

Road Safety Research Report No. 112 Understanding Public Attitudes to Road-User Safety – Literature Review: Final Report

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EXECUTIVE SUMMARY

Context and scope

- The literature reviewed in this report is primarily UK based and published post 2000.
- In total, 72 articles have been reviewed in-depth and represent a mixture of qualitative, quantitative and mixed methodology primary research and a variety of reviews (see Appendix 2).
- A wider definition of attitudes was incorporated to include a variety of psychosocial variables, such as social norms, risk, identity and impression management, pro-social behaviour, habit, thrill-seeking behaviour and personality,
- The review sought to include a variety of road users, especially those at most risk, including young (especially male) drivers, those who drive for work, motorcyclists, children, older people, black and minority ethnic (BME) groups and those from deprived areas.

Findings

Aberrant road-user behaviour

- It is clear that the public know that driving behaviour is a major contributory factor in all accidents. However, there is the perception among individuals that it is 'other' drivers and 'other pedestrians', not themselves, that are the risk.
- Safety is a key concern for motorists, but safety concerns centre on the safety of other drivers rather than drivers' own behaviour.
- What constitutes speeding is conceptualised differently for different drivers.
- Generally, drivers see speeding as dangerous and are aware of the link between speed and accidents.
- However, on closer inspection, knowledge of this link is not so clearly evident when drivers' discuss and examine their own driving behaviour, and, despite advocating greater penalties for speeding, continue to speed themselves.
- Reasons for speeding linked to attitudes include: speeding because other drivers do so; perceiving the speed limit as too low; a belief that they will not be caught by the police for speeding; not knowing they were speeding; a belief that speeding is not that dangerous; and views that link speeding to positive connotations.
- Both driving too fast and too slow are linked to a perception of a dangerous driver. Driving at an appropriate speed is not seen as a quality of a good driver.

- Various personality traits are linked to poor driving behaviour, including sensation seeking, aggression and anger, a Type A personality, normlessness, intolerance, less empathy, impulsiveness, recklessness and mild social deviance.
- Drivers are not very good at assessing their own skill.
- It is suggested that further research in the area addresses in more depth the acceptability of speed, attitudes to risk and speeding, normative and peer influence on risk taking, changes over time, interaction between the psychosocial variables, a need to establish whether generic personality traits display similar behaviours across a range of activities or whether driving is unique, and how can self-assessment be improved.

Engineering solutions

- Support for traffic-calming measures varies between the type of measure, with raised junctions and speed humps being most favourable. On the whole, the acceptability of speed humps has risen since 1991, but remains constant at around 50%. More sustained support is seen for 20 mph zones.
- Current in-vehicle technology is viewed positively in terms of increasing roaduser safety.
- Future in-vehicle technology has some support, especially for information provision rather than systems that take-over driving behaviour.
- There are concerns that technology might make driving less safe, especially in terms of over reliance on the technology. In addition, the (perceived) safety and comfort of modern cars is felt to encourage speeding behaviour.
- Technological solutions are viewed differently by different people. Those who
 drive least safely most of the time (continuous risk takers) tend to view all
 engineering interventions very negatively, except black box technology.
- More research is required on the link between attitudes and acceptance. In addition, a closer examination of the importance of control and driving should be considered.

Enforcement

- There is support that more visible policing would alter a driver's own behaviour.
- Almost all drivers, though, believe themselves to be law-abiding, but have their own definition of what constitutes 'law-abiding', especially with regards to driving over the speed limit.
- Stronger penalties are perceived to be more appropriate for drivers who deliberately and wilfully break driving laws. Drivers have mixed views as to whether speeding constitutes a deliberate or accidental breaking of the traffic laws, and hence mixed responses to perceived penalty.

- There is high support for seat-belt and drink-driving laws, and high compliance with such laws. However, there continues to be a small minority who flout such laws.
- Although the majority of younger people were against drug-driving, driving on cannabis was thought to be more acceptable and less dangerous than drinkdriving and driving on other types of drug.
- Most people support the ban on mobile phone use and support tighter legislation.
- There is some support for speed cameras, but how support is changing over time is open to debate.
- Support is found for visible speed cameras and for hand-held speed cameras.
- Further research is suggested to address whether support for speed cameras is changing and why there is more support for mobile cameras. In addition, research on the comprehension of speeding as an unintentional slip/lapse or an intentional violation is suggested.

Education

- Campaigns targeting a mass audience may have little effect on changing the behaviour of road users, but may influence attitudes and social norms.
- Campaigns that induce fear have little effect on the most confident drivers who believe such adverts are not targeted at them.
- Skills training can have an unintended negative effect on driver performance by creating overconfidence, especially among professional drivers.
- More success in changing behaviour and attitudes comes from interventions that target specific behaviours and groups, such as implementation intentions and reflective group discussions.
- Evaluations of safety campaigns have, in the past, been subject to methodological flaws which reduce their findings and conclusions.

Pedestrians

- Walking is viewed as the safest mode of transport.
- Road safety is viewed by parents as one of three key risk areas for children (along with drugs and bullying).
- Parents have a good understanding of children's road safety needs. Parents think their children have good road safety skills, although BME parents are less confident in their children's road safety skills.
- Older children and adolescents think they have a good attitude to road safety, but believe others do not, especially their peer group. Adults and parents believe that

road-user skills deteriorate as children get older, largely attributing this to peergroup pressure.

Cycling

- Most children do not think cycling was very risky and did not think accidents would happen to them.
- One of the major barriers to cycle-helmet use includes peer pressure, with cycle helmets being seen negatively by friends.

Motorcyclists

- Motorcycling is viewed as the most dangerous mode of transport.
- Younger, less experienced drivers have the least positive attitude towards motorcyclists and are more likely to be involved in accidents with them.
- Females drivers show less empathy towards motorcyclists, but display more skill in interacting with them.
- Most positive attitudes towards motorcyclists come from drivers who themselves are motorcyclists or have close relatives who are.
- There is some interesting research on attitudes towards motorcyclists that links attitudes and skill, something that other areas of road-user safety research requires more focus on.

Attitudes and behaviour

- Concluding the empirical evidence from the literature, it may be argued that, while road-users' attitudes towards safe behaviour is an important determinant of (intended) behaviour, it does not provide by itself a full explanation of that behaviour.
- Subjective norms do play an important role in explaining intension and behaviour in the context of road-user safety, including aspects such as driving speed, committing risky violations and involvement in risky road-user behaviour in general.
- Perceived Behaviour Control is the strongest predictor of speeding behaviour and those who feel they have less control commit more violations.
- According to the Theory of Planned Behaviour (TPB), behaviour is assumed to be reasoned, controlled or planned. One criticism of TPB had been that human behaviour is habitual or automatic, rather than planned.
- Alternatively, cognitive psychologists and behavioural economists argue that choices made by individuals, systematically deviated from rational models of behaviour, can be explained and predicted by cognitive psychology models of bounded rationality. Moreover, it opens the opportunity to change an individual's

behaviour towards better alternatives – in a way that does not limit their freedom of choice (or, as it is fashionable to say, people are 'nudge-able').

Methodological issues

- Research reviewed for this report has largely been quantitative in nature and has a variety of limitations, including the self-report nature of the data, the terminology used in the collection of the data, the lack of focus on the outliers, the over-use of forced-choice rather than open-ended questions, and the proposition of fixed time responses.
- It is suggested that a deliberative qualitative approach can help address some of these issues.

Recommendations

- It is suggested that future research should concentrate on teasing out some of the following relations:
 - the difference between attitudes a road user has about their own road-user behaviour and the attitudes they have about other road-user behaviours, and how that shapes and mediates accepted risk;
 - the influence of normative pressure on behaviour and how this is framed by attitudes;
 - to address interpersonal differences in attitudes and behaviour at the disaggregate level;
 - changes in attitude at an intrapersonal level;
 - how road-user safety is conceptualised, especially in relation to other nonroad-user and other road-user behaviour, to address the cognitive and emotional perceptions of risk;
 - to look for links and mapping of different psychosocial variables;
 - to address the role of positive psychology and pro-social behaviour;
 - to address changes in attitude and behaviour over time;
 - to examine attribution of behaviour to assess true attitude-behaviour relationships;
 - to address the public's own semantics, terminology and meanings with regard to road-user safety; and
 - to address the role of attitudes in the success of interventions aimed at improving road-user safety.
- In addition, a number of knowledge gaps were found, including attitudes of, and towards, pedestrians (especially adults), motorcyclists, cyclists (again especially adults) and public attitudes towards drug-driving.

- Attitudes towards new concepts such as psychological and intuitive trafficcalming, shared space and the relationship to road-user safety should be investigated.
- Finally, to assess whether attitudes towards the environment may influence roaduser safety.

1 CONTEXT AND SCOPE

1.1 Introduction

This is the final report of a review of literature on the public attitudes to road-user safety. This report supports the conclusion of stage one of a project that will provide the Department for Transport with an in-depth understanding of how the public engage with the issue of road-user safety. The overall project will consist of five stages of research (see Figure 1.1).

The aim of stage one is to review and synthesise existing research on public attitudes to road safety to inform subsequent research components.

As such, stage one is a platform that informs the content and future direction of the research. It is based on a comprehensive literature review of the evidence and detailed scoping of activities. The review will provide a theoretical framework to develop the recruitment of different segments of the population, their mediation of risk, and substantive issues to be explored through the deliberative process during the latter stages of the project.

The literature on public attitudes to road-user safety is vast and dates back many years. In order for the review to be relevant and up-to-date, a variety of criteria were employed to manage the literature to be reviewed, including the following:

- The literature is primarily UK based. The highly contextual nature of road use and attitudes towards road-user safety means previous research that has focused on road-user safety regardless of geographical, cultural or social context could be considered too generic. As such, studies involving data on attitudes from the UK population were used as the initial focus. Other relevant and important studies from the international literature are also included, but contextual differences are noted.
- There is a focus on literature published post-2000. Public attitudes across the population and relevant sub-groups vary over time. In order to inform future



strategy, an up-to-date knowledge of such attitudes was required. Hence, a theoretical cut-off of literature post the year 2000 was presented to assume highest relevance of findings. Nevertheless, changes over time, where appropriate, are noted, insofar as they create knowledge on patterns of attitudinal and behavioural change. In addition, seminal pieces of research pre-2000 are included where theory and debate still have an impact on the data and framework of the research to date.

1.2 Methodology for the literature review

The literature review took place in two waves.

1.2.1 Wave 1

Using the framework outlined above, a trawl of the literature began, addressing a number of different sources, including the following:

- Databases social science and psychology databases (e.g. Psychinfo), transport databases (e.g. TRIS, Transport, etc.).
- Conference reports/presentations Universities Transport Research Group, Transportation Research Board, International Conference on Traffic and Transport Psychology, International Association of Applied Psychology Conferences, Behavioural Research into Road Safety Seminar, World Conference on Injury Prevention and Safety Promotion.
- Reports Department for Transport, Department for Health, Transportation Research Laboratory, the US Transportation Research Board, World Bank Studies, EU Research Report into Injury and Accident Prevention.
- Specific journals Accident Analysis and Prevention, Human Factors, British Journal of Applied Psychology, British Journal of Social Psychology, Transportation Part F: Traffic and Transport Psychology.

Searching for articles included looking for key words and elements of the article that addressed attitudes and variables known to be associated with attitudes including specific attitudinal theory (e.g. theory of planned behaviour), acceptability of legislation and interventions, identity and impression management, risk, social norms, pro-social behaviour and habit (more detail on this scope is given in Section 1.3.1). In addition, road-user safety involved a variety of elements to be searched, including: interventions (engineering - seat belts; enforcement – speed limits, drink driving; infrastructure - traffic calming; education – adverts, campaigns, initiatives such as Think! Brake, Neighbourhood Road Safety Initiative, etc.), policy, pedestrians, drivers, cyclists, motorcyclists, children (up to 16), adolescents/youth (17–21), older people (60 years and over), those driving for work, black and minority ethnic (BME) groups and residential deprivation (see Section 1.3.2 for more detail).

Once searching commenced, all found articles were collated in an Excel file and then articles with the highest relevance were distributed among the team for critical review. The critical review involved analysis of the key points including identifying gaps and key issues to inform the methodology of the project at subsequent stages. The team was required to make a detailed review on each article, taking into account a number of points including summaries of methodology, main findings and a commentary and interpretation of the project (see Appendix 1 for the notes given to the researchers).

The initial list at the interim report stage consisted of 160 articles, of which 47 articles were selected by the team for primary relevance to the project.

1.2.2 Wave 2

It was recognised that this list was not exhaustive and, as such, a second wave of literature searching and review took place. This involved:

- key articles referred to and encountered in the 47 articles reviewed so far;
- articles identified by the Department for Transport following a presentation of the interim report; and
- articles identified by an expert group of advisors (Professors Phil Goodwin, Jimmie Thomson, Steve Stradling, Elizabeth Towner and Ray Fuller).

Again, articles were added to the Excel file and then articles of primary relevance were distributed among the team for critical review, as at stage one.

This presented the team with 78 new articles for review of which the team selected a further 25 for primary relevance to this project, making a total of 238 articles, of which 72 received in-depth reviewing and are included in this report (see Appendix 3 for a list of total articles found and Appendix 2 for those given in-depth reviewing).

1.3 Definitions and scope of the project

In order to define attitudes as a useful concept within the traffic and transport domain, it is important to view the domain as a social situation, with actors or agents that interact with one another. Hence we agree with the definitions given by Haglund and Aberg $(2000)^{*1}$ that traffic should be viewed as a social situation where drivers interact and influence each other. In addition, O'Connell (2002) states that the

¹ References followed by an asterisk are to be found in Section 11, the references section of the report. References without an asterisk are to be found in Appendix 3 (the total list of articles found by the review). Reference numbering (e.g. YS9) refers to Appendix 2 (the articles that were given in-depth reviewing).

design and construction of the road and traffic system 'must not be based on an erroneous model of humans as abstract rational actors, isolated from their social context and operating on purely "objective" criteria' (p. 201). In specific relation to this project, road-user safety can be viewed as not just skills-based and rule-governed, but also in terms of being an expressive activity (YS9). Attitudes are therefore at the heart of such a social and irrational context.

1.3.1 Definition of attitudes

Attitudes can be defined as '... a positive, negative, or mixed reaction to a person, object, or idea' (Brehm *et al.*, 2002; p. 179*) and 'a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour' (Eagly and Chaiken, 1993; p. 1*). Hence, attitudes can be seen to be an evaluative reaction to a concept, such as road-user safety. It must be noted that attitudes towards a concept may be mixed and not necessarily be consistent within the individual (Brehm *et al.*, 2002*).

For the scope of the project, it was proposed that attitudes are investigated in relation to other related psychosocial variables (see Figure 1.2), including the following.



1.3.1.1 Social norms

These are unwritten rules of behaviour that may influence the way people behave in particular circumstances. Norms are formed and maintained through social interaction with significant group members that may involve verbal and non-verbal signals for approval or disapproval. These norms form the basis of a social contextual approach. For example, young people's risk beliefs in a variety of setting, including road-user safety, become habituated, mediated through social relationships, transmitted wisdoms, localised myths, and experience-based knowledge (Shiner and Newburn, 1997*). There are a variety of different types of social norm, including the following:

- **Injunctive norms** are behaviours which are perceived as being approved of by other people.
- **Descriptive norms** are perceptions of how other people are actually behaving, whether or not these are approved of.
- Explicit norms are written or spoken openly.
- **Implicit norms** are not openly stated (but you find out when you transgress them).
- **Subjective norms** are expectations that valued others have about how we will behave.
- **Personal norms** are standards we have about our own actions (Durlauf and Blume, 2008)*²).

1.3.1.2 Risk

Specifically, there is a need to take account of how the subjective understanding of risk, often amplified through wider social signs and signals, leads to differences in cognitive judgements around road safety. In short, people make their own representation of risk and danger, and this subjective appraisal of accident likelihood affects road-user behaviour and thus exposure to risk. Generally, there are three areas of risk representation (Musselwhite, 2004 (CM8)):

- 1. Spatial representation of risk at a primary level individuals hold subjective knowledge on geographically spatial locations of risk and potential accident involvement. People are aware of areas, especially locally to themselves, that are more or less risky and dangerous.
- 2. Temporal representation of risk at a secondary level individuals make sense of risk and accident likelihood through evaluating their own ability to deal with the risk and hence the skills they have to mitigate the risk.

² See http://changingminds.org/explanations/theories/social_norms.htm for further information.

3. Social representation of risk – at a tertiary level, representation of risk occurs in a social context, rather than in psychological and geographical isolation. It is therefore important to study how risk is represented in light of other's opinions on similar risk.

1.3.1.3 Impression management and social identity

Identity theory suggests that we construct our sense of self through our interactions with others and that we further shape our self through establishing difference or similarity with others (Erikson, 1954*; Tajfel and Turner, 1986*). The process of controlling how one is perceived by other people is called self-presentation or impression management (Leary, 1995*). Outcomes in life depend heavily on how people are perceived and evaluated by others. As a result, impression management increases in public settings and is situation dependent (Paulhus, 1984*). As such, self-identity is deliberately and wilfully constructed, maintained and displayed through impression management.

1.3.1.4 Pro-social behaviour

Pro-social behaviour might be understood as a specific form of helping behaviour. It comprises helpful actions intended to benefit another person, which are not undertaken through professional obligation. Pro-social behaviour can be categorised as either egoistically motivated (helping someone in order, ultimately, to benefit oneself) or altruistically motivated (intended only to benefit the other person).

1.3.1.5 Habit

There are instances where unsafe driving behaviour may occur when no semblance of risk-taking is made. Regardless of whether a person intends or does not intend to drive in a safe manner, habitual processes tend to supersede cognitive processing. A review of research found that, among behaviours conducted frequently and in stable contexts, past behaviour was the strongest predictor of future behaviour, whereas among less frequent behaviours conducted in unstable contexts, intention was the stronger predictor of future behaviour.

1.3.1.6 Thrill-seeking and risk-taking

Zuckerman *et al.* (1964*) proposes that there are four sub-dimensions to the sensation-seeking rait:

- 1. 'Thrill and Adventure Seeking', which relates to the willingness to take physical risks and participate in high risk sports;
- 2. 'Experience Seeking', which relates to the need for new and exciting experiences, and is associated with all types of risk taking;

- 3. 'Disinhibition', which relates to a willingness to take social risks and engage in health risk behaviours (e.g. binge drinking or unprotected sex); and
- 4. 'Boredom Susceptibility', which relates to an intolerance for monotony.

There is good evidence for the validity of each of these sensation-seeking subdimensions, with the exception of Boredom Susceptibility. The fact that different types of risk-taking are both associated with the Experience Seeking sub-dimension therefore adds weight to the argument that different types of risk-taking may all be associated with a universal 'risk-taking personality'. Personality tends to be described as relatively stable traits that influence other psychosocial factors and could affect road-user safety in general or via the mediation of attitudes.

1.3.2 Definition of road user

The road users about whom attitudes are expressed or who own the attitudes need to be made salient. It was decided certain groups of road user would be important to study because of their salience within road-user safety:

- Young (especially male) and novice drivers younger drivers are at a much higher risk of road traffic collisions than older drivers. In particular, younger male drivers are up to four times more likely to be involved in a road traffic accident than their older counterparts.
- Those who drive for work there is an over-representation of road collisions for those who drive for work. It is estimated that a third of all those killed or seriously injured in road collisions are caused by those driving for work and they account for a fifth of all work-related collisions (Department for Transport, 2004*). Obviously, the more drivers are exposed to the road because of more time they spend on the roads and/or more miles driven accounts for some of the explanation. However, some studies suggest that, even taking into account mileage, such drivers are still over-represented (Stradling, 2001*).
- **Motorcyclists** another group that tends to break the speed limit is motorcyclists. They often ride beyond their ability and skill, and frequently fail to negotiate bends on rural A-roads or cope with other hazards.
- Children children (up to the age of 15) pose a greater risk on the road than adults. This is largely due to two main factors a lack of road-user experience and skills and large amounts of exposure to road environments in the lightest form of exposure (as a pedestrian and cyclist, for example). Researchers have also cited inappropriate attitudes and peer pressure to accept higher risk thresholds as an added increase in risk. In addition, deliberate risk-taking, such as playing chicken, can take place.
- Older people in the UK, there is a rise in the pedestrian accidents from late middle age, despite older people travelling less than younger people (Dunbar *et al.*, 2004*). Road accidents for older people are more likely to result in an

injury, and recovery is less likely than for younger people (Dunbar *et al.*, 2004*). Although pedestrians aged 60 or above represent only 20.5% of the population, they account for 47% of pedestrian fatalities (Hakamies-Blomqvist, 2003*). The combination of physiological/cognitive/psychological aspects together with the socio-economic aspects of these group (low car ownership/use, accessibility needs, etc.) expose elderly people to higher road accident risk.

- Black and minority ethnic groups - traffic accident studies have found significant differences in accident risk rates based on ethnicity (White et al., 2000*). Accident reports suggest, in some cases, the 'non-White' accident casualties had only recently arrived in the UK, suggesting there was a deficiency of appropriate experience of UK traffic norms and behaviour. A review of roaduser accidents among ethnic minorities in a variety of countries, including the United States, Sweden, Israel, Singapore and New Zealand, suggests children of ethnic minority background do suffer substantially increased risk of pedestrian injury relative to the norms for the country as a whole (Thomson *et al.*, 2001*). In the UK, children of Asian ethnic origin appear to be disproportionately vulnerable. But self-report data from young people in Neighbourhood Road Safety Initiative (NRSI) areas suggest that non-White groups are diverse and this heterogeneity generates variable levels of self-reported accidents, with Bangladeshi, Black African and Afro-Caribbean young people reporting higher levels of accidents (Ward et al., 2008*). As White et al. (2000*) suggest, per head of population, those young pedestrians of Asian origin aged 0-9 years were over-represented in road accidents by a factor of two.
- **Deprived areas** the number of accidents is not distributed equally across Britain and a much higher number of road accidents occur in deprived areas than would be expected. For example, children from disadvantaged backgrounds are five times more likely to be killed on the roads as pedestrians than children from more affluent backgrounds (Roberts and Power, 1996*; White et al., 2000*). Studies on hospital admissions suggest that there is both an increased number of injured people and severity of the injury with increasing deprivation, and that the increase is more pronounced for pedestrian injuries (Abdalla et al., 1997*; Hippisley-Cox, 2002*; Vincenten, 2006*). Grayling et al. (2002*) found that deprivation is the major factor in pedestrian casualties when other aspects of the environment, including population (density and proximity), employment (number, density and proximity), type and length of road and weather, are controlled for and that the pattern is true for adults and children, though is more pronounced for children. Noland and Quddus (2004*) report a positive correlation between area deprivation and traffic casualties. Areas that have higher IMD (Index of Multiple Deprivation) scores (i.e. are more deprived) are associated with increased serious and slight injuries.

1.3.3 Definition of road-user safety

In addition, attitudes towards safety need to consider attitudes in three main domains:

- **Infrastructure** attitudes towards the design of the roads and streets is important.
- Attribution attitudes of road users about other road users is important to capture. In addition, perceptions of why certain behaviours (their own and others) on the road are displayed will be captured.
- Attitudes towards and acceptance of interventions traditionally broken down into three areas:
 - Education these involved strategies aimed at changing behaviour through information provision and appealing to emotions.
 - Engineering these involve physical changes to the infrastructure and/or vehicle that try to alter a change in behaviour and may include current invehicle technology, such as anti-locking braking systems (ABS), air-bags or infrastructure-based technology, for example traffic calming, through to future systems designed to provide extra information to the driver or that take over driving functions, Advanced Vehicle Control and Safety Systems (ACSS), including Intelligent Speed Adaptation and Adaptive Cruise Control.
 - **Enforcement** these involve written laws, including posted speed limits, with accompanied enforcement tactics, such as speed cameras.

In all cases, attitudes towards such interventions are linked to the subsequent effectiveness. For example, one of the most salient concepts that reflects public acceptance of an intervention aimed at improving road safety is individual attitude. Previous research has shown that attitudes towards engineering interventions, such as traffic calming and Intelligent Transport Systems (ITS), are directly linked to their success. With regard to traffic calming that initially met much public resistance in its introduction, Webster (1998*) states that 'it is increasingly clear that successes of such traffic calming schemes is not determined by objective measures of their effect . . . but that subjective assessment is also important. If measures are introduced which the local public do not like then they soon become discredited.' Similarly, attitudes towards new technologies, such as black box technology and speed-limiting devices, affect their use and, consequently, their overall effectiveness. It is, therefore, very important to study attitudes towards such engineering measures.

2 ABERRANT ROAD-USER BEHAVIOUR

2.1 Attitudes to hazards and risks

It is clear that the public know that driving error is a major contributory factor in almost all road-user accidents (EA13). However, there is the perception among individuals that it is 'other' drivers and 'other pedestrians' (EA24), not themselves, that are the risk.

Attitudes involving risk are not displayed equally across the population. For example, there are gender differences in risky driving attitudes. Females, compared with males, hold far less risky attitudes towards driving (DfT1; CM73) and show far more concern for the potential to harm someone else while driving (CM73). In a wider context than just driving, females show less risky attitudes towards road-user behaviour attitudes in general and are far more concerned about road safety in general than males. For example, females were more likely to express concern for the concept of breaking the speed limit and for performing risky overtaking behaviour (CM16; CM52), and are better informed of potential road hazards and were more likely to rate the dangers of risky road-user behaviour higher than males did (CM16). In addition, reported road-user safety skill increases with measured femininity (as measured using the Bem Sex Role Inventory). (Ozkan and Lajunen (2006) cited in CM73). This sex difference is prevalent from an early age and is present in pre-drivers, where boys (aged 11-16) feel driving violations are more acceptable than girls (AG4), and in 15–19-year-olds, where girls expressed safer attitudes than boys (RF3). Older drivers have less risky attitudes to road-user safety (DfT1). This translates into behaviour with older drivers (age 50 years and over) displaying less violations with regard to driver behaviour, especially aggressive violations, suggesting deliberate risky behaviour is far less prevalent among this age group (EA27).

The level of deprivation in the local area also affected people's views. Respondents from deprived areas considered risky road-user behaviour, particularly that relating to local residential location, as more dangerous. For example, they viewed speeding to be more dangerous than those from more affluent areas, and also that driving in and around heavily residential areas as more dangerous than those from more affluent areas (CM52).

Safety is a key concern of motorists. Of the top eight concerns mentioned by motorists in the latest annual RAC survey (CM74) of 2,209 motorists, six are related to safety, four of them directly. It is noticeable also that three out of the four are concerns that directly involve 'other' drivers (see Figure 2.1; CM74). Specific concerns about driving and safety (see Figure 2.2) are almost all about 'other drivers' and include (in order of percentage of motorists agreeing):

- 1. other motorists driving under the influence of illegal drugs: 76%;
- 2. other motorists driving over the legal alcohol limit: 74%;

Figure 2.1: Issues of concern to motorists (orange: directly related to safety; dark grey: indirectly related to safety) (CM74)

Issues of concern to motorists	Percentage saying this is of most concern
The cost of driving and running a car	74%
The behaviour of other drivers	73%
Other people driving cars without tax or insurance	68%
The number of accidents on the road	64%
Traffic congestion/slower journey times	64%
The growing number of cars on the road	57%
The environmental impact of motoring	50%
The roadworthiness of other cars on the road	50%
Base: all respondents ($n = 2,029$)	

- 3. other motorists driving too fast or speeding: 71%;
- 4. other road users not paying attention: 62%;
- 5. other motorists' aggressive driving: 61%;
- 6. car crime (joy-riding, vandalism, theft, etc.): 60%; and
- 7. other motorists' ability to drive in bad weather/poor visibility: 54%.

A key issue among motorists on an unprompted response to the question of most dangerous behaviours on the road is speeding, with 56% spontaneously suggesting that this is a key concern (see Table 2.1; YS17). This is followed by drink-driving

Table 2.1: Most dangerous behaviours on the road and who should address themspontaneous answer (YS17)				
Issue	Spontaneous Mention (%)	Think Government should address (%)	Causes road casualties (%)	
Drink driving Drug driving Speeding Use mobile phones without hands-free kit Not wearing seat belts Not using child restraints Drivers not fully concentrating Child road awareness Driving while tired Motorcycle accidents	51 21 56 23 11 8 11 11 11 10 6	81 35 61 33 17 11 19 12 14 5	32 3 34 7 2 1 12 1 5 2	

Figure 2.2: Where are the main problems with regard to safety on the road according to motorists (CM74)?

	Not at all concerned	Extremely concerned
Concerns about safety	1 2 3 4 5 6	7 8 9 10
Other motorists under the influence of illegal drugs	1% 2% 4% 7% 9% 15% 15%	46% Very concerned 76%
Other motorists over the legal alcohol limit	1% 3% - 6% <mark>8% 10% 16% 15%</mark>	41% Very concerned 74%
Other motorists driving too fast or speeding	1%- <mark>12% 5%7%12% 21%</mark>	18%22%Very concerned 71%
Other road users not paying attention	1% 2% 6% 11% 18% 20%	19%21%Very concerned 62%
The aggressive driving of other motorists	1% 1% 2% 10% 15% 21% 2%	15%24%Very concerned 61%
Car crime: joy-riding, vandalism, theft etc.	1% 1% 2% 4%8% <mark>9% 14% 17%</mark> 2%	16%29%Very concerned 60%
Other motorists' ability to drive in bad weather/poor visibility	1%4%10% <mark>2%4%10%2</mark>	3% 15% 16% Very concerned 54%
Other motorists' ability to drive safely at night	1%5% 15% <mark>13% 17%</mark> 2%	19% 15% 14% Very concerned 48%
The quality of the roads I use: signage, condition etc.	1%- 2%-6%5% 13% 14% 19%	19% 11% 12% Very concerned 41%
The abiility to drive safely given the number of cars on the road	1%6% 12% 17% 21% 4%	5 19% 8% 10% Very concerned 37%
The roadworthiness of other cars on the road	2% 2% 6%8% 15% 15% 17	7 <mark>% 17% 7% 11%</mark> Very concerned 35%
Things going wrong with the car I am driving	8% 8% 10% 9% 14% 9%	0 10% 12% 8% 12% Very concerned 32%
Base: all responents ($n = 2,029$) NB: Values of less than 1% in the boxes above, are not shown		

(51%) and using mobile phones without a hands-free kit (23%). Speeding is the only aberrant behaviour on the list that drivers themselves admit to substantially performing (YS17).

Drink-driving (69%), speeding (43%) and the use of mobile phones while driving (40%) were seen as the key road safety issues which the Government should address (DfT1; see Table 2.1 and Figure 2.3). The road-user behaviours considered to be most unacceptable were drug-driving, not wearing a seat belt in the front of the car,



driving without insurance and using a mobile phone while driving - all given a rating of 4 or 5 on a scale of 1 to 5 in terms of unacceptability of the behaviour (DfT1).

On the whole, drivers believe that they themselves are safe behind the wheel, with 80% stating that they feel very safe (CM74). Only 3% indicated that they themselves do not feel safe as drivers (CM74). It would be interesting to note who these 3% are, though no details are given in CM74. By contrast, only 41% feel very safe driving on the roads today (20% state feeling unsafe), with the assumption being that the difference must again be made up by perceiving other drivers as dangerous (see Figure 2.4; CM74). There is, of course, a problem with having to answer a generic question on how safe an individual feels, since the concept of safety is something that probably varies within and between journeys, and to give an overall impression misses out some of the variability in feeling. There is little difference in background of those who feel they themselves are safe or not. However, who feels safe on the road does vary (CM74):

Figure 2.4: Attitudes towards feeling safe on the roads, as a driver and in general (CM74)

Safely driving	Not at all safe	Extremely safe	
How safe a driver would you say that you are yourself?	* * * * ^{2%} -14% Not safe 2%	34% 29% 17% Very safe 80%	
As a car driver, how safe do you feel driving on the roads today?	1%- 1%- 3% Not safe 20%	24% 11%6% Very safe 41%	
* less than 0.5% Base: all respondents ($n = 2,029$)			

- younger drivers (17–24-year-olds) feel most safe: 48%;
- older drivers (65+) are less likely to state they feel safe: 35%;
- men are more likely than females to feel safe (male: 48%; female: 34%);
- no differences in safety as to whether the driver had children or not;
- city drivers tend to feel more safe than suburban drivers (city: 47%; suburb: 38%);
- those who drive for work feel more safe than those who drive privately (work: 59%; private: 40%);
- high-mileage drivers tend to feel more safe than-low mileage drivers (high mileage: 49%; low mileage: 36%);
- habitual speeders feel more safe;
- those who have penalties for speeding feel more safe; but
- those who had had an accident or near-miss felt less safe.

Two in ten respondents (18%) believed that the roads are safer than they were five years ago (DfT1).

Many drivers believe accidents happen outside their vehicle and outside of their own control and not to themselves (DfT4). This is further explained in DfT3, where drivers put themselves at the centre of the risk-accident relationship. Hence they feel in control of their own safety, but feel accidents to be out of their own control and, hence, a feeling of 'accidents are unlikely to happen to me'.

2.2 Attitudes towards vehicle speed

Since speeding is seen a key risky road-user behaviour for drivers, it is important to give it closer attention. Although 90% of the population agree it is important that

people drive within the speed limits (British Attitudes Survey (2005) cited in DfT2) and 39% state it is dangerous to drive over the speed limit at all (DfT1), it is clear that the majority continue to 'speed'. There seems to be some ambiguity over the definition of speeding among the public and what constitutes speeding is different for different people (CM55; EA13). In CM55, for example, 33% think that 'speeding' is 1 mph above the speed limit, whereas 33% think it is 5 mph above the speed limit, and a further 33% think it is 6 mph or above the speed limit.

In addition, people have a 'normative' view of speeding, and decide for themselves what constitutes illegal and dangerous 'speeding' behaviour. A total of 76% of drivers completely agree that driving too fast for the conditions is dangerous (DfT1), so people are happy that their speeding is not too fast for the conditions. This is further emphasised in CM34, where the principal reason given for speeding by drivers was that the speed 'feels about right'. Speeding beliefs are often informed by the view that speed limits are arbitrary limits and that it is OK to challenge such authority in light of road conditions, experience and competence (DfT3). Drivers feel that there is great ambiguity over the speed limits set, with similar roads (as perceived by the drivers themselves) receiving very different speed limits and such inconsistencies lead to a disrespect of the system which translates into a justification for speeding (CM36). In addition, modern technology makes drivers believe that the speed limits are outdated and questionable; cars are designed far better than ever before and, hence, are able to withstand greater impact (DfT3; CM36). Participants also note that less feedback from better insulated cars also means higher speeds are being chosen (CM36), especially for older drivers who have a greater number of years' experience on vehicles that give more feedback (CM4).

CM84 suggests that drivers tend to define speeding at around 10 mph above the speed limit and that drivers driving within their own definition of the 'speeding' threshold still count themselves as 'law abiding' even if they are going above the posted speed limit. Indeed, drivers tend to think that most people drive, on average, around 10 mph faster than the speed limit (CM81). RF2 suggest that 34–35 mph in a 30 mph zone is seen as acceptable by other drivers.

CM81 asked about the speeds at which they would 'normally drive' and 'would prefer to drive' on various road types – the numbers nominating a normal speed above the speed limit ranged from between 30% and 35% on the motorway, the two-lane suburban dual-carriageway, the main road in town and the wide residential street through to 18% on the dual-carriageway and the narrow residential road to 10% on the country road. The proportion of males whose normal speed exceeds the speed limit for that road was greater than that for females on roads with higher limits, but not on slower roads. Drivers in the 21–29 age group generally showed the highest proportion whose normal speed exceeded the speed limit. Not all drivers want to drive fast or exceed the speed limit: 1 in 5 (22%) indicated preferred speeds below the 70 mph speed limit on the motorway and half (54%) said they preferred to drive at speeds below the 60 mph limit on the rural road (CM81).

Perceptions of safe speeding vary by road type and severity of speed over the speed limit. In the 2003 Omnibus survey (reported by DfT2), 90% of people thought that driving at 40 mph in a 30 mph zone was dangerous, but just over a fifth thought it was safe to drive at 35 mph or more in a 30 mph zone. In addition, 65% thought that driving at 80 mph on a clear motorway was dangerous, while around a third thought it was perfectly safe. In focus groups, speeding on the motorway was seen as acceptable (RF2). Males and females differed in their opinions of whether speed limits were too fast or too slow on the faster roads, but not on the slower roads; 38% of males and 17% of females thought the motorway limit of 70 mph was too slow, and 34% of females and 26% of males thought the 60 mph limit on the rural road was too fast, whereas a third of both males and females thought that the 30 mph limit on the narrow residential road was too fast (CM81).

In a study of around 1,000 home interviews, 83% agreed that the current 70 mph speed limit on dual-carriageways was set at about the right level (CM36). On motorways, 60% thought that the 70 mph speed limit was set about right, although 36% felt it should be raised (CM36). According to CM81, male and female drivers differed significantly in their attitude to speed limits both on motorways and 'on other roads'. On motorways, 45% of females, but only 30% of males, thought 'speed limits should not be broken at all', while 32% of males and 23% of females thought that, on motorways, 'speed limits are set below a safe limit and it is acceptable to exceed them by up to 10 mph'. On 'other roads', 55% of females and 43% of males thought 'speed limits should not be broken at all'.

Overall, a hierarchy of acceptability of speeding is seen, where speeding on the motorway is viewed as far more acceptable, on the whole, than other road types. Speeding is viewed as least acceptable on residential roads.

Speeding is seen as a major problem in residential areas and there is strong public support for the tougher enforcement of speeds. The 2003/04 and 2004/05 British Crime Survey asked about perceptions of anti-social behaviour at a local level. The most widespread perceived problem was speeding, with 45% agreeing that it was a very big or fairly big problem (DfT2). This was viewed as serious by more people than a problem with cars parking incorrectly or illegally, teenagers hanging around, rubbish and vandalism (DfT2; see Figure 2.5). Hence, it is no surprise that the majority of respondents support the tougher enforcement of speed limits and are in favour of reducing speed limits in certain areas (CM55). In general, the public want slower speeds near schools and in residential areas (YS17). For example, 70% are in favour of stricter enforcement of 30 mph in residential roads (CM55), 89% support 20 mph zones outside schools (CM59) and 77% support 20 mph speed limits in general on all residential roads (British Attitude Survey (2007) cited in DfT2). Support for 20 mph zones has remained constant at this level between 2000 and 2007 (DfT2), although among Scottish drivers support for 20 mph zones has risen from a mere 22% in 1991 to 86% in 2002 (CM81). There is also very low support



for higher speed limits in the UK, in fact one of the lowest among all European countries (CM65a).

In the same way that the public has a good knowledge of the high contribution of risky behaviour to road-user accidents, the public also states that it has a good understanding of the link between speed and accidents (CM55, CM65a). A total of 87% state that speed is a major cause in most road accidents (CM73). In addition, 80% agree that the better enforcement of speeds has had a significant impact on safety (CM74). In a qualitative piece of research, drivers in focus groups saw high speeds as scary and admitted to having a fear of crashing (RF2). As already noted, speeding was mentioned spontaneously as a major issue in road-user safety by 56% (it was the item mentioned most – see Table 2.1; YS17). However, drivers were unaware of the chances of survival of a pedestrian being hit at 20 mph, underestimating the chance of survival by a high margin (CM59). However, there must be a question over how easy it is for people to determine ratios and percentages for survival and death in abstract manners presented in questionnaires. Some capture of the process of working out such calculations would provide a better insight into such attitudes.

Individuals are much less sure of the relationship between their own speeding and dangers when asked explicitly. For example, when asked whether their own speeding is more dangerous than travelling at the speed limit, almost half thought so in 20 and 30 mph zones, but only 18% in 70 mph zones (see Figure 2.6; YS17). Hence, over half the respondents think their own speeding behaviour in 20 and 30 mph roads is as safe as going at the speed limit, and over 80% believe this is true on motorways. Hence, the link between their own speeding and accident involvement is not



understood. In qualitative focus groups, it was found that non-compliance with the speed limit is not necessarily viewed as unsafe (RF2). This is further emphasised in the 1,000 interviews carried out by CM36, where responses about speeding included the notion of the driver's own speeding as being safe and other driver's speeding as being dangerous. Dangerous speeding is often linked to stereotypes of which the driver themselves does not belong – hence dangerous speeding is seen in 'boy racers' or 'company car drivers' (CM36).

The stated knowledge of the relationship between speed and accidents is even less clearly evident when drivers are asked separate questions on their driving speed and how dangerous their driving is relative to others. Figure 2.7 shows that 14% of drivers state they are faster than other drivers (Figure 2.7(a)), but only 3% state they feel they are more dangerous (Figure 2.7(b)), leaving a gap between reportedly going faster than others and believing they are not more dangerous than others (Figure 2.7(c)) (CM65a; CM73). The pattern is far more marked for male drivers and is linked particularly to age in the case of male drivers (CM73).

Overall, there seems to be knowledge of the link between speed and increased danger among drivers, but they are unwilling to acknowledge the link in their own driving. Maybe the link is seen as pertinent for other drivers, but not for themselves, or the relationship is not between speed and danger, but between (subjective impression of) speeding and danger. Hence, so long as individuals are not speeding within their own normative view of speeding, they will not increase danger relative to other motorists. This misperception is obviously worthy of further study.

Despite wanting tougher enforcement and some support suggesting knowledge of the speed- accident link, the majority of drivers continue to drive faster than the



speed limit. Based on self-report data, 88% of drivers admit to driving over the speed limit in the year prior to survey (CM59). Similarly, 85% of respondents stated that they exceeded speed limits 'on occasion' (CM36). In reality, the same drivers were taken on an hour's recorded driving and 98% of the drivers were observed to drive over the speed limit at least once (CM36). Department for Transport figures suggest that around 50% of drivers went over the speed limit in 30 mph zones in 2005 (down from 66% in 2000) (EF8), and 20% will drive above 35 mph in a 30 mph zone with only around 37% of drivers citing complete compliance with speed limits (Stradling et al. (2003) cited in EF8). This depends very much on the context and falls to only 8% of drivers stating that they would stay within the speed limit on a good flowing road, with good weather, good visibility and no intersection (Letrand and Delhomme (2005) cited in CM73). The SARTRE data suggest that drivers in the UK do not drive any slower despite having higher knowledge of speed-accident risk compared with many other EU countries (CM65a). Younger drivers intend (EF28) and accidentally speed more than older drivers. Younger people 'like' and 'prefer' higher speeds, especially males (CM72). In a study of predriver attitudes with boys and girls aged 11-16, boys have a greater enthusiasm for speed than girls (AG4). This peaks at around 14 years for boys and 13 years for girls, and remains constant for boys, but tails off for girls (AG4; see Figure 2.8). Driving fast is associated with being macho and slow driving is for 'old fogeys' (CM36). Indeed, many drivers find driving fast an exhilarating and pleasurable experience (CM36; RF2), although the majority of drivers mention that they do not enjoy speeding (see EA13, CM65a and SS1).



Since speeding is a highly prevalent behaviour, yet it is known to be linked (in some way) to danger, attitudes surrounding why it is performed need to be addressed. They seem to fall into six main categories.

2.2.1 Other drivers speed, so I speed (normative influence)

Almost all drivers believe that other drivers speed (CM81; YS12; CM73; YS17; RF2; CM36) and 92% think other drivers break the speed limit (YS17). UK data from the SARTRE project (EA13) suggest that 93% of UK drivers think other drivers speed. This is a higher percentage than any other EU country (CM65a). The belief that most other drivers are speeding influences an individual's own choice of speeding behaviour; the more likely they are to perceive others speeding, the more likely they are to speed themselves (CM73). Younger drivers are more likely than older drivers to perceive other drivers as speeding (CM78). This is also true of faster drivers, who are more likely to perceive others speeding (Aberg *et al.* (1997) cited in YS12; Haglund and Aberg (2005) cited in CM73).

2.2.2 Speed limit is perceived to be too low

Drivers who perceive the speed limit to be too low are more likely to break the speed limit (Mäkinen *et al.* (1995); Yagil (2005); CM73; YS17; RF2). In a self-completed questionnaire with 1,656 drivers, CM1 and CM8 suggest that there is a category of driver named 'calculated risk takers' who is more likely to set their own speed limit. Such drivers score highly on questions such as 'do you feel 30 mph speed zones should really be 40 mph?' and 'do you often drive over a 30 mph speed

limit when it feels safe to do so?'. They are a group of drivers who are more likely to be male and drive for work purposes, and are more likely to display such behaviour when driving for work.

2.2.3 I won't get caught

There is a belief that there is little chance of being stopped by the police for speeding (CM36). There is a widespread belief that the police allow a fair amount of tolerance on top of the legal speed limit (CM36). Speeders, themselves in particular, underestimate the chances of being stopped by the police (YS9). In addition, there is no shame in being caught for speeding (RF2):

'... if I got done for speeding then I wouldn't mind telling my colleagues or anything, I don't see ... I'm not ashamed of it I suppose. I got done at 36 and everyone was saying "och, that's ridiculous" so its more sympathetic than anything else.' (RF2)

2.2.4 I didn't know I was

One of the top reasons cited for speeding was speeding unintentionally (YS17). For example, in a study of drivers caught doing 36 mph in a 30 mph zone by a speed camera, 54% of drivers claimed they did not realise that they were 'speeding' (Corbett and Simon (1999) in EF11). Cars are viewed as too comfortable and people do not realise their speed (RF2):

'Modern cars are moving further and further toward being high-speed living-rooms.' (RF2)

Not knowing the speed limit was also frequently cited (RF2; CM4).

2.2.5 Speeding may be linked to danger, but is not seen as that dangerous

In a study of 881 drivers examining attitudes towards behaviours, subjective norms, perceived behavioural control and behavioural intentions (all of them key constructs in the Theory of Planned Behaviour), speeding was viewed as the least dangerous violation (CM27). Speeding is cited as being not as dangerous or as 'anti-social' as drink-driving in the SARTRE data across all countries (EA13). Speeding drivers do not feel at risk from their own behaviour (CM79; CM81; YS12). Furthermore, there is a distinction between common moderate speeding, which is seen as not dangerous, and less common serious speeding, which is viewed as dangerous (CM36). A review of a number of large-scale national surveys suggests that speeders underestimate the chances of causing an accident or putting lives at risk due to their own actions (YS9).

2.2.6 Speeding is positive

Some drivers evaluate speeding as positive and the outcomes of speeding are perceived favourably (getting somewhere faster, the thrill of speeding) (Caird and Kline (2004) cited in YS12). The stronger the perceived negative consequence of speed, the less intention to speed (EF28). Men perceive fewer disadvantages of speeding (CM27). Younger drivers gain more peer support for speeding (CM27) and there is greater social pressure for younger males to speed (YS12). Social stigma surrounds slow driving – slow drivers are seen as 'road hogs', fast drivers as being able to drive with high skills (CM84). Speeding and slow driving are both seen negatively (CM8; see Section 2.4 below). In addition, speed was seen as pleasurable itself and there is a desire to experience a power associated with going fast (RF2), although many speeders mention that they did not enjoy speeding (EA13 – 5% enjoy speed; CM65a – 10%; SS1 – 18%).

2.3 Attitudes towards others

Much of the research so far points towards the concept of the difference between perception of self as road user (safe) and perception of others as road users (tend to be more dangerous). CM57, a survey of 1,009 drivers, asked the question directly concerning perception of the standard of other drivers over the past 12 months. A total of 60% stated that they felt others were more dangerous than safe, 33% thought others were more safe than dangerous, 6% thought that there were hardly any safe drivers on the road at all, and only 1% thought there were hardly any dangerous drivers at all (see Figure 2.9).



In particular, attitudes on the attribution of danger tend to cite the young as being especially dangerous, and 66% agree that road safety initiatives should be targeted at younger age groups specifically (CM55). Younger age groups accept that they are the most dangerous at an aggregate level (CM55). Older drivers think younger drivers are more dangerous, less considerate and deliberately tailgate older drivers (CM4).

2.4 Attitudes towards what makes a good driver?

CM8 placed descriptions given by 57 interviewees (47 drivers; 10 non-drivers) of what makes a good driver and bad driver into six categories. Four skill categories can be distinguished – observational skills, social skills, car handling skills, and cognitive skills – and two further categories, rule-knowledge and general behaviour, can be established. The most frequently mentioned answers all fell within the social skill category, with being confident, considerate, courteous and patient mentioned the most often (see Figure 2.10).

Figure 2.10: Interviewees' responses to 'what makes a good driver?'				
Observational skills Reading the road ahead; being observant; reading others' behaviour; being ready for others to make mistakes	Social skills Confidence; considerate; courteous; patience; full control of self; see car as an extension of self; being alert and attentive			
Car handling skills Good at manoeuvres; technically able; no harsh acceleration/deceleration; smoothness; full control of car; not driving too close to others	Cognitive skills Good hand–eye coordination			
Rule knowledge and obedience Observation and obeying of speed limit; knowledge of the Highway Code; respond to traffic signs appropriately	General behaviour Safe; knowledge of destination and how to reach there; competence			

Interestingly, more homogenous answers were used to describe poor drivers and quicker response times were found when answering, perhaps showing it is easier to describe what constitutes inappropriate driving. Nearly all mentioned driving at a fast speed as a problem, particularly 'inappropriate speed for the conditions' rather than simply breaking the speed limit. Almost as many mentioning driving at a fast speed also mentioned driving too slowly, stating this was as dangerous. Driving too close to the vehicle in front was also mentioned often. A number of social skills were also frequently mentioned, particularly the lack of concentration, patience and consideration. No observation skills were mentioned. Figure 2.11 shows some of the answers given under the same headings as those made for good driving skills.
Figure 2.11: Interviewees' responses to 'what makes a poor driver?'				
Observational Skills None mentioned	Social skills Not being ready or alert; lack of concentration; no consideration for others, not being patient			
Car handling skills Driving too fast; driving too slow; driving too close to others; poor positioning on the road; being ponderous; making dangerous manoeuvres	Cognitive skills Slow reaction skills			
Rule knowledge and obedience Disobeying rules	General behaviour High risks and high danger			

It is interesting to note which skills mentioned for good driving have opposites mentioned for poor driving. Rules being obeyed and broken are seen as a skill for good and poor drivers respectively. Being considerate, patient, alert and attentive, performing manoeuvres and driving too close are all mentioned as both. Driving too fast or too slow is mentioned as an ability of a poor driver, but its opposite – driving at an appropriate speed for the conditions – is not mentioned as a skill of a good driver. Maybe this is one of the problems with regard to speed; driving at an appropriate speed is not seen inherently as an example of a good driving skill.

In addition to the above, qualitative research also suggests that drivers aspire to be a relaxed driver (DfT4).

Similarly, further qualitative research has found that drivers rate themselves as a good driver and characterise this by stating attributes such as confidence, being capable of stopping if needed to, and being able to handle speed (DfT3). They contrast this to poor drivers (largely 'other drivers') who are characterised by being too slow, dangerous and take risks they cannot handle (DfT3).

CM36 found that drivers believe a safe driver is a skilled and moderate speeder and a poor driver is a dangerous speeding driver or a driver who drives too slowly. Not surprisingly, most drivers believed that they were safe and skilful speeders.

2.5 Identity and road-user safety

Personal identity with driving involves aspects such as: driving a car is a way of projecting a particular image of oneself; and gives a feeling of pride, power, control, self-confidence and a sense of status (CM1; CM6; CM7; CM8; Stradling *et al.* (2001) cited in YS12; CM72). Distinguishing between the driving behaviour being linked to identity and the car itself being linked to identity is not easy in these

surveys and often the two are linked. In particular, though, driving itself raises peergroup status for adolescents and is associated with the mastery of skills and demarcates an adolescent entering adult status (CM82).

Identity and driving is higher for those on lower incomes (CM72). Personal identity with driving (or the car) declines from age 30–39 and remains constant for males from 40 onwards, and increases again for females as they get older (see Figure 2.12). Younger women do not identify as highly with driving as younger men (CM72; see Figure 2.12). CM4 suggests that the slower driving associated with older age tends to reduce the amount of personal identity that older males, in particular, have with that type and style of driving – slower and more ponderous not being linked to a masculine stereotype and hence a refutation of identity with that kind of driving.

In a further piece of qualitative research, it was suggested that people often react against their stereotypical image, for example females state that they enjoy speeding and males state that they felt thoughtful about skill and judgement and are keen to make the right decision (DfT3). Similarly, through focus groups and interviews, older drivers baulked at the stereotypical image of themselves and said that they were just as fast and as well as ever, and that the image of the doddering old driver was very far from reality (CM4). How far these views alter actual driving behaviour needs further exploration.



CM82, using focus groups, identified four types of psychosocial function, revealing how identity interacts with driving:

- 1. visibility attracts attention by the type of car driven and a distinct driving style;
- status confers adult identity recognition from others getting 'one over' other drivers;

- 3. control control of powerful vehicle, risk management and control of journey choice; and
- 4. mobility car enables freedom of movement, freedom from interference and unplanned activity.

This finding is in contrast to suggestions that people are 'carcooned' in their own environment (see, for example, CM36) and can create a sense of 'deindividuation' (where people are said to lose their personal identity and values when part of a crowd - see RF4).

2.6 Personality and safety

Various measures of personality traits have been linked with driving behaviour. For example, faster driving is linked with: sensation seekers (CM30, CM31); aggression and anger (CM73); a Type A personality (Perry and Baldwin (2000) cited in YS12); normlessness (CM73; YS12); intolerance (CM30; CM31); less empathy (Owsley *et al.* (2003) cited in YS12); impulsiveness (Owsley *et al.* (2003) cited in YS12); recklessness (Owsley *et al.* (2003) cited in YS12); and mild social deviance in other aspects of life (West *et al.* (1993) cited in RF4; CM30). Risky driving behaviours are linked with sensation seeking (CM73; CM80; YS12), anger and aggression and normlessness (YS12), and Jessor (1987) in RF4 suggests that there is a possibility of a risk-taking personality explained by someone who takes risks in a variety of aspects of life including road-user behaviour, sexual health behaviour, alcohol and drug use, and general deviance.

Male drivers are more likely to persistently speed for the thrill of it (Begg and Langley (2004) cited in CM73). Thrill-seeking and driving declines with age and are higher for males throughout (CM72). A scale suggesting low harm-avoidance is linked with more driving for thrills (CM73). Egoism is linked to the intention to violate (Burgess (1998) cited in CM73). Safety mindedness and driving improves with age and is higher for females throughout (CM72). Low harm-avoidance is linked with driving for thrills (CM73). Anticipated regret is linked to slower speeds (CM73 for review).

There are mixed results found with regard to self-control and driving behaviour. Research presented in CM73 suggests that having low self-control tends to be linked to driving for thrills (Begg and Langley (2004) cited in CM73) and high self-control is linked to a lower number of accidents (Trimpop and Kirkcaldy (1997) cited in CM77). However, research suggests that high self-control is linked to higher speeds and greater risk-taking (CM77; YS12). CM77 suggests that the reason for this is that those with high self-control feel in control of chance events, such as risky driving behaviour by others or chances of accidents, and hence there is no need to moderate their behaviour. Finally, YS12 suggests that having a higher internal locus of control is linked to higher speeds.

2.7 Self-awareness and driving

Across all driving groups there is extreme confidence about driver's own driving ability (DfT3; CM36). DfT3 coins this as 'the geocentricism of the road'. Males, compared with females, rate themselves as having much higher skill (CM72). No age differences are found with regard to the rating of skill (CM72), but younger drivers rate themselves significantly higher than actual ability (CM73).

On the whole, drivers are not very good at judging their own ability. This is especially true of older people (see review in CM4), but reflective methodology focusing on driving task can help improve self-awareness and self-assessment of skills (CM4).

That being said, drivers' subjective impression of their own speeding behaviour is similar to that of observed speeds. A total of 35% of drivers who rate themselves as 'much slower than average' were in the slowest band of drivers caught by a speed camera, with only 7% of those who rated themselves as 'much slower than average' being in the fastest band as caught by a speed camera (CM30). Similarly, 40% of those who rate themselves as 'much faster than average' are in the faster band as found when caught by a speed camera, with 4% of drivers rating themselves as much faster being caught in the slowest band (CM30). Similarly, in research using a 'video-drive' with 243 drivers, of the 25% who reported exceeding the speed limit, 84% were in fact doing so compared with those who reported that they were travelling at less than the speed limit, where only 8% were in fact speeding, suggesting that people have good judgement in detecting speeding behaviour and that very little speeding behaviour is actually unintentional (CM36).

Those driving over 31 mph underestimate their speed and those driving under 31 mph overestimate their speed (CM84). CM84 suggests that this is due to a number of possible factors, including deliberate or non-deliberate over- or under-reporting.

Finally, there is a tendency for faster drivers to underestimate their own and others' speed (YS12).

2.8 Social facilitation and inhibition

The visual or auditory presence of others provides an activating stimulus. For example, cyclists tend to go faster when they are being paced by a bicycle which is ahead of them (Triplett (1898) cited in RF4). However, in other situations it was found that the presence of others can cause a deterioration in performance ('social inhibition'). It has been suggested that the presence of others enhances performance on simple well-learned tasks, while on complex, novel tasks the presence of others acts as an impairing force. In other words, social facilitation occurs on easy tasks, while social inhibition occurs on complex tasks. Driving, while a complex skill to

master at first, through practice becomes an automatic task in an individual's repertoire. While the novice driver's performance on the roads is likely to be impaired by the presence of passengers or other motorists, the typical experienced motorist will experience social facilitation in these situations. This will produce a greater rate of response of various motoring behaviours, for example speeding.

The presence or absence of other people influences driving behaviour. AG8 reports a good review of this for younger drivers. Some passengers (e.g. parents) tend to reduce risky driving, whereas others (e.g. peers) might encourage more risky driving. Young men were more likely to take risks than young women. Young people stated that they judge the degree of acceptable risk depending on the situation. Young people said that they were more likely to drive riskily when driving alone or late at night when the roads are quieter than during the day or when they were responsible for others in the car. Some young people felt that they 'grew out' of risky driving as they got older with more expensive cars and family responsibilities. They also said that the social expectation that they would drive riskily made it more likely that they would do so.

In addition, CM36 suggests that the effect is there for all ages of driver, but is more pronounced for younger male drivers. The majority of those surveyed in CM36 admitted driving differently with passengers in the car. This varied by sex, and particularly by age. Three-quarters of young males reported that they drive differently with passengers. They tend to drive faster when they were with friends. In other cases the tendency was to drive more slowly, especially with children or parents in the car.

These findings suggest that immediate peer pressure is an important factor in speeding for some groups, young males in particular. They also suggest that there is an awareness of risk which does modify behaviour, for example to protect a child in the car.

It would be interesting to observe whether the theory of social facilitation can be extended beyond the concept of passenger effects into the wider social world of the driver. Could it be that social facilitation creates a sense of being watched by significant others outside of the vehicle for some or all drivers, or indeed be translated into other road-user behaviours? Further research is needed in this area and how this might link into social identity and the use of driving and the car as an expressive activity.

2.9 Key points

2.9.1 Acceptability of speed

A closer examination of why speed is seen as an acceptable violation is needed, especially compared with other aberrant driver behaviours such as, for example,

drink-driving, close following and dangerous overtaking. It is suggested that the concept of speed is examined in a social context in order to study the motivations for speeding. For example, is there something embedded in the UK culture that celebrates speed and efficiency, especially in terms of solving complex tasks? This is then translated into the driving arena where the dominant discourse is that a good and skilled driver is also one who can drive at fast speeds in a safe manner? So, if individuals want to be a good and a safe driver then they also want to be a fast driver. In addition, there are many extrinsic benefits to completing tasks quicker that promote the use of speed, such as less travel time when driving.

2.9.2 Attitudes to risk and speeding to investigate further

Despite individuals knowing and acknowledging that speed is linked to increased danger and accidents, speed continues to be seen as an acceptable risk or violation, especially among male drivers, high-mileage drivers, younger drivers and those who drive for work. This deserves some closer investigation, as there is clearly a dissonance at play between a socially desirable answer (link between speeding and danger is known and articulated) and the socially acceptable answer (speeding is expected and acceptable). Maybe there is the view that others' speed is linked to danger and collisions, but that their own speed is viewed as far more safe, resulting in the notion that speeding and collisions are linked for other people, but not for themselves. In which case much more is needed on how drivers defend such a proposition and maintain such high confidence, and acquire and maintain such an optimistic bias.

2.9.3 Acceptability and unacceptability of speed

The most anti-social behaviour people suffer is speeding, yet most people engage in such behaviour. More research is needed on this example of cognitive dissonance in order to play out the tension between the unacceptability and acceptability of speeding. Is it that it is acceptable to speed for oneself, but unacceptable that others should? Or is it that speeding is anti-social when responding wearing the 'hat' of a resident, and acceptable when responding with a 'hat' of a driver? Or is there a threshold between acceptable speeding and unacceptable speeding, and where does this lie in objective or subjective stances?

2.9.4 Normative and peer influence on risk taking requires more understanding, particularly in adolescents

To view road-user behaviour in a social context highlights the importance of interaction between road users. Viewing continuous behaviour in a social context is subject to social norms, the unwritten rules of behaviour. Such norms are dominant in shaping behaviour for individuals. On the road such norms for drivers consist of driving at speed and, for a subsection of the population, especially younger males, exhibiting risk. Further investigation is required addressing why individuals see

speeding and risk taking as the norm, and whether it manifests itself as an influence on behaviour or whether it is used as a form of justification for aberrant behaviour.

2.9.5 Changes over time

With regard to all road-user behaviour, attitudes and acceptability, changes over time need to be studied. For example, younger drivers, especially male drivers, are more likely to have positive attitudes to speeding. What happens to the acceptability of speeding as drivers age? Is there a gradual change in attitudes and acceptability, or are there specific triggers that change such concepts? Such triggers may be linked to the task directly, for example being involved in an accident or near-miss, or may be indirectly linked, for example getting married, having a job and having children (all of which have been linked to reduced acceptability of speeding – see Rolls and Ingham (1992) cited in CM8).

In addition, personality variables have been studied, which, by their very definition, should be largely stable throughout the lifetime of an individual. However, such variables are linked to aberrant road-user behaviour in a younger group of drivers. Are such personality traits still in evident in older drivers, but do not directly affect road-user behaviour (in which case what mediates such a relationship), or are such traits actually changing over time, in which case they are reflective of a less stable element of personality and perhaps are better termed attitudes?

2.9.6 Links between the psychosocial variables

Most of the research to date has not captured psychosocial variables in their entirety. Studies have focused on a small number of variables and their effect on speed or risk taking on the road. More is needed on bringing all these elements together and trying to model the relative influence and importance of individual factors, and assessing what variables interlink and influence each other. Theoretical models have attempted to explain driver behaviour (see CM73), but more is needed to explain road-user behaviour, for example how attitudes and other psychosocial variables (and behaviour) change when an individual changes from being a pedestrian into a driver. This is especially true in terms of mismatches in psychosocial theories used to explain risky road-user behaviour, for example deindividuation used to describe a feeling of anonymity in the vehicle versus using driving as an expressive act to show identity to other people. In addition, further research is needed to extend theories beyond their current application, for example is social facilitation only highlighted by passenger effects or are such effects translated into other road-user behaviour or even when the observer is perceived and may not be present?

2.9.7 Need to establish whether generic personality traits display similar behaviours across a range of activities or whether driving is unique

Is driving, in particular, a unique behaviour in which people do not act as they would elsewhere? Hence, can personality and attitude scales be generic and used across behaviours or should they be tailored towards driving behaviour itself? The relative conceptualisation of road-user behaviour in terms of understanding of risk should be examined further. For example, more is needed on questions addressing how risky is driving compared with other risk-taking behaviours, and how risky is driving compared with other road-user behaviours?

2.9.8 How can self-assessment be improved and does it matter?

Overall, reflection on task helps improve the self-assessment of driving ability among older drivers (CM4). Examination of how increased self-awareness and better self-assessment affects attitudes and behaviour is required. Does it make a positive difference to attitudes and behaviour (as CM4 suggests)? Or does it create overconfidence (see CM79), or does it make little difference at all?

2.9.9 Attitude development and formation

From an early age, boys rather than girls are far more likely to report a desire to engage in risky driving behaviour, which mirrors sex differences found in experienced drivers (AG4). Hence, risky attitudes associated with dangerous driving and accidents are in evidence a long time before drivers get behind the wheel. Hence, an understanding of how these attitudes are formed and prevail among younger people is needed. AG4 does not investigate how passing a driving test may alter attitudes, but suggests it has little effect. More work is therefore needed on addressing how learning to drive, the driving test and passing the driving test affects attitudes.

3 ENGINEERING SOLUTIONS

3.1 Attitudes to traffic-calming measures

The British Attitudes Survey in 2007 (cited in DfT2) suggests that 37% are in favour of closing residential streets to through traffic, with a similar proportion (30%) opposing this. In addition, 49% of the public are in favour of speed bumps, with 35% against. Whereas support for reducing speed limits to 20 mph remains fairly constant since 2000, support for closing streets is falling and support for speed humps fell between 2001 and 2004 and has remained constant since (DfT2; see Figure 3.1). Support is consistent across socio-demographic backgrounds, though there is greater support for speed bumps from non-drivers (DfT2). Over a longer time-period, CM81 suggests that support among Scottish drivers for vertical deflections (or speed humps) has risen from 53% in 1991 to 76% in 2002. However, DfT1 suggests that support for the statement 'traffic calming measures (e.g. speed bumps) make roads safer' has fallen from 56% (20% strongly agree, 36% agree) in November 2006 to 49% (15% strongly agree, 34% agree) in November 2007 (see Figure 3.2).





SS1 reports County Surveyors' Society (2006), which suggest different levels of support for different types of traffic calming. Most favourable is raised junctions (58%) followed by speed humps (53%), speed cushions (51%), chicanes (50%) and gateways (30%). However, the most favourable items on the survey are two non-traffic calming items – the interactive road sign (80%), followed by the fixed camera site (62%).

3.2 Attitudes to technology and safety

There is high public support for current in-vehicle technology. The RAC report on motoring (CM74), involving responses from 2,027 UK drivers, found that 82% agree that cars are safer than ever before and that in-car technology, including airbags, seat belts and Antilock Braking Systems (ABS) have had the biggest impact on road-user safety in the past five years (followed by enforcement improvements, including clampdowns on drink-driving, the introduction of compulsory seat-belt wearing for passengers and the introduction of lower speed-limits in built-up areas). With regard to intelligent technology that may inform the drivers of current driving conditions or take over some of the driving tasks, there is evidence of growing support among the population. The SARTRE data (EA13) suggest that 37% of UK drivers are in favour of intelligent speed adaptation (ISA; a device that limits the speed of the vehicle to the speed limit). However, closer inspection of ISA suggests that individuals prefer systems which advise the driver of the current vehicle speed

in relation to the speed limit and would warn the driver if the driving speed exceeded the speed limit rather than have a system that actually limits the vehicle speed (CM1; CM4; CM7; CM8; Stradling (2001) cited in SS1). They prefer the warning to be audible rather than visual or haptic, and they would have the ability to set such a warning to a limit of their choice, for example 1 or 2 mph above the speed limit (CM4; CM8). Most set speeds for ISA mentioned by the participants in CM8 were over the speed limit in each case. On average across all speeds set, the highest over the speed limit was in the 20 mph zone, here on average across all drivers the speed set was 23.94 mph or 19.74% more than the speed limit compared with 33.55 mph in 30 mph zones, which is 11.83% over the speed limit, 34.07 mph in commercial zones, which is 13.55% over the speed limit, and 44.97 mph in 40 mph zones, which is 12.43% over the speed limit. In addition, drivers disengage such systems when they believe the speed limit is too low (Jamson (2005) cited in CM73), Support for systems taking over driving increases as the driver gets older (CM72) and there is more support for 'take over' systems from females, on the whole (CM72). Support for ISA is growing year on year, moving from initial resistance to increased acceptance (Jamson et al. (2006) cited in SS1). There is more support for black box technology than speed limiters, especially if used to record a variety of driving behaviours and used to reduce insurance premiums (CM8). Similarly, the SARTRE data suggest some support for black box technology in terms of a recorder of pre-accident events (support from 27%) or for use in enforcement (support from 34%) (EA13).

However, 50% of drivers in the RAC study on motoring are concerned that such technology could make driving less safe, especially with regard to over-reliance. The qualitative interviews suggested some of the following concerns (CM74):

'I think we get back to the problem that the car becomes so technically advanced that it's almost driving it for you, there's no stimulus, no natural concentration, whatever you're doing.'

'I think because of the overcrowding on the roads and the cars are designed to go faster, that the risk of having an accident is probably higher now than it was twenty years ago.'

'It's taking you away from your own thought process isn't it? When you are reliant on the car to do it for you rather than thinking ahead yourself and you can't replace that can you really?'

Qualitative interviews with 57 individuals and a survey of 1,656 drivers suggest that different categories of driver may approach engineering interventions differently (CM7; CM8; see Table 3.1). The most dangerous category of driver, termed 'continuous risk takers' (which consisted of mainly younger male drivers who perform risky behaviours throughout their driving on a regular basis), tend to have negative attitudes towards all engineering interventions, except black box

technology. This was attributed to being rewarded for performing safer driving behaviours through reduced insurance premiums, for example, rather than being punished for the absence of safer driving behaviours. Speed humps and ISA that took over the speed of the vehicle without any voluntary setting and with no ability to turn it off (mandatory take over ISA) were viewed negatively by all groups of drivers except those in the unintentional risk-taking category, the safest category of drivers who already perform little or nor risky driving behaviours. Hence, it could be argued that such engineering interventions will only be accepted by those already having very safe attitudes. This has implications in that, if technology systems are introduced and are voluntary, they will only be used by those already fairly safe and that speed humps will be avoided if possible by faster more dangerous drivers. Adaptive Cruise Control (ACC) had positive views throughout, except by continuous risk takers. It was felt that such technology allowed most drivers to display the behaviours they feel most comfortable with and that calculated risk takers (take risks when they feel it is safe to do so, not when the law allows) and reactive risk takers (take risks when feeling stressed, angry or annoyed) were able to use the system to their advantage to display more risky driving behaviours when they choose to and it would help unintentional risk takers take less risk. Continuous risk takers required a system that would give them more control over driving than ACC would allow.

Table 3.1: Different categories of driver have different attitudes (CM8)						
Category of driver	Speed humps	Mandatory take over ISA	ACC	Black box technology		
Calculated Unintentional Continuous Reactive Overall	Very negative Positive Negative Negative Negative	Negative Positive Very negative Negative Negative	Positive Positive Negative Positive Positive	Positive Positive Positive Negative Positive		

3.3 Key points

3.3.1 Different hats and acceptability of traffic calming

Further research is needed to tease out the difference between support shown for traffic calming by residents against support shown by motorists. Since motorists are residents, how do people account for the potential cognitive dissonance?

3.3.2 Terminology, principles and design

Many of the pieces of research label traffic-calming measures in different terminology. How important is this labelling to the overall rank of acceptability given? Is it the principle of traffic calming that is investigated or the detail of design? In any given attitudinal commitment from the public, how far does it reflect a consideration of the principles or the design?

3.3.3 Experience affects attitudes

The attitude-behaviour relationship is not straightforward, nor linear. Behaviour can influence attitudes as much as attitudes influence behaviour. Hence, experience with engineering measures can alter attitudes towards them. At the aggregate level in these pieces of research, participants are often a mixture of people with different levels and depth of experience with engineering interventions and, hence, miss subtle differences between attitudes as a reflection of experience.

3.3.4 More research needed on how attitudes affect the acceptance of such technologies

The link between attitudes towards driving and road-user behaviour and the acceptance of such technologies requires further investigation. In addition, how such attitudes and acceptance change over time need to be examined – why do older drivers prefer such technology and at what points do such changes occur? Whether it is due to the ageing process or a change in cohort, especially with regard to expectations of technology and driving behaviour, need to be examined.

3.3.5 Research to address the acceptability of take over technologies

Attitudes towards technologies that take over part of the driving task are often met with a more negative attitude and more research is needed with regard to understanding why this might be the case. Understanding the relationship between control and driving is key to this and requires further investigation. Different technologies and take over systems need examination – why, for example, are power steering and automatic gears acceptable, after all they take over parts of the driving task, and speed limiters are not?

3.3.6 Research to address the acceptability of new approaches to the design of streets

Research is needed into the public attitudes of changes in the infrastructure that aim to improve road-user safety and create a balance between different users of roads and streets. For example, research into 'Home Zones', reduced segregation between light and motorised street use and psychological traffic-calming, is suggested as important.

4 ENFORCEMENT

4.1 Relative importance of enforcement and education

Research for Brake involving interviews with 789 drivers (CM58) and 850 drivers (CM59) looked at attitudes towards the relative importance of education and enforcement following questions about the maintenance of vehicles (CM58) and road safety and speed (CM59) (see Table 4.1). Both articles suggest that participants believe enforcement will have more impact on their own driving behaviour, especially more visible traffic police (CM58 – 53%; CM59 – 63%), followed by tougher penalties (CM58 – 38%; CM59 – 63%). The differences in percentages between CM58 and CM59 could be due to the priming effect of the questions asked beforehand, with drivers feeling that the interventions discussed would affect them based on better maintenance of their vehicle (CM58) or reducing their driving speed (CM59), especially as enforcement cameras are far higher on CM59 (36%) than on CM58 (22%). It could be due to changes over time (CM58 is from 2005 and CM59 is from 2004) between the surveys, but further analysis of this would be required.

Table 4.1: Attitudes to whether enforcement and education would affect own driver behaviour (CM58 and CM59)					
	CM58 – after questions on maintenance of vehicles and road-user safety	CM59 – after questions on driving speed and road-user safety			
Year	2005	2004			
n	789	850			
More visible traffic police	53%	63%			
Tougher penalties	38%	48%			
Government advertisements on road safety	33%	33%			
Enforcement cameras	22%	36%			

4.2 Attitudes towards the law

Constant *et al.* (2008*) examined the reasons for recent declines in traffic fatalities in France and found that enforced regulations can often improve attitudes towards road-user safety. Changes in driver attitudes before and after a three-year period of increased traffic regulations imply that drivers 'internalised traffic regulations' (Constant *et al.* (2008*), p. 856). It is likely that this occurred as drivers notice the beneficial effects of law enforcement and a belief that, if such principles have become law and are being enforced, then they must be serious and important. Such changes in attitudes following a change in behaviour is fairly common and can be seen in changing attitudes towards technology, such as Intelligent Speed Adaptation (ISA) and Adaptive Cruise Control (see Section 3.2.3).

Almost all drivers consider themselves to be law abiding. In the RAC report on motoring, 94% consider themselves law abiding drivers (CM74). There is good reason to be law abiding, with 54% believing that they would be caught for breaking most motoring rules and believing that the benefits of breaking the traffic law are outweighed by the risks of getting caught (62%) (CM74; see Figure 4.1). However, CM82 suggests that drivers' perception of law abiding does not take into account driving over the speed limit. A driver can still consider him or herself to be law abiding and drive up to 10 mph over the posted speed limit. Through discussions with younger drivers the majority perspective was that the laws and rules of driving were things to be followed not for their own sake, but only if they were judged to be genuinely relevant to the safety of driving and if they coincided with what were believed to be the norms of driving as a social activity and in order to avoid penalties (YS7).

Figure 4.1: Attitudes to the law (CM74)									
Motorists and the law						Disagr Disagr Neithe Agree Agree	ree r sliq stro	strongly slightly ghtly ongly	
I consider myself to be a 2 law-abiding driver	2%	21%			7	73%			
						Total	ag	ree 94%	
l don't think I am very likely to get caught if I break most motoring laws			29%		28%	20%		14% <mark>6%</mark>	
						Total	ag	ree 20%	
The benefits of breaking minor		34%		28%	21	%	<mark>11%</mark> 4%		
of getting caught						Total agree 15%			
Base: all respondents $(n = 2)$,029)								

People with a high sensitivity to punishment are less likely to speed (Costella and Perez (2004) cited in YS12). Females have a stronger moral obligation to obey the law and they evaluated traffic laws more positively (Yagil (1998) cited in CM73). In addition, females think the penalties for speeding are too lenient (CM81).

There is a feeling that there is an overemphasis on policing speeding and that the police should concentrate on all bad or inconsistent driving (CM55). Greater penalties for dangerous driving are supported by 96%, but greater penalties for speeding are only supported by 46% (CM52) This was mainly attributed to drivers feeling that, on occasion, speeding was acceptable (CM52). Overall, stronger penalties are viewed by motorists as appropriate for errors that are perhaps seen as a deliberate violation and less severe penalties for errors perceived as non-deliberate slips or lapses (CM55; CM58; CM59; see Tables 4.2 and 4.3). Speeding is viewed in

Table 4.2: Suggested penalties for different road-user errors (CM55)			
Penalty	Road-user error		
Informal warning	Having loud exhaust, incorrectly displaying number plate, driving inconsiderately (slip/lapse)		
Fixed penalty	Going through red traffic light, travelling at 80 mph on the motorway, travelling at 40 mph in a 30 mph area, driving while using a mobile phone (mixed)		
Summons to court	Reckless or dangerous driving (violation)		
Arrest	Using vehicle to commit crime (violation)		

Table 4.3: Suggested penalty for causing death by dangerous driving in different situations (CM58 and CM59)

	Badly maintained vehicle causes death (CM58) (%)	Speeding causes death (CM59) (%)	Overtaking on blind road bend causes death (CM59) (%)
No jail term Up to 6 months in jail 6 months to 2 years in jail 2–5 years in jail 5–10 years in jail 10–15 years in jail 15 years or more in jail Perception of error in	3 5 9 15 23 17 23 Slips/lapses	3 6 12 17 20 15 19 Mixed slips/lapses	2 2 8 15 21 18 28 Violation
offence		and violations	Violation

the middle – perhaps with some incidences being attributed to a deliberate violation and other times to a slip or lapse.

Most drivers believe that drivers who break the speed limit are unlikely to lose their licence (CM81). Fines for speeding were viewed as very low and thus were seen as somewhat ineffective (CM36). Other types of punishment were viewed as potentially being more effective, including community service and compulsory driver re-training (CM36). However, CM81 found that around 6 in 10 drivers think the typical penalty for excess speed of £60 plus three penalty points is 'about right', though more males think it is 'too harsh' and more females think it is 'too lenient'.

Around 50% of respondents felt that the police do a good, consistent and fair job, treating the motorist fairly, and around half thought the police treated the motorist unfairly (CM55). Overall, SARTRE data suggest quite high satisfaction with enforcement activity in the UK (EA13), and the UK sample is more proenforcement than previous SARTRE surveys (EA13).

4.3 Attitudes to seat belts

High support for seat-belt laws is found with a high level of compliance. Most drivers agree that seat belts are necessary even when drivers are very careful (EA13). DfT1 suggests that 94% agreed that wearing a seat belt is something they have to do, with 90% agreeing that they want to. Brake research with 789 individuals suggests a compliance rate of around 88% every time, 9% most, 2% occasionally and 1% never. Reasons for not wearing a seat belt include: 41% only driving on a very short journey; 14% feel they are uncomfortable; 8% feel should not have to; 5% are very careful anyway; 5% feel they crease clothes; and 24% (unspecified) other answers. The approval of seat belts across the EU is high and is highest where enforcement is greatest (CM16). A total of 89% believe that wearing a seat belt makes them feel safer (DfT1), which compares with only 34% who believe that wearing a seat belt makes then drive safer (DfT1).

Knowledge of seat-belt law is low, however (DfT1). When asked what the penalty was for not wearing a seat belt in a moving vehicle, the most common spontaneous response was a £60 fine (28%). Just 12% mentioned the correct answer: a £30 fine. The most common response to the question which asked the age at which a person is responsible for wearing a seat belt was 16 (23%). Thirteen per cent mentioned the correct answer of 14. A higher proportion of men than women thought, correctly, that the age of responsibility was 14. Older people were less likely to say 14. More than half (58%) of all adults said that they were aware that not wearing a seat belt could reduce the amount of compensation received if a crash resulted in injury – a higher proportion of men than women were aware. Of those who said that they were aware, four in ten (41%) said that they did not know the reduction in percentage terms. This was the most common response. Between 41% and 50% was the next most common response (mentioned by 14%). Eight per cent thought it would practically invalidate their claim by reducing it by 91–100%.

A piece of insightful research (DfT4) with a variety of drivers who are only occasional seat-belt wearers suggests that seat belts are only worn by such a group in perceived high-risk situations such as high speeds, unfamiliar roads and long journeys (though no objective data are presented as to how such statements are defined). Drivers emotionally detach themselves from accidents even if they have been involved in them – hence there is a chasm between the risk of an accident and the effect on one's self. The distance between the self and an accident is characterised by a number of beliefs and behaviours (see Figure 4.2), including driving experience ('I know my capabilities'), area familiarity ('I do the same journey every day', 'I feel completely in control'), speed ('nothing too bad can happen at slow speeds'), vehicle type (especially work motorists – 'I feel empowered and dominant in my company van'), airbags ('I would rely on the airbag to kick in and save me') and then the seat belt ('I don't need a seat belt in order to feel safe', 'no added protection from wearing a seat belt'). So there is a need to

move attitudes from 'seat belts are something that makes me feel safer' to 'seat belts are something that I feel unsafe without'.



4.4 Attitudes to drink-driving

There is high support for drink-driving laws, which has remained fairly constant over recent years (CM55). The RAC report on motoring suggests that the recent clamping down on drink-driving is positively perceived by drivers and is a significant contributor to better safety (CM74). There is support for harsh penalties too, with 72% of the public believing that anyone caught drink-driving should be given a ban of five years (DfT2).

It is well known that drink-driving is a major cause of road accidents, with 91% stating that they acknowledge this fact (CM73; EA13). There is also good knowledge that alcohol can last in the body from one evening to the next morning (CM55). However, around three-quarters of respondents feel that the public are unable to judge how much they can drink before they are over the limit (DfT2). So, again, there is an 'us and them' situation, where individuals can judge for themselves how much they can drink and drive, but feel other people are unable to do so.

In addition, 94% of drivers would support a more severe penalty for drink-driving (EA13) and 85% of the public believe if someone has even one drink they should not drive (DfT2). Women, non-drivers and those in lower socio-economic groups tend to be more punitive with regard to drink-driving than average (DfT2), and this evident even in 15–19-year-olds where boys are more tolerant than girls are about drink-driving (RF3). That said, drink-driving is generally still felt to be unacceptable among younger people (AG8). In fact, driving under the influence of cannabis is thought to be more acceptable than drink-driving (AG8). Despite drink-driving

being viewed negatively, there is still a substantial number of drivers who find it acceptable to have at least one or two drinks and drive (CM55).

4.5 Attitudes to drug-driving

AG8 suggests that, although the majority of younger people were against drugdriving, driving on cannabis was thought to be more acceptable and less dangerous than drink-driving and driving on other types of drug.

DfT5 presents the findings of a qualitative piece of research with drug-drivers. Drug-drivers' car use is deeply bound with his or her identity, especially in terms of freedom and self-control and confidence (if they can continue to drive it creates a sense of normalness and shows how in control of their drug use they are). Drug drivers rationalise their use by stating it is pre-planned and they are in control, but many incidences of last-minute use occur – so they can be spontaneous and unplanned and linked to an emotional response, i.e. continuing the drug taking experience. Cannabis and cocaine are seen to improve driving – improves focus and concentration. Cannabis slows driving and helps reduce aggression. The acceptability of drug-driving among drug-drivers themselves varies from almost total acceptability of driving 'the morning after' the drug experience and 'after a couple of spliffs' through to less acceptability for being on ecstasy (E) and LSD/ mushrooms (see Figure 4.3). Drug-drivers believe that they are able to drug-drive because no one has told them not to. There is the perception that drug-driving is not seen as a 'real' issue in the outside world.



4.6 Attitudes to mobile phone usage while driving

The British Social Attitudes Survey 2007 (cited in DfT2) reveals that a total of 88% think that the use of a hand-held mobile phone while driving is dangerous, 58% agreed that all use of mobile phones (including hands-free) while driving was dangerous, and 45% agreed that all use should be banned. Support for current enforcement is low, with 81% in 2006 and 74% in 2007 feeling that current legislation was not properly enforced (see Figure 4.4).



4.7 Attitudes towards speed cameras

Generally, there is quite high support for speed cameras among the public (CM55; British Attitude Survey 2005 cited in DfT2). The SARTRE data suggest that support in 2003 for speed cameras in the UK was around 78%. SS1 reports that there is around 70–80% support for speed cameras among the public in the UK (average across six surveys is 74%, see PA Consulting and University College London (2004) cited in SS1). In the British Attitude Survey 2007, SS1 reports a study by Corbett and Caramlau (2003) which found that 85% of London motorists agreed that speed cameras are there to encourage compliance with speed limits, with 87% stating that speed cameras were there to reduce accidents and 91% stated that they believed they were there to save lives. A total of 46% agree that speed cameras save lives, 50% agree that speed cameras are mostly there to make money and 46% agree there are too many speed cameras. DfT2, looking at the British Attitude Surveys between 2004 and 2007, suggests that there is a growth in support, with less people agreeing year-on-year that speed cameras are there to make money (58% in 2004 agreed, down to 50% in 2007; see Figure 4.5). Qualitative research suggests that support for speed cameras exists because they are viewed as equitable – they catch all or no one without discrimination (CM36). However, negative views for speed cameras suggest that it is the lack of a human element which could make a judgement on the context of speeding which makes such cameras unfair (CM59). Most drivers believed that speed cameras caused drivers to slow down and then speed-up again afterwards, reducing their effectiveness and reducing support for speed cameras (CM36; CM81).



However, some research suggests that support for speed cameras is falling (CM55; CM59; EA13). The Brake report (CM59) suggests that 50% of drivers supported speed cameras in 2004, which is down from 74% in 2003. In addition, it states that 30% of drivers had no support for speed cameras in 2004 – an increase from 14% in 2003. CM55 states that the reduction in support for speed cameras is due to a growing number of people who think that they are there to generate revenue and a lower number who believe that they are there to reduce accidents, though it offers no suggestion as to how these views were conceived.

There is more support from female drivers than males, and more support from nondrivers (British Attitude Survey 2007 cited in DfT2). A study of 1,000 Scottish car drivers (CM81) found that 82% of female drivers and 68% of male drivers were strongly in favour of speed cameras, with 4% of females and 17% of males against them. Proportions in favour grew with age, with 17–24-year-old males being around 46% in favour, up to 96% of females over the age of 65 being in favour (see Figure 4.6).



There is a more support for cameras to be visible (59% of 850 drivers agree that the camera should be painted yellow), than to be hidden (26% of 850 drivers agree that the camera should be pained grey; CM59). In addition, there is more support for hand-held mobile cameras (62% of 850 drivers) than speed cameras (50%; CM59).

Most drivers believe that speed cameras have a tolerance of 5 mph (CM84) or even 10 mph (CM81) and, hence, it is OK to speed up to that threshold. Different drivers approach speed cameras differently. Table 4.4 shows the results of report EF11, where drivers caught speeding by a speed camera were placed into categories based on how they approached the speed cameras. A total of 33% of drivers were 'manipulators' (who slow down for speed cameras, but speed up afterwards), 31% were 'conformers' (people who nearly always adhere to speed limits), 27% were 'deterred' (who have reduced their speed since cameras were introduced) and 9% were 'defiers' (are drivers who speed most of the time). Table 4.4 shows their attitudes to speed cameras given in an open question for comments on speed cameras completed after being caught by a speed camera. Hostility to speed cameras is similar across all groups (around 2 or 3%) except defiers who show no hostility at all. Support is seen most by those who are deterred by speed cameras (11%), followed by manipulators (8%) and conformers (6%). Defiers show no support at all. Reasons for being caught were addressed: conformers are more likely to state that they were speeding by mistake and defiers see the speed limit as inadequate, both

defiers and deterred are more likely to see their future behaviour changed as a result of being caught by a speed camera. Conformers and defiers are more likely to think the penalty for speeding is too harsh. Almost a quarter of manipulators believe dangerous driving is increased at speed cameras (22%), followed by 17% of conformers, 14% of defiers and 15% of deterred.

Table 4.4: Attitudes to speed cameras given in response to an open question completed after being caught for speeding by a speed camera (EF11)							
	Conformers – people who nearly always adhere to speed limits. Most driving experience, oldest group, fewer points on licence	Deterred – drivers who have reduced their speed since cameras were introduced. Least likely to have had an accident in previous three years	Manipulators – drivers who slow down for speed cameras, but speed up afterwards. Least driving experience	Defiers – drivers who speed most of the time. Youngest group, almost exclusively male			
n (% of total)	133 (31%)	117 (27%)	143 (33%)	40 (9%)			
Attitudes							
Hostility towards cameras Support for cameras Accidental speeding Fixed speed limit inadequate Dangerous driving increased at cameras Penalty too harsh Change future behaviour	3 6 17 6 17 14 2	2 11 8 4 15 8 11	3 8 13 22 6 3	0 0 10 29 14 19 10			

4.8 Bicycle helmet legislation

ET1 reports that, although bicycle helmet legislation is effective in increasing observed helmet use, research from Australia, New Zealand and Canada suggests that it may discourage some users from cycling altogether, especially teenagers. ET15, in focus groups with 12–13-year-olds in the UK, found that the children think that even if there was a law making children wear a cycle helmet few would follow and that the police would not have enough resources to enforce it.

4.9 Recommendations

4.9.1 Is support for speed cameras falling?

Further investigation is required to address changes in attitudes towards speed cameras over time. As speed cameras increase in number, is this affecting attitudes and behaviour? Do more cameras signify a need for increasing revenue or a

legitimate way of increasing road safety (or indeed both!)? The (largely negative) press on the subject may well have an impact on attitudes and behaviour surrounding speed cameras. Also, experience with speed cameras (e.g. being caught for speeding by a speed camera) may well have an impact on attitudes and behaviour. Plus, what are the norms surrounding tolerance thresholds for getting caught and whether the cameras actually work or not, and how do these affect behaviour surrounding speed cameras?

4.9.2 The human element in enforcement

There is contention about whether the public prefer a fixed automatic camera collecting fines in an automated way or whether they prefer a human-being with the perceived ability to use discretion. The former presents a picture of fairness in that everyone will get treated the same, the latter presents a picture of fairness in that details of the context and nature of the offence could potentially being taken into account. More research is needed to play out this debate among the public in order to inform the most acceptable ways of enforcing speed and safe driving among the public.

4.9.3 Why is there more support for mobile cameras?

Further investigation of whether there is more support for mobile cameras than fixed cameras needs to occur. In addition, the motivation for such patterns needs to be considered. If mobile cameras are indeed more popular, is it something to do with the human element, for example that the police will use their discretion in judging speeding rather than a fixed speeding point?

4.9.4 View of speeding as an unintentional slip/lapse or an intentional violation

It seems that slips and lapses occurring on the road should require less harsh penalties than deliberate violations. Speeding seems to create mixed views as to whether it is a slip or lapse or violation. Further research could tease out when speeding is viewed as a slip, lapse or when it is a deliberate violation. Given the prevalence of the 'self versus other road user' concept seen throughout the research, it may be sensible to hypothesise that drivers believe that they mistakenly speed more than deliberately speed and that other drivers more often deliberately speed rather than mistakenly speed. Further research should investigate this in more depth.

5 EDUCATION

5.1 Attitudes to driver education and the driving test

In CM58, participants were asked whether they felt the driving test was too easy, 20% agreed it was too easy and 71% disagreed. However, the majority of people do not think that the test adequately prepares drivers for the road (YS7). Common reasons for such a belief included that drivers were not prepared well for motorway driving, that a single assessment of competence was not enough to judge whether someone had reached the required standard, and the belief that driving testers had quotas to meet (YS7). A view that was consistent among the public was that driving really begins after the test through learning from experience, in particular learning from mistakes and understanding and forming habits and norms (YS7). YS3 notes the areas where drivers felt they needed a lot of improvement after passing their test. The most common response was joining fast-moving traffic and changing lanes on fast multi-lane roads (13% each), followed by parking (16%), overtaking (10%), driving on high-speed roads (7%), driving in the dark (6%) and reversing (6%). In all cases, females compared with males were more likely to admit to needing improvements (YS7).

With regard to improving learning prior to the driving test, CM58 found that 83% of the public think learning to drive should occur with a qualified driving instructor. Following passing, 69% of the public felt certain restrictions should be placed on a newly qualified driver, with the majority (84%) of them believing P-plates should be mandatory (CM58). In addition, 34% felt that newly qualified drivers should not be able to drive at night and 25% felt that there should be a maximum of one passenger (CM58). Similarly, CM74 suggests improvements in driving could occur if newly qualified drivers had a limit on the size of the engine of the vehicle they were allowed to drive, limit the number of passengers and should include some supervised driving. In addition, CM74 found support for more lessons on night driving to improve driving after passing the test. A total of 79% of the public support further education after passing the test, such as that offered by PassPlus (CM58).

Learner drivers have a poor conceptualisation of what makes a good driver (YS3). Younger drivers want more education themselves (CM74), though little (22%) seek extra training after passing their test (YS3). That said, learner drivers also want to pass the test as quickly as possible (CM74).

Fifty-four per cent of the public support more driver training throughout their lifetime (44% did not support this; CM58). A total of 22% of the driving public felt that they would fail the test if they took it today (CM74); most felt they would fail on theory (50%), followed by the Highway Code (22%, with 57% stating they had not read the Highway Code since passing their test), and 14% felt they would fail on

speeding. A total of 51% thought drivers should never have to re-take a driving test, with 36% stating drivers should take one every 10 years, 11% every five years and 2% every two years (CM58). CM74 suggests that 43% support re-taking the test periodically, compared with 34% against. In addition, 66% support an eyesight test for driving every five years, 21% every 10 years and 10% never (CM58).

5.2 Attitudes to road safety campaigns and education

There is little support for changes in attitudes and behaviour with conventional road safety campaigns. AG8 concludes that education or skills training have either negative or no effect on driver behaviour and subsequent accident involvement. RF4 reports that media campaigns have had little success in persuading audiences to change their attitudes or behaviour.

CM79 suggests that extra skills training can lead to overconfidence and induce more risky behaviours. YS12 reviews road safety campaigns and suggests that campaigns that try to induce fear have little effect on driver attitudes and behaviour, partly because the driver, particularly the most risky road users, are able to distance themselves from the message through believing the campaign is targeted for those with less road-user skill than themselves. RF4 suggests that incurable optimism (where most drivers believe they are better than average) leads people to believe the message is not for them. Coupled with feelings of illusion of control, where drivers feel very much in control of their vehicle and their own safety, and the false consensus effect (the view that everyone shares similar attitudes, values and behaviours), means the messages tend to be ignored (RF4). As CM36 concludes, some campaigns can give drivers an excuse for aberrant driving behaviour (who do not identify with the target group) by reinforcing the belief that such behaviour lies with a limited group of drivers, not themselves. In addition, YS12 discusses how the wrong psychosocial variables are targeted and suggests that more appropriate targeting would be to target normative influence and perceived threat to change behaviour. In addition, YS12 suggest that campaigns need to consider that selfefficacy is important in influencing behaviour and behavioural intention is important in influencing behaviour.

Overall, in November 2007, 42% believed that 'road safety advertising has a strong impact on how people behave on the roads', which is similar to the November 2006 survey where 44% agreed with the statement (see Figure 5.1). That said, some specific campaigns have received some positive evaluation. DfT4 suggests that part of the Department for Transport's THINK! campaigns such as 'Julie', 'Backwards', 'clunk:click' and 'Look out for motorcycles' have been successful. When shown a list of words that could be used to describe the THINK! brand, respondents tended to have positive associations (DfT1; see Figure 5.2). Around half felt that it was 'thought-provoking' (48%), four in ten deemed it 'helpful' (42%), and a quarter (25%) influential, although 'helpful' and 'influential' have decreased slightly since 2006 (49% and 29%, respectively). There have been small increases in some





negative associations, including 'boring' (9% from 5%) 'old fashioned' (7% from 5%) and 'irrelevant' (7% from 5%), although these are still minority perceptions. Among those who recognised the THINK! logo, six in ten (61%) said that they would trust something which had the logo on it (a decrease from 68% in 2006). Seven in ten (72%) said that it would make them take notice (a slight decrease from 78% in 2006), and half (49%) felt that THINK! was making a difference to the safety of roads, a decrease from 57% in 2006. These results suggest that the THINK! brand may need some refreshment in the coming year (DfT1).

Campaigns which target specific behaviour and groups of driver seem to have more success. Implementation intentions, when drivers are invited to specify the situations in which they plan to control their speed, for example, have had some success, especially in very local and specific situations (EF34). The Thames Valley Speed Course, an optional course for people caught speeding in the area to attend instead of points on their licence, has had some effect on change in attitude and behaviour on local 30 mph roads (CM3). YS12, CM8 and CM79 suggest that the most positive effect on attitudes and behaviour seems to come from group discussions on driver behaviour that emphasise interaction between road users and reflect on habitual and subconscious behaviour, which reduces habitual behaviour by raising into the conscious habitual behaviours. In addition, such group discussion should highlight internal inconsistencies including cognitive dissonance, emphasises norms, introduces emotive content and introduces a reflection on attitudes, values and beliefs.

Drivers in general feel that radio advertisements are more effective than TV, primarily because they listen to the radio while driving, whereas TV adverts are remote from the driving task (CM36).

Expert opinion is that a long-term strategy is essential if attitudes are to change (CM36). The success of the campaign to change attitudes to drinking and driving is often cited as an example to emulate, while recognising that there is no simple solution that will eradicate speeding (CM36).

There are also indications that drivers can be motivated to reduce speeding by the knowledge that lower speed limits on congested roads can enable smoother flow and quicker progress (as in the variable speed limit trial on the M25; CM36). Cost savings may also result, such as improved fuel consumption and less tyre wear from stop/start traffic, which offer an attractive package of benefits (CM36).

In trying to change attitudes and behaviours of occasional seat-belt wearers, DfT4 suggests that greater impact is found around campaigns with simple visual comparisons (before and after), statistics which weave into the story and are repeated, and the resonance of human dynamics. There is a need to use statistics judiciously and only when there is new news or implications to relay, and they are most effective when integrated into the territory as part of factual, expert tone.

However, RF4 notes that simple reminder stickers have had a good effect at getting people to apply seat belts.

DfT3 suggests messages to reduce speeding need to puncture the bubble (coined as the 'hybridity phenomenon') where drivers feel isolated from the outside world and to challenge the discourse of freedom, control and choice that is so intertwined with driving. However, the concept of being isolated from the outside world is somewhat at odds with the car or driving as an expressive act linked to self-identity which shows something about the person themselves.

RF3 found a small amount of attitudinal change in certain measures in exposing children to a drama production about road-user safety and driving accidents. In particular, those who saw the play versus those who were in the control group were far more likely to agree strongly with the statement that injury sustained through accidents can have a negative effect on employment, fitness, social life, driving, meeting new friends and education both post-test (5-10 days later) and re-test (8-10 weeks later). However, no difference was found on other items on the questionnaire. In addition, the effect on this question was lost after one year, although there was evidence of a 'ground preparation effect' in that the treatment group showed more positive views than the control group following a road safety video at this stage. This seems to have had a more positive effect than other interventions using drama – perhaps as it included one of the actors recounting a real-life story of a friend seriously injured in a car accident. Hence, the intervention is a combination of drama and real-life incident (see RF3 for further discussion).

Video information had little effect on children's knowledge of road safety, despite parents believing it had made a difference, suggesting that a campaign targeting a mass audience tends to be ineffective (EF36). EF17 suggests that road safety training does have an effect on children's attitudes, but not necessarily their behaviour. AG8 suggests that the effectiveness of pedestrian education is not proven. RF6, following a review of research into the evaluation of various education interventions aimed at improving child pedestrian road-user behaviour, tends to agree. They found that methodologies employed to assess success of such interventions is usually poor, so very little substantive conclusions can be given. For example, evaluations tended to suffer from poor randomisation when allocating participants into groups, have high attrition rates and only report knowledge and self-report behaviour. Hence, although there is some evidence for changes in knowledge, behaviour and attitudes, the durability of these changes has not yet been assessed. RF6 concludes that the most effective programmes tend to:

- 1. be theory based;
- 2. be longer in duration and begin at four or five years old;
- 3. provide accurate information;

- 4. address issues of social pressure, communication skills, values, group norms, and so on;
- 5. involve modelling and practice; and
- 6. involve training for the educators.

AG8 reports that campaigns aimed at improving bicycle helmet use vary in their success, with the more successful campaigns targeting small groups. ET1 and AG8 suggest such campaigns work best among girls and primary school age children. Campaigns that include free or discounted helmets improve uptake and use (ET1; AG8). Less effect is seen with campaigns aimed to increase cycle helmet use on children in poorer communities (ET1; AG8).

ET19 used the Theory of Planned Behaviour as a basis to design a booklet containing persuasive messages for children (aged 15 to 19) to discuss in groups. The messages included:

- (behavioural belief) 'wearing a helmet while cycling to and from school would make me take care';
- (normative belief) 'my parents think that I should wear a helmet while cycling to and from school'; and
- (control belief) 'even if I wanted to, I might not be able to wear a helmet while cycling to and from school because there is nowhere to keep it during lessons'.

No initial differences were found between a treatment and a control group, but differences were found post-intervention and a follow-up, suggesting the intervention was successful in changing attitudes and behaviour (there were more wearing helmets in the treatment group). Normative beliefs about parental expectations were the most powerful discriminators between the intervention and the control group. Hence it shows the importance of perceptions of what significant others think in altering attitudes and behaviour.

Further research is needed in order to address the salience of different concepts within these messages and to understand how people interpret and digest information or how they distance themselves from them.

6 PEDESTRIANS

6.1 Perception of pedestrian safety

Results from the 2005 Office for National Statistics (ONS) Omnibus Study found that 45% of participants felt that walking was the safest mode of transport (this was the highest agreement, followed by train, 22%; and car, 16%; DfT2). However, judgement of safety had little impact on actual modal choice (with 67% stating that concerns over accident risk have little impact on transport choice; DfT2). The 2004 Omnibus Study stated that 55% thought traffic in their area was a danger to pedestrians (DfT2). People living on main roads in towns and cities (77%) and rural through roads (63%) are more likely to cite this as a problem (DfT2).

Children are not good at perceiving traffic safety, often cited as a lack of skills, and can be easily distracted and are impulsive (see RF6). Older children tend to select a poor choice of crossing point (e.g. between marked cars and near to, but not at, formal crossing points), and younger children tend to lack the cognitive skills required to identify a threat and know what to look out for (RF6). Boys, compared with girls, show greater risk in crossing behaviour (see RF6). Children think that it is often the responsibility of other older road-users to look out for them, mirroring schema from the rest of their lives where responsibility lies with adults (RF6). CM71 suggests that 11–12-year-olds show better road safety behaviour than 13–16-year-olds, largely due to psychosocial reasons, including attitudes, normative beliefs and peer pressure.

Children from lower socio-economic backgrounds are more likely to display risky road pedestrian behaviour (RF6). In addition, non-White children are found to perform more risky pedestrian road-user behaviour, but how far this is linked to lower socio-economic status or lowered parental familiarity with traffic regulations, systems and norms is relatively unexplored (RF6).

6.2 Attitudes of parents and children to pedestrian safety

Road safety is viewed by parents as one of three key risk areas for children (along with drugs and bullying; CM48). Parents have a good understanding of children's road safety needs (CM48). Parents think their children have good road safety skills (CM48), although Black and minority ethnic (BME) parents are less confident in their children's road safety skills (CM48).

However, children who have undergone a road safety campaign may be at greater risk because of parents' increased confidence in their children's road safety awareness, which can lead to less supervision (RF6).

Sixty-three per cent of parents believe they have responsibility for teaching road safety to their children, and 32% believed in a shared responsibility between themselves, teachers and the police (CM48).

6.3 Effect of the peer group on children and road-user safety

Older children and adolescents think they have a good attitude to road safety (EA22), but believe others do not, especially their peer group (EA22). Adults and parents believe that road-user skills deteriorate as children get older, largely attributing this to peer-group pressure (CM48; CM69; CM70; RF6). Parents of children aged 7 to 18 years of age felt that their child's road safety skills deteriorated when among a group of friends, mainly due to peer pressure (CM48). Young adolescents may actively seek risk on the road due to peer pressure, identity and the need to create a sense of control and to challenge authority (CM69; CM70; RF6). Alongside the effect of peers, there is evidence of sensation seeking among adolescent children with regard to road-user safety (CM69; RF6), and this is more marked for boys than girls (peaking at around age 14, see Figure 6.1; AG4).



There is a four-fold increase in accidents close to formal pedestrian crossings. An inspection of the motivations for crossing at such locations include perceived avoidance of delays, not perceiving the risk, a weak sense of compliance with road safety rules in general, and peer pressure, especially in children.

7 CYCLISTS

7.1 Perception of cycle safety and injuries

Amongst the general public, 47% never cycle, with the most stated reason being concern about safety issues (CM57). Children aged 12–13 are aware that cycle injuries may result in severe head-injuries, including concussion, and in broken limbs (ET15). However, very few children mention death as an outcome from a cycle injury and those that did reported that they felt it was a remote chance (ET15). Most children had previously had minor injuries from cycle accidents, though accidents were no predictor of attitudes towards injury and safety (ET15). Overall, most children did not think cycling was very risky and did not think accidents would happen to them (AG8).

7.2 Cycle helmet use

ET8 suggests that most cyclists agree that cycle helmets can give either 'moderate' or 'great' protection from a head injury, although significantly more adults (65.9%) than adolescents (43.9%) believed that the protection afforded by bicycle helmets was 'great'. Despite this belief, a majority of adolescents and adults indicated that there was only a 'slight risk' of head injury when bicycling without a helmet (ET8).

ET1 reviews the literature on bicycle helmet use (up to 2002) and suggests that, over time, cycle helmet use is increasing in most countries, including the UK, but helmet use is still low (ET1 reports in 1999 that rates were 22% on busy roads and 8% on minor roads in the UK). ET15 and AG8 suggest that cycle helmets are accepted for certain types of cycling, viewed as high risk, but not for day-to-day routine cycling, for example cycling at night or in bad weather.

ET1 suggests that barriers to helmet use include age (low helmet use among teenagers), social background (low helmet use in low socio-economic groups), geographical factors (lower helmet use in rural areas), group effects associated with companionship (especially helmet-wearing parents), cost and discomfort. In addition, ET1 suggests that attitudinal barriers to helmet use include low risk perception (especially short journeys and residential areas), peer pressure (helmets are seen as ugly and stupid by young people, but a person is more likely to wear one if friends wear them), and parental influence (especially with younger children). ET13 highlights the importance of parents' and friends' positive image and opinions about bicycle helmet in increasing cycle helmet use among children. ET8 suggests that peer helmet use significantly influenced cycle helmet use among all ages of cyclists (including adults). ET15 and AG8 suggest that children would be viewed negatively by friends and peers if they were seen wearing a cycle helmet, with great concern being expressed about the potential for being teased.

Children tend to have a negative attitude towards helmets. ET15 found children at the most at-risk of injury on a bicycle age group (12–13 years) tend to see helmets as annoying, hot, uncomfortable, horrible looking and stupid looking. There was a feeling that those who wore them were nerds, were overprotected by parents and were generally regarded as 'losers'. There was a call for the design of the helmets to change – to be smaller, to incorporate a radio or to look more attractive (ET15; AG8). ET15 found that almost all of the children's parents wanted the child to wear a safety helmet when cycling, but most children did not adhere to this request – either disobeying or taking the helmet off when out of parental sight.

AG8 reports that most young people did not feel that wearing a helmet affected the way they cycled, though some expressed concern about the possibility that motorists would think they were less vulnerable and so drive more dangerously around them.

ET15 suggests that guidance from teachers, families or GPs on helmet use was absent.

8 MOTORCYCLISTS

8.1 Attitudes towards motorcycle safety

In the 2005 Office for National Statistics (ONS) Omnibus Survey, the majority of the public state that motorcycles are the least safe mode of transport (70%; DfT2).

8.2 Motorcyclist attitudes towards safety

Riding safely is held in high regard among dedicated motorcyclists (RF2). However, the enjoyment of taking risks and the enjoyment of speed, in particular, are higher for motorcyclists than for car drivers (SS1). That said, although speed violations are a significant predictor of at-blame accidents, the biggest predictor of crash involvement among motorcyclists is non-deliberate errors, rather than violations (EA29).

8.3 Car driver attitudes towards motorcyclists

The most negative attitudes towards motorcyclists on the road came from the least experienced drivers (EF3). This group also has poorer skills in dealing with motorcyclists on the road (EF3), suggesting an attitude and skill interaction that results in dangerous behaviour (EF3). Men have greater empathy for motorcyclists on the whole, but actually show less empathy in their behaviour, for example female drivers give motorcyclists more room when overtaking or when entering at intersections and junctions (EF3). Greatest empathy comes from those who are motorcyclists themselves or know motorcyclists (EF3). Car drivers who are motorcyclists or have motorcycling relatives are less likely to collide with a motorcycle. The suggestion is that they have 'mental preparation' for motorcyclists and understand the norms better – attitude through preparation is therefore important (YS12).

8.4 Key points

EF3 is an interesting paper in that it links attitudes with skill and suggests that attitudes and skill are related. However, that relationship varies, for example for younger less experienced drivers, inappropriate attitudes are linked with poor driving behaviour, but in male drivers more positive attitudes towards motorcyclists are linked to less empathy and less skilful behaviour. More research addressing the link between attitudes, empathy and skill in other road-user safety behaviour would be useful. It is also interesting to ascertain why men have the greatest empathy for motorcyclists. Women tend to show greatest empathy for other road users, especially light road users and other car drivers (CM7; CM8). What is special about motorbikes for men?

9 ATTITUDES AND BEHAVIOUR

9.1 The attitude-behaviour gap

For a long time, road users' attitudes were seen as a key predictor of their behaviour. As reported in the preceding sections of this report, much research on the safety behaviour of road users has been focused on attitudes. In these studies it is generally assumed that attitude, as a function of beliefs about the perceived consequences of the behaviour under consideration, is a determinant of intended behaviour; the individual's intention to be engaged in the behaviour is believed to have a direct effect on behaviour (see Figure 9.1). For example, if one strongly believes that speed driving is dangerous, wrong or has negative consequences, he or she will be less inclined to speed, leading him or her to do less speed driving.



While some of the studies reviewed in this report explore the links between road users' attitudes and their revealed behaviour, many assume the correlation between the two without providing empirical evidence to support it. In other studies it is the effect of attitudes on intentions, rather than the effect on behaviour, that has been explored.

Moreover, in some of the empirical studies that tested the hypothesis about attitudes as a main determinant of behaviour, it was found that attitudes provide only a partial and limited explanation of intentions or behaviour. For example, Whissell and Bigelow (2003) (cited in CM73) found no link between attitudes toward speed driving and actual reported crashes. By studying drivers' compliance with speed
limits, EF13 found very little relationship between attitude and intention. Studying the intention to commit driving violations, CM27 found that the relation between attitudes towards behaviour and behavioural intentions was consistently weaker than other determinants of behavioural intentions. Tolmie (2006) (EA22), who studied pedestrian decision-making of young adolescents, found that attitudes have an influence on behaviour, but not as strong as other determinants of behaviour.

Concluding the empirical evidence from the literature, it may be argued that, while road users' attitudes towards safe behaviour is an important determinant of (intended) behaviour, it does not provide by itself a full explanation of that behaviour.

9.2 Subjective norms

Subjective norm is an individual's perception of social normative expectations and pressures. Relevant others' beliefs that he or she should (or should not) perform a behaviour have an effect on the intended behaviour (see Figure 9.1). For example, an individual might speed if he or she believes that others (friends, family members, colleagues) might support this behaviour – even if his or her attitudes towards speed driving are negative.

There is much evidence from the reviewed literature that social norms do play an important role in explaining intensions and behaviours in the context of road safety. Subjective norms is one of the factors that predicted intentions to speed (EF10). The relation between subjective norms and behavioural intentions to commit driving violations was consistently stronger than between attitudes towards behaviour and behavioural intentions (CM27).

The perceived speed of others influences one's own speed as reported by Kimura (2003) and Aberg (1998), reviewed in CM73, and by Aberg *et al.* (1997), reviewed in YS12.

Social pressure and more normative pressure for young males to speed is reported in a study by Connor *et al.* (2003), cited by YS12; this was even stronger when a male passenger is present. Based on reviewed literature, YS12 suggest changing perceived normative pressure in younger men with regard to speeding behaviour.

On their study on drivers' compliance with speed limits, EF13 found that older drivers and female drivers perceived more pressure from significant others, than younger drivers and male drivers.

In a study by the World Health Organization (WHO, 2007; cited in CM69) it was found that, as young children become adolescents, peer influence becomes increasingly important, compared with the earlier strong influence of parents. For many young people, their peers are the most important people in their lives and are often also their primary source of behavioural norms. Teenagers can be led by what is considered 'cool', not necessarily by what is safe. Peer pressure can mean that young people are more likely to behave in a risky manner on the road, both as novice drivers or riders, and as pedestrians.

Large corporations and industries can influence both individual behaviour and social norms in a manner that may increase risk on the roads (WHO, 2007; cited in CM69). For this reason, one needs to consider not only individual behaviours, but also the environmental factors – including media messages, community norms, and public and institutional policies – that may support high-risk behaviours.

EA22 found that perceived approval/disapproval of the young adolescents' different pedestrian behaviours by their parents and peers has an effect on their behaviour. Peers were seen as substantially more likely to engage in risky behaviour, especially by 15-year-olds. Participants' self-identity and risk-taking profiles lay between parent and peer norms, being less cautious than the former, but more so than the latter. There was a gradual drift towards greater espousal of risk-taking among older participants, reflecting the shift in peer norms. Adolescents seem more likely to behave in a risky fashion as pedestrians where parental influence is weakened. A study by EA5 confirmed the findings of previous studies (Ferguson *et al.*, 2001; Taubman-Ben-ari *et al.*, 2005) and provided more evidence that parental driving risk is transmitted to children. Youth collision risk is related to both parental collisions and offences.

9.3 Perceived Behaviour Control

Perceived Behaviour Control (PBC) is an individual's perceived ease or difficulty of performing the particular behaviour. It is generally assumed that PBC is determined by the total set of accessible control beliefs (see Figure 9.1). For example, the individual's intention to commit a traffic violation, such as speed driving, might be influenced by his or her perceived believes related to questions such as 'Am I able to commit a speed driving violation?' or 'Am I able to resist doing that?'.

Parker *et al.* (1992a and 1992b), cited in Fylan *et al.* (2006; YS12) found PBC to be the strongest predictor to speed driving, where subjective norm is the next largest predictor. More evidence to the strong role PBC has in explaining speed driving is provided by Letirand and Delhomme (2005), cited in Fuller *et al.* (2008; CM73), Elliott *et al.* (2005), cited in Fuller *et al.* (2008; CM73), Elliott *et al.* (2007; EF32), and Connor *et al.* (2007; EF10).

Generally, those who felt less in control rated themselves as more likely to commit the violations (CM27).

It was suggested by Ajzen (1988*) that PBC is the most important determinant of intention (more important than attitudes and norms) when the subject has previous

knowledge or experience of the behaviour in question. Indeed, Parker *et al.* (1992; CM27) found significant evidence to support the hypothesis that those who felt less in control rated themselves as more likely to commit the violations.

In a study on the attitudinal determinants of driving violations (YS8), it was found that PBC is influenced by both internal factors (being in a bad mood, not paying attention) and external factors (being in a hurry, being in heavy traffic).

In a study on drivers' compliance with speed limits, older drivers and female drivers had greater PBC than younger drivers and male drivers (EF13).

9.4 Behaviour is not always planned

The Theory of Planned Behaviour (TPB) model, presented in Figure 9.1, with its determinants of behaviour (attitudes, perceived norms, PBC and intentions) is a powerful model for explaining and predicting human behaviour. Thousands of studies have tested TPB in various behaviour domains. There is compelling evidence that TPB (applied in general non-transport contexts) accounts for about 40-50% of the variance in intentions and about 25-30% of the variance in behaviour (see, for example, Armitage and Conner, 2001*). TPB implies that changes in attitude, subjective norm and PBC can lead to changes in intentions and behaviour. However, the effect of this type of interventions is a matter of debate in both a general context and a traffic safety context. Some (e.g. Conner and Armitage, 1998*) argue that more research is needed to test whether changes in beliefs lead to behaviour change, and that TPB could be more widely used to develop and evaluate interventions.

According to TPB, behaviour is assumed to be reasoned, controlled or planned. One criticism of TPB had been that human behaviour is habitual or automatic rather than planned. Some of the reviewed studies reported habitual behaviour by violators or by non-violators (EF13; CM74). However, there is a lack in systematic evidence-based approaches to understand and analyse how the process habits are formed, or to test whether indicators of habit strength used to predict behaviour provide better explanation than TPB models.

9.5 Violations, errors and lapses

One criticism of TPB had been that it was only really applicable to volitional control, i.e. the patient's wilful control over their behaviour. Reason *et al.* (1990*) showed that driver violations, errors and lapses are empirically distinct classes of behaviour. 'Violations' are defined as 'deliberate deviations from those practices believed necessary to maintain the safe operation of a potentially hazardous system' (for example disregarding speed limit or more 'aggressive' violations). 'Errors' are defined as 'the failure of planned actions to achieve their intended consequences' (for example, braking too quickly on a slippery road). 'Slips and lapses' can be defined as attention and memory failures, which can cause embarrassment, but are

unlikely to have an impact on driving safety (Parker *et al.*, 1995^*) – for example, getting into the wrong lane approaching a roundabout.

Unlike errors and lapses, violations were seen as deliberate behaviours, although both errors and violations are potentially dangerous and could lead to a crash. Since violations, errors and lapses result from different psychological processes, they should be treated differently (Reason *et al.*, 1990*). The study of violations, errors and lapses, applying the Driver Behaviour Questionnaire (DBQ), has been used in dozens of studies, a few of them reviewed in this work (EA23; YS9; EF3). YS9 found that violations, not errors or lapses, are statistically linked to greater crash involvement. Unlike errors, driving experience is not related to the number of lapses (EF3). Women had more lapses than men, but fewer reported violations than men (EF3).

9.6 Nudges

Some work to improve safety behaviour reviewed in this work is based on the provision of information, often increasing the awareness of road users to the risk for themselves and others associated with their behaviour. People's cognitive biases actually cause them to understand, interpret and use information about road safety, not necessarily in line with the intentions of the transport systems' designers, and not necessarily in accordance with rational man theory. Inspired by the works of cognitive psychologists and behavioural economists, they argue that choices made by individuals, systematically deviated from rational models of behaviour, can be explained and predicted by cognitive psychology models of bounded rationality. Moreover, it opens the opportunity to change individuals' behaviour towards better alternatives - in a way that does not limit their freedom of choice (or, as it is fashionable to say, people are 'nudge-able'). An example brought by Thaler and Sunstein (2008; EA14) is of an initiative by the city of Chicago to handle a problem of drivers failing to reduce their speed limit before a dangerous S curve. A series of white stripes painted on the pavement gave drivers the sensation that their driving speed is increasing, signalling them to slow down: when they first appear, they are evenly spaced, but as drivers reach the dangerous portion of the curve the stripes get closer together. This illustrates one of the possible explanations to the attitudebehaviour gap: in situations where speed-driving is more related to errors and lapses rather than violations, and behaviour is not 'planned' or 'intended' as in TPB, the design of the transport environment could make some types of behaviour less/more attractive than others. Nudges can make use of other cognitive biases, like misperceptions of risk, the effects of information 'framing' and herd behaviour, in promoting safe behaviour.

'Nudge' approaches have not been tested in a large scale or systematically analysed in the context of road safety. Therefore their effectiveness remains an open question.

10 METHODOLOGICAL ISSUES

10.1 Introduction

The studies in this project included a variety of methodological frameworks and analyses in the categories outlined in Table 10.1. The majority of articles on attitudes are quantitative in nature, with few being mixed qualitative and quantitative and very few solely qualitative.

Table 10.1: Type of methodology by analysis of data in reviewed articles							
Methodological analysis	n	Article reference					
Qualitative	10	CM4, CM6, CM79, CM82, DfT3, DfT4, DfT5, ET5, RF2, YS7					
Quantitative	39	AG4, CM3, CM16, CM27, CM30, CM31, CM52, CM55, CM57, CM58, CM59, CM65a, CM72, CM74, CM77, CM78, CM80, DfT1, EA5, EA13, EA22, EA23, EA24, EA27, EA29, EF3, EF10, EF11, EF13, EF17, EF28, EF32, EF34, EF36, ET8, ET13, ET19, RF3, YS8					
Mixed	8	CM1, CM7, CM8, CM36, CM48, CM71, CM81, YS9					
Review	15	AG8, CM69, CM70, CM73, CM84, DfT2, EA14, EF8, ET1, RF4, RF6, SS1, YS3, YS12, YS17					

10.2 Methodological limitations

There is a number of methodological limitations which must be taken into account in the literature reviewed to date and these are briefly discussed below.

10.2.1 Self-report

Much of the data assessing attitudes and other psychosocial variables heavily relies upon self-report (e.g. CM3; CM4; CM6; CM7; CM8; CM27, etc.). Many of the studies had little validity check on whether the answers given were indeed a true representation of the participant's reality. Where the variable is subjective in nature, such as an attitudinal statement, then validity is difficult to ascertain other than for searching for within category or variable consistency, although of course there may be consistency in erroneous reporting. Where the variable is a self-report of an 'actual' behaviour, then the lack of validity checking is more problematic, although is not as easy a task as first may appear. For example, reporting speeding behaviour in general is difficult to answer truthfully, since speed is continuous and variable. Hence, ecological validity of generalising results to other speeding behaviour from a specific answer may be inappropriate. Scenario-based questions attempting to gather an amount of performance within a time and space definition, such as speeding in a 30 mph zone late at night with little traffic around, also becomes difficult to answer truthfully through participants trying to remember or picture such occasions. Validity checks with real-life speeding incidents show less support than would be imagined, for example no correlation between observed speed and self-reported speed is found in CM30 or CM31, though when observed and reported speed data are collapsed into categories then a significant difference between categories is found to exist in a pattern that is to be predicted (i.e. 35% of drivers who reported driving much faster than average were observed in the highest speed category). A further problem exists in the 'objective' measurement within which to gather such information. A one-off spot measurement of speed is taken in CM30 which is difficult to then generalise to other situations. In-car technology was used to record data on speed, acceleration and deceleration in CM8, and a test-drive was taken with an experimenter and data recording equipment in CM31, all of which affects the normal performance of driving. Hence, results in all self-reported activity need to be considered in light of what they are -a proximal variable of reality. Qualitative data allow for a better chance to check internal (in)consistency of answers given to check for validity and the ability to probe in-depth on matters which may give a deeper insight into attitudes people hold. Hence, the research has a chance not to just uncover and collect attitudes, but to elicit and even generate attitudes through conversation, keeping an audit trail of their origin. After all, if there has been a need to impression manage attitudes in a social situation, then what does this say about the importance of the attitudinal concept in such a context?

10.2.2 Simulators

In some research the use of simulators has been adopted to capture certain road-user behaviours (e.g. EF32). However, the lack of validity surrounding simulators again means such behaviours observed on simulators does not always match actual behaviour. In addition, simulators use models of behaviour of the motoring situation which rely more on the principles of physics and logic than on the cognitive performance of drivers within a social context. Finally, the lack of consequences on a simulator for risky, aberrant or accidents reduce their validity to the real world.

10.2.3 Spot observations

Research has used one-off measurements as a proxy for driving behaviour, often involving speed as the principle variable (CM30). However, the continuous nature of driving behaviour and the variety of other variables and factors involved means such a measure is not always very valid. However, attempts at validating such aspects have occurred and often centre around comparing spot measured speed with recorded or observed speed over longer distances, but do not include observing other variables in the same relationship nor attempt to look at the profile of those who do not create a match (see CM30 and CM31).

10.2.4 In-vehicle observations

Some studies use the continual collection of variables as the driver drivers the vehicle (CM31; CM36). Such black box technology and cameras have been used in various different stances in such research, collecting a variety of behaviours including speed, acceleration and deceleration, longitudinal and latitudinal positioning, distance to the vehicle in front, etc. However, again the intrusion and the knowledge of being recorded reduce the validity of such a methodology and build a gap between research and real life. Overcoming this was cleverly done in CM31 by instructing participants that they were merely there to test new recording equipment, though how far such drivers believed this is not known.

10.2.5 Terminology of questions used

With many of the surveys there seems to be ambiguity about how the questions could have been interpreted. This seems especially to be the case with regard to questions on speeding, since people have very different views on what 'speeding' actually means. For example, speeding is defined by some drivers as going over the posted speed limit by a certain amount (different amount for different people), while other drivers define speeding as going over their own determined speed limit (CM55; EA13; CM84). Hence, not everyone is answering the question in the same manner. Qualitative research would be able to get a situation where most people are answering the same question in a similar fashion as there is the opportunity to explore the meaning of such terminology. In addition, the whole question used on questionnaires is sometimes quite difficult to conceptualise for the participant into an actual situation, for example consider the question from the Driver Behaviour Questionnaire (CM27): how often do you 'Become angered by another driver and give chase with the intention of giving him/her a piece of your mind?'. Which part of this should a participant agree to – becoming angered, giving chase, having an intention to give them a piece of your mind – what if the participant does not agree to any part of the question – such as getting angry and giving a piece of mind without any chasing, or chasing but not wishing to give a piece of mind? Where should a participant indicate their answer? A qualitative approach allows for a discussion of such points and draws out the generic from the specific, and vice versa.

Hence, in understanding the attitudes discussed in this document, care must be taken in understanding how questions were asked and interpreted by participants, and how that affects the results given and discussed.

10.2.6 Outliers

The studies, being largely quantitative in nature, have a tendency to report macrolevel findings and ignore small-scale abnormalities. For example, in CM30, 7% of drivers who rate themselves as slower than average find themselves in the highest observed speeding band. The study does not discuss this unusual group – why have the group got such a difference in perceived and actual speeding behaviour? What is their background? Is there something similar about individuals within such a group? In CM58, 1% never use seat belts. More detail of this group of driver is required. If this is representative, then this equates to a large number of drivers on the road and more detail about such an aberrant behaviour would be useful to inform policy and practice.

10.2.7 Forced choice and open-ended answers

Many of the studies involve presenting a number of statements to which participants can cite their preferred amount of agreement. However, this tends to lead participants into certain statements and attitudes that they may not actually primarily think are important. Open-ended questions allow for greater scope with regard to actual attitudes and impressions and the order in which such attitudes are important to individuals. Nevertheless, such questions are largely ignored in questionnaire design and, hence, are more likely to be found in qualitative work. The dearth of qualitative work found on attitudes to road-user safety suggests that there is an imbalance in favour of researcher-led questions and there is a need to balance up responses from end users themselves.

10.2.8 Fixed time

Road-user behaviour is a continuous activity, and attitudes and associated psychosocial behaviours change over time. Hence, studies need to address changes in attitudes and behaviour over time. There is an over-representation of younger people in road-user accident statistics and in risk-taking behaviour on the roads, and how this changes and why it changes throughout life requires some examination, perhaps through a longitudinal approach.

10.3 Proposed qualitative approach

To overcome some of these limitations it is proposed that a qualitative design be adopted which would adopt a deliberative approach in order to gain insight and depth in a social context. Analysis will be in the form of matrix mapping.

11 RECOMMENDATIONS FOR THE WAY FORWARD

Following on from the previous section, it is suggested that a qualitative approach be adopted in subsequent phases of the research. The research should elaborate on the pervading themes emerging in this review and, in addition, offer insight into missing or incomplete themes.

11.1 Suggested topics for the next stages of research

The research should consider elaborating on the following important themes that have emerged from the literature review to date.

11.1.1 Self versus other road users

A prevailing theme throughout this review has been the notion of a difference between the road user themselves and 'other' road users. Overwhelmingly, there seems to be a consensus that drivers and pedestrians see themselves as competent and safe road-users and others as more risky and dangerous. Individuals see themselves as law abiding and if they take any risks they do so within their own judgement of safety. Hence, they freely admit to speeding safely, and that it is other drivers who speed unsafely. The concept of the self as safe and others as dangerous may explain the reason why there are high levels of support for the stricter enforcement of speed limits and harsher penalties for dealing with poor road-user behaviour, as individuals view such interventions as being aimed at other road users. Increasing support for speed limiters and black box technology is found – probably for other road users. Such an attitude has far-reaching consequences with regard to the effectiveness of interventions. A campaign targeted at revealing the danger in the road would have an effect if an individual had just distanced themselves away from the danger. However, they have shifted the danger away from themselves and onto others. Hence, campaigns revealing danger are viewed as not for them, but for other, more dangerous, drivers to take note from. Such campaigns may further increase the distance by giving self-confident drivers an excuse for their risk-taking behaviour, in the belief that it is others who are risky, not themselves. In addition, control of the risk is in the hands of the individual, which further emphasises the distance between the self and those elements out of control, such as other drivers and accidents. An assessment of risk puts drivers themselves at the centre of the equation - 'I am in control therefore any accident is out of my control' and 'It is unlikely to happen to me' (slide 28; DfT3). Drivers emotionally detach themselves from accidents even if they have been involved in them – hence there is a chasm between the risk of an accident and the effect on the self. The concept of the self and others does not just reside within an individual and is seen with regard to group behaviour. Hence, people on the road identify with a particular in-group, all of

whom drive safely, and an out-group all, of whom drive dangerously. This is seen when individuals view dangerous drivers as out-groups, such as company car drivers, young drivers, school run mums, etc. (for example, older drivers viewed themselves as a heterogeneous group of individuals all with good skill, but a variety of ways of displaying such skill, and younger drivers as a homogenous group of individuals all with equally poor ability skill and inappropriate attitudes). Qualitative group work is ideal to explore the concept of self and others further, as it will be in the presence of both the 'self' and the 'others'. In further research it will be important to establish both how the distance between the self and others is formed, maintained and justified through narrative.

11.1.2 Normative pressure

Normative pressure can be described in two different ways. First, social norms appear to influence road-user safety behaviour through the exchanging of attitudes. In speeding, for instance, it is often viewed that many drivers speed which offers a justification for such behaviour (CM81; YS12; CM73; YS17; RF2; CM36). Other heuristics maintain such behaviour with various rules of thumb applied to justify similar behaviour, such as tolerance thresholds being over the speed limit or the belief that drivers will not be caught for speeding (CM36; YS9). Peer pressure is especially evident among driving behaviour for youngsters (especially immediate passenger effects (RF4; CM36; AG8), adolescent pedestrian behaviours (CM48; CM69; CM70; EA22; RF6) and children's cycle helmet use (AG8; ET8; ET15). However, it would be interesting to explore peer pressure at other ages and for other types of road-user behaviour. In addition, besides peers what examples of others are influential – is it all others, significant groups like themselves, champions, peers? How do car adverts, emphasising speed and aggressive driving, influence the norms of driving behaviour? How are such themes maintained by the press, television and other popular culture? How do these normative influences affect our own norms and values, and what happens when normative influence from others is not consistent?

11.1.3 Individual interpersonal differences

A study of the individual differences at a disaggregate level is required to understand attitudes and road-user safety, Much of the work to date has ignored interesting outliers and tends to try and treat the road-using community as a homogenous group. Where research has looked for differences between groups, it tends to have used background details, such as age, gender, driving experience and socio-economic groups, to show differences between attitudes. Some studies have used post-hoc categorisation (CM7; CM8; CM73; EF11) based on clusters of similar attitudes or behaviours in order to explain differences. This segmentation approach could have merit in targeting specific interventions, hence similar approaches in analysis are suggested for future research here.

11.1.4 Different hats, empathy and intrapersonal differences

The literature reviewed has typically investigated the attitudes of one aspect of roaduser behaviour, so they study attitudes of drivers, or of pedestrians, with little regard for the concept that drivers are also pedestrians and may at other times be cyclists or motorcyclists. The research that found greater empathy towards motorcycles by car drivers who were themselves motorcyclists or had motorcyclists in their close family or friends, suggests this theme could be taken further for other road-user behaviour (EF3). Research needs to understand road-user attitudes in the context of an individual; how do attitudes towards road-user safety vary within individuals depending upon the context?

11.1.5 Conceptualisation of road-user safety

How people conceptualise road-user risk is important to study. In particular, how is road-user risk compared with other, non-road-user, risks? Further research is needed to assess the relative importance of road-user safety and risk in terms of nontransport safety and risky behaviours. In addition, understanding relative risk between different road users is needed. How do people balance different types of road user risky behaviour within a particular mode of transport and between different road-user modes?

11.1.6 The cognitive and emotional perceptions of risk

Research on decision making and behaviour generated much evidence that people are very bad at perceptions of risk (Tversky and Kahneman, 1981*). In particular, because of people's limited cognitive abilities, the risk of extreme events is underweighted because the probability is too low to evaluate intuitively. In many situations, road users are largely or totally ignoring the risk of a serious or fatal accident. The perception of risk in a travel behaviour context, and its effects on risktaking behaviour and choices made by road users, have been studied recently by transport researchers (Avineri and Prashker, 2003*). However, research in this area is limited and the role of biases in risk perception in a road safety context is largely unknown. Hence, addressing issues related to the perception of risk by road users, and their possible contribution to risky behaviour, could be addressed as part of this research. The framing of risk has tended to ignore the contribution of emotion to date. The social context of road-user behaviour means risk cannot be appraised without some conceptualisation of emotion. The thrill of risk taking and the pleasure of speed need to be understood and be mapped against the cognitive appraisal of risk taking and driving at speed. In addition, research is needed into other emotions and road-user safety, for example boredom and its influence on driving.³ Can emotive aspects be detached from their influence on road-user behaviour?

³ A PhD study is studying just this; see Heslop et al. (2009*).

11.1.7 Links between psychosocial factors

Previous research has tended to study in-depth one or two major theoretical components or psychosocial variables without bringing them together. This is especially true of research investigating personality and driving, where little research has been done to go beyond a limited number of dimensions and their associations. A broader picture of interactions would be useful. In addition, other elements have traditionally been studied in isolation, such as skills and attitudes. For example, there has long been a debate in road-user safety about whether younger drivers have more accidents due to experience or due to inappropriate attitudes. However, it is likely that an interaction between the two is possible and is discussed on driver attitudes to motorcyclists in EF3, but further investigation into other areas of road-user safety is needed. Studying links between the factors could also help where competing evidence occurs. For example, whether the need for control creates safer or more dangerous road-user behaviour and whether driving can be viewed in terms of deindividuation or whether it is an expressive activity.

11.1.8 'Positive psychology' and pro-social behaviour

A large portion of the research on the behaviour of road users tends to focus on its negative aspects – behaviour that leads to risks, violations and aggression – and how to reduce such behaviours. However, very little research looked at what behaviours avoid these problems before they start, and how to maintain positive behaviours (and 'pro-social behaviour') among road users. Also, what makes some road users more pro-social than others, and whether or not the safety 'climate' in society or culture contributes to pro-social behaviour? We therefore identify that the research needs to understand pro-social behaviour and its determinants,

11.1.9 Changes over time

Another prevailing theme that emerges from the literature to date is that attitudes towards road-user safety seem to vary within individuals over a period of time. Older drivers have more safety orientated attitudes than younger drivers, for example. It is suggested that this study should address at what stages in life do such changes take place and what are there triggers for such changes? Within this, the project should also ascertain how far the attitudes are an example of changes over time or due to cohort differences.

11.1.10 Is it an excuse or an actual attitude?

It is unclear how far aberrant road-user behaviour is being justified by stated attitudes, rather than attitudes shaping such behaviour. Hence, the real motivations for such behaviour are masked by socially acceptable or impression managed attitudinal statements. For example, more people state they unintentionally speed (YS17; EF11) than was found through more controlled methodology (CM30;

CM31). It has been well established in psychology literature for years that shifting the blame to external sources is often done to preserve or maintain the confidence and control and to justify behaviour. In addition, the fundamental attribution error is the judgement that other's actions are a result of their own personality, attitudes, judgement or skill. Hence, dangerous road-user behaviour when it occurs to the actor is due to external pressure and when it occurs to the observed is due to their inadequacies. Research is therefore needed on attribution and associated biases to explain aberrant road-user behaviour.

11.1.11 Semantics, terminology and meanings

Respondent's attitudes require qualifications to help amplify semantics, terminology and meaning. Did the respondent mean that for themselves, for other drivers, for both, in what situations, in what contexts?

11.1.12 Interventions

More research is needed on what makes a successful intervention that affects roaduser attitudes (and behaviour) of the participants. How important are elements of the intervention for it to be successful? For example, is the human element in decisions about aberrant driving important? How important is it that context is taken into account when speeding interventions are introduced?

11.2 Knowledge gaps

More research is needed on a variety of road-user attitudes that have not been well covered in the past. In particular, it is suggested for pedestrians (especially adults), motorcyclists (of all ages), cyclists (especially adults) and the public's attitudes to drug-driving. In addition, public attitudes towards new initiatives like shared space concepts and psychological traffic-calming would be useful to know. Links between attitudes for other concepts linked to transport and road-user behaviour would be interesting to study, not least attitudes to the environment and attitudes to road-user safety; do those who think green, drive safer, for example, in order to save fuel? Finally, something is needed among all the variables on the role of habit in maintaining some of the behaviours in order to reveal conscious and subconscious decisions in aberrant road-user behaviour.

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APPENDIX 1

Important points of procedure for reviewing literature

A1.1 When reading and making notes

Remember the purpose of the project – to advance knowledge on the public attitudes of road-user safety. We defined attitudes as a more generic concept involving a number of psychosocial behaviours (especially attitudes, identity, risk, social norms, pro-social behaviour, habit and also decision making, emotions, social deviance, etc.) and road-user safety to encompass a variety of groups and their objective and subjective experience of road safety (in terms of accepted risk, speed of vehicles, crossing behaviour, driver or rider behaviours, but also any interventions aimed at improving road-user safety like seat belts, education, enforcement, speed cameras, traffic calming or any special risk situations like drink-driving or drug-driving). We need to concentrate on UK and post-2000 articles – but may look outside this – any that are outside this remit ought to refer to how it compares to the UK or newer articles.

A1.2 Creating a summary

- 1. Should begin a new Word file for each article reviewed.
- 2. Put the following detail in the title:
 - Name of reviewer, article reference, Harvard ref (taken from the Excel sheet).
 - Write any key words.
 - Especially what attitude type or psychosocial factors it covers (e.g. attitudes (Theory of Planned Behaviour or other type), risk, decision-making, identity, etc.), what group it covers articles about (e.g. drivers, pedestrians, cyclists, older people, adolescents, etc.), what interventions it covers (if any, e.g. seat belts, enforcement, education, learning, etc.).
- 3. Write a summary of the methodology:
 - How many people were involved, attempt at being representative of a population or not, type of methods used?
- 4. Write a summary of the findings:
 - Key findings to be noted especially if not only the ones relating to road user safety and attitudes towards it (albeit our wider definition of attitudes which involves many psychosocial variables).
 - Keep any tables, graphs etc. fine to copy and paste them into the document, but label them and refer to them.

- 5. Write a commentary/interpretation:
 - Read between the lines any indication of bias in the report?
 - Any issues you feel with the methodology and interpretation of the results?
 - Contextualising with other findings.
 - Be honest, did it work? What has it added to our knowledge main findings re-iterated?
 - Very important to note any **gaps** in methodology and findings, and note where would the research go next.
- 6. Links to other articles:
 - Make a note of any other articles you know of or have reviewed that this one links to.

Any actual verbatim quotes taken from the research should be written as such with speech marks around it and page number.

APPENDIX 2

List of articles summarised for the literature review to date

Ref	Article details	Year of pub.	Type of literature	Base of study	Methods	n
AG4	Waylen, A. and McKenna, F. P. (2008) Risky attitudes towards road use in pre- drivers. <i>Accident Analysis and Prevention</i> , 40, 905–911.	2008	Journal	UK	Quantitative	576
AG8	Thomas, J., Kavanagh, J., Tucker, H., Burchett, H., Tripney, J. and Oakley, A. (2007) <i>Accidental Injury, Risk-taking Behaviour and the Social Circumstances in which Young People (aged 12–24) Live: A Systematic Review.</i> London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.	2007	Report	UK	Review	N/A
CM1	Musselwhite, C. B. A. (2006) Attitudes to vehicle driving behaviour: contextualising and categorising risk. <i>Accident Analysis and Prevention</i> , 38, 324–334.	2006	Journal	UK	Mixed	57 qual. and 1,655 quant.
СМЗ	McKenna, F. P. and Poulter, D. (2008) <i>Speed Awareness: The Effect of Education Versus Punishment on Driver Attitudes.</i> Reading: The University of Reading.	2008	Report	UK	Quantitative	2,718
CM4	Musselwhite, C. B. A. and Haddad, H. (2007) <i>Prolonging the Safe Driving of Older</i> <i>People through Technology. Final report. October 2007.</i> Bristol: Centre for Transport & Society, University of the West of England.	2007	Report	UK	Qualitative	70
CM6	Musselwhite, C. B. A. and Haddad, H. (2008) A Grounded Theory exploration into the driving and travel needs of older people. <i>Proceedings of the 40th Universities Transport Study Group Conference,</i> University of Southampton, Portsmouth, January.	2008	Conference paper	UK	Qualitative	70
CM7	Musselwhite, C. B. A. (2004) Technological Humps and Having the Hump with Technology. Presented at the <i>International Conference on Traffic and Transport Psychology</i> , Albert Hall, Nottingham, UK, 5–9 September.	2004	Conference paper	UK	Mixed	57 qual. and 1,655 quant.
CM8	Musselwhite, C. B. A. (2004) <i>Driver Attitudes, Behaviour and Speed Management Strategies.</i> University of Southampton, PhD Thesis.	2004	Thesis	UK	Mixed	57 qual. 1,655 quant.
CM16	Dahlstedt, S. (1994) <i>The SATRE Tables. Opinions about Traffic and Traffic Safety of Some European Drivers.</i> VTI Report No. 403. Linköping, Sweden: VTI.	1994	EU publication	EU	Quantitative	Various
CM27	Parker, D., Manstead A. S. R., Stradling, S. G., Reason J. T. and Baxter, J. S. (1992) Intention to commit driving violations: an application of the theory of planned behaviour. <i>Journal of Applied Psychology</i> , 77(1), 94–101.	1992	Journal	UK	Quantitative	881
						(continued)

Ref	Article details	Year of pub.	Type of literature	Base of study	Methods	n
СМ30	Quimby, A., Maycock, G., Palmer, C. and Buttress, S. (1999) <i>The Factors</i> <i>Influencing a Driver's Choice of Speed – A Questionnaire Study.</i> TRL Report No. 325. Crowthorne: Transport Research Laboratory.	1999	Report	UK	Quantitative	4,526
CM31	Quimby, A., Maycock, G., Palmer, C. and Grayson, G. B. (1999). <i>Drivers' Speed Choice: An In-depth Study.</i> TRL Report No. 326. Crowthorne: Transport Research Laboratory.	1999	Report	UK	Quantitative	116
CM36	Silcock, D., Smith, K., Knox, D. and Beuret, K. (1999) What Limits Speed? Factors that Affect how Fast We Drive. Basingstoke: AA Foundation for Road Research	1999	Report	UK	Mixed	1,000 home interviews, 12 group discussions and 243 video drives
CM48	Scottish Executive Social Research (2004) <i>Parental Attitudes to Road Safety.</i> Edinburgh: Stationery Bookshop.	2004	Report	UK	Mixed	2,400 + 13 focus groups
CM52	Department for Transport (2004) <i>Attitudes to Road Safety</i> . London: Department for Transport. www.dft.gov.uk/pgr/statistics/datatablespublications/trsnstatsatt/ earlierreports/(last accessed 28 October 2008).	2004	Report	UK	Quantitative	Not stated
CM55	Higginson, G. (2005) <i>Lancashire Partnership for Road Safety: Public Opinion Survey</i> . Manchester: ORC.	2005	Report	UK	Quantitative	1,105
CM57	Brake (2006) <i>A Risky Business</i> . The Green Flag Report on Safe Driving 4. Brake Road Safety Charity. www.brake.org.uk/index.php?p=935 (last accessed 28 October 2008).	2006	Report	UK	Quantitative	1,009
CM58	Brake (2005) <i>Are you ready to drive</i> ? The Green Flag Report on Safe Driving 3. Brake Road Safety Charity. www.brake.org.uk/index.php?p=935 (last accessed 28 October 2008).	2005	Report	UK	Quantitative	789
CM59	Brake (2004) <i>Speed.</i> The Green Flag Report on Safe Driving 2. Brake Road Safety Charity. www.brake.org.uk/index.php?p=935 (last accessed 28 October 2008).	2004	Report	UK	Quantitative	850
CM65a	Quimby, A. (2005) Comparing UK and European drivers on speed and speeding issues: some results from the SARTRE 3 survey. <i>Proceedings of the 15th Behavioural Research in Road Safety Conference,</i> November.	2005	Conference paper	UK	Quantitative	Various samples
						(continued)

	Understanding Public
	Attitudes to Road
	d-User Safety – l
	Literature Reviev
	w: Final Report

Ref	Article details	Year of pub.	Type of literature	Base of study	Methods	n
CM69	World Health Organisation (2007) <i>Youth and Road Safety.</i> Geneva, Switzerland: World Health Organisation.	2007	Report	EU	Review	N/A
CM70	Martin, A. (2006) Factors Influencing Pedestrian Safety: A Literature Review. TRL Report PPR 241. Crowthorne: Transport Research Laboratory.	2006	Report	UK	Review	N/A
CM71	Elliott, M. A. and Baughan, C. J. (2003) <i>Adolescent Road User Behaviour: A Survey of 11–16 year olds.</i> TRL Report No. 561. Crowthorne: Transport Research Laboratory.	2003	Report	UK	Mixed	2,433
CM72	Meadows, M. L. and Stradling, S. G. (2006) Young Driver Attitudes. Paper presented at the <i>Novice Drivers Conference</i> .	2006	Conference paper	UK	Quantitative	<i>c</i> . 800
СМ73	Fuller, R., Bates, H., Gormley, M. and Hannigan, B. (2008) <i>The Conditions for Inappropriate Speed: A review of the literature 1995–2006.</i> Unpublished report for the Department for Transport.	2008	Report	UK	Review	N/A
CM74	RAC (2007) RAC Report on Motoring 2007. Driving safely? Norwich: RAC.	2007	Report	UK	Quantitative	2,029
CM77	Hammond, T. B. and Horswill, M. S. (2001) The influence of desire for control on drivers' risk-taking behaviour. <i>Transportation Research Part F: Traffic Psychology and Behaviour</i> , 4, 271–277.	2001	Journal	UK	Quantitative	33
СМ78	Yagil, D. (1998) Gender and age-related differences in attitudes toward traffic laws and traffic violations. <i>Transportation Research Part F: Traffic Psychology and Behaviour, Part F,</i> 2, 123–135.	1998	Journal	UK	Quantitative	181
СМ79	Dorn, L. and Brown, B. (2003) Making sense of invulnerability at work: a qualitative study of police drivers. <i>Safety Science</i> , 41(10), 837–859.	2003	Journal	UK	Qualitative	54
CM80	Rosenbloom, T. (2003) Sensation seeking and risk taking in mortality salience. <i>Personality and Individual Differences</i> , 35, 1809–1819.	2003	Journal	Israel	Quantitative	120
CM81	Stradling, S. G. and Campbell, M. (2003) <i>The Speeding Driver: Who, How and When.</i> Edinburgh: Scottish Executive Social Research.	2003	Report	UK	Mixed	1,084
						(continued)

Ref	Article details	Year of pub.	Type of literature	Base of study	Methods	n
CM82	Moller, M. (2004) An explorative study of the relationship between lifestyle and driving behaviour among young drivers. <i>Accident Analysis and Prevention</i> , 36, 1081–1088.	2004	Journal	Demark	Qualitative	29
CM84	Corbett, C. (2001). Explanation for 'understating' in self-reported speeding behaviour. <i>Transportation Research Part F: Traffic and Transport Psychology</i> , 4,131–150.	2001	Journal	UK	Review	N/A
DfT1	Angle, H. Buckley, K., Fearn, A. and Goddard, E. (2007) <i>Think! Road Safety Campaign. Annual Survey 2007</i> . London: Department for Transport.	2007	Report	UK	Quantitative	2,019
DfT2	Department for Transport (2008) Public attitudes towards road safety issues. Report taken from the <i>British Attitudes Survey 2007</i> . London: Department for Tranpsort.	2008	Report	UK	Review	Mixed
DfT3	Flamingo Research (2008) <i>Driver Mindsets, Myths and Beliefs</i> . Presented to the Department for Transport on 17 July 2008.	2008	PowerPoint presentation	UK	Qualitative	Various
DfT4	2CV (2008) Seat Belts – Communications Territory Exploration. Presented to the Department for Transport in May 2008.	2008	PowerPoint presentation	UK	Qualitative	Various
DfT5	2CV (2007) Road Trip: Informing A Drug Driving Communications Strategy for THINK! Presentation to Department for Transport in June 2007.	2007	PowerPoint presentation	UK	Qualitative	Various
EA5	Wilson, R. J., Meckle, W., Wiggins, S. and Cooper, P. J. (2006) Young Driver risk in relation to parents' retrospective driving record. <i>Journal of Safety Research</i> , 37, 325–332.	2006	Journal	Canada	Quantitative	N/A
EA13	JP. Cauzard (ed.) (2003) <i>European Drivers and Road Risk: Report on principle analyses SARTRE III</i> . Institut National de Recherche sur les Transports et leur Sécurité INRETS.	2003	Report	Int. (EU), incl. UK	Quantitative	c. 24000
EA14	Thaler, R. H. and Sunstein, C. R. (2008) <i>Nudge: Improving Decisions about Health, Wealth, and Happiness</i> . New Haven, CT: Yale University Press.	2008	Book	Int.	Review	N/A
EA22	Tolmie, A. (2006) <i>The Role of Skills, Attitudes and Perceived Norms in the Pedestrian Decision-making of Young Adolescents</i> . A Paper presented at the Road Safety Congress 2006.	2006	Conference paper	UK	Quantitative	Study 1: 169, study 2: 307
						(continued)

Ref	Article details	Year of pub.	Type of literature	Base of study	Methods	n
EA23	Lajunen, T., Parker, D. and Summala, H. (2004) The Manchester Driver Behaviour Questionnaire: a cross-cultural study. <i>Accident Analysis and Prevention</i> , 36, 231–238.	2004	Journal	Finnish	Quantitative	2,000
EA24	King, Y. and Parker, D. (2008) Driving violations, aggression and perceived consensus. <i>Revue européenne de psychologie appliqué</i> , 58, 43–49.	2008	Journal	UK	Quantitative	171
EA27	Parker, D., McDonald, L., Rabbitt, P. and Sutcliffe, P. (2000) Elderly drivers and their accidents: the Aging Driver Questionnaire, <i>Accident Analysis and Prevention</i> , 32(6), 751–759.	2000	Journal	UK	Quantitative	2,294
EA29	Elliott, M. A., Baughan, C. J. and Sexton, B. (2007) Errors and violations in relation to motorcyclists' crash risk. <i>Accident Analysis and Prevention</i> , 39(3), 491–499.	2007	Journal	UK	Quantitative	8,666
EF3	Crundall, D., Bibby, P., Clarke, D., Ward, P. and Bartle, C. (2008) Car drivers' attitudes towards motorcyclists: a survey. <i>Accident Analysis and Prevention</i> , 40(3), 983–993.	2008	Journal	UK	Quantitative	1,355
EF8	Stradling, S. G. (2007) Car driver speed choice in Scotland. <i>Ergonomics</i> , 50(8), 1196–1208.	2007	Journal	UK	Review	N/A
EF10	Conner, M., Lawton, R., Parker, D., Chorlton, K., Manstead, A. S. R. and Stradling, S. (2007) Application of the Theory of Planned Behaviour to the prediction of objectively assessed breaking of posted speed limits. <i>British Journal of Psychology</i> , 98(3), 429–453.	2007	Journal	UK	Quantitative	Study 1: 128 Study 2 318
EF11	Blincoe, K. M., Jones, A. P., Sauerzapf, V. and Haynes, R. (2006) Speeding drivers' attitudes and perceptions of speed cameras in rural England. <i>Accident Analysis and Prevention</i> , 38(2), 371–378.	2006	Journal	UK	Quantitative	464
EF13	M. A. Elliott, C. J. Armitage and Baughan, C. J. (2003) Drivers' compliance with speed limits: an application of the Theory of Planned Behavior. <i>Journal of Applied Psychology</i> , 88, 964–972.	2003	Journal	US	Quantitative	598
EF17	Zeedyk M. S., Wallace L., Carcary B., Jones K. and Larter, K. (2001) Children and road safety: increasing knowledge does not improve behaviour. <i>British Journal of Psychology</i> , 71, 573–594.	2001	Journal	UK	Quantitative	Study1: 120, study 2: 47
						(continued)

Ref	Article details	Year of pub.	Type of literature	Base of study	Methods	n
EF28	Lawton, R., Parker, D., Strading, S. G., and Manstead, A. S. R. (19971) Self- reported attitude towards speeding and its possible consequences in five different road contexts. <i>Journal of Community and Applied Social Psychology</i> , 7, 153–165.	1997	Journal	UK	Quantitative	198
EF32	Elliott, M. A., Armitage, C. J. and Baughan, C. J. (2007) Using the Theory of Planned Behaviour to predict observed driving behaviour. <i>British Journal of Social Psychology</i> , 46, 90–96.	2007	Journal	UK	Quantitative	150
EF34	Elliot, M. A. and Armitage, C. J. (2006) Effects of implementation intentions on the self-reported frequency of drivers' compliance with speed limits. <i>Journal of Experimental Psychology: Applied</i> , 12, 108–117.	2006	Journal	UK	Quantitative	419
EF36	Zeedyk, M. S. and Wallace, L. (2003) Tackling children's road safety through edutainment: an evaluation of effectiveness. <i>Health Education Research</i> , 18, 493–505.	2003	Journal	UK	Quantitative	120
ET1	Towner, E., Dowswell, T., Burkes, M., Dickinson, H., Towner, J. and Hayes, M. (2002) <i>Bicycle Helmets – A Review of their Effectiveness: A Critical Review of the Literature.</i> Road Safety Research Report No. 30. London: Department for Transport.	2002	Report	UK	Review	N/A
ET8	Finnoff, J., Laskowski, E., Altman, K. and Diehl, N. (2001) Barriers to Bicycle Helmet Use. <i>Pediatrics</i> , 108(1), e4.	2001	Journal	USA	Quantitative	2,970
ET13	Lajunen, T. and Räsänen, M. (2001) Why teenagers owning a bicycle helmet do not use their helmets. <i>Journal of Safety Research</i> , 32(3), 323–32.	2001	Journal	Finland	Quantitative	965
ET15	Loubeau, P. (2000) Exploration of the barriers to bicycle helmet use among 12 and 13 year old children. <i>Accident Analysis and Prevention</i> , 32, 111–115.	2000	Journal	UK	Qualitative	31
ET19	Quine, L., Rutter, D. and Arnold, L. (2001) Persuading school-age cyclists to use safety helmets: effectiveness of an intervention based on the Theory of Planned Behaviour. <i>British Journal</i> of <i>Health Psychology</i> , 6, 327–345.	2001	Journal	UK	Quantitative	97
RF2	Fuller, R., Hannigan, B., Bates, H., Gormley, M., Stradling, S., Broughton, P., Kinnear, N. and O'Dolan, C. (2008) <i>Understanding Inappropriate High Speed: A</i> <i>Qualitative Analysis.</i> Road Safety Research Report No. 94. London: Department for Transport.	2008	Report	UK	Qualitative	36
						(continued)

Ref	Article details	Year of pub.	Type of literature	Base of study	Methods	n
RF3	O'Brien, G., Rooney, F., Carey, C. and Fuller, R. (2002) Evaluation of the effectiveness of a dramatic presentation on attitudes to road safety. <i>Behavioural Research in Road Safety XII</i> . London: Department for Transport. pp. 195–207.	2002	Conference paper	Ireland	Quantitative	519
RF4	O'Connell, M. (2002) Social psychological principles: 'The group inside the person'. In Fuller, R. and Santos, J. A. (eds) (2002) <i>Human Factors for Highway Engineers.</i> Amsterdam: Pergamon. pp. 201–215.	2002	Book chapter	N/A	Review	N/A
RF6	Dragutinovic, N. and Twisk, D. (2006) <i>The Effectiveness of Road Safety Education: A Literature Review</i> . R-2006-6. Leidschendam, The Netherlands: SWOV Institute for Road Safety Research.	2006	Report	EU	Review	N/A
SS1	Stradling, S. (2008) A Review of Recent Literature on Road Users' Attitudes to Speed Management. An unpublished report for Transport for London.	2008	Report	UK	Review	N/A
YS3	Emmerson, K. (2008) <i>Learning to Drive: The Evidence</i> . Road Safety Research Report No. 87. London: Department for Transport.	2008	Report	UK	Review	Not specified
YS7	Christmas, S. (2007) <i>The Good, the Bad and the Talented: Young Drivers' Perspectives on Good Driving and Learning to Drive</i> . Road Safety Research Report No. 74. London: Department for Transport.	2007	Report	UK	Qualitative	55
YS8	Department for Transport (2000) <i>The Attitudinal Determinants of Driving Violations</i> . Road Safety Research Report No. 13. London: Department for Transport.	2000	Report	UK	Quantitative	830
YS9	Reason, J., Manstead, T., Stradling, S., Parker, D., Meadows, M., Lawton, R., Baxter, J., Lajunen, T., Senior, V., Adams, J., Beatty, S. and Wooliscroft, J. (2001) <i>Influencing Driver Attitudes and Behaviour</i> . London: Department for Transport.	2001	Report	UK	Mixed	830
YS12	Fylan, F., Hempel, S., Grunfeld, B. Conner, M. and Lawton, R. (2006) <i>Effective Interventions for Speeding Motorists</i> . Road Safety Research Report No. 66. London: Department for Transport.	2006	Report	UK	Review	N/A
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APPENDIX 3

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