

SEMINAIRE

СЕМИНАР

SEMINAR

INLAND TRANSPORT
COMMITTEEDistr.
GENERALInternational seminar on
Aggressive behaviour on the roadTRANS/SEM.1/2004/6
12 February 2004

Geneva (Switzerland), 5 April 2004

ENGLISH ONLY

Part one – Causes, effects and
Consequences of aggressiveness on
the road

Effect of aggressiveness on the road

Speaker: Ms. Sonja Forward, Swedish Road and Transport Research Institute, Linköping

Participants in this study were 1800 adult subjects, 1287 were males while 513 females. The sample was drawn from the Swedish register of car owners and divided into three age groups 17 to 25 (n=543), 45-56 (n=617) and 62-72 (n=631).

The questionnaire was originally designed by the Manchester Driving group and then translated and shortened. The questionnaire presented various anger-provoking situations, subsequent reactions and in order to answer the question, if anger behind the wheel is different from other situations, general anger was measured.

The items dealing with different anger provoking situation were factor analysed and formed four sub-scales: Discourtesy, Slow driving, Illegal driving, and Hostile gestures. The result found that young drivers scored higher on Discourtesy, Slow driving, and Hostile gestures. The oldest group scored higher on Illegal driving. The next step was to find out what the effects would be of such provocation. The results showed a high correlation between the degree of provocation and expression of anger which applied to both men and women. It was also shown that the expression of anger behind the wheel was related to how people express their anger in other situations. Finally, we wanted to determine how well driving violations could be predicted by aggression. The results showed that a model including three of the sub-scales; slow drivers, illegal driving and hostile gesture together with general anger, annual mileage, gender and age explained 39 percent of the variance.

It was therefore concluded that it was relatively common that drivers were provoked when driving and that very few suppressed this feeling. Drivers who themselves violated the rules also tend to be more irritated by other drivers especially if they act in a hostile way and/or if they are

perceived to drive too slowly. Young drivers and drivers who use the car regularly were more frequently represented in this group.

1. Introduction

Anger can be defined as an emotional state or as Lakoff (1987) describes it “Anger is the heat of liquid in a container”. It can vary in frequency, intensity and duration and can be experienced as anything from mild irritation to intense fury and rage. It is fairly prevalent and could be felt, in one form or another, several times a week (Averill, 1983).

Anger may or may not be linked to aggression and it is therefore important to differentiate between angry feelings and how that anger is expressed (Spielberger, Reheiser and Sydeman, 1989). If anger is the emotional state then aggression can be described as its response, immediate or planned, intending to harm, hurt or injure another person or object. It can serve different functions such as; reduce tension; increase self-esteem and escape from boredom. A person can be angry without becoming aggressive and Averill (1983) showed that only 10 % of the angry feelings resulted in physical aggression. The same applies to aggression, it is possible to behave in an aggressive way without being angry. Instrumental aggression is one form of aggression, which can be performed without angry feelings. It is a proactive form of aggression involving some degree of planning to achieve a goal.

1.1 DRIVER AGGRESSION

In recent years the level of aggressive driving seems to have increased. Joint (1995), for instance, reported that 60 % of the participants in his survey had behaved aggressively whilst driving. In a later study by Underwood, Chapman, Wright and Crundall (1999) this figure had risen to 85 %. Another term used is “road rage” which might be misleading since it has become an umbrella term including both a criminal action on the road and some milder forms of frustrations resulting in beeping the horn or gesticulation (Elliot, 1999). It was therefore suggested that the term road rage should only refer to criminal actions of assault and that it is distinguished from other forms of aggressive behaviour.

Road rage might well be perceived as unacceptable but some would argue that aggressive behaviour behind the wheel is tolerated and even excused which can be due to Western societies encouraging aggressiveness, competitiveness and risk-taking. Other reasons could be that the car symbolises power (Whitlock, 1971) and that it provides some protection (anonymity) making the drivers less restrained (Whitlock, 1971; Ellison-Potter, Bell and Deffenbacher, 2001; Hennessy and Wiesenthal, 2001). Novaco (1989) would argue that the car is used as an instrument of dominance and that the road then becomes an arena for competition and control. Pordage (1995) also believed that control was important but added that it could be a way to demonstrate own skills. This form of demonstration can well lead to both risky and reckless driving even if the driver themselves believe that they drive in a skilful way (Ingham and Rolls, 1992).

Not surprisingly then that studies have found a relationship between aggressiveness and crash involvement (Tillman and Hobbs, 1949; Mayer and Treat, 1977; Matthews, Dorn and Glendon, 1991). Furthermore, driving violations, another factor related to accidents (Parker, West, Stradling and Manstead, 1995), has also been related to aggressiveness (Donovan and Marlatt, 1982; Underwood, Chapman and Wright, 1999). Elliot (1999) argued that aggressive driving many times results from careless and risky driving. He goes on saying that the “victim frequently

precipitate the initial event which causes anger in the perpetrator, and retaliation by the victim leads to escalation of the conflict and eventually to assault”.

1.2 AGE AND GENDER

Individuals differ in their propensity toward aggression and young males, in particular, have been noted for their high level of aggression. The same seem to apply to aggressive drivers who are typically young and male (Parry, 1968; Marsch and Collett, 1986; Lajunen, Parker and Stradling, 1998). In the study by Marsch and Collett (1986) 25 % of the young drivers aged 17 – 25 would chase another driver if they had been offended. In a study by Krahe and Fenske (2002) another dimension was added namely macho personality. The results showed that young macho men assigned greater importance to speed and sportiness of a car and reported significantly more driving aggression than young non-macho men. Perhaps it is the combination of being young, male and macho which predict aggressive driving rather than just age and gender? Studies comparing men and women in general tend to support this since they usually fail to find a difference (Joint, 1995; Lajunen, et al., 1998; McGarva and Steiner, 2000). The same applied to research looking at mild aggression such as horn honking and fist shaking (Hauber, 1980; Hennessy and Wiesenthal, 1999, 2001). In addition to this Hauber (1980) found that young women usually were more aggressive than older men. This would be consistent with other studies looking at general anger, which have shown that women tend to experience anger as frequently as men (Averill, 1983; Kassinove and Sukhodolsky, 1995). The same applies to studies looking at anger expression which have failed to distinguish between the two groups (Thomas, 1989; Campbell, 1997). Although the frequency of both anger and aggression is very similar the reasons and the manner in which it is expressed is not (Kring, 2000). For instance several studies have found that women reported more anger than men following condescending remarks and that men are more likely to get into physical fights, damage property and verbally assault people than women (Kring, 2000).

1.3 PSYCHOMETRIC SCALES

A number of psychometric scales have been developed to measure anger, which are both contexts specific and general. The expression of anger as measured by Spielberger Anger Expression (AX) scale includes three sub-scales the AX/In, AX/Out and the AX/Con. AX/In describes angry feeling not expressed, AX/Out feelings are expressed verbally or physically and AX/Con are monitored and prevented from expression (Spielberger, et. al., 1995). Another scale measure aggression on the road (Deffenbacher, Oetting, and Lynch, 1994). It contains 33 items which forms six sub-scales; 1) hostile gesture, 2) illegal driving, 3) police presence, 4) slow driving, 5) discourtesy and 6) traffic obstructions. The reliability of the sub-scale is between .78 to .87. The results from the study using this scale found an effect of gender on four of the six clusters. Women reported more anger in response to traffic obstructions and illegal driving and men more anger in response to police presence and slow driving. However, no main effect with regard to gender could be found since the differences compensated for each other giving a very similar total anger score. In this study the effect of age could not be determined since only students took part in the study.

The aim of this study was to take the research on aggression behind the wheel a step further and also assess how perceived anger is related to expressed anger. In addition to this aggressive driving style and behaviour described as acting out was also analysed. In this presentation it is not possible to present the results from the complete survey. The emphasis will rather be placed on

the reaction to anger, its relationship to aggressive driving, driving violations and general anger. It is conceivable that age and gender will have an effect thus the groups will be analysed separately.

2. Method

2.1 PARTICIPANTS

Participants in this study were 1800 adults, 1287 were male and 513 females. The sample was drawn from the Swedish register of car owners and stratified into three age groups 17-25 (n=543), 45-56 (n=617) and 62-72 (n=631).

2.2 PROCEDURE

300 postal surveys were sent to the participants including a self-addressed envelope. In the explanatory letter it was explained that the information was strictly confidential and would be used for research purpose only. 143 surveys were returned to sender and of those who could reply 63 % did so after two reminders.

The questionnaire was originally designed by the Manchester Driving Group and then shortened and translated into Swedish. The questions consisted of six sections covering the following areas:

- I. Attitudes and intentions towards two different scenarios describing road rage. A five point Likert scale was used including different statements about the behaviour and how it made them to feel (e.g. the degree of satisfaction with the behaviour, if it was acceptable and if it would make them feel excited or brave).
- II. Aggressive driving measured on a five point Likert scale, responses ranged from 1 *very usual* to 5 *very unusual* (e.g. I accelerate hard when the traffic-light change in order to compete with the driver behind me).
- III. 27 items based on the Driving Anger scale developed by Deffenbacher et al., (1994) measuring hostile gestures, illegal driving, slow driving, discourtesy and police presence. Items measuring traffic obstruction was not included in the study. The respondents were asked to imagine different anger provoking situations and then rate the amount of anger that it would provoke using a five point Likert scale, ranging from 1 = *not angry* to 5 = *extremely angry*. In addition to this the participants were also asked to indicate how they would react to each situation. 1 indicated *no reaction*, 2 = *horn honking or flashing with the lights*, 3 = *make a gesture to the other driver*, 4 = *swear or verbally abuse the other driver* 5 = *drive closely and/or follow the other driver to show that they had made a mistake*, 6 = *stop the vehicle and go out preparing themselves for a discussion* and 7 = *use physical violence*.
- IV. This was then followed by a section measuring violations on the road with answers ranging from 1 *very usual* to 5 *very unusual*.
- V. The fifth section included 29 questions measuring their degree of general anger. The questions were mainly derived from Spielberger Anger-Expression (AX) scale. In addition to this five questions were included measuring Type A behaviour. These questions were based on a shortened version of a Type A scale. This scale was not included in the original questionnaire developed by the research team at Manchester University.

- VI. The final section included background information such as socio-demographic information, car use, frequency of driving, accidents and conviction history and finally a question asking if they had been involved in a situation which would be described as road rage, if the answer was affirmative the participants were asked to describe the incident.

3. Results

3.1 EXPERIENCED ANGER

The items measuring the response to different anger provoking situations were factor analysed (using the varimax method) and formed four sub-scales; hostile gestures, illegal driving, discourtesy, slow driving and police presence. Table 1 shows the reliability of the sub-scales.

Table 1. Scale reliability of the sub-scales

Sub-scales	Alpha
Hostile Gestures	0.85
Illegal Driving	0.70
Discourtesy	0.85
Slow Driving	0.80
Police Presence	0.74

Table 1 shows that the reliability coefficients of the different sub-scales were acceptable. Table 2 shows the mean scores, standard deviations.

Table 2. Mean and Standard Deviation for experience of anger

Subscales	No of items	Mean	Sd
Hostile gesture	3	2.21	0.95
Illegal driving	4	1.85	0.66
Discourtesy	9	2.42	0.64
Slow driving	6	1.78	0.53
Police presence	3	1.22	0.54

1=not angry; 5=extremely angry.

Table 2 shows that discourtesy and hostile gesture generated most anger. Police presence generated very little anger. Age has been shown to be an important factors and the different age groups was therefore analysed separately using a one way Anova, see Table 3.

Table 3. Age groups: Mean (and standard deviation) for experience of anger

Subscales	17-25	45-56	62-72	p
Hostile gesture	2.58 (1.03)	2.07 (0.87)	2.01 (0.86)	<.001
Illegal driving	1.69 (0.59)	1.87 (0.67)	1.96 (0.69)	<.001
Discourtesy	2.68 (0.62)	2.33 (0.64)	2.29 (0.61)	<.001
Slow driving	2.03 (0.58)	1.71 (0.47)	1.65 (0.46)	<.001
Police presence	1.39 (0.73)	1.17 (0.41)	1.10 (0.34)	<.001

1=not angry; 5=extremely angry.

Table 3 shows a significant difference between the ages. The youngest group experienced more anger when another driver acted in a hostile manner, showed discourtesy and were driving too slowly. However, illegal driving was something, which made the oldest group angrier than the other two. Police presence generated very little anger in all age groups and was therefore dropped from further analysis. In order to determine the effect of gender three independent t-tests were performed, see Table 4.

Table 4. Age and gender: Mean (and standard deviation) for experience of anger

Subscale	17-25		45-56		62-72	
	Women n=150	Men n=390	Women n=219	Men n=394	Women n=138	Men n=484
Hostile gesture	2.71 (0.95)	2.54 (1.05)	2.20* (0.84)	2.01 (.0.87)	2.33*** (0.87)	1.91 (0.84)
Illegal driving	1.86*** (0.59)	1.63 (0.58)	2.09*** (0.73)	1.76 (.0.61)	2.17*** (0.72)	1.90 (0.66)
Discourtesy	2.72 (0.60)	2.66 (0.63)	2.45 *** (0.64)	2.27 (0.63)	2.47 *** (0.66)	2.24 (0.58)
Slow driving	1.99 (0.56)	2.04 (0.58)	1.68 (0.44)	1.72 (0.49)	1.64 (0.47)	1.65 (0.46)

1=not angry; 5=extremely angry. * = $p < .05$; *** = $p < .001$.

Table 4 shows that participants, men and women, aged 17-25 experienced a similar amount of anger despite from the reaction to illegal drivers which the women found more provoking than the men. In the age group 45-56 the difference were more pronounced, women got significantly angrier if another driver behaved in a hostile manner towards them, if they broke the rules and if their behaviour was discourtesy towards themselves. The same also applied to the oldest age group.

3.2 EXPRESSED ANGER

The next step was to analyse if experienced anger were related to expressed anger. In this section of the questionnaire the participants were asked to indicate how they would react to each of the situation.

Table 5. Pearsons correlation of experienced and expressed anger

Sub-scales	r
Hostile Gestures	.69 **
Illegal actions	.42 **
Discourtesy	.55 **
Slow driver	.56 **

** = $p < .01$.

Table 5 shows that the four sub-scales were positively correlated with each other. This suggests that if a driver experience anger then that anger is also expressed, the greater the anger the greater the response.

Table 6. Age groups: Mean (and standard deviation) for expressed anger

Subscales	17-25	45-56	62-72	<i>p</i>
Hostile gesture	2.43 (1.30)	1.70 (0.91)	1.56 (0.89)	<.001
Illegal driving	1.43 (0.65)	1.38 (0.51)	1.46 (0.59)	<.001
Discourtesy	2.44 (0.79)	1.99 (0.58)	1.89 (0.59)	<.001
Slow driving	1.87 (0.73)	1.51 (0.42)	1.47 (0.44)	<.001

1 = no reaction; 7 = strong reaction.

Table 6 shows a significant difference between the ages. The youngest group expressed more anger when another driver acted in a hostile manner, showed discourtesy and were driving too slowly. However, illegal driving was something, which made both the oldest and the youngest group to react in a stronger way as compared to the middle group. Further analysis looking at specific items showed that some of the items were more likely to generate a reaction than others, see Table 7.

TABLE 7. ITEMS MOST LIKELY TO PRESENT A REACTION

Sub-scale	Description	Reaction %
Hostile gesture	Someone makes an obscene gesture towards you about your driving	44
Illegal driving	Someone does not stop at a stop sign	38
	Someone is weaving in and out of traffic	35
Discourtesy	Someone takes the parking spot you have been waiting for	70
Slow driving	A slow vehicle on a winding road will not pull over and let people pass	59

Table 7 shows that most of the respondents would react in one form or another if someone took their parking spot and if a slow vehicle did not pull over. A fairly high proportion would also react if someone made an obscene gestures towards themselves, if they did not stop at a stop sign and if they were weaving in and out of traffic. Further analysis showed the situations, which made the greatest number of people to react were the same across the age group with one exception. The youngest age group found weaving in and out of traffic more provoking than others and the oldest group were more likely to react if someone did not stop at a stop sign. The degree of reaction was measured on a scale and the strongest presented a case when the person was prepared to stop their vehicle and take up discussion with the other driver. This was fairly unusual but if someone took their parking spot then 17 % were prepared to act in this manner. The next step was to determine the effect of gender, thus three independent t-tests were performed, see Table 8.

Table 8. Age and gender: Mean (and standard deviation) for anger expression

Subscale	17-25		45-56		62-72	
	Women n=150	Men n=390	Women n=219	Men n=394	Women n=138	Men n=484
Hostile gesture	2.25 * (1.21)	2.51 (1.34)	1.61 (0.80)	1.74 (0.96)	1.72 (1.01)	1.52 (0.86)
Illegal action	1.48 (0.66)	1.41 (0.65)	1.38 (0.56)	1.38 (0.48)	1.56 (0.50)	1.43 (0.59)
Discourtesy	2.15 (0.84)	2.46 (0.78)	1.96 (0.60)	2.00 (0.56)	1.86 (0.56)	1.89 (0.60)
Slow drivers	1.84 (0.76)	1.89 (0.72)	1.42 * (0.80)	1.53 (0.43)	1.46 (0.50)	1.47 (0.43)

1 = no reaction; 7 = strong reaction; * = $p < .05$.

Table 8 shows that the difference between men and women in the different age groups was relatively small. Amongst people aged 17 – 25 years old women expressed a little less anger than the men with regard to hostile gesture and in the group 45 – 56 the same applied but this time it was to slow drivers.

3.3 PARTICIPANTS ANGER WHEN DRIVING AND MORE GENERAL

This study also assessed the relationship between driver anger and anger expressed outside the car. Table 9 presents the correlation between scores on the driver anger scale and general anger showing the likelihood of expressing anger either physically or verbally i.e. “acting out”.

Table 9. Correlation between Driving anger scale and General Anger

	Hostile gestures	Illegal actions	Slow drivers	Discourtesy
General anger “acting out”	-.30**	-.11**	-.30**	-.28**

** = $p < .01$

From this table we can see that three of the four scales measuring expressed driver anger correlated highly with the scale measuring anger out. This would suggest that a person who gets angry behind the wheel is somebody who also expresses his/her anger outside the car in a verbal or physical way.

Finally we wanted to determine how well risky driving as measured by a shortened version of the Driver Behaviour Questionnaire could be predicted by aggression. A multiple regression analysis (stepwise) was carried out. The different sub-scales included in the driving anger scale were entered together with general anger, gender, age and mileage.

Table 10.
Prediction of aggressive violations from the driver anger scale, anger out, gender age and annual mileage

Predictor	Rsq	Beta
Slow drivers	.214	-.35
Anger out	.292	.36
Illegal driving	.353	.25
Mileage	.367	-.11
Hostile gesture	.381	-.15
Gender	.387	-.09
Age	.389	-.04

Table 10 shows that the variables explained 39 % of the variance. Their reaction to slow drivers explained most of the variance followed by anger out, illegal driving, annual mileage, hostile gesture and gender. Reaction to discourtesy was excluded. This would then imply that this driver who drive in an aggressive way becomes provoked if the other driver drive too slowly and if they act in a hostile way. Illegal driving, on the other hand, does not cause them any concern. This driver also has a tendency to act out their anger when not driving either physically or verbally. They use the car fairly frequently and are more likely to be a young man.

4. Discussion

This study assessed how driving anger was related to the expression of anger using the Driving Anger Scale (DAS). A factor analysis carried out including all the items generated five different sub scales; hostile gestures, illegal driving, discourtesy, slow driving and police presence which is in agreement with Deffenbacher et al. (1994). However, the fifth scale, police presence, was subsequently dropped since it only generated a very modest amount of anger. One possible reason for this could be that Swedish drivers, as compared to drivers in the USA, did not find the police carrying out traffic surveillance especially anger provoking. A previous study carried out in the UK by Lajunen et al. (1998) reported the same. However, one plausible explanation presented by Lajunen was that this discrepancy depended on differences in age, the mean age in the UK sample was 44 years as opposed to the US which consisted of mainly young drivers, could not be supported. In this study a large number of young drivers were included and could therefore be analysed separately. Although the results showed that the young age group was significantly more angry than the older ones their anger was still modest and not greater than the one presented in the UK study (UK study mean 1.4).

The results from the remaining scales showed that discourtesy and hostile gesture generated most anger. Age has been found to be an important factor when trying to explain aggressive driving thus the participants in the study was drawn from three different age groups (17-25, 45-56 and 62-72). The groups were then analysed separately. The results showed that the total scores measuring experience of anger were higher in the youngest group. However, the results also suggested that this was context related. The youngest group got more provoked if other drivers acted in a hostile and discourteous manner and if they, according to themselves, drove too slowly. On the other hand the two older groups would become angrier if the other driver did not follow the rules, slow drivers did not bother them very much. However, gender together with age is perhaps of greater interest since a number of studies have found that it is young men rather than young women who are noted for their high level of aggressive driving (Parry, 1968; Marsch and

Collett, 1986; Lajunen, Parker and Stradling, 1998). In this study the difference between young men and women was not very great. If anything the difference pointed in the opposite direction with women being more provoked than the men. Women were significantly angrier if they encountered another driver who deviated from the rules. On the other three scales no significant difference was found but the mean value of women tended to be greater than the men and it was only slow driving which provoked men more than women. The same also applied to the other age groups but here the difference was even greater. On three of the four scales the difference were significant, hostile gesture, illegal driving and discourtesy, with women being angrier than the men. With regard to slow driving the men tended to become more provoked but as in the younger group the difference was not significant and in the oldest age group it was negligent. This partly support the results presented by Deffenbacher et al. (1994) who looked at young men and women. The women reported more anger in response to illegal driving and the men more anger in response to slow driving. In this study the same applied although in the latter case the difference was very small and non-significant.

Kring (2000) reported a number of studies showing that women tended to experience more anger as a reaction to condescending remarks something the present study supported. Hostile gesture, which upset women more than men, included descriptions of drivers who made obscene gestures, shouted or beeped at them something which can be interpreted as condescending. The results were also in agreement with that of Hauber (1980) who found that young women were more aggressive than older men. It could therefore be argued that studies looking at age differences with regard to the experience of anger should also include gender and context.

The study also asked the participants to consider the different anger provoking situations and state how they would react. A Pearsons correlation analysis was carried out showing a strong relationship between experienced and expressed anger. This strong relationship contradicts the results presented by Averill (1983) who found that only ten percent of the experienced anger was expressed. However, Averill (1983) did not study aggression on the road and this might well be different. Firstly the person is protected and anonymous making them less restrained, secondly the car itself gives him/her some power and can be used as an instrument.

The results also showed that the strongest relationship was displayed in regard to hostile gestures and the weakest, although significant, was the one dealing with illegal action. The strongest reaction was towards somebody who behaved in a discourteous manner followed by expression of hostility. When the different age groups were analysed separately it was shown that the youngest age group reacted stronger than the other on all the scales expect for illegal driving. In the latter case the score of the youngest and the oldest group was very similar. The items included in the questionnaire were studied in more detail and the results showed that the most anger-provoking situation, which also resulted in the strongest reaction, was if someone took their parking spot. In this case nearly a 1/5 would be prepared to stop their vehicle and take up a discussion with the other driver. The second most offensive behaviour was if a slow vehicle on a winding road refused to pull over and let people pass. A large proportion would also react if someone made an obscene gesture towards themselves, and nearly forty percent would react if someone did not stop at a stop sign and if a driver was weaving in and out of traffic. Gender was also considered with regard to anger expression. The results showed very few differences. Men in the youngest age group reacted somewhat stronger if the other driver behaved in a hostile manner and in the middle age group the men reacted more strongly if another drove too slowly. In the oldest age group their reaction was very similar. Young women also reacted more strongly than older men. It could therefore be argued that the manner in which their anger was expressed

was not different which contradicts other studies looking at gender differences (Kring, 2000). One possible reason for this could be that the car offers some form of protection (anonymity) but also that the car itself is a symbol of dominance making them more daring.

A popular opinion is that driving transforms the person, someone who outside the car is very pleasant and placid outside turns into a violent person when sitting behind the wheel. The study therefore wanted to assess participants' reaction to events not related to car driving and see if that was related to the expression of anger whilst driving. The results did not reveal a so called Dr Jekyll and Mr Hyde syndrome, instead the relationship was very strong suggesting that it is people who have a tendency to express their own anger either verbally or physically in general who also express more anger whilst driving.

The study then went on looking how well aggressive driving style as measured by the DBQ could be predicted by the sub-scales, anger out, gender, age and annual mileage. The results showed that the variables explain 39 % of the variance. The strongest predictor was the sub-scale measuring slow drivers explaining 21 % of the variance followed by anger out adding a further 8 %. This would then suggest that drivers who themselves drive in an aggressive way react more strongly if another driver drive too slowly and if they become hostile towards themselves. This group of people also tend to act out their own anger rather than suppress it. They use the car fairly frequently and tend to be young and males although these two last variables added very little to the result. If we exclude gender and age the model would explain 38 percent of the variance. It could be argued, along the lines of Elliot (1999), that drivers who themselves drive in an aggressive way would be more likely to encounter hostile behaviour from others trying to tell them that their driving behaviour is not acceptable. Since they themselves tend to break the speed limits they would also be more than likely to encounter other drivers who in their opinion drive too slowly. Hence their own driving style provokes the very thing they dislike creating a vicious and very dangerous circle.

References

- Averill, J. R. (1983). Studies on anger and aggression: implications for theories of emotion. *American Psychologist*, 38, 1145-1160.
- Campbell; A. (1997). Sex differences in aggression: Does social representation mediate form of aggression? *British Journal of Social Psychology*, 36, 161-171.
- Deffenbacher, J. L., Oetting, E. R. and Lynch, R. S. (1994). Development of a driving anger scale. *Psychological Reports*, 74, 83-91.
- Donovan, D. M. and Marlatt, G. A. (1982). Personality subtypes among driving-while-intoxicated offenders: Relationships of driving behaviour and driving risk. *Journal of Consulting and Clinical Psychology*, 50, 241-249.
- Ellison-Potter, P., Bell, P. and Deffenbacher, J. L. (2001). The effects of trait driving anger, anonymity, and aggressive stimuli on aggressive driving behaviour. *Journal of Applied Social Psychology*, 31, 431-443.
- Elliot, B. J. (1999). Road rage –media hype or serious road safety issue? Paper presented at the *Third National Conference on Injury Prevention and Control*, May 9-12, 1999, Brisbane, Australia.

- Hauber, A. R. (1980). The social psychology of driving behaviour and the traffic environment: Research on aggressive behaviour in traffic. *International review of Applied Psychology*, 29, 461-474.
- Hennessy, D. A. and Wiesenthal, D. L. (1999). Traffic congestion, driver stress, and driver aggression. *Aggressive Behavior*, 25, 409-423.
- Hennessy, D. A. and Wiesenthal, D. L. (2001). Gender, driver aggression, and driver violence: An applied evaluation. *Sex Roles: A Journal of Research*, 66(16).
- Ingham, R. and Rolls, G. (1992). *Attitudes and behaviour of safe and unsafe younger drivers*. Paper presented at Euro Safe 1992, London: Association of London Borough Road Safety Officers.
- Joint, M. (1995). *Road rage*. London: Automobile Association.
- Kassinove, H. and Sukhodolsky, D. G. (1995). Anger disorders: Basic science and practice issues. In Kassinove, H. (Ed.). *Anger disorders*. Washington DC: Taylor and Francis.
- Krahe, B. and Fenske, I. (2002). Predicting aggressive driving behavior: The role of macho personality, age, and power of car. *Aggressive Behavior*, 28, 21-29.
- Kring, A. M. (2000). Gender and anger. In Fischer, A. H. (Ed.). *Gender and emotion: Social psychological perspectives*. Cambridge University press.
- Lakoff, G. (1987). *Women, fire, and dangerous things: What categories reveal about the mind*. Chicago: The University of Chicago press.
- Lajunen, T., Parker, D. and Stradling, S. G. (1998). Dimensions of driver anger, aggressive and highway code violations and their mediation by safety orientation in UK drivers. *Transportation Research Part F*, 1, 107-121.
- Marsch, P. and Collett, P. (1986). *Driving passion: The psychology of the car*. Boston: Faber and Faber.
- Matthews, G., Dorn, L. and Glendon, A. I. (1991). Personality correlates of driver stress. *Personality and Individual Difference*, 12, 535-549.
- Mayer, R. E. and Treat, J. R. (1977). Psychological, social and cognitive characteristics of high-risk drivers: A pilot study. *Accident Analysis and Prevention*, 9, 1-8.
- McGarva, A. R. and Steiner, M. (2000). Provoked driver aggression and status: A field study. *Transportation Research Part F*, 3, 167-179.
- Novaco, R. W. (1989). *Aggression on roadways*.
- Parker, D., West, R., Stradling, S. G. and Manstead, A. S. R. (1995). Behavioural characteristics and involvement in different types of traffic accident. *Accident Analysis and Prevention*, 27, 571-581.
- Parry, M. (1968). *Aggression on the road*. London, Tavistock.
- Pordage, C. A. (1995) A licence to kill. *The Journal of the Institute of Road Safety Officers*, 16, 29-39.
- Speilberger, C. D., Reheiser, E. C. and Sydeman, S. J. (1995). Measuring the experience, expression and control of anger. *Issues in Comprehensive Pediatric Nursing*, 18, 207-232.

Thomas, S. P. (1989). Gender differences in anger expression: Health implications. *Research in Nursing and Health*, 12, 389-398.

Tillman, W. A. and Hobbs, G. E. (1949). The accident-prone automobile driver. *American Journal of Psychiatry*, 10, 321-332.

Underwood, G., Chapman, P., Wright, S. and Crundall, D. (1999). Anger while driving. *Transportation Research part F*, 2, 55-68.

Whitlock, F. A. (1971). *Death on the road*. London: Tavistock.
