent with the scenario where time pressure was present. In both scenarios, the offending driver was anonymous. As shown in Table 3, the presence of time pressure had a significant effect on the amount of anger reported and the extent of behavioural response chosen. The mean anger score increased from 2.98 to 3.72 and was statistically significant at $\alpha = 0.01$ while the mean score for aggressive response increased from 19.14 to 20.15 and was statistically significant at $\alpha = 0.01$.

In order to test the final hypothesis, a series of one-way ANOVA's were conducted to investigate the differences in the responses of male and female participants for each of the five scenarios and the results were reported in Table 4. With respect to the amount of anger aroused, there was no significant difference between male and female participants in relation to the scenario involving time pressure but a difference existed when there was no time pressure, with male participants experiencing significantly more anger. Also, there was no difference in the amount of anger aroused when the offending driver was a young female but a significant difference existed when the offending driver was either an elderly female or a young male. Again, male participants reported significantly more anger than their female counterparts.

With respect to the likely behavioural response, male participants reported more aggressive responses than females in all scenarios but these differences were statistically significant in only four of the five scenarios. The only exception was the scenario where the offending driver was a young female. Even though male participants reported, on average, a

more aggressive response than female participants, this difference is not statistically significant.

4. DISCUSSION

In addition to examining the characteristics of the participants, this study also investigated the effects of the offending drivers' gender, age and anonymity on the level of anger aroused and the likely behavioural responses to a potentially frustrating road situation. Consistent with the results obtained by VCCAV², this study hypothesized that the age of the offending driver would have a significant influence on the level of anger aroused and the severity of the response reported by participants. Our results, however, provided only partial support for this hypothesis. We found that the elderly female offender aroused the same amount of anger as a young female offender but participants were more likely to retaliate against a young female offender than an elderly female offender for creating the same adverse situation on the roads. The latter result is expected because it is considered less socially acceptable to retaliate aggressively against elderly people, even if they generate the same amount of frustration or anger as a young offender.

The gender of the offending driver was hypothesized to have a significant influence on the amount of anger experienced and the severity of the response reported by participants. Yagil found that male drivers were perceived more negatively and therefore attracted more negative attributions than female drivers¹⁴. Our results, however, provided only partial support for this hypothesis. Although road situations involving a young male offending driver appeared to generate higher levels of self-reported anger than the same situation involving a young female offending driver, this did not result in a significantly stronger reported behavioural response. These results may suggest that a typical driver is more likely to get angry at adverse situations created by young male drivers compared to the same situations

created by young female drivers. However it appears that drivers are equally likely to retaliate against both groups of young offenders.

It was hypothesized that an 'anonymous' offending driver would increase the anger experienced and the likelihood of retaliation by the participants. As expected, the anonymous offender aroused more anger than an elderly offender and was more likely to receive an aggressive response from the participants as compared to either a young female or an elderly female offender. However, there was no significant difference in either the anger experienced or the retaliatory response reported by participants in relation to the scenarios depicting an anonymous offender and a young male offender. These results may suggest that, in the absence of identifying characteristics of the offending driver, drivers will often assume that a young male driver is responsible.

Consistent with previous studies, it was also hypothesized that participants would experience higher levels of self-reported anger and increased severity of the behavioural response when they were under some time pressure. This hypothesis is supported by the results of our study. The inclusion of a sense of time pressure in the scenario resulted in higher levels of anger aroused and increased potential for more aggression. It should be noted that our characterization of time pressure as being late for an appointment may be a better reflection of the pressures of modern living than the varying degrees of congestion used in earlier studies which found mixed results for this hypothesis^{3,7,8}.

Last, it was also hypothesized that male participants would experience greater anger and were more likely to retaliate when faced with a frustrating situation on the roads. In general, our results supported this hypothesis, with higher mean scores for male participants in both the level of anger aroused and the behavioural response. However, the higher levels of reported anger in male participants were statistically significant only when the participants were not under time pressure and offending driver was either anonymous, elderly female or a

young male. Both male and female participants reported the same levels of anger when they were under time pressure and when the offending driver was a young female. In terms of behavioural response, the differences between male and female participants were statistically significant across four of the five scenarios, with the young female offender being the exception. These results are not overly surprising because every one tends to be upset when under pressure. Also, as indicated by the other result (male participants were more upset by young male offenders), female participants may also be more upset by young female offenders, which may raise their level of anger to that experienced by male participants.

Besides testing the various hypotheses, our study also produced some interesting general results. Although the results suggest that all the different types of road aggression on the continuum are likely, the mean behavioural response across the five scenarios for all participants is fairly high, indicating a moderately high level of driver aggression in the sample, and possibly in the population as well. Participants were prepared to go beyond benign, instrumental behaviour in a simple situation, such as an unexpected delay, into the realms of interpersonal aggression, such as gesturing at another driver, or possibly worse. The adoption of an aggressive behavioural response that involves an interpersonal element, however, is liable to increase the likelihood of an aggressive behavioural response by the offending driver, thereby leading to the potential escalation of a relatively minor road incident¹⁴. This escalation may also account for possible difficulties in distinguishing between the victim and the perpetrator of road rage, as reported by the VCCAV².

Consistent with the literature review, this study found that the amount of anger experienced in a frustrating road situation was affected by a variety of situational characteristics and provided some support for Berkowitz's proposal to reformulate the frustration-aggression theory⁵. Current evidence tends to support the view that both person-related and situational factors will influence the experience of anger and the expression of

aggressive behaviour on the roads. Hence, there may be some merit in developing a more general framework or extending Shinar's model to capture the relationships between the multiple factors that have been found to affect anger and the expression of aggression on the roads^{3,10,11}.

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Table 1

Situational Characteristics Manipulated Across the Five Scenarios

Scenario	Situational Characteristics
1	View of other driver obscured (anonymity)
2	A young woman, approximately 20 years of age
3	An elderly woman
4	A young male of approximately 20 years of age
5	View of other driver obscured (anonymity) and extremely late for an important meeting

Table 2
Behavioural Response Set

Items
1. No reaction
2. Swear or mutter to yourself or others in your car
3. Beep horn and/or flash lights
4. Gesture at the other driver
5. Swear at and/or verbally abuse the other driver
6. After moving off, drive close to/follow the other vehicle
7. Get out of your vehicle, ready to argue
8. Get out of your vehicle, prepared to engage physically with the other driver
9. Use your vehicle to physically damage the other driver's vehicle

Table 3
Tests of Equality of Means Between Scenarios

	Anger	Response
<u>Offender's Age</u>		
Scenario 2: Young Female (Reference Group)	2.90 (0.89)	18.61 (4.65)
Scenario 3: Elderly Female	2.83 (0.98)	17.48** (4.56)
<u>Offender's Gender</u>		
Scenario 2: Young Female (Reference Group)	2.90 (0.89)	18.61 (4.65)
Scenario 4: Young Male	2.99* (0.94)	19.18 (5.84)
<u>Offender's Anonymity</u>		
Scenario 1: Anonymous (Reference Group)	2.98 (0.96)	19.14 (5.15)
Scenario 3: Elderly Female	2.83** (0.98)	17.48** (4.56)
Scenario 2: Young Female	2.90* (0.89)	18.61** (4.65)
Scenario 4: Young Male	2.99 (0.94)	19.18 (5.84)
<u>Participant's Time Pressure</u>		
Scenario 1: Time Pressure Absent (Reference Group)	2.98 (0.96)	19.14 (5.15)
Scenario 5: Time Pressure Present	3.72** (0.91)	20.15** (5.06)
Note: Standard deviations are reported in parentheses. * and ** denote significant difference at $\alpha = 0.05$ and 0.01 respectively.		

Table 4
Effects of Participant's Gender

	Male Participants	Female Participants
<u>Anger Experienced</u>		
Anonymous Offender - Participant Not Under Time Pressure	3.25** (1.03)	2.82 (0.89)
Elderly Female Offender - Participant Not Under Time Pressure	3.03* (1.02)	2.71 (0.94)
Young Female Offender - Participant Not Under Time Pressure	2.98 (0.90)	2.85 (0.88)
Young Male Offender - Participant Not Under Time Pressure	3.21* (1.05)	2.87 (0.86)
Anonymous Offender - Participant Under Time Pressure	3.82 (0.96)	3.67 (0.88)
<u>Behavioural Response</u>		
Anonymous Offender - Participant Not Under Time Pressure	21.46** (6.12)	17.79 (3.92)
Elderly Female Offender - Participant Not Under Time Pressure	18.75* (5.57)	16.73 (3.67)
Young Female Offender - Participant Not Under Time Pressure	19.85 (5.25)	17.89 (4.12)
Young Male Offender - Participant Not Under Time Pressure	21.95* (6.76)	18.15 (4.99)
Anonymous Offender - Participant Under Time Pressure	22.39** (5.68)	18.85 (4.16)

Note: Standard deviations are reported in parentheses.

* and ** denote significant difference at $\alpha = 0.05$ and 0.01 respectively.