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Special Topics Essay

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Aberrant Driving Behaviour

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I affirm that this essay is my own work and does not include any unacknowledged material taken from any other source.

Introduction.

“I think men's minds are going to be changed in subtle ways because of automobiles; just how, though, I could hardly guess. But you can't have the immense outward changes that they will cause without some inward ones, and it may be that... the spiritual alteration will be bad for us” Eugene Amberson, *The Magnificent Ambersons* (1942, writer & director: Orson Welles).

The seemingly inexorable rise of the automobile has altered the shape of our landscape, changed the places we can live and work, and even created a new way of evaluating each other's social status. Such a significant change in our society is bound to have implications for the way people behave towards each other. People's behaviour is not always socially desirable or acceptable, and as such it is to be expected that the drivers of vehicles will sometimes behave badly. This essay will examine the research into aberrant driving behaviour and examine any common underlying factors or theories which may help to explain such behaviour.

Aberrant behaviour can be defined as behaviour which is “deviating from that which is normal, usual or right” (Colman, 2003, p.1). Normal social behaviour obeys social norms, and in this respect driving behaviour is no different. What is right on the roads is fairly well defined by the law, but that does not necessarily encompass what is usual: some aspects of usual driving behaviour contradict the law, or are in addition to it. The purpose of flashing headlights is usually taken to be an indication of giving way to another road user at a junction or in a lane-changing situation, whereas the law limits the use of flashing headlights to alerting another road user to your presence (DSA, 2004).

There are many possible components to aberrant driving behaviour: driving speed; concentration and attention; vehicle capabilities; fatigue or alertness; alcohol and drugs; aggression; external distractions; and even peer pressure from passengers. The list is long and by no means exhaustive. There are also individual differences between drivers which may have significance in predicting aberrant behaviour such as age; gender; driving experience; and even predisposition to other aberrant social behaviour.

Driver behaviour is an important area of applied social psychology, which seeks the ability to reliably predict behaviour, but also to modify behaviour when necessary. For this reason, even though demographic factors like age and gender may be significant predictors of behaviour, the age or gender of drivers cannot be changed, so other means of modifying aberrant behaviour are of greater interest.

This essay is primarily addressing the psychological determinants of aberrant driving behaviour, but some acknowledgement must be made of the impacts of the engineering of roads and vehicles, specifically speed reduction and traffic calming measures; and the increasing level of performance and safety features of modern vehicles. Road use and vehicle design are huge economic concerns, and it must be noted that this cannot be an exhaustive study, since many studies undertaken by vehicle manufacturers will remain commercially confidential. Even studies undertaken in the public sector have an unfortunate tendency to “disappear forever in the cupboards of the agency that provided the financial support” (Rothengatter & de Bruin, 1987, p.IX).

Gathering data on driving behaviour.

Gathering data on real-world behaviour is problematic. Issues of ecological validity, observer effects, and social desirability biases can all interfere with the collection of such data outside the laboratory. This is not purely a psychological phenomenon: quantum physicist Werner Heisenberg described the problem as the ‘uncertainty principle’. Heisenberg wrote that you cannot observe, measure or quantify any entity without in some way influencing or affecting it (Encarta, 2003). Three main methods of gathering data have been employed for the study of driving behaviour (Parker & Manstead, 1996, p.200 - 202):

- direct observation
- simulation of driving tasks
- self-reported behaviour

All three methods have their strengths, but as detailed above they are all necessarily imperfect at some level.

Direct observation.

There are two main types of direct observation methods for driving behaviour: an observer in the same vehicle; or external roadside or chase car observations (Parker & Manstead, 1996, p.200). An observer in the vehicle can see the driver clearly, and can collect data on behaviour that might be difficult to gather otherwise, like frequency of mirror observations, or whether they return their hands to the steering wheel between gear changes. The main disadvantage of this method is that it introduces an experimenter or observer effect, the sort of artificial situation which experimenters would hope to avoid. Another problem is one of parallel-forms reliability, for instance drivers performing the same task using different vehicles (Parker & Manstead, 1996, p.200).

External, static observation is useful in certain tasks, for instance assessing how drivers react to a re-designated speed limit, (Casey & Lund, 1987), but impractical in assessing driver behaviour over an entire journey. A chase car would be a better method for such a task, but this too has its limitations. If the driver has consented to being followed, this may induce an observer effect and change their driving behaviour. If the driver has not consented to being followed, and they spot the vehicle following them, they may become suspicious or even fearful of being followed by an unknown vehicle, which will preclude naturalistic driving behaviour.

One avenue for potential further research has been made possible by technology developed for televising Formula One. Viewers can now see the drivers' eye view; the drivers' hands; the speed of the car; the throttle setting; the gear selection; the braking severity; and linear and lateral G-forces acting on the vehicle (Renault, 2005). This sort of observation or recording should be able to produce a comprehensive record of a driver's behaviour, although the financial costs are somewhat prohibitive at present.

Simulated driving tasks.

There are two main methods of simulating driving tasks: the head mounted display; and the cab environment system. The head-mounted display is a motion-sensitive helmet fitted with a display mounted in front of the eyes. The display moves in sympathy with the participant's head in order to create a virtual

environment. This is a relatively cheap system, and changing vehicle type or design is entirely a matter of software, but the helmet is heavy and may increase reaction times, or induce fatigue in an artificially short time. The cab environment system uses a real or replica vehicle cab, and external visual projections and sounds to simulate vehicle movement. This is a more realistic environment than a head-mounted system, but is expensive and inflexible when it comes to changing vehicle type or design (Olsen, 1995).

Simulation is a very useful tool in the study of known hazardous behaviour such as alcohol and drug-impaired driving, the effects of fatigue on driving, and distractions like using a mobile telephone whilst driving (see Haigney & Westerman, 2001 for a review). Simulation is also a useful way to train drivers in techniques like police pursuit, where they can make mistakes at zero cost. Simulation does have problems of ecological validity, however. A study by Panerai, Droulez, Kelada, Kemeny, Balligand & Favre (2001), using a very sophisticated truck simulator and a real truck, found that participants (professional truck drivers) left an inter-vehicle safety gap on the simulator that was twice as large as they did in the real truck. In the context of aberrant behaviour, this is a real limitation for simulation studies.

Self-reported behaviour.

Tillman and Hobbs (1949) suggested that “One drives as one lives”, a statement which was qualified by Shaw (1965), that people “drive as they would like to live” (quoted in Parry, 1968, p.6 - my emphasis): people’s lives are not as exciting or reckless as their driving style might suggest. This has implications for self-reported driving behaviour: how likely is it that an otherwise sensible, responsible driver will admit “I was driving like that because I was pretending to be James Bond”?

Reason, Manstead, Stradling, Baxter & Campbell (1990) designed a driver behaviour questionnaire (DBQ) to investigate aberrant driving behaviour. Factor analysis of their results showed significant distinctions between three types of aberrant driving behaviour:

- Lapses: harmless errors such as forgetting where you parked your car;
- Errors: more dangerous errors which involve a hazard to self and others;
- Violations: deliberate contraventions of the law or the social norm.

The DBQ has the advantage of being relatively cheap and quick to administer, and as a result large samples of participants can be obtained with greater ease and less expense than other methods. The test-retest reliability of the DBQ's three subscales have been reported between .69 and .81, which makes it a fairly robust tool overall (Parker & Manstead, 1996, p.201). The use of self-reported data has led to some criticism (Rabbitt, 1990), although a study by Lajunen and Summala (2003) found that there were no significant differences across two conditions of formality and anonymity (i.e. anonymously and voluntarily; or as part of a formal educational appraisal). Lajunen and Summala did, however, find that their sample reported a disproportionately low accident rate; and no drink-driving whatsoever.

The DBQ has been translated into different languages, and adapted to the local laws and social norms of different countries, and is now fairly widely used in countries like China, Finland, Greece, New Zealand, and Sweden (Xie & Parker, 2002; Lajunen & Summala, 2003; Chliaoutakis, Koukouli, Lajunen & Tzamalouka, 2005; Sullman, Meadows & Pajo, 2002; Rimmö & Hakamies-Blomqvist, 2002). Lajunen, Parker and Summala (2004) report that in both cross-cultural and cross-language contexts, the DBQ remains robustly valid and reliable.

Aberrant driving behaviour.

Reason *et al* (1990) identified several differences in patterns of aberrant driving behaviour using the DBQ. Men reported more driving violations across all age ranges than did women, and women reported more lapses than did men. Across both genders, violations decreased with increasing age but errors did not. They concluded that violations may be explained by motivational and social factors, but that errors and lapses are more likely to be explained by the individual's information-processing characteristics. Parker, Reason, Manstead & Stradling (1995) found that errors are not associated with accidents but that violations are.

Parker, Manstead, Stradling, Reason and Baxter (1992) applied Ajzen's (1985, 1988) theory of planned behaviour (TPB) to the intention to commit driving violations. They found that, as perceived behavioural control of driving behaviours increased, the intention to commit violations decreased. The TPB adds in an element of perceived behavioural control to the theory of reasoned action (Fishbein & Ajzen, 1975), in recognition of the fact that there are different amounts of volitional and non-volitional elements to some behaviour. As such, people may feel that they have more, or less, control over those behaviours.

Behaviour like regularly taking a vitamin pill, a voluntary behaviour that requires knowing where the vitamin pills are, and remembering to take one, has a high degree of volitional control. Regularly getting a good night's sleep is behaviour which can have high level of non-volitional control, due to external or uncontrollable factors like noisy neighbours, or the individual's health (Hogg & Vaughan, 2002, p.156 - 158). Behaviours like driving too fast for the road conditions may be easier to predict if the driver's perceived level of control of their aberrant behaviour is known. A driver who perceives that they cannot control their own speeding is more likely to engage in such behaviour than a driver who perceives that they are in full control of their speeding, despite their being subject to the same social norms, and even the same attitudes.

Psychologists and insurance companies have long since established that there is a link between young drivers and higher accident rates. The results of the DBQ indicate high rates of violations from younger drivers (Reason *et al*, 1990), and some research implicates aberrant driving in between 84% and 95% of all accidents (Rothengatter, 2005; Rumar, 1985). Studies indicate that young drivers drive faster: they maintain a higher average 'cruising' speed than older drivers (Wasielewski, 1984); and they do not reduce their speed as much as more experienced drivers in road situations which require it (Quimby & Watts, 1981).

Chliaoutakis *et al* (2003) found that driving without a destination was associated with violations, a behaviour in which the driver is driving for driving's sake; escaping their home environment or family; or actively sensation seeking. They suggest that driving without a destination was predominantly an activity

undertaken by the younger driver (although they do not provide statistical evidence). Zuckerman defines sensation seeking as “the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal and financial risks for the sake of such experience” (Zuckerman, 1994, p.27). Rimmö and Åberg (1999) added Zuckerman’s sensation seeking scale questionnaire to the Swedish version of the DBQ, and found an association between two of the four sensation-seeking sub-scales and driving violations.

The relationship between aberrant driving and general social deviance has been investigated with varying levels of success. Social deviance has been found to be greater in men than women, and more prevalent in the young, but West, Elander and French (1993) failed to find an association with driving violations. Lawton, Parker, Stradling and Manstead (1997) found that there was a relationship between accident involvement and social deviance, age and gender having been accounted for, but that the relationship between driving violations and accident involvement was stronger. This suggests that the violations a driver commits will mediate the relationship between social deviance and accident involvement, rather than there being a direct causal link between social deviance and aberrant driving (Parker & Manstead, 1996, p.205).

A common problem for all of this research is the definition of a young driver: different researchers have used 16 to 18; 18 to 25; 16 to 20; or 18 to 25 years as their criterion for age. Wasielewski’s study used the criterion that the driver was visually ‘judged to be’ under twenty-one. The characteristics of sixteen year-olds and 25 year-olds are probably different as regards drinking and drug use; attitudes and beliefs; and driving experience (Jonah, 1986).

Elderly drivers tend to limit their driving according to their perceptions of their own abilities (Rimmö & Hakamies-Blomqvist, 2002). Older drivers, aware of their diminished eyesight and slower reactions, may decide to limit the types of weather conditions in which they will drive, or self-impose lower speed limits, in order to stay within their own limitations and remain a safe driver. It would not be safe or practical for the elderly driver to increase their speed, but other drivers

stuck behind their car may well be cursing them for what they regard as unacceptably slow driving. Does this self-imposed speed limit constitute aberrant driving behaviour? Or is the frustration of the following drivers aberrant? The same drivers may not feel the same level of anger about following a large, abnormal load, or a funeral cortege travelling at the same speed, either of which they would normally expect to be travelling slowly.

Adolescents in the company of their peers pay less attention in general to road safety than either adults or younger children in similar situations (Chinn, Elliot, Sentinella & Williams, 2004), and peer pressure is a particular problem for younger drivers (Mitsopoulos & Regan, 2001). Young drivers with a passenger have been shown to be between three and five times as likely to be involved in an accident as drivers in the 30 – 59 age group with a passenger (Williams, 2001).

Part of the problem with young males and peer pressure is that their peers are typically other young males. They also drive too fast, engage in sensation seeking behaviour, and are probably equally inexperienced. When under peer pressure to be just like each other, only more so, it is hardly surprising that young male drivers drive faster than usual, do silly things for kicks, and make inexperience errors which are not picked up by their passengers. This sort of social behaviour may lead to their making attribution errors about their driving skills.

Manstead, Parker, Stradling, Reason & Baxter (1992) found a false consensus effect in a sample of drivers with varying degrees of habitual driving violations. The regular violators significantly overestimated the proportion of the population which engaged in their particular violation compared to the irregular violators. This sort of attributional bias would be of particular interest to critical social psychologists, who view attributions as social negotiations, and norms as social constructions (Stainton-Rogers, 2003, p.223). It could be argued that persistent violators are trying to negotiate their behaviour towards being social desirable by manipulating both the subjective social norm, and the attributions about their own driving.

The link between speed and accident involvement has been examined from many different angles. Self-reported data indicates that drivers who report higher levels of speeding report higher levels of active accident involvement, a passive accident being one in which their vehicle is hit, an active accident being one in which their vehicle does the hitting (Parker, West, Stradling & Manstead, 1995). It is worthy of note that violations in general, not just speeding, were associated with both active and passive accident involvement.

Vogel and Rothengatter (1984) applied the theory of reasoned action to speeding behaviour. They found that speeders enjoyed their behaviour, and had fewer safety concerns about their own speed than they did about other safety issues. All drivers in the study understood that speeding got them to their destination in less time but cost them more; but speeders valued saved time more than saved money; and the non-speeders valued saved money over saved time (Parker & Manstead, 1996, p.208). It is possible that manipulating these attitudes may effect a change on speeding behaviour.

Elliot (2005) investigated speeding in the context of habitual behaviour, and found that although perceived behavioural control was a significant predictor of speeding behaviour, prior behaviour accounted for the largest amount of variability in that behaviour. Prior speeding behaviour can be characterised as a habit: either having the habit of breaking the speed limit; or not having the habit of obeying the speed limit. Habits are not entirely volitional, so concentrating on TPB factors like perceived behavioural control may not be a comprehensive solution to the problem.

Elliot used the model of action phases (Gollwitzer, 1990) to give an alternative focus of implementation intentions to 'give up' the habit of speeding. Although Elliot's research was inconclusive in the context of implementation intentions, which he attributes at least in part to the scales he used to gather data, it may prove to be a fruitful area of research in the future.

Alcohol and drugs are significant factors in aberrant driving behaviour. Mayhew, Donelson, Beirness and Simpson (1986) reviewed previous studies of drink-

driving and found that around 40% of males and 10% of females under the age of twenty self-reported drinking and driving at some point. Bearing in mind the findings of Lajunen and Summala (2003), the real figure may be higher. Mayhew *et al* also point out that young people report being a passenger in a vehicle with a driver who has been drinking more often than they report drink driving themselves – an unlikely situation, statistically, which may indicate a social desirability bias in operation.

There are multiple problems with the relationship between alcohol and driving. Alcohol is a depressant which slows reaction times, affects the ability to divide attention between multiple tasks, and impairs visual perception, all of which negatively affect driving performance itself (Moskowitz & Burns, 1990). Further to these impediments, alcohol can produce cognitive biases which can affect the decision about whether to drive or not (MacDonald, Zanna & Fong, 1995).

Stoduto, Viniglis, Kapur, Sheu, McLellan and Liban (1993) studied drug screening results from injury and fatality road accidents, and found that as many as a quarter of drivers tested positive for some type of illicit drug. Drug users are subject to the same attributional biases as other drivers: drug users who drive whilst intoxicated believed that it was less dangerous than those who do not (Albery, Strang, Gossop & Griffiths, 2000), but because drug use is regarded as aberrant under any circumstances, the strength of the social norm that forbids driving whilst intoxicated may be weakened.

Alcohol is a legitimised and accepted part of society; drugs are not. A drinker who decides to drive is deciding to both contravene the social norm and break the law, which incurs a social desirability cost. A drug user who decides to drive is already outside the accepted social norm, and has already broken the law, so the decision is less costly. Another of the problems with drugs and driving, in this country at least, has been a perception on the part of drug users that there is no roadside test for drug intoxication in the same way that breathalysers test for alcohol, thereby reducing the possible consequences. Recent advertising campaigns have been addressing this issue (Ormston, 2003, p.17 - 18).

In the mid-to-late 1990s, the newspapers and media in this country identified a new phenomenon: 'road-rage'. A Home Office Briefing Note from 2000 concluded that the media upwardly misrepresented both the incidence and the prevalence of 'road-rage' incidents, and that whilst aggressive driving was a real social problem, the police and judicial system were dealing adequately with it (Marshall & Thomas, 2000).

'Road-rage' appears therefore to be a modern media phenomenon, whereas aggressive driving behaviour is a well-established problem. As long ago as 1968, Parry reported incidents of aggressive driving that would have been characterised today as 'road-rage':

“Subject: ...when I was almost home, following slowly behind a line of traffic, the car in front of me stopped and the chap decided to park there... People behind were also tooting, but he started walking away, so I drove my car right into the back of his...

Interviewer: How did you feel after all this?

Subject: Bloody marvellous...” (Parry, 1968, p.32-33)

The advent of 'road-rage' in the media may be the reification of various aggressive and aberrant social behaviours into an artificial construction, but it is still worthy of psychological investigation in terms of attributions and social schemas.

A driver may lose their temper and engage in aggressive behaviour towards another road user, and then write it off as 'a little bit of road-rage': an external, circumstantial attribution, outwith their control, and part of the driving schema. If the excuse of 'road-rage' was not available, they might have to attribute their behaviour to their own aggression: it would be an internal, dispositional attribution; and would not necessarily be limited to their driving behaviour. In this way, the label 'road-rage' may be an impediment to dealing with the causes of such behaviour.

The idea that using a telephone introduces a significant distraction whilst driving is not a new one (Brown, Tickner & Simmonds, 1969), but the wider availability of the technology in the past few years makes it a more pressing issue. Various models of multiple-task performance have been proposed to explain the mechanisms by which attention is split between the multiple tasks, but there are additional difficulties in defining the task parameters of making a telephone call; and of driving.

Driving a manual transmission vehicle along a rainy, winding road in the rush hour is a distinctly different driving task from ambling down an empty, sunny highway with the cruise control set. Similarly, chatting to a friend about where to meet for coffee is a different telephone task from trying to close a difficult sale with a hostile customer. Types of telephone are also significant: hand-held; hands-free; and voice activated telephones all require different levels of physical, visual and mental resources to use (Haigney & Westerman, 2001). Problems with sound quality and signal strength may prompt hands-free users to pick up the telephone in order to hear better (Wigley & Curtis, 1997). Briem and Hedman (1995) found that men exhibited better vehicle control than women when making a hands-free call in difficult driving conditions. The relative performance levels for making the telephone call, however, were not quantified.

Horswill and Coster (2002) investigated the relationships between risk-taking behaviour, internal car noise, vehicle performance and vehicle safety. They found that high vehicle performance and safety features like anti-lock brakes (ABS) increased risk-taking behaviour; and that a propensity to risk-taking behaviour independently affected drivers' choice of preferred vehicles. They also found that higher levels of internal vehicle noise decreased the drivers' minimum vehicle following distance and increased acceptance of marginal gaps in traffic. The age of a vehicle may also affect risk-taking behaviour: a study by Fosser and Christensen (1998) found that drivers in new vehicles were more likely to become involved in accidents than drivers of older vehicles, a finding which would be distinctly unwelcome with vehicle manufacturers.

These findings should have obvious implications for the automotive industry. The automotive industry, however, is in the business of marketing and selling new vehicles, not promoting road safety and compliant driving, and may in fact be quite resistant to any 'toning down' of the visceral appeal of their latest models. The BBC's motoring programme 'Top Gear' compiled a top ten chart of desirable cars (see appendix). Nine out of ten of these cars were capable of more than twice the national speed limit (70 mph), the exception being a supercharged off-roader which was only capable of 130 mph. Referring back to Shaw's (1965) comment that "we drive as we would like to live", perhaps we choose our vehicles along similar aspirational lines?

The Ford Motor Company promotes its new Focus ST model as having "head-turning design and confidence", "pulling power of around 220PS"¹ and an interior with "a jet-fighter cockpit feeling" (Ford, 2005). These attributes do not contribute to the car's suitability for taking children to school, carrying shopping home from the supermarket, or sitting in the car park outside its owner's place of employment, which are realistic tasks for a mid-sized car. This aspirational, performance-oriented marketing of new cars may be part of the reason that drivers of newer cars are involved in more accidents: new cars are marketed heavily; older cars are not. Aspiring racing drivers, or 'Walter Mitty'-style secret agents, who think they need 220PS of power and a jet-fighter cockpit will be attracted to this car by its advertising; they will not be attracted by older cars, which have a much less glamorous image. As Horswill and Coster (2002) found, a propensity to risk taking affects choice of vehicle, and this sort of advertising may be, consciously or unconsciously, aimed at potential risk-takers.

The modern trend towards traffic calming in non-arterial routes may have discouraged some drivers from taking short cuts, and may have limited speeds to some extent, but it has also produced its own problems. The government acknowledges this: "It is important that road traffic measures continue to address aspects of the driving environment that may make the experience inherently frustrating" (Marshall & Thomas, 2000, p.5). There is a difficult balance to be struck between reducing speed and increasing frustration and anger for drivers.

¹ 1 PS is roughly equivalent to 1 Horsepower or 746 Watts.

Traffic congestion in cities and towns is now a major problem. As the concentration of vehicles on the road increases, the problem increases. Despite the alternatives afforded by public transport, some drivers insist on driving in congested urban areas: does this constitute aberrant driving behaviour? It certainly causes a public nuisance and an economic burden by congesting roads and slowing down buses and commercial vehicles. Measures have been introduced in order to militate against it, such as Congestion Charging in London (Transport for London, 2005), and in Edinburgh much of the city centre is now out of bounds to cars (BBC News, 2005).

Most current traffic calming measures are aimed at reducing the speed of vehicles in residential areas; discouraging heavy goods vehicles from using unsuitable routes; improving conditions for vulnerable road users (i.e. cyclists and pedestrians); and reducing noise, disturbance and anxiety for non-drivers (Scottish Road Safety Campaign, 2005). Although speed humps, chicanes and road narrowing reduce speeds at the point in the road that they occur, there is evidence to suggest that some drivers accelerate hard away from them, and then brake before the next occurrence (Tenkink, 1988). Vehicles are less stable under acceleration or deceleration than when travelling at a constant speed (Milliken & Milliken, 1995). Speed humps in particular are unpopular with car owners due to the extra wear and tear on the car's wheels, tyres and suspension (Martens, Comte & Kaptein, 1997). All of these measures add features to the road, increasing the level of attention required to comply with the rules of the road, while reducing drivers' overall speed, and increasing journey times. This does not seem to be addressing the problem of driver frustration.

A proposed 'Naked Road' scheme will remove all the road signs, traffic signals, footpaths and road markings from Exhibition Road, London, to see what would happen when traffic and pedestrians are required to interact without barriers (both literal and metaphorical) between them. Kensington and Chelsea Council say the scheme will promote "inferred pedestrian priority" and "'polite' behaviour by pedestrians" (RBKC, 2005). There are no results so far, but a similar scheme in Drachten in the Netherlands has been hailed as a success for the "Principle of Shared Space" (Geemente [Government] Smallingerlande, 2005).

Conclusion

Defining the scope and impacts of aberrant driving behaviour is problematic. Quantifying any real-world behaviour presents difficulties to those attempting to study it, and driving behaviour is a relatively modern phenomenon, the prevalence of which has expanded rapidly in the past few decades. This compounds the difficulties, since the nature of driving behaviour is constantly evolving with changing technology, changes in the law, and changes in patterns of travel and road use. Despite the difficulties with research methods, it is possible to arrive at valid conclusions about driving behaviour, and to some extent predict behaviour even when that behaviour is subject to change over time.

The driver behaviour questionnaire has proved to be a robust tool in the investigation of aberrant driving, and in combination with other self-report techniques it has been possible to examine the motivations and attitudes behind, and relationships between, many other forms of behaviour. This understanding is at the root of efforts to change behaviour, such as experimental road systems; campaigns against drink-driving and drug use; anti-speeding publicity and the like. Other methods, like simulation, have also proved useful in their contexts, like comparative evaluations of the errors caused by using a telephone whilst driving; or observation, for evaluating the re-design of roads and new speed limits.

It should be noted that although there are imperfections in these methods, they can be used to predict real driver behaviour with a fairly high degree of confidence. Real levels of accident involvement (from police or insurance data) can be correlated to self-reported accident involvement in order to evaluate the real effect of a behavioural modification. Simulation data from studies with a distraction condition and a control condition, can be correlated to 'real driving' data. As long as it is accepted that these sources of data are not identical to real-world driving behaviour, but should correlate well with real-world behaviour, then they will remain a useful tool.

Although much of the research alluded to here implicates young drivers and male drivers in aberrant driving behaviour, it is not a practical proposition to change those demographic attributes. Other driver attributes, like perceived behavioural

control; risk-taking behaviour; sensation-seeking behaviour; tolerance of external distractions like telephones; and behaviour like alcohol and drug use, can and should be changed in order to minimise their negative impacts. While it may not be possible to eliminate the risk bias for young and male drivers, it may be possible to limit its extent.

The motor industry has been using psychology for years in order to sell new cars. If there is a way to motivate them to market and sell cars on the basis of sensible and polite driving, instead of unrealistic or irresponsible aspirations, then that would indeed be a huge step forward for the psychology of driver behaviour. Drivers may yet come to the realisation that as their vehicles get faster, it becomes necessary to make their roads slower, which benefits no-one and adds to driver frustration.

The psychological aspects of road design seem almost certain to become more important in the future, as more vehicles take to the roads and greater demands are made on the balance between enhancing road safety and maintaining reasonable journey times. Pioneering schemes Congestion Charging, Edinburgh's city centre traffic system, and experiments like Exhibition Road may be the only way to test such innovations, since it is almost impossible to accurately model or simulate the responses of a mass of drivers to such changes in a complex traffic system.

Aberrant driving behaviour cannot be completely eliminated, in much the same way that we cannot completely eliminate other aberrant social behaviours. What we can do is try to counteract the motivations underlying such behaviour, modify the attitudes that allow the behaviour to be accepted by the drivers' peers, and try to address the unrealistic, romanticised expectations we have about cars and driving. There would be fewer aberrant drivers on the road if more of them took the train instead.

(5,530 words.)

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Appendix

BBC Top Gear's 'The World's Greatest Cars'

1. Rolls-Royce Phantom

Faultless, peerless, ageless. No wonder Jeremy's so impressed.
Top speed: approximately 155mph (road test estimate).

2. Ferrari F430

All the emotion, none of the frustration. It's a 24/7 supercar.
Top speed: 196mph (manufacturer's specifications)

3. Aston Martin DB9

Ice-cool British beauty. Yes it has its faults, but call that character.
Top speed: 186mph (manufacturer's specifications).

4. Bentley Arnage

A car built to outlive its owners. Quality craftsmanship ends here.
Top speed: 155mph (manufacturer's specifications).

5. Range Rover Supercharged

From the Cotswolds to Compton, its a low-ratio, high profile must.
Top speed: 130mph (manufacturer's specifications).

6. Ford GT

Heart not head. Thirsty, meaty, silly-fast and super-exclusive.
Top speed: approximately 200mph (road test estimate).

7. Mercedes S65 AMG

The Teuton's choice. Blistering pace and souless mega-tech.
Top speed: 155mph (manufacturer's specifications).

8. Maserati Quattroporte

The romantic's choice. Seductive, luxurious and neatly understated.
Top speed: 171mph (manufacturer's specifications).

9. Volkswagen Phaeton

Simply is the most precisely engineered limo money can buy.
Top speed: 155mph (manufacturer's specifications).

10. Porsche 997 Carrera S

Supercar handling, everyday useability. Now with extra soul.
Top speed: 182mph (manufacturer's specifications).

Source:

<http://www.topgear.com/content/features/stories/2005/10/stories/17/1.html>