

**Road Safety Research Report No. 66**

**Effective Interventions for  
Speeding Motorists**

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# EXECUTIVE SUMMARY

This report summarises the results of research undertaken by two independent research groups (Brainbox Research and the University of Leeds) into the components of interventions that are most likely to change speeding driver behaviour (part one). The parallel nature of the work by these two groups has led to partially overlapping conclusions, which are noted in this joint report. Part two reports the discussions and consensus of an expert group meeting of scientists and stakeholders at which the research was presented. The outcome of this meeting was a list of components that national speed awareness schemes should include, and how such schemes should be evaluated.

Chapter 1 of the report provides an overview of the seven main models that have been used to predict and modify health-related behaviour. The ways in which each of these models assumes speed choice is determined are discussed, and the predictive power of components of the models compared. The review of the models suggests that the strongest predictors of behaviour are intentions, attitudes, perceived behavioural control and self-efficacy. However, the models do not indicate which of these constructs are more amenable to change, so that even though intention to drive within the speed limit would be the greatest predictor of not speeding, it may be difficult to change intention directly, and the other predictors, although having less predictive power, may be easier to change.

Chapter 2 presents a literature review of the social cognitive predictors of speeding. The aim was to investigate the relationship between psychological theoretical models, speeding intentions and behaviour. The review considered attitudes, perceived control, anticipated regret, intention, influence of others, perceived risks, personality and affect. The review provides evidence that social cognitive components predict speeding, and that the perceived benefits of speeding may be as important as the perceived risks. The papers reviewed also point to the need to distinguish between the majority of drivers for whom speeding is moderate and those who adopt speeds that are considerably higher than the norm. This second group of drivers appear to be those who are least deterred by speed cameras and for whom the negative consequences associated with speeding may be least important. They may also be a group of drivers who engage in other risky driving practices (e.g. dangerous overtaking), and these drivers may ignore anti-speeding messages either because they do not think they are targeted at them or because they adopt strategies (e.g. risk-mitigating beliefs) that reinforce their speeding. The findings suggest that whilst road safety campaigns containing risk information and speed enforcement strategies may be useful in deterring drivers, en masse, from speeding and in maintaining current average speeds on roads in the UK, these same strategies may be ineffective in tackling the worst offenders. Indeed, for this group of drivers, the benefits associated with driving fast – perhaps the thrill, excitement and social kudos that speeding generates – may be sufficient to maintain the behaviour despite

the threat of negative consequences. Different forms of interventions may be necessary for this group.

Chapter 3 reports a broader review of the literature on drivers' choice of speed. This had the aim of identifying different sub-groups of speeding drivers. Five psychological factors that influence the speed at which drivers travel were identified:

- attitudes and appraisals;
- perceived normal behaviour and values;
- personality;
- self-identity; and
- intention.

The evidence base supports the existence of four different sub-types of speeding drivers. Unintentional speeders are those who are not aware of the correct speed limit, or who speed because of a lapse of attention, or because they underestimate their speed. Moderate occasional speeders consider themselves to be safe and skilled, and exceed the limit by a level they believe to be relatively low. They do not identify themselves as a speeding driver and they speed less frequently than high speeders. They do not tend to experience pleasure from speeding and they do not generally violate traffic rules. Frequent high speeders are aware that they drive faster than average, and while they may acknowledge that this represents an increased risk, they nevertheless believe they are safe. They have a higher intention to speed and a more positive attitude to speeding than low speeders, and they tend to speed more frequently and experience more pleasure and emotional outlet from driving. These drivers take more risks and report more general accidents or violations. They are usually more experienced drivers and more likely to be men. Their high-speed driving may be restricted to certain circumstances, such as a motorway. Socially deviant drivers acknowledge that their behaviour is dangerous, and they enjoy taking risks and breaking rules. They are more likely to engage in dangerous driving and more general law-breaking, and they score higher on personality measures of psychoticism, thrill, adventure seeking and boredom, and lower on neuroticism. These drivers are more likely to be young, and to engage in more risky behaviour and violations in general. Identifying the type of speeding driver is likely to be problematic when only the observed speed is noted; more information on the individual speeding driver is generally needed.

Chapter 4 reports the results of two independent reviews on effective interventions to change risky behaviour conducted by the University of Leeds and Brainbox. The reviews reached markedly similar conclusions, and provide evidence that effective interventions should target:

- attitudes (beliefs and values) towards speeding;

- beliefs about the acceptability and ubiquity of speeding;
- the driver's responsibility for their own speed choice;
- perceptions of the likelihood of being detected;
- perceptions of the benefits of speeding and the negative consequences of being caught or of crashing;
- perceived barriers to driving at an appropriate speed;
- the way in which speeding makes drivers feel;
- drivers' perceptions of their ability to drive at an appropriate speed; and
- when and where drivers will reduce their speed.

Persuasive messages should be paired with strategies that promote elaboration (e.g. group discussion), and there should be interactive problem-solving sessions to help individuals identify and adhere to appropriate speeds. For example, interventions might be designed to:

- undermine the perception that speeding is associated with benefits;
- promote the idea that there are costs, other than crashing, associated with speeding;
- promote the idea that drivers have control over the speed they adopt and that barriers to driving slowly are easy to overcome;
- undermine the effect of normative pressure on driving fast; and
- promote the affective benefits of driving more slowly.

The reviews indicate that self-efficacy (and perceived behavioural control) may be a particularly important target because of its strong association with behaviour and the fact that there is good evidence about how to intervene effectively. Persuasive messages should be paired with strategies that promote elaboration (e.g. group discussion), and there should be interactive sessions on joint problem-solving to help individuals identify and adhere to appropriate speeds. Drivers should be reminded that speeding is illegal. Reminders of key messages should be sent to drivers some months after the course. Interventions developed to change the speeding behaviour of the worst offenders may need to be different from those designed to prevent/reduce speeding in the general population.

Chapter 5 presents a literature review undertaken by Brainbox to identify the extent to which these potentially effective means of behaviour change have been used in interventions to change speeding behaviour. Eleven published studies describing separate interventions were identified. These provide evidence to suggest that effective speed awareness courses should be based on information and education, and make use of materials that are credible and forceful. Threat- and shock-based

materials are more effective when combined with information on methods of driving more safely. Interventions should include group discussions that address driving problems and how to solve them, and, where possible, should be tailored to individual drivers. Frequent high-speeders and socially deviant drivers are likely to require additional material on why the course is relevant to them, and more material to change their attitudes towards speeding. Moderate, occasional drivers are more likely to require information on why exceeding the speed limit by a few miles is not safe. Chapter 5 also maps current speed awareness courses in the UK against effective intervention components.

Chapter 6 reports an evaluation of existing speed awareness courses. Ten speed awareness courses that are currently run by Safety Camera Partnerships were identified. Courses could be broadly divided into three types:

- classroom-based presentations and discussions together with a driving demonstration and practice;
- classroom-based presentations and discussions without the practice element; and
- a seminar.

One course also included a computerised driving behaviour questionnaire and hazard perception test, which provides drivers with a personalised risk-profile. The majority of courses targeted drivers detected speeding just above the 30 mph enforcement limit, usually 35–39 mph, and some also invited drivers detected in 40, 50 and 60 mph zones. One course was for drivers detected driving at excessive speeds, e.g. 50 mph in a 30 mph zone. The courses tended to have a common core content, including:

- the reasons people speed;
- the consequences of speeding;
- stopping distances at different speeds;
- the likelihood that pedestrians will die when hit at different speeds;
- the purpose of safety cameras and the criteria used for siting them;
- identifying speed limits;
- hazard perception; and
- selecting an appropriate speed.

Four of the courses contain a two- or three-hour practical session in which two or three drivers practise their driving with an Advanced Driving Instructor. Clients are asked to identify speed limits, hazards and appropriate driving speeds. In addition to assessing venue and instructor quality, we recommend that course evaluations should include a questionnaire to assess:

- clients' intentions to speed;
- their confidence in identifying the speed limit of different roads;
- their confidence in their ability to apply what they have learnt; and
- their attitudes toward speeding, including subjective norms.

A questionnaire on intentions to speed, attitude towards speeding, subjective norms regarding speeding and confidence in identifying the correct speed limit should be sent to clients before the course, and they should be asked to complete the same questionnaire directly after the course. The impact of the course on these areas should be assessed. We further suggest that an evaluation should assess the effectiveness of the course in changing speeding behaviour. This should be undertaken by recording subsequent speeding offences in a group of clients who have attended the course and in a matched group who chose not to attend the course. Speeding offences should be recorded nationally rather than at a local level, with a minimum follow-up period of six months. The proportion of drivers offered the course who choose to attend (i.e. uptake rates) should also be monitored.

Part two of the report summarises the discussions that took place during an expert group meeting of scientists and speed awareness course stakeholders, with the aim of discussing the research and agreeing a set of feasible practical recommendations for police forces and course providers. While the courses are targeted primarily at unintentional and moderate speeders, all four types of speeding drivers are likely to attend, so a core component should be delivered to all drivers, with some tailored components added for the most deviant two groups.

Details of the cost and duration of the course were discussed. It was agreed that the cost of courses (time and money) should not have an adverse affect on uptake. While longer behavioural programmes, particularly those delivered at more than one time point, tend to be more effective, practical constraints on course providers and clients could make it difficult to deliver multi-session courses successfully. The group recommended three course structures of increasing robustness:

- a half-day classroom course;
- a full-day course (half-day classroom and half-day practical); and
- a full-day course followed one week later by a half-day classroom discussion.

The best possible course type should be provided given the available resources and constraints. Course content was also discussed. It was agreed that all constructs identified by the research review should be included in the courses. The Association of Chief Police Officers (ACPO) course model has provided a starting point and the scientists were tasked, post-meeting, with mapping the ACPO course against the effective interventions identified in the review (Section 7.3), and using the research findings to develop suggestions for course content (Section 7.4). The group agreed

that, while some prescription on course content is needed, this should be limited to essential parameters so as to allow the flexibility to tailor the intervention to individual attenders. The method of delivery is important: elaboration, discussion and problem solving are vital, and methods that make attenders engage and interact with the material should be used. There is evidence that post-course reminders are effective, and the group agreed that such reminders, by way of posted leaflets with key messages, should be sent to all attenders some weeks after course completion. This should be a checklist of things drivers have to put in practice. A constant reminder – such as a key ring with key messages – might also be useful.

The group agreed that quality assurance is important and should be monitored closely. A percentage of courses could be observed, and the cost of this validation could be covered within the course fee. In addition to the quality of provision, course effectiveness should also be evaluated. At present, the majority of evaluations are of client acceptance rather than whether the course's aims have been achieved. The opportunities for control group data from regions that do not currently offer a speed awareness course should be explored in the near future. As well as being validated, the way in which courses should be evaluated was discussed. It was agreed that the scientists should work together after the meeting to develop an evaluation methodology. The scientists recommended (Section 7.5) that this should include both intentions and attitudes to speeding, and also changes in each of the constructs that the course aims to address (e.g. self-efficacy, normative beliefs). Measures should be taken at three time points:

- before the course;
- directly afterwards (clients should complete and return their questionnaires at the course rather than at home so as to reduce data loss from non-returned questionnaires); and
- 12 months after the course.

Re-offending data should also be collected over the 12-month post-course period.

# PART 1 RESEARCH REPORT

## 1 MODELS USED TO PREDICT AND MODIFY BEHAVIOUR

There are several health psychology theories that aim to predict behaviour and to model the way in which individuals make decisions about their health. Increasingly, such theories have been used in the design and implementation of interventions to change risky behaviours. The main models relevant to this report are outlined below.

### 1.1 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) proposes that behaviour is determined by **intention** to engage in that behaviour and **perceptions of control** over that behaviour. Intentions represent a person's motivation in the sense of her or his conscious plan or decision to perform the behaviour, and are determined by three factors. The first of these is **attitudes**, which are the overall evaluations of the behaviour by the individual. The second is **subjective norms**, which consist of a person's beliefs about whether significant others think he or she should engage in the behaviour. The third determinant of intentions is **perceived behavioural control** (PBC), which is the individual's perception of the extent to which the behaviour is easy or difficult to perform. So, according to the TPB, a driver is likely to avoid speeding if he or she believes that this will lead to particular outcomes which the driver values (such as avoiding points or reducing the risk of crashing), if the driver believes that people whose views they value think they should avoid speeding, and if the driver feels that they have the necessary resources and opportunities to do so.

### 1.2 Health Belief Model

The Health Belief Model (HBM) contains two main components: (a) perceptions of a health threat; and (b) evaluations of the effectiveness of behaviours aimed at counteracting the threat. Threat perceptions result from beliefs about the **perceived susceptibility** to the illness or adverse event and the **perceived severity** of its consequences. Perceived severity is not just concerned with medical consequences, but also with the potential effects of an illness or event on an individual's job, family life and social relations. Whether or not an individual engages in a health-related behaviour is determined by the combined effect of these two variables. An individual will decide upon the particular action to be taken by evaluating the possible alternatives. Health behaviours will be evaluated in terms of their **perceived benefits** or efficacy (such as reducing the risk of crashing) and also by their **perceived costs or barriers** (such as it being inconvenient, unpleasant or expensive).

A further predictor of behaviour in the HBM is **cues to action**, commonly divided into factors which are internal (e.g. physical symptoms) or external (e.g. mass media campaigns, advice from others) to the individual. **Health motivation** was suggested by Becker (1974) as a further component of the model. Becker defined health motivation as readiness to be concerned about health matters and argued for its inclusion in the model as certain individuals may be predisposed to respond to cues to action because of the value they place on their health. Therefore, according to the HBM, a driver is likely to avoid speeding if:

- they believe that they are susceptible to negative outcomes. such as being fined or being involved in a crash and that these outcomes are serious;
- they believe the benefits of not speeding outweigh the costs; and
- that they notice that they are travelling fast and observe safety cameras.

### 1.3 Protection Motivation Theory

Protection Motivation Theory (PMT) explains fear appeals. As typically applied (Maddux and Rogers, 1983), PMT describes adaptive and maladaptive coping with a threat as the result of two appraisal processes: threat appraisal and coping appraisal. Threat appraisal is based on perceptions of **susceptibility** and **severity** of the threat. Coping appraisal involves the process of assessing the behavioural alternatives which might diminish the threat. This coping process is assumed to be based upon two components: the individual's expectancy that carrying out a behaviour can remove the threat (**action-outcome efficacy**), and a belief in one's capability to successfully execute the recommended courses of action (**self-efficacy**). Together these two appraisal processes result in the **intention** to perform adaptive or maladaptive responses. Adaptive responses are more likely if the individual perceives themselves to be susceptible to a threat which is perceived as being severe; fear arousal is assumed to operate via increasing these perceptions of susceptibility and severity. Adaptive responses are also more likely if the individual perceives them to be effective in reducing the threat and believes that he or she can successfully perform the adaptive response. Protection motivation is typically operationalised as the intention to perform the health-protective behaviour or avoid the health-compromising behaviour in order to protect oneself from danger. The likelihood that an individual would perform adaptive behaviours (drive within the speed limit) increases when they perceive strong self-efficacy (e.g. 'I know what the limit is and I am able to drive within it') and response-efficacy (e.g. 'If I drive within the limit I won't be flashed by a camera'), and few costs associated with performing that behaviour (e.g. 'Driving within the limit won't add much extra time to my journey'). In contrast, the likelihood of performing maladaptive behaviours (speeding) is increased when they hold positive beliefs about the rewards associated with the maladaptive behaviour (e.g. 'Speeding is exciting and it will get me there faster') and low vulnerability (e.g. 'I can drive fast safely'), and severity of the risks involved (e.g. 'Three points won't make much difference to me').

## 1.4 Social Cognitive Theory

In Social Cognitive Theory (SCT; Bandura, 1982) human motivation and action are assumed to be based upon three types of expectancies: **situation-outcome**, **action-outcome** and **perceived self-efficacy**, although the focus is on the latter two and self-efficacy in particular. Situation-outcome expectancies represent beliefs about which consequences will occur without personal action. Susceptibility to a health threat represents one such situation-outcome expectancy. Action-outcome expectancy is the belief that a given behaviour will or will not lead to a given outcome. For example, the belief that slowing down will lead to a reduced risk of crashing would represent an action-outcome expectancy. Self-efficacy expectancy is the belief that a behaviour, such as complying with the speed limit, is or is not within an individual's control. SCT also includes **goals** and **perceived impediments and opportunities**.

## 1.5 Implementation intentions

A construct that appears important to the translation of intentions into actions is implementation intentions (Gollwitzer, 1993). While goal intentions are concerned with intentions to perform a behaviour or achieve a goal (i.e. 'I intend to comply with the speed limit'), implementation intentions are concerned with plans as to when, where and how the goal intention is to be translated into behaviour (i.e. 'I intend to comply with the speed limit when I drive to work'). The important point about implementation intentions is that they commit the individual to a specific course of action when certain environmental conditions are met; in so doing, they help translate goal intentions into action. Gollwitzer (1993) argues that by making implementation intentions, individuals pass control to the environment. The environment therefore acts as a cue to action, such that when certain conditions are met, the performance of the intended behaviour follows almost automatically.

## 1.6 Transtheoretical Model

The Transtheoretical Model (TTM) is the dominant 'stage' model in health psychology and health promotion. Such stage models are different from the models considered above in that they consider behaviour change to occur through a series of stages. Such models focus on factors that predict stage transition rather than those that predict intention or behaviour. Although often referred to as the stages of change model, the TTM includes several constructs: the **stages of change**, the **pros and cons of changing** (together known as **decisional balance**), **confidence and temptation**, and the **processes of change**. The TTM was an attempt to integrate these different constructs into a single coherent model. The most widely used version of the model specifies five stages:

- **precontemplation**, where the person has no intention of making changes ('I am happy speeding and intend to continue speeding');

- **contemplation**, where the person is considering changing ('Perhaps I should make sure that I don't speed in future');
- **preparation**, where the individual makes some small change to their behaviour ('I will try to stop speeding in pedestrian areas');
- **action**, where the individual is engaged in changing their behaviour ('I have stopped speeding'); and
- **maintenance**, where the individual has been sustaining that behaviour changes over time ('I have not been speeding for months').

People are assumed to move through the stages in order, but they may relapse from action or maintenance to an earlier stage, or they may cycle through the stages several times before achieving long-term behaviour change. Drivers would therefore start by not considering reducing their speed (precontemplation), then think about it (contemplation), then find out more about identifying speed limits and techniques to reduce their speed (preparation), then apply this to drive within the speed limit (action) until such driving behaviour becomes habit (maintenance). The pros and cons are the perceived advantages and disadvantages of changing one's behaviour. Confidence is similar to Bandura's (1997) construct of self-efficacy; it refers to the confidence that one can carry out the recommended behaviour across a range of potentially difficult situations. Temptation refers to the temptation to engage in the unhealthy behaviour across a range of difficult situations. Finally, the processes of change are the covert and overt activities that people engage in to progress through the stages. Prochaska *et al.* (2004) have identified 10 such processes that appear to be common to a number of different behaviours: five experiential (or cognitive-affective) processes and five behavioural processes.

## 1.7 Self-regulation Model

The Self-regulation Model was developed in the context of chronic illness and processing information from health-threatening messages. It was proposed that individuals form a lay **representation** of their illness or condition and that the representation has both **cognitive** and **emotional** content. According to the theory, if the condition or event is represented as sufficiently threatening by an individual, they will be compelled to search for appropriate **coping procedures** to reduce the perceived threat. Coping procedures may be active (behavioral) or passive (psychological), and are applied to both the cognitive and emotional components of the representation. The effectiveness of these coping procedures is appraised and, if necessary, the person modifies their representation of the illness. Applied to speeding, drivers would form a representation of speeding based on both what they think of speeding (e.g. safety, time saving, risk of being caught) and how it makes them feel (e.g. exhilarated, skilled, nervous, stressed). They apply coping procedures to reduce the threat from both their beliefs and their feelings. For example, the driver who speeds and is not detected and does not crash, might modify their

representation of speeding as being safer and they might choose to continue to drive faster. The driver who is detected might change their representation so that speeding is perceived as being less safe, and may cope by decreasing their speed, either generally or in areas where safety cameras are located.

## 1.8 Comparing the different models

Despite the substantial volume of empirical work using the above social cognition models (SCMs) to predict a range of behaviours, there has been little empirical work comparing the predictive power of the different models (Conner and Norman, 2005). A number of authors have commented on the theoretical overlap between constructs contained in the main SCMs (e.g. Norman and Conner, 2005). First, models that have been developed specifically to predict health behaviour (i.e. HBM and PMT) focus on the notion of threat as measured by perceived susceptibility and perceived severity. In addition, SCT focuses on expectancies about environmental cues (i.e. risk perception). In contrast, the TPB does not explicitly cater for emotional or arousal variables, leading some authors to suggest that the TPB may be limited to the rational part of a health decision. Second, most SCMs of health behaviour focus on the perceived consequences of performing a health behaviour (e.g. Weinstein, 1993). For example, in the TPB the focus is on behavioural beliefs, in the HBM it is on the benefits and costs of performing a health behaviour, while in SCT it is on outcome expectancies and in PMT it is on response-efficacy. Third, there is considerable overlap between the PBC component of the TPB and self-efficacy (Ajzen, 1991). A number of the models also focus on specific control issues or barriers to the performance of health behaviour. Thus, a similarity can be noted between control beliefs in the TPB, the perceived barriers dimension of the HBM and the response costs in the PMT (Conner and Norman, 1994). Fourth, normative influences on behaviour are not explicitly covered by SCMs of health behaviour (Conner and Norman, 1994), with the exception of the TPB which includes the subjective norm construct and underlying normative beliefs. In the HBM, normative influences are simply listed as one of many potential cues to action. In SCT, normative influences may be covered by outcome expectancies that focus on the perceived social consequences of behaviour. Fifth, the TPB, SCT and PMT include an intervening variable which is seen to mediate the relationship between other social cognitive variables and behaviour (Weinstein, 1993). In the TPB this variable is behavioural intention, while in PMT it is labelled protection motivation. Sixth, the TPB and SCT also postulate a direct relationship between self-efficacy (or PBC) and behaviour, in addition to the one between intention and behaviour.

A number of conclusions can be drawn from the above comparisons (Norman and Conner, 2005). First, there is considerable overlap between the constructs included in the models. For example, most focus on outcome expectancies or the consequences of performing a behaviour. Second, some of the models may usefully be expanded to consider normative influences and perceived threat. Third, there is a strong case for including self-efficacy in all models of health behaviour. Fourth,

behavioural intention should be included in all models as a mediating variable between other social cognitive variables and behaviour. Not only does intention typically emerge as the strongest predictor of behaviour but it also marks the end of a motivational phase of decision making that many SCMs focus upon.

Tables 1.1 and 1.2 summarise data from a review of the predictive power of constructs taken from these different models (Conner and Norman, 2005). Table 1.1 shows their power to predict behaviour, while Table 1.2 shows their power to predict intentions. In both tables,  $k$  is the number of studies,  $n$  the total sample size, and  $r^+$  the effect size. The relationship between intention and behaviour equates to large effect sizes ( $r^+ \sim 0.5$ ) for the TPB and PMT. The relationship between behaviour and PBC and attitude (TPB) and response costs (PMT) are of a medium effect size ( $r^+ \sim 0.3$ ). Other relationships have small ( $r^+ \sim 0.1$ ) to medium ( $r^+ \sim 0.3$ ) effect sizes.

<b>Table 1.1: A meta-analytic integration of the predictors of behaviour from the reviewed SCMs</b>			
<b>Relationship</b>	<b><math>k</math></b>	<b><math>n</math></b>	<b><math>r^+</math></b>
<b>TRA/TPB<sup>1</sup></b>			
Intention – behaviour	420	82,712	0.48 <sup>1</sup>
PBC – behaviour	241	55,444	0.35 <sup>2</sup>
Attitude – behaviour	126	28,495	0.36 <sup>2</sup>
Subjective norm – behaviour	122	28,410	0.16
<b>HBM<sup>2</sup></b>			
Barriers – behaviour	16	-	-0.21
Susceptibility – behaviour	16	-	0.15
Benefits – behaviour	16	-	0.13
Severity – behaviour	16	-	0.08
<b>PMT<sup>3</sup></b>			
Vulnerability – behaviour	4	401	0.12 <sup>4</sup>
Severity - behaviour	4	372	0.07
Fear – behaviour	1	194	-0.04
Self-efficacy – behaviour	5	512	0.22
Response efficacy – behaviour	4	388	0.09
Response costs – behaviour	2	194	0.25
Intention – behaviour	4	432	0.40
<b>SCT<sup>4</sup></b>			
Self-efficacy – behaviour	20	6,913	0.23
Outcome expectancy – behaviour	17	5,502	0.17
Goal Intention – behaviour	4	1,453	0.30
Sociostructural factors – behaviour	1	299	0.20
1 From Conner and Sparks (2005). 2 From Harrison <i>et al.</i> (1992). 3 From Milne <i>et al.</i> (2000). 4 From Conner <i>et al.</i> (2005).			

**Table 1.2: A meta-analytic integration of the predictors of intentions from the reviewed SCMs**

Relationship	<i>k</i>	<i>n</i>	<i>r</i> <sub>+</sub>
<b>TRA/TPB<sup>1</sup></b>			
Attitude – intention	497	111,558	0.51
Subjective norm – intention	472	109,111	0.34
PBC – intention	386	95,877	0.43
<b>HBM<sup>2</sup></b>			
–			
<b>PMT<sup>3</sup></b>			
Vulnerability – intention	10	1,366	0.16
Severity – intention	9	1,196	0.10
Fear – intention	4	411	0.20
Self-efficacy – intention	13	2,181	0.33
Response efficacy – intention	12	1,756	0.29
Response costs – intention	4	631	0.34
<b>SCT<sup>4</sup></b>			
Self-efficacy – goal intention	3	1,154	0.52
Outcome expectancy – goal intention	5	2,999	0.28
Sociostructural factors – goal intention	1	299	0.16

1 From Conner and Sparks (2005).  
2 From Harrison *et al.* (1992).  
3 From Milne *et al.* (2000).  
4 From Conner *et al.* (2005).

## 1.9 Conclusion

The review indicates that the strongest predictors of behaviour are, in descending order of importance: intention, attitude, PBC, and self-efficacy. Effective interventions should, theoretically, target these areas. However, the models do not indicate which of these constructs are more amenable to change, so that even though intention to drive within the speed limit would be the greatest predictor of not speeding, it may be difficult to change intention directly, and the other predictors, although having less predictive power, may be easier to change. The evidence for the effectiveness of interventions in changing behaviour is addressed in Chapter 4.

## 2 SOCIAL COGNITION PREDICTORS OF SPEEDING

Between January and March 2005 a review of the speeding literature, using PsycInfo, Medline and Web of Knowledge databases, was conducted by the University of Leeds. The aim of the review was to investigate the relationship between psychological theoretical models, component constructs, and speeding intentions and behaviour. Methodological details are provided in the full report (Conner *et al.*, 2005). A total of 613 papers were generated by this search. Application of the inclusion criteria – (1) empirical studies, (2) included speed intentions or behaviour as an outcome variable and (3) measurement of psychological construct/s – reduced this to 24 articles and book chapters. The review is structured around the psychological constructs used in these studies.

### 2.1 Influence of others

Four studies explicitly investigated the influence of others on speeding behaviour. These social influences were conceptualised as:

1. the perception of other drivers' speed (Aberg *et al.*, 1997; Groeger and Chapman, 1997);
2. the direct influence of a passenger via social facilitation (Baxter *et al.*, 1990); and
3. perceived normative pressure from a passenger (Conner *et al.*, 2003).

In 1993, Connolly and Aberg suggested a contagion model of drivers based on the view that speed is affected by a comparison of one's own speed with that of other nearby drivers; this model was later tested by Aberg *et al.* (1997). The findings indicated that drivers who engaged in speeding were more likely to overestimate the speeding of others and were more likely to want to drive like others, and these effects were not mediated by attitudes toward speeding.

Groeger and Chapman (1997) tested the contagion model by studying the extent to which speed varied as a function of others' speeding behaviour and information about the normative compliance level via the posting of roadside variable message signs. These experiments demonstrated that posted information about the percentage of people complying with the speed limit can be effective in reducing traffic speeds, but only when other traffic appears to be complying with this posted information. Thus, the presentation of normative information in the form of variable message signs is ineffective when the behaviour of those around contradicts this message.

Baxter *et al.* (1990) used an in-car observational technique to investigate the social facilitation effects of passengers of different ages and genders for different groups of

drivers. Younger drivers drove faster than older drivers. Slower speeds were adopted by drivers with older female passengers than when drivers were alone or with either male or female younger passengers. Young male passengers were associated with the highest levels of speeding.

A scenario-based questionnaire study to assess the impact of the gender of passengers on intentions to break the speed limit was carried out by Conner *et al.* (2003). Male drivers did not differ from females in their intentions to speed in this study. Young men appear to perceive greater social pressure to speed than young women. Normative pressure was also more likely to predict intentions to speed for men than women, particularly when driving alone. The results also suggest that intentions are predicted more strongly by normative pressure in driving situations in which the passenger is a young male. Together, these findings suggest that normative pressure arising from young male drivers is strongest and that this might have the most significant effect on the speed adopted by young male drivers.

These studies of social influence on drivers' speeding intentions and behaviour have important implications for interventions to reduce speeding. Changing the perceived normative pressure from young men, and targeting these same male drivers, perhaps by undermining the norms that promote speeding, might be a useful target for intervention. One way this might be achieved is through the ridiculing of attempts to impress a male passenger with fast driving. However, the findings from the contagion model suggest that the effects of this kind of intervention might be short lived if the target audience perceives that the norm on the roads is to drive above the speed limit. Intervention on two fronts, via enforcement of the speed limit and thus the reduction of the observed average speed (actual social influence), together with interventions to undermine the norms that sustain fast driving amongst those most at risk (young men), may be required to produce any longer-lasting effect.

## 2.2 Perceived risk

Two studies identified in this review examined speeding in relation to perceptions of risk. Adams-Guppy and Guppy (1995) investigated the role of the perceived probability of adverse events (perceived risk) together with utility measures (e.g. the importance of getting to a destination on time) in predicting self-reported behaviour. Drivers were asked to report on their frequency of speeding on motorways at 10 mph and 20 mph above the speed limit. Hierarchical multiple regressions indicated that, while perceptions of the risk of injury were not good predictors, time pressure was a good indicator. This finding implies that more frequently occurring positive factors are better predictors of behaviour than rare, but negative, events.

Brown and Cotton (2003) interviewed drivers about their perceptions of risk in relation to speeding, and risk-mitigating beliefs (the common-sense notions that a driver might employ to justify their speeding, e.g. that it is ok to speed when there are no cars around or when driving on a straight road). The findings suggest that

those who adopt risk-mitigating beliefs report higher levels of speeding. Moreover, as estimates of risk partially mediated this effect, the implication is that these risk-mitigating beliefs may serve to reduce perceptions of the risk of speeding. The authors also identified that those drivers who reported speeding perceived higher levels of negative consequences.

Lawton *et al.* (1997) used a scenario-based questionnaire to investigate attitudes towards speeding in five different contexts:

- a residential street (30 mph limit);
- a busy shopping street (30 mph limit);
- a winding country road (50 mph limit);
- a dual-carriageway (60 mph limit); and
- a motorway (70 mph limit).

Half of the drivers considered speeding 10 mph above the speed limit, while the other half considered a 33% margin (i.e. 93 mph on a motorway). Drivers were asked to indicate their intentions to exceed the speed limit, as described in the scenario. They were also asked to indicate how serious an offence, and how risky and annoying to other road users, the speeding depicted in the scenario was. Drivers reported being most likely to speed in a residential street and this was associated with lower negative consequences. Moreover, perceptions of negative consequences were a significant and important predictor of intentions across scenarios.

The results of the studies reported here suggest that the relationships are complex. Although, intuitively, one might expect that those people who perceive the risks associated with speeding to be high will be less likely to speed, other factors seem to be more important, such as benefits (e.g. getting to the destination more quickly). As drivers rarely experience negative outcomes such as accidents, fines, etc., they may employ risk-mitigating beliefs as a defensive strategy that allows them to maintain speeding. Campaigns designed to increase perceptions of risk may be less effective than campaigns that undermine the experience of the positives associated with the behaviour. Support for this comes from a study by De Waard and Rooijers (1994) which showed low-speed drivers to have neutral attitudes toward speeding, while fined and unfined offenders had equally positive attitudes. Thus, the experience of a negative consequence seems to have done little to change attitudes. This has implications for interventions designed to reduce speeding. It suggests that emphasising the negative consequences associated with speeding may not be effective in reducing intentions to speed.

## 2.3 Theory of Planned Behaviour

Three studies designed to test the TPB in the context of intention to speed are described below. Three additional studies were identified which used the TPB as a framework for an intervention, and these are described in Section 5.1.

Newnam *et al.* (2004) used the TPB to predict speeding intentions when driving both work and personal vehicles. Participants were presented with a scenario describing a driver travelling at 65 kph in a 50 kph zone. Two regressions were performed predicting the intention to speed in a personal vehicle and the intention to speed in a work vehicle. The total variance accounted for was 27% and 16% respectively. In both cases the strongest predictor of speeding intention was anticipated regret. Attitude and PBC were also significant predictors of intention to speed in a personal vehicle.

Parker *et al.* (1992a,b) investigated intentions to drive at 40 mph in a 30 mph zone. Eight-hundred drivers were recruited to the study, stratified by age and sex. The items included in the questionnaire were elicited via a previous pilot study involving 240 drivers. Together the TPB variables accounted for 47.2% of the variance and all were significant predictors. The strongest predictor was PBC ( $\beta = -0.39$ ) and subjective norm ( $\beta = 0.30$ ). Thus, those people who reported intentions to speed at 40 mph in a 30 mph zone were more likely to have lower perceptions of control over their speeding and to feel that important others agreed with their speeding.

The two studies above, not only rely on self-report, but they are cross-sectional and attempt to predict speeding intentions, rather than speeding behaviour. Elliot *et al.* (2003) addressed some of these limitations in their prospective study of compliance with speed limits in built-up areas. Demographic information, TPB variables and past behaviour were measured, and three months later their speeding behaviour was recorded. The TPB variables all significantly predicted intention, with the strongest predictor being PBC. Both intention and PBC were significant predictors of behaviour. The authors conclude that targeting PBC as the strongest predictor of intention and a significant direct predictor of reported behaviour might be a useful means of reducing speeding.

Studies of speeding using the TPB as a framework have consistently identified that feelings of control are important in predicting both intentions and self-reported behaviour. This finding is also revealed in prospective studies, making the argument for causation stronger. Hence, regardless of whether drivers use perceived lack of control as an excuse for their speeding or whether their actual or perceived level of control causes them to drive fast, this is an important variable to target. Another promising target for intervention, that has been little researched, are the emotions around speeding. Both anticipated regret (operationalised as how good speeding makes you feel) and affective beliefs have been shown to be influential in changing attitudes and predicting intentions and self-reported behaviour.

## 2.4 Personality characteristics

Six studies investigated the relationship between personality characteristics of the driver and reported or actual speeding behaviour. In a study of the demographic and personality predictors of risky driving, Boyce and Geller (2002) also investigated the extent to which risky behaviours covary. Measures of personality included thrill-seeking, impulsivity, hostility, trait anger, perceptions of invulnerability, locus of control and Type A personality. Regression analyses identified that mean speed across the trial was predicted by age ( $r = -0.59$ ) and Type A personality ( $r = 0.33$ ); together these variables accounted for 42% of the variance. Significant correlations were found between speeding, driving too closely and off-task behaviours, which offers support for problem behaviour syndrome. This, they suggest, is important because intervening to change one's behaviour will impact on other driving behaviours.

West *et al.* (1993) did not find a significant relationship between Type A behaviour and reported speeding amongst a sample of drivers in the UK. However, reported speed was significantly predicted by social deviance ( $\beta = 0.36$ ), thoroughness ( $\beta = -0.14$ ) and annual mileage ( $\beta = 0.28$ ).

Jonah *et al.* (2001) found that high sensation seekers were more likely to report driving at 120 kph or faster if there was no speed limit. This same group also rated driving at this speed as more exciting. Whissell and Bigelow (2003) also investigated sensation seeking in driving, via a newly developed speeding attitude scale, and tested the extent to which responses on this measure were associated with having been issued with speeding tickets. The authors report a significant correlation ( $r = 0.16$ ) between sensation seeking and speeding tickets. The scale itself measures the extent to which driving fast is experienced as thrilling and fun, and whether mood effects one's driving. Sumer (2003) used structural equation modelling techniques to develop a contextualised model of risky driving. Sensation seeking was found to be a large and significant predictor of speeding, with a path coefficient of 0.60. Hammond and Horswill (2001) suggest that the desire for control might be crucial in distinguishing speeders from non-speeders. Significant differences in speed choice were found for those people with a high desire for control (9.44 mph) and those with a low desire for control (3.20 mph).

Together, these findings suggest that while personality might be a factor in speed choice, there is no clear evidence as to which personality dimension is most important. Moreover, identifying personality characteristics that might be correlated with reported or actual speeding behaviour is not particularly helpful in developing interventions, except perhaps in appealing to the personality of certain drivers in targeted speeding campaigns or where personality moderates the influence of other, more easily modified predictors of speeding behaviour.

## 2.5 Affect

Four studies have investigated the effect on speeding of various forms of threat message designed to promote fear. Ben-Ari *et al.* (1999; 2000) investigate the effect of increasing mortality salience on reported speeding behaviour and simulated speeding behaviour. Making mortality more salient will have the effect of reducing sensitivity to fatal costs and will increase awareness of the self-relevant esteem-related gains. Thus, the authors predicted that, for drivers who perceived driving as relevant to their self-esteem, speeding would increase as a result of mortality salience. When mortality was made salient, participants for whom driving was important to their self-esteem increased their speed, whereas those for whom driving was not important to self-esteem, decreased their speed. These effects were found for both self-report behaviour and driving in a simulator. Positive feedback about driving skills was found to weaken the effects of mortality salience on driving speed.

In two further studies, Ben-Ari *et al.* (2000) argued that threat appeals in the form of road safety adverts could be conceptualised as mortality salience inductions. Therefore, they hypothesise that road safety adverts will have a differential effect on those for whom driving is highly relevant to their self-esteem and for those for whom it is not. The first experiment, based on **self-reported** reckless driving, contradicted the previous findings: the threat appeal appeared to significantly reduce reported reckless driving when driving was relevant to self-esteem compared to when it was not. In a follow-up study, in which **speed** in a simulator was the dependent variable, the previous findings were supported. The videos served to reduce speeding for drivers when driving was not relevant to self-esteem, but had the effect of increasing speeding amongst those for whom driving was relevant. Together, these findings suggest that, for some groups of drivers, fear-inducing adverts that make mortality more salient may have an undesired effect. However, the long-term impact of mortality salience is unknown, and further research is required to understand why the findings were different for self-report and simulator driving behaviour.

Rossiter and Thornton (2004) also conducted a study to investigate the patterns of fear and relief generated during television anti-speeding adverts, and the impact of these adverts on speed choice in a video speed test. The participants were randomly assigned to watch either a shock-based anti-speeding advert or a fear-relief advert. Participants were exposed to the videos for five minutes, for three consecutive weeks. At the end of the video in week three, participants completed a video speed test which measured the tendency to speed up or slow down compared with the driver in six driving scenarios. A comparison, control group was also recruited which completed the video speed test without seeing the commercial. While speed was lower for the fear-relief advert compared with the control after both moderate and heavy exposure to the video, the shock advert appeared to result in greater speeds amongst males than for the control group

Walton and McKeown (2001) investigated the reactions to safety campaigns of drivers with biased perceptions about their own speeding behaviour in comparison to that of others. Participants reported their usual speed (on 50 kph and 100 kph roads) and their perception of the speed of others on these same roads. Participants who reported that their speed was higher than the actual average speed, but lower than other drivers, were allocated to the biased perception group. In the second part of the survey, participants were asked to indicate whether anti-speeding messages were intended for 'people like me' or 'intended for others'. For all but one of the five slogans tested, those drivers in the biased perception group were significantly more likely to report that the slogans were directed at others, rather than themselves. The authors concluded that safety messages might be ignored by speeding drivers because they have biased perceptions about their driving in comparison to others and so they feel that the messages are targeted at others. Another group of drivers clearly recognised that they engaged in speeding and that the messages were aimed at them but, given their reports of speeding, had obviously been unaffected by the messages. These findings suggest that safety campaigns may do little to change the behaviour of those drivers most at risk.

Together these studies suggest that caution is needed when developing road safety campaigns that involve generating extremes of negative affect – shock, fear or mortality salience. While these approaches may be effective for some drivers, it is possible that for those for whom driving is important to self-esteem, or for drivers with biased perceptions about their speed in comparison to others, these campaigns may have undesirable or limited effects.

## 2.6 Conclusions

There is now a body of research investigating the social cognition constructs predicting speeding intentions and behaviour. However, the heterogeneity of this research with respect to sample type (student, employees, drivers in the general population), road type (e.g. motorway or suburban road), speeding measure (i.e. absolute speed/speed choice or likelihood of travelling at 40 mph in 30 mph zone) and whether measures are of intentions/behaviour, are self-report or objective, and the variety of psychological factors investigated (e.g. personality, risk perception, control, attitudes, social influence), means that it is difficult to draw any strong conclusions. Moreover, it is possible to make only tentative claims about causative relationships as 13 of the 24 papers reviewed here report research that is cross sectional. There is also evidence from this review that the benefits associated with speeding, for example reaching a destination more quickly, may be as, if not more, important than the risks associated with speeding in predicting self-reported intentions and behaviour. The findings also indicate an important role for perceptions of control in predicting this risk-taking behaviour. Indeed, all of the studies that measured PBC as a component of the TPB identified that this variable was a significant and large predictor of intentions and behaviour.

The papers reviewed here also point to the need to distinguish between the majority of drivers for whom speeding is moderate and is 'normal' (i.e. it is not considered deviant), and those drivers who adopt speeds that are considerably higher than the norm. This second group of drivers appears to be comprised of those who are the least deterred by speed cameras and for whom the negative consequences associated with the behaviour may be the least important. They may also be amongst a group of drivers who engage in other risky driving practices (e.g. dangerous overtaking). The evidence above suggests that these drivers may ignore anti-speeding messages either because they do not think they are targeted at them or because they adopt strategies (e.g. risk-mitigating beliefs) that reinforce their speeding.

Together, these findings suggest that, while road safety campaigns containing risk information and speed enforcement strategies may be useful in deterring drivers, en masse, from speeding and in maintaining current average speeds on roads in the UK, these same strategies may be ineffective in tackling the worst offenders. Indeed, for this group of drivers, the benefits associated with driving fast, perhaps the thrill, excitement and social kudos that speeding generates, may be sufficient to maintain the behaviour despite the threat of negative consequences. Different forms of interventions may be necessary for this group.

### **3 ARE THERE DIFFERENT SUB-GROUPS OF SPEEDING DRIVER?**

In addition to identifying the social cognition predictors of speeding, it is also important to explore wider factors that, from a psychological perspective, could make different types of intervention more effective for different types of speeding driver. A review was therefore undertaken of the national and international literature on speeding drivers in order to identify the psychological correlates of speeding. Specifically, the review questions were:

1. Why do drivers speed?
2. Are there distinct sub-groups of speeding driver for whom different types of intervention are required?

The principles of systematic review were adopted: rigorous and reproducible methods applied to synthesise the available evidence. Full details of the review are found in Fylan and Hempel (2005). The literature search revealed over 3,500 articles. Inclusion screening, based on the title and abstract, or the full article, reduced this to 195. Hand searching, bibliography searches and contact with experts yielded a further 11 studies. Data from the final 206 articles were extracted, and are shown in the data table in Fylan and Hempel (2005). The majority of the studies identified measured self-reported speeds. While this has received some criticism, there is evidence of a reasonable correlation between self-reported and actual speed (Corbett, 2001; Haglund and Aberg, 2000; Walston and Bathurst, 1998). Therefore studies that measure actual and self-reported speed are combined.

#### **3.1 Reasons for speeding**

Five psychological reasons for speeding were identified:

1. attitudes and appraisals;
2. perceived normal behaviour and values;
3. personality;
4. self-identity; and
5. intention.

They are explored in the following sections, and are used to differentiate between the sub-groups of different speeding driver.

### 3.1.1 Attitudes and appraisals

Attitudes and appraisals are good predictors of speeding behaviour (Deery and Fildes, 1999; Parker *et al.*, 1992b) and can distinguish between drivers who intend to speed generally from those who speed only occasionally (Lawton *et al.*, 1997). Many drivers evaluate speeding positively and see the outcomes of speeding as beneficial (Caird and Kline, 2004). Particularly in women and older drivers, speeding is related to perceived gains (Yagil, 1998). While some drivers enjoy speeding (Rothengatter, 1998), most (90%) drivers apprehended for speeding report experiencing little or no enjoyment of their speed (McKenna, 2004). The enjoyment or thrill derived from speeding is therefore relevant to only a small number of speeding drivers. Instead, drivers' perceptions of the negative consequences of driving may be a more important factor. Drivers who perceive fewer negative consequences are more likely to speed (Lawton *et al.*, 1997); men in particular perceive fewer disadvantages of speeding (Parker *et al.*, 1992b).

The ways in which attitudes and appraisals influence drivers' speeding behaviour are described in four categories:

- the threat of crashing;
- the threat of being caught speeding;
- the threat of being late; and
- threats to complying.

#### **Threat of crashing**

Drivers choose to speed because they are insufficiently aware of the consequences of crashing (Rossiter and Thornton, 2004) and because they do not feel at risk (Dorn and Brown, 2003; Stradling and Cambell, 2003). While the majority of drivers acknowledge that speed causes accidents, drivers who speed frequently perceive speed to be less of an accident risk (Adams-Guppy and Guppy, 1995). This might arise because of the 'car-coon' effect of modern cars, reducing the perception of speed and its associated risk (Silcock *et al.*, 2003) or because drivers consider themselves to be safe or skilled (Karlaftis *et al.*, 2003) and that their driving ability is better than average (Horswill and McKenna, 1999). Indeed, most drivers tend overestimate their own skills (Rothengatter, 2002) and to underestimate driving hazards (Thompson *et al.*, 1985). Hence, speeding occurs because drivers feel in control at high speeds (Corbett and Simon, 1992) and so underestimate the increased risk. It has been suggested that drivers adapt to the risk involved in driving and do not consider it rationally (Summala, 1998). There is a clear link between risk perception and attitude towards complying with the speed limit (Garvill *et al.*, 2003), and between compliance with speed limits and the belief that speed limits reduce accidents (Kenellaidis *et al.*, 1995).

Demographic differences in appraising the threat of crashing are in accordance with police statistics. It has been suggested that young drivers are unrealistically optimistic, which leads them to underestimate their chances of crashing (Rothengatter, 2002). However, some younger drivers realise that their speeding behaviour is risky and they enjoy the risk (Moller, 2004). Men, in particular, overestimate their skill and perceive less risk (DeJoy, 1992). For example, men are more likely to consider that driving at 120 kph in a 70 kph zone is safe (Harre *et al.*, 2000). In summary, most speeding drivers do not believe they are at risk or that they pose a risk to others (Rothengatter, 1988).

### **Threat of being caught speeding**

Drivers who speed believe there is a lower chance of being caught than those who do not speed (Guppy, 1993), and the less chance drivers think there is of being caught, the faster they drive (Parker, 2002; Rothengatter, 1988; Stradling and Campbell, 2003). For this reason, an overt police presence can be effective in reducing the number of drivers who speed (Holland and Conner, 1996; Kanellaidis *et al.*, 1995). However, police enforcement produces only temporary changes in driver behaviour – although small halo-effects exist, reductions in speed are mainly limited to times of deployment (Casey and Lund, 1993), and when drivers have passed the enforced area they speed up again (Shinar and Stiebel, 1986). Drivers adopt this maladaptive coping response in order to maintain their preferred driving speed while minimising the threat of being caught. Drivers who believe that their personal contacts mean any speed penalty will be cancelled are more likely to speed (Lagarde *et al.*, 2004). Hence threat appraisal is important in drivers' speed selection.

There are demographic differences in threat appraisal: older drivers perceive traffic violations as more of a threat than younger drivers (Yagil, 1998), and women think penalties are more lenient than men (Stradling and Campbell, 2003). Personality differences are also important: drivers with high sensitivity to punishment are less likely to speed, whereas those with high sensitivity to reward believe speeding to be enjoyable and are more likely to do so (Castella and Perez, 2004).

### **Threat of being late**

While being in a hurry is reported by several authors as a reason for speeding (e.g. Kanellaidis *et al.*, 1995), it has been estimated that few drivers would speed to arrive on time (Adams-Guppy and Guppy, 1995) and the majority of speeding drivers reported that they were not in a hurry when they were apprehended (McKenna, 2004). Differences in the frequency of being late and drivers' responses to being late may be related to personality. Time urgency is a component of a behaviour pattern known as Type A personality. Furthermore, time pressure seems to increase the influence of the personality traits of aggression and sensation seeking, both of which are linked to speeding (Yagil, 2001).

## Threats to complying

Several reasons why drivers decide that it is too difficult to comply with the speed limit have been identified, including believing that it is difficult to drive modern cars below 35 mph (Stradling and Campbell, 2003), and being closely followed (tailgated) by the driver behind (Silcock *et al.*, 2003).

### 3.1.2 Influences of perceived normal behaviour and values

There is substantial evidence that perceived norms influence speed choice, as this can influence drivers' perceptions of speeding as acceptable, common and expected.

Speeding is widely regarded as acceptable (Rosenbloom, 2003) and drivers justify their own speeding because they class it as 'skilled and moderate' speeding rather than 'dangerous' speeding, which they do not identify with (Silcock *et al.*, 2003). Once again, gender differences in this factor are in accordance with police statistics: men (Conner *et al.*, 2003), particularly younger men and those of high socio-economic status (Elliot *et al.*, 2003), perceive there to be less pressures to comply with the speed limit and more facilitators to speeding.

Drivers believe that most other drivers speed (e.g. Stradling and Campbell, 2003) and they are accurate in this belief as speeding is very common (e.g. Aberg *et al.*, 1997). Drivers select their speed based on perceptions of road culture (Silcock *et al.*, 2003) and the speed of nearby cars (Connelly and Aberg, 1993), and speeding intentions are predicted by how fast they think other drivers are travelling. Younger drivers, in particular, are more likely to believe that speeding is common (Yagil, 1998). However, drivers often overestimate average speeds (Aberg *et al.*, 1997) and so believe that they drive slower than average and, therefore, perceive that they are safer than average (Walton and Bathurst, 1998). Road signs that provide drivers with feedback on the proportion of drivers complying with the speed limit can therefore be effective in reducing speeding – but only when the signs indicate that the majority of other drivers comply (e.g. Groeger and Chapman, 1997). Such signs are particularly good at reducing the speed of faster drivers (Van Houten *et al.*, 1980) but there remains a minority who continue to speed excessively.

The importance of drivers' perceptions of what is expected of them is highlighted by the effect of perceived peer-group approval of speeding and the presence of passengers on speed selection. Younger drivers perceive that others approve more of speeding and they are less likely to refrain from speeding (Parker *et al.*, 1992b). Speeding is more common in young drivers when they are travelling with friends than with parents (Arnett *et al.*, 1997). The highest risk group for speeding is young men – and they are more likely to speed if they are travelling with other young men (Stradling and Campbell, 2003) – and drivers are least likely to speed with an older female passenger (Baxter *et al.*, 1990). A final factor is that of employer expectations: there is an association between speeding in professional drivers and

their perceptions of organisational culture, such as scheduling realistic drive times, and planning routes optimally (Caird and Kline, 2004).

### 3.1.3 *Personality*

While the effects of personality are likely to be manifest through differences in attitudes and threat appraisal, there is a substantial body of work on the link between several different personality traits and speeding behaviour. Personality traits are described here in four sections:

- sensation seeking;
- Type A personality;
- aggression and emotion; and
- control.

#### **Sensation seeking**

The area that has received most attention is that of thrill and sensation seeking. Speeding is related to thrill or adventure seeking. While not all studies have found a significant link between sensation seeking and speeding, the majority have done so (e.g. McKenna, 2004; Meadows *et al.*, 1998; Ulleberg and Rundmo, 2003). Impulsive personalities and those with less empathy are also more likely to speed (Owsley *et al.*, 2003). Recklessness and speeding are also related: they load onto the same factor and are positively related to risk taking (Golias and Karlaftis, 2001). Normlessness has also been linked, with driver anger, to speeding (Iverson and Rundmo, 2002).

#### **Type A personality**

People characterised by the Type A behaviour pattern (aggressive, hostile, competitive, impatient and with a high level of time urgency) are more likely to speed (e.g. Perry and Baldwin, 2000). Time pressure is one of the identified reasons for speeding and the experience of time pressure is related to someone's personality: some people experience time pressure more often than others. The Type A behaviour pattern is also characterised by high levels of aggression.

#### **Aggression and emotion**

There is substantial evidence that drivers who score high on personality measures of aggression are more likely to speed (e.g. Deffenbacher *et al.*, 2003; McKenna, 2004; Whissell and Bigelow, 2003). Aggressive driving is also correlated with driving violations and with high self-esteem (Stucke, 2001). Drivers whose self-esteem is linked to driving choose higher speeds (Ben-Ari *et al.*, 1999). Personality traits of anger (Deffenbacher *et al.*, 2003), hostility, hyper-competitiveness and emotion are

also linked to speeding behaviour (Houston *et al.*, 2003). Drivers who use their car to express anger also tend to score highly on aggression and to undertake risky driving behaviours (Deffenbacher *et al.*, 2001), and drivers who report experiencing more positive affect and less negative affect are more likely to speed (Lawton *et al.*, 1997), and drivers with higher affect are more likely to worry about the risks of speeding (Rundmo and Iversen, 2004). There is evidence of a link between personality and perceived susceptibility: anxious drivers perceive more risks (Ulleberg and Rundmo, 2003). Two different types of personality clusters relating to speeding have been identified: deviant and aggressive/anxious (Ulleberg, 2001).

## Control

Speeding appears to be linked to the desire to be in control: drivers with a high desire for control report the intention to drive faster (Hammond and Horswill, 2001). Drivers with an internal locus of control, who believe that they personally – rather than other road users or chance – control their behaviour, tend to drive faster. Internal locus of control is also associated with other personality measures which affect speeding, such as hostility (Gidron *et al.*, 2003). Speeding drivers believe that the speed limit is too low (Silcock *et al.*, 2003) and report feeling less constrained by the road environment (Kanellaidis, 1995), again suggesting a need to control their own traffic decisions. Speed limits may be viewed as a threat to independent driving behaviour (Peltoniemi, 1982).

### 3.1.4 Self-identity

Drivers may select speed based on self-identity (Silcock *et al.*, 2003) and, accordingly, speeding behaviour tends to be consistent (Michiels and Schneider, 1984). Many drivers, particularly women and older drivers, believe that traffic laws are important (Yagil, 1998) and they perceive themselves to be law-abiding people (Laapotti *et al.*, 2003) and, as a consequence, they become habitual speed compliers. Gender differences are consistent with this: more women than men observe speed limits ‘all the time’ (Shinar *et al.*, 2001). Speeding is seen as a male attribute, and men who believe themselves to be more ‘macho’ are also likely to speed (Krahe and Fenske, 2002) and young male drivers, in particular, view speeding as ‘cool’. Driving fast is also thought to raise peer-group status (Moller, 2004) and is therefore a means of expressing oneself and bonding with peers. In contrast, the perception of oneself as a ‘good driver’, despite speeding, has been reported by several authors. Many drivers believe that because they are a good driver they can speed safely (Dorn and Brown, 2003) and the speed limit, therefore, does not apply to them (Silcock *et al.*, 2003). Drivers reassure themselves that because others drive faster than them they are not a ‘real speeder’ (Silcock *et al.*, 2003) and that speed campaigns are not aimed at them, but at other ‘dangerously fast’ drivers (Walton and McKeown, 2001).

### 3.1.5 *Intention*

Most theories of health-related behaviour distinguish between intention and actual behaviour. Although it has been suggested that unintentional speeding is relatively rare (Silcock *et al.*, 2003), there are several reasons for speeding that fall into this category, including not knowing the speed limit (Stradling and Campbell, 2003) and not realising that you are speeding. A lapse of attention (Corbett and Simon, 1992) can also give rise to unintentional speeding, as can drivers underestimating their speed when they have driven from a higher-speed into a lower-speed zone (Holland and Conner, 1996).

## 3.2 The psychological sub-types of speeding driver

In order to identify sub-types of speeding drivers, each research finding was listed and different reasons for speeding were combined into groups of congruent reasons. The groups were subsumed iteratively until no further reduction appeared possible: each group contained drivers whose reason for speeding were qualitatively different from those of the other groups. This approach identified four different types of speeding drivers. For the individual types, different speeding interventions appear to be indicated.

- **Unintentional speeders** – drivers who, because of poor knowledge of traffic rules, are not aware of the correct speed limit, or who speed because of a lapse of attention, or who underestimate their speed temporarily, for example when travelling from a high-speed to a low-speed zone. The best way to change the speeding behaviour of this group may be to raise their awareness that they are at risk of speeding, and to teach them tips to identify the speed limit more effectively and to monitor their speed.
- **Moderate occasional speeders** – drivers who consider themselves to be safe and skilled, and who exceed the limit by a level they believe to be relatively low. They do not identify themselves as a speeding driver and they speed less frequently than high speeders. They do not tend to experience pleasure from speeding and they do not generally violate other traffic rules. The best way to change the behaviour of this group may be to increase their awareness of the link between speed and crashing, the more severe consequences of crashing at higher speeds, that they overestimate their own driving skills and the speed at which other drivers travel, and that their speeding behaviour is governed by their own decisions rather than the behaviour of other drivers.
- **Frequent high speeders** – drivers who are aware that they drive faster than average and, while they may acknowledge that this represents an increased risk, they nevertheless believe that they are safe. They have a higher intention to speed and a more positive attitude to speeding than low speeders, and they tend to speed more frequently and experience more pleasure and emotional outlet from driving. These drivers take more risks and report more general accidents or violations. They are usually more experienced drivers and are more likely to be

men. Their high-speed driving may be restricted to certain circumstances, such as a motorway. The best way of changing the speeding behaviour of this group may be to increase their awareness of the link between speed and crashing, the more severe consequences of crashing at higher speeds, the higher penalties and more severe consequences of driving with excessive speed, and that they overestimate their own driving skills. For this group it is very important that their prior beliefs are challenged with appropriate methods, for example demonstrating that speeding leads to a lack of control when needing to avoid an obstacle or to slow down suddenly. For these drivers it is also necessary to put more emphasis on learning new driver behaviour than the previous mentioned groups. These drivers speed out of habit, and habits are notoriously difficult to change. The literature usually shows that it is very difficult simply to stop a habit and that it is necessary to learn and train a new behaviour.

- **Socially deviant drivers** – these drivers acknowledge that their behaviour is dangerous, and they enjoy taking risks and breaking rules. They are more likely to engage in dangerous driving and more general law breaking, and they score higher on the personality measures of psychoticism, thrill, adventure seeking and boredom, and lower on neuroticism. These drivers are more likely to be young, and to engage in more risky behaviour and violations in general. It is likely that parts of this group will lose their driving licence or have serious accidents due to other behaviours than speeding. Younger drivers who lose ('grow out of') this behaviour pattern are most likely to do so by the age of 26. The best way of changing behaviour in this group may be to raise their awareness that their driving behaviour is immature, and that their personality profile causes them to underestimate the risks of speeding.

### 3.3 A common perspective: matching enforcement and psychological definitions

Identifying the type of speeding driver from a psychological perspective is likely to be problematic when only the observed speed is noted. More information on the individual speeding driver is generally needed. While both unintentional and moderate occasional speeders are likely to exceed the speed limit by only a small amount, frequent high-speed drivers and socially deviant drivers will show a much wider range of speeds. Hence the speed at which a driver is apprehended is not necessarily indicative of their preferred speed. The results of studies that compare drivers attending high- and low-speeding courses confirm this problem. Differences between high- and low-speed drivers are present, but are small. When drivers with the lowest and highest preferred speeds are compared, however, the differences are much more marked: highest-speed drivers report more lapses of attention, are more inclined to use a car as an emotional outlet, derive more independence from driving, and are more aggressive. This indicates that some of the drivers attending low-speed courses are highly likely to fall within the frequent high-speed group.

Drivers travelling at excessive speeds are either frequent high speeders or socially deviant drivers, while drivers travelling at excess speeds could fall into any one of the four groups. The best way of distinguishing between groups would be to examine their driving record. Several previous speeding convictions would indicate that the driver is unlikely to be an unintentional speeder. Any excessive speed convictions would indicate that they are unlikely to be a moderate speeder. Previous traffic violations, but not non-traffic violations, would indicate that they are likely to be a frequent high speeder. Finally, a driver apprehended at an excessive speed with a range of traffic and non-traffic violations is more likely to be a socially deviant driver.

## 4 EFFECTIVE INTERVENTIONS TO CHANGE BEHAVIOUR

Two independent reviews were conducted to identify the components of interventions that successfully change behaviour. These reviews reached markedly similar conclusions. The only significant differences were that one report (Conner *et al.*, 2005) placed more emphasis on the need to address how speeding makes the driver feel (affect) and the need for a large-scale prospective research study, while the other report (Fylan *et al.*, 2005b) highlighted the role of changing drivers' perceptions of themselves as a speeding driver (self-identity), and for drivers to formulate and rehearse their reactions and behavioural responses to specific situations in which they might speed. Summaries of the reviews are presented first, and the combined conclusions in Section 4.3.

### 4.1 Social cognitive model review

This review has considered the research on seven different SCMs:

- the Theory of Reasoned Action/Theory of Planned Behaviour (TRA/TPB);
- the Health Belief Model (HBM);
- the Protection Motivation Theory (PMT);
- the Social Cognitive Theory (SCT);
- implementation intentions;
- the Transtheoretical Model of Change (TTM); and
- the Health Action Process Approach (HAPA).

The aim was to identify the model or components from these models that might most appropriately form the basis of interventions to change speeding behaviour. This has mainly been achieved through examining the power of these different models in predicting behaviour and the power of interventions based on these models in changing behaviour. See Conner *et al.* (2005) for full details of the methodology and for a full report of the results.

#### 4.1.1 *Theory of Reasoned Action/Planned Behaviour*

Overall, 41 papers were identified that targeted a range of behaviours, including sexual behaviours, dietary behaviours, oral health behaviours, smoking behaviours, and safety and risk behaviours such as road crossing among adolescents and helmet wearing amongst bicycle-riding adolescents. The studies targeted a range of populations, including school children, university students, mothers, members of a workforce and the general public. Written or brief interventions were those which

typically provided a persuasive booklet or lecture to respondents. Media interventions aimed to change behaviour primarily through media channels using paid advertisements. Multi-session interventions delivered the intervention message in a number of sessions which could range in length from a few days to a few months. Studies were described as completely effective if they successfully changed all indicators related to the construct in question.

Ten interventions were found to be completely effective and a further six were partially effective. Six of these used written or brief interventions. For example, Quine *et al.* (2001) developed a persuasive booklet aimed at increasing helmet use amongst school-age cyclists. The booklet targeted attitudes, subjective norms and PBC. Respondents completed the booklet individually and then elaborated on the messages contained through group interaction. A control group received a similar booklet on bicycle proficiency and maintenance. At the five months follow-up they found that 25% of the intervention group had started to wear a helmet ( $n = 12$ ) compared with none in the control group. Several other brief interventions employed implementation intentions (e.g. Sheeran and Silverman, 2003) and were generally found to have a medium effect size. Three interventions were multi-session interventions.

Overall, 16 interventions reported some level of effectiveness in changing behaviour but many of these changes were small. Six multi-session interventions were found to be partially or completely effective, and two were found to be ineffective. It is impossible to ascertain which techniques used in multi-component interventions are instrumental in achieving change and which are ineffectual. In terms of brief, written or media-based interventions, it is slightly easier to conclude what might make an effective intervention. Repeated media announcements may have an effect if a specific message is targeted. Printed interventions may also be effective at changing behaviour if they encourage the formation of implementation intentions, or encourage the elaboration of persuasive messages.

The available evidence shows that all the ineffective interventions were based on brief written booklets or simple lectures. This suggests that the simple presentation of persuasive material is not effective in changing intentions. In comparison, interventions which encourage elaboration of briefly presented persuasive material, either through group interaction (Quine *et al.*, 2001;), self-monitoring (Kelley and Abraham, 2004) or repeated exposure (Booth-Butterfield and Reger, 2004; Reger *et al.*, 2002) did appear to increase intentions, albeit moderately. It can be tentatively concluded that elaboration is the key to changing cognition and motivation in the context of brief interventions, however, future research should investigate this directly.

### 4.1.2 *Health Belief Model*

We identified 30 interventions, including breast self-examination, encouraging safe sexual behaviours, reducing smoking, and promoting healthy dietary behaviours. Intervention styles ranged from simple reminder cards and pamphlets to educational presentations in classes or workshops, individually tailored counselling and national television programmes. The majority of the interventions were successful, and those that were not used questionable evaluation, did not fully address all the model components or used written materials that may not have been read by the participants. Our review suggests that neither information nor HBM-based belief change interventions alone are sufficient to change the behaviour in question. A combination of the two, on the other hand, produced a four-fold increase in adherence.

Despite the success of many HBM interventions, there are a number of caveats. Effect sizes, where they can be calculated, are modest. The range of behaviours examined is relatively small. There is a lack of evidence about how best to change the components of the HBM. Finally, the methods of evaluation employed are generally weak. In conclusion, based on current HBM intervention studies, it is somewhat difficult to pinpoint a specific series of belief-changing techniques that are likely to prove effective. An examination of the unsuccessful interventions, however, would suggest that interventions containing only written material, or that piece different behaviours together, are ineffective. Given that previous meta-analyses (Harrison *et al.*, 1992; Janz and Becker, 1984) have found the barriers component to have the highest average correlation with health behaviour, interventions which omit this important component (e.g. Schmitz *et al.*, 1999) are also best avoided. It is also worth noting the similarity of barriers to self-efficacy (which is found to be such a powerful predictor in other models).

### 4.1.3 *Protection Motivation Theory*

As Milne *et al.* (2000) note, it is possible to distinguish between two types of PMT intervention studies:

1. 'health education' interventions that are broadly based on PMT; and
2. experimental manipulations of specific PMT variables.

In health education interventions, the intervention group receives information about a health threat and recommended action, whereas the control group receives information on an unrelated topic or receives no information. The health education intervention typically provides general factual information on the health threat and an appropriate coping response based on PMT constructs. For example, in an intervention to encourage participation in mammography screening (Boer and Seydel, 1996), women in the intervention group were sent a PMT-based leaflet entitled *Breast Examination* that described the relative high vulnerability of older

women to breast cancer and the high response efficacy of mammography screening. Feelings of self-efficacy towards participating in the screening programme were encouraged by explaining that mammography is a straightforward procedure with little discomfort. Three days after receiving the leaflet, the women received a PMT questionnaire. The women in the control group received no information, simply receiving the PMT questionnaire.

Other studies have directly manipulated specific PMT variables. In these studies participants typically read a persuasive communication in which specific PMT variables have been independently manipulated prior to their measurement in a PMT questionnaire. Most of these studies seek to manipulate specific PMT variables through the presentation of information designed to produce high versus low levels of the targeted construct. For example, participants in one condition may receive information designed to increase perceptions of vulnerability whereas participants in the other condition may receive information designed to decrease perceived vulnerability.

Unusually, in this area, PMT interventions have been subject to a quantitative review. Milne *et al.* (2000) assessed the impact of PMT interventions through a meta-analysis of cognition changes following experimental manipulations of specific PMT variables. Their meta-analysis consisted of eight studies that included specific manipulations of PMT constructs and that considered the effects of the manipulations on corresponding PMT cognitions. Manipulations of the threat appraisal variables led to significant changes in corresponding perceptions of severity and vulnerability. The effect sizes are large. The effect sizes for manipulations of response efficacy and self-efficacy, though smaller, were significant and in the medium-to-large range. Only manipulations of response costs were unable to produce a significant effect. It is noteworthy that the experimental manipulations tend to be more successful at changing threat than coping appraisal cognitions.

Unfortunately, Milne *et al.* (2000) did not consider the impact of PMT interventions on protection motivation (i.e. intention) and behaviour. Considering the impact of manipulating specific PMT variables, the largest number of studies have focused on exercise. For example, Courneya and Hellsten (2001) presented students with essays that manipulated each of the four main PMT constructs. Only the perceived severity manipulation was found to have a significant effect on exercise intentions. However, most other studies have reported significant effects for self-efficacy manipulations on exercise intentions (e.g. Fruin *et al.*, 1992), and significant effects have also been reported for perceived vulnerability (Wurtele and Maddux, 1987) and response efficacy (Stanley and Maddux, 1986) manipulations. Only a small number of experimental studies have focused on other health behaviours. For example, Stainback and Rogers (1983) presented high versus low threat information to high-school students which was found to influence intentions to remain abstinent and not to drink and drive.

It is clear that the majority of application and intervention studies based on PMT have investigated the adoption of health-promoting behaviours (e.g. screening, exercise, adherence to medication) rather than the cessation or reduction of risky behaviours (e.g. binge-drinking and smoking). In fact, to date, there have been only three published studies in which PMT has been applied to risky behaviours in adults. These provide evidence that self-efficacy is an important predictor of **intention**, but it is not clear whether this translates into **behaviour**. Moreover, there are only a few interventions based on PMT that target risk behaviours amongst adults and so strong claims about the efficacy of PMT-based interventions for these behaviours are difficult to make. Maddux and Rogers (1983) found that manipulations of response efficacy and self-efficacy had significant effects on intentions to quit smoking. The study by Greening and Stoppelbein (2000) is encouraging and suggests a role for self-efficacy and rewards associated with the maladaptive behaviour. A recent study in which the PMT was used to make predictions about the impact of messages within anti-smoking campaigns (Pechmann *et al.*, 2003) is also interesting, suggesting that risks other than those associated with health may be important for some populations. Those messages that enhanced adolescents' perceptions that smoking resulted in social disapproval were the most effective in increasing non-smoking intentions.

In summary, there is support for a role of threat appraisal variables (i.e. perceived severity and vulnerability) and a greater role of coping appraisal variables (i.e. perceived response efficacy, self-efficacy and response costs) in predicting protection motivation and, to a lesser extent, behaviour. Interventions based on PMT have been somewhat successful in changing intentions, and when these changes do occur they appear to be due to changes in the relevant cognitions. However, evidence that PMT is a successful model for behaviour change is still weak and further studies of these relationships and, specifically, for risk behaviours are needed before any strong claims can be made about the efficacy of PMT as a basis for reducing speeding.

#### 4.1.4 *Social Cognitive Theory*

We located 39 intervention studies that were based on SCT to various degrees. There are many problems inherent in comparing the efficacy of interventions, including the fact that studies target different components of SCT in different ways, and frequently include components from other models. A range of behaviours was examined, including safer sex, exercise, diet, alcohol use, smoking, drug use, and driving (e.g. Newman *et al.*, 1992). Twenty-four of the 32 studies (75%) that included behaviour as an outcome measure reported evidence of behaviour change following SCT-based interventions. However, the wide range of content, style, theoretical basis and behaviours involved in the interventions makes it difficult to pinpoint which of the specific SCT components or interventions are the most effective at promoting behaviour change. The interventions generally included a combination of approaches. Most of the interventions included an educational

component, which ranged from lectures and group demonstrations to one-to-one sessions. Other interventions included social support enhancement, goal setting, self-monitoring, role play and group work. Tailored interventions were administered in at least five studies. One of the more innovative interventions was that by Winkleby *et al.* (2004). In this intervention school children critically analysed the content of tobacco advertisements designed to promote smoking amongst teenagers. Participants were encouraged to discourage their peers from smoking, and they also carried out activities in the community aimed at reducing the amount of tobacco advertising that could be seen by children, they discussed tobacco funding with council representatives, and increased stores' compliance with the laws regarding the selling of cigarettes to minors. Although there was no significant impact in terms of overall smoking, the intervention did reduce smoking amongst regular smokers.

Most of the interventions also included a skill enhancement or self-efficacy bolstering component. According to Bandura (1997), self-efficacy can be enhanced through personal mastery and vicarious experience, with personal mastery being the most effective, since it provides personalised information regarding goal attainment. Such interventions provide participants with opportunities to gain experience relevant to the skills necessary to carry out a behaviour. Lawrence *et al.* (1997), for example, gave female prison inmates the opportunity to practise condom application skills and found that participants subsequently demonstrated greater skill in this area. Vicarious experience is gained through modelling (i.e. observing others performing a difficult behaviour). This approach was employed in six of the interventions and all showed significant changes in the desired direction. Interventions that fail to include mastery experience (cf. Schnoll and Zimmerman, 2001) may improve outcome expectancies without changing self-efficacy or behaviour. Such interventions do not present individuals with the opportunity to experience potential barriers during the intervention and to learn techniques to deal with them. If they are later faced with such barriers, they might fail and subsequently develop low expectancies regarding their own abilities. Computerised interventions have been employed in order to expose individuals to vicarious and mastery experience.

Five components identified by Bandura (2000), and included in SCT, that are thought to be particularly important in terms of adopting health behaviours are:

- provision of information;
- skill mastery;
- self-efficacy for skill implementation;
- social competence; and
- social support.

In light of these suggestions Lawrence *et al.* (1997) designed an HIV intervention incorporating:

- an educational component;
- a component aimed at rehearsing skills targeting social competence, such as how to negotiate with a partner or refuse suggestions;
- self-protective skills, such as condom application and needle bleaching;
- fostering social support; and
- creating a social norm of self-protection.

At the follow-up, participants reported improved self-efficacy, more frequent communication about condom use, increased knowledge about AIDS, and improved condom-application skills. These changes were still apparent at a follow-up period of six months.

Individually tailored, one-to-one interventions (e.g. Cook *et al.*, 2003) based on SCT may, however, be more effective and lead to better maintenance than non-tailored interventions. Encouraging behaviours via SCT variables could, perhaps, better be accomplished by improving self-efficacy and discussing the benefits and barriers to the behaviour in question.

Interventions based on SCT have a fairly impressive success rate, but perhaps their most valuable contribution has been to draw attention to the importance of considering self-efficacy. There is now a strong evidence base that suggests focusing interventions of self-efficacy is an effective strategy (Bandura, 2000). The majority of studies in this area measure self-efficacy and behaviour pre- and post-intervention, and they are mainly concerned with how self-efficacy impacts directly upon behaviour. There is a need for more research to differentiate the effects of mastery-enhancing experience and vicarious learning. Interventions that offer a combination of mastery enhancement (through honing skills and presenting participants with potential barriers which they may need to overcome in the future) and ‘testimonials’, such as those offered by Kinsler *et al.* (2004), may prove the most effective.

#### 4.1.5 *Implementation intentions*

Eighteen published papers were identified. The standard design of studies in this area is one in which participants complete a questionnaire in which constructs from theories (usually TPB or PMT) are measured and where an intervention in the form of a brief statement requesting the participant to form an implementation intention is appended to the end of the questionnaire for those participants randomly assigned to the implementation intention condition. The participant is often asked to give some details of this plan.

Five studies have examined the impact of implementation intentions on exercise behaviour, mainly in student populations. The research suggests that difficult goals, such as increasing exercise, may only be achieved by boosts to motivation as well as specific plans with both a motivational and planning component. A series of studies have also examined dietary changes, self-examinations and screening, pill intake, avoiding risky health behaviours, and attending health and safety courses. There is strong evidence across these studies suggesting that implementation intentions are effective in moving people towards achieving their goals. Fourteen of the 18 studies reviewed found significant effects for implementation intentions either alone or in combination with a motivational intervention. However, these findings, although impressive, must be treated with caution as most have involved student samples who may participate in studies for very different reasons (e.g. course credits) from those people for whom interventions are often designed (e.g. speeding drivers). Where non-student samples have been employed, the findings have been more mixed and the effects, if any, smaller.

The overall impact of implementation intentions on behavioural performance and goal achievement has been tested in two meta-analyses (Koestner *et al.*, 2002; Sheeran, 2002). Implementation intentions have a medium effect size on behavioural enactment and goal attainment. Thus, forming an implementation intention makes an important difference to whether or not desired outcomes are obtained compared to the formation of a goal intention on its own. However, effective implementation intentions do require high levels of goal intentions. Thus, if they were to be employed in relation to speeding behaviours, it would require either focusing on a group with strong goal intentions or the combining of implementation intentions with a motivational intervention designed to increase goal intentions. Moreover, it is not yet clear whether implementation intentions are an effective way of producing change across different types of health behaviour; for example easy and difficult (such as taking pills versus regular exercise) and infrequent versus repeated behaviours (such as mammography testing versus eating healthily). The evidence suggests that implementation intentions are effective for one-off and more difficult behaviours, particularly when combined with a motivational intervention. There is mixed evidence that implementation intentions are effective when the aim is to reduce or stop the occurrence of a behaviour altogether.

In summary, implementation intentions offer the possibility of a cheap and effective strategy for producing behaviour change, but the body of methodologically strong, field-based studies is not yet large enough to provide convincing evidence that they would be an effective strategy for changing risky behaviours such as speeding.

#### 4.1.6 *Transtheoretical Model of Change*

Although there are a large number of intervention studies which claim to be based on the TTM, in reality there are actually few. The strongest evidence for a stage

theory would be to show, consistently, in randomised experimental studies, that stage-matched interventions are more effective than stage-mismatched interventions in moving people to the next stage in the sequence (Sutton, 2005). Blissmer and McAuley (2002) studied physical activity. Two-hundred and twenty-eight university staff were randomly assigned to four conditions, including:

- stage-matched materials provided on a monthly basis; and
- stage-mismatched materials, also delivered monthly.

After 16 weeks, 40% of the matched group had progressed one or more stages compared with 32% of the mismatched group. This difference was in the predicted direction but was non-significant. The other two experimental studies of matched and mismatched interventions found little or no evidence for the stage model predictions (Sutton, 2005). The TTM has been very influential and has popularised the idea that behaviour change involves movement through a series of discrete stages. It has also stimulated the development of innovative interventions. However, as Sutton (2005) concludes, the model cannot be recommended in its present form. Not only are there fundamental problems with the definition and measurement of the stages (see Sutton, 2005) but the large body of literature on the TTM provides little supportive evidence. Clearer predictions from the model need to be specified and tested using strong research designs: longitudinal studies of stage transitions with short time intervals and experimental studies of matched and mismatched interventions (Weinstein *et al.*, 1998).

#### 4.1.7 *Health Action Process Approach*

Only three recent intervention studies based on the HAPA were identified. Each examined the effect of brief interventions designed to encourage the formation of detailed plans with respect to future behaviour, and each produced modest impacts on behaviour change. For example, in a study on breast self-examination (BSE), Luszczynska (2004) evaluated the effectiveness of a single-session intervention designed to enhance pre-action and maintenance self-efficacy and positive outcome expectancies in a sample of 417 students in Poland. The intervention consisted of several components, including a film showing a woman performing BSE, practise with a silicone model of a breast, and a leaflet. Relative to the no-intervention control condition, the intervention significantly increased pre-action self-efficacy and outcome expectancies (but not maintenance self-efficacy), and led to a significant increase in the frequency of BSE 12–15 weeks later. In relation to designing a course to change driving behaviour, the HAPA, as yet, does not provide compelling evidence about the target and the nature of the interventions that are likely to be successful.

#### 4.1.8 Conclusion: the practicality of social cognition models

Social cognition models can be used to inform the development of interventions to change health behaviour (Norman and Conner, 2005). Brawley (1993) argues that it is possible to assess the extent to which a model provides a sound framework for intervention design on the basis of its **practicality**. To have a high level of practicality a model must:

- have predictive utility;
- describe the relationships between key constructs;
- offer guidelines for the assessment of these constructs;
- allow the translation of these constructs into operational manipulations; and
- provide the basis for detecting the reasons why an intervention succeeds or fails.

Each of these factors are considered in turn in relation to the seven SCMs reviewed. Implementation intentions do not fit easily into such a framework, appearing to be more like an intervention (see below).

First, it is clear that many of the models have good predictive utility and, as such, provide a sound basis for developing interventions. TPB studies indicate that intentions, PBC and attitudes have medium-to-strong impacts on behaviour. Similar results have been reported in relation to PMT, and the self-efficacy construct of SCT. In contrast, the HBM and TTM have received less empirical support. Overall, considering the predictive utility of SCMs, it is clear that the TPB, PMT and SCT are likely to provide good frameworks for the development of effective interventions, whereas the empirical basis for the practicality of the HBM, TTM and HAPA is less well established.

Second, models should describe the relationships between key constructs. Overall, the TPB, PMT and SCT appear to provide sound frameworks for intervention design as they describe the relationships between key constructs, whereas the HBM and TTM require further model specification.

Third, a model should provide guidelines for the assessment of key constructs. This criterion appears to be met by all the models considered, although the TPB, SCT and the TTM stand out inasmuch as detailed guidelines have been provided by the models' authors.

Fourth, it should be possible to design interventions to change these constructs. However, a common critique of the major SCMs is that, while they can be used to identify the key beliefs for interventions to focus on, they provide few guidelines on how to change these beliefs (Norman and Conner, 2005). Given the cognitive nature of these models, most theory-based intervention studies use the presentation of persuasive messages to attempt to change beliefs (Hardeman *et al.*, 2002). However,

as Eagly and Chaiken (1993; p. 240) highlight in relation to the TPB, there is ‘no formal guidance for choosing arguments to include in messages designed to influence a specific belief’. Instead, it is necessary to look to models of attitude change, such as the elaboration likelihood model (ELM; Petty and Cacioppo, 1986), which proposes that attitude change is dependent on message favourability and elaboration (for an example study see Quine *et al.*, 2001). An exception to this critique of SCMs is SCT. Bandura (2000) outlines various sources of self-efficacy that can be targeted to enhance self-efficacy. First, self-efficacy can be enhanced through personal mastery experience, for example splitting a target behaviour into various sub-behaviours which can be mastered in turn. Second, self-efficacy can be enhanced through vicarious experience, i.e. from observing a person successfully perform the behaviour. Third, persuasive communications can be used, for example in leaflets, to enhance self-efficacy. Finally, physiological feedback that is compatible with the successful performance of the behaviour can also be used to enhance self-efficacy. Encouragingly, interventions encompassing the above suggestions have been found to increase the performance of health behaviour. Other models also provide theory-based intervention techniques. In particular, the formation of implementation intentions specifying when, where and how a behaviour is to be performed is a powerful volitional technique for ensuring that goal intentions are translated into behaviour.

Fifth, a model should provide a basis for detecting the reasons why an intervention succeeds or fails. It is clear that the major SCMs have the potential to provide such an account and it is difficult to distinguish models on this basis. However, intervention studies generally do not report such analyses.

The SCMs reviewed here satisfy many of the criteria put forward by Brawley (1993) for assessing the practicality of a model. As a result, they should provide a good basis for the development of interventions to change health behaviour. The TPB, SCT and PMT probably have the best evidence for practicality. However, evidence for the utility of interventions based on these models is mixed. There are various reasons for this mixed pattern of results, for example both the HBM and TTM have been found to have limited predictive utility and lack model specification. In addition, most of the models fail to specify how to manipulate key constructs. Most theory-based interventions simply use the presentation of persuasive messages to attempt to change beliefs and behaviour. However, there are a range of behaviour change techniques that could be utilised. Hardeman *et al.* (2000) identified 19 such techniques in behaviour change programmes to prevent weight gain that were classified according to the four ‘fundamental intervention activities’ identified by Kalichman and Hospers (1997). First is instruction, in which individuals are provided with explanations and rationales for adopting the target behaviour (i.e. persuasive messages). Second is modelling, in which a credible model is seen to successfully perform the target behaviour. Third is practice, or mastery experience, which may be achieved through the use of role plays. Fourth is feedback, in which practitioners and peers provide support and encouragement to reinforce behaviour

change. Unfortunately there were insufficient studies to allow us to identify which type of intervention works best with which model.

#### 4.1.9 *Which variables to target in interventions?*

An alternative approach to identifying which model to focus on is to try to identify which variables to target in interventions. Tables 1.1 and 1.2 (see Section 1.8) usefully summarise the effect sizes from reviews of applications of the literature. This would suggest the value of targeting intentions, PBC/self-efficacy, attitudes, outcome expectancies, response costs and barriers. However, it is worth reiterating that, in general, the evidence about how to intervene to change these variables is modest. The power of intentions to predict behaviour might be directly targeted through interventions promoting planning or perhaps the formation of implementation intentions. Attitudes, response costs, barriers and outcome expectancies/response efficacy are typically targeted through persuasive messages. Our review of interventions would appear to suggest that such persuasive messages need to be paired with strategies that promote elaboration (e.g. group discussion) in order to be effective. In relation to outcome expectancies, our own research (Lawton *et al.*, in press) has identified that affective beliefs are more important predictors of self-reported and actual speeding behaviour (recorded via a speed camera) than cognitive beliefs. There is also evidence from our review of speeding (see Chapter 3) that the benefits associated with speeding (e.g. reaching a destination more quickly) may be as, if not more, important than the risks associated with speeding in predicting self-reported intentions and behaviour. These might form useful targets for intervention designed to change speeding and unsafe driving.

One area where the evidence about how to intervene is better is in relation to self-efficacy. Bandura (1991) has outlined four main sources of self-efficacy that could be targeted in interventions. Our review of speeding research indicated that PBC/self-efficacy may be an important area for intervention.

#### 4.1.10 *Which interventions are particularly effective?*

Our conclusions from the review of effective interventions are somewhat weaker. In general, there are insufficient well-designed and evaluated interventions within each model on which to base firm conclusions and recommendations. An exception is in relation to implementation intentions, where a number of well-designed and evaluated interventions are to be found, indicating a medium effect size of such interventions. However, even here the long-term effects have not been studied. Another conclusion from the intervention studies is that persuasive materials tend to be more effective when combined with an intervention that promotes the elaboration of the messages.

#### 4.1.11 Summary of implications

- Of the models examined, preference might be given to TPB, SCT and PMT models based on evidence from meeting good criteria for developing interventions.
- Of the models examined, preference might be given to SCT, HBM and TPB models based on evidence from existing intervention studies.
- Potentially useful integrative models have been proposed based on the models reviewed here (e.g. Fishbein *et al.*'s (2001) Major Theorists Model) but have not been tested. These might usefully inform interventions.
- Of the variables considered, the evidence would suggest the value of targeting intentions, PBC/self-efficacy, attitudes, response costs and barriers in order to change behaviour.
- In relation to changing behaviour through changing intentions, the evidence would suggest the value of targeting attitude, PBC/self-efficacy, outcome expectancies/response efficacy, and response costs.
- Persuasive messages are most commonly employed but they need to be paired with strategies that promote elaboration (e.g. group discussion) in order to be effective.
- In relation to speeding, targeting affective beliefs may be more important than targeting cognitive beliefs, and targeting benefits may be more important than targeting risks.
- Self-efficacy/PBC may be a particularly important target because of its strong association with behaviour and the fact that there is good evidence about how to effectively intervene.
- Implementation intentions appear to be a useful strategy in helping people to act on strong intentions in order to adopt a new behaviour or in order to do more of an existing behaviour. The evidence is less strong that they are useful in the cessation of behaviours and further research is necessary.
- There is limited evidence in relation to changing the behaviour of speeding drivers.
- Addressing social pressures to speed, time pressure as a motivation for speeding, and the positive outcomes of speeding may reduce speeding.
- Interventions developed to change the speeding behaviour of the worst offenders may need to be different from those designed to prevent/reduce speeding in the general population.

Going a little beyond the reviewed material, we would also make the following **recommendations**:

1. Interventions based around the models and/or variables identified as most predictive in this review should be piloted within the target population – speeding drivers.
2. Interventions might be designed to:
  - (a) undermine the perception that speeding is associated with benefits – do you really get there quicker? do you really get ahead of other traffic?
  - (b) promote the idea that there are costs, other than accidents, associated with speeding – less money to spend because of increased insurance costs or a speeding fine; having to rely on other people to drive you around because you are banned from driving;
  - (c) promote the idea that drivers have control over their speed and that barriers to driving slowly are easy to overcome – it is easy to take your foot off the accelerator; a skilled driver is one who drives at the appropriate speed; leave plenty of time to get to your destination;
  - (d) undermine the effect of normative pressure on driving fast – how ‘cool’ is it to drive fast to impress a friend? are you sure your mates are really impressed by your fast driving? are you one of the herd or are you a skilled driver who adopts an appropriate speed?
  - (e) promote the affective benefits of driving more slowly – feeling less anxious; feeling in control.
3. Qualitative research investigating the beliefs of drivers who attend speeding interventions may help to target interventions more effectively. For example, it is useful to know what costs are important for this specific group of drivers.
4. Further research is required to address the factors that predict the initiation and maintenance of speeding. A large-scale longitudinal study measuring the cognitions identified in this review (intentions, PBC/self efficacy, attitudes, outcome expectancies/response efficacy, and costs and barriers) before and, for some time after, learning to drive would help to elucidate the pattern of influences on behaviour.
5. The value of combining interventions designed to change social cognition variables with changes to the driving environment in order to promote safer driving should be further investigated.

## 4.2 Theory-based intervention review

A review was undertaken of the literature on theory-based interventions to change behaviour. The aim of the review was to identify effective theoretical components that have been used successfully in interventions to change risky health behaviours, and to use the information identified to develop a framework of intervention

characteristics that are most likely to change speeding behaviour. Specifically, the review questions were:

1. Which theoretical components have been used successfully to change risky health behaviours?
2. How might these components be applied to changing speeding behaviour?

The principles of systematic review were adopted: rigorous and reproducible methods applied to synthesise the available evidence. See Fylan *et al.* (2005b) for details of the methodology for the review, including search strategy and terms, inclusion screening and data extraction.

The focus of the behavioural change interventions was non-addictive behaviours in adults. Addressing addictive behaviours, such as smoking and alcoholism, were excluded because any intervention would need to address the addictive nature of the behaviour as well as beliefs and attitudes. Interventions aimed at children and their parents were also excluded, as these would not map as clearly to an intervention targeted at an adult population. The review specifically aimed to identify effective health theory-based interventions and, therefore, intervention studies without a clear reference to psychological theory were excluded.

Three approaches to the literature search were taken. First, the evidence base of systematic reviews of interventions to change health behaviours was searched. Second, a review of recently published (2003–05) papers that describe interventions to change behaviour was undertaken. Third, key health psychology texts were searched for accounts and evaluations of interventions.

These three searches revealed over 3,000 articles. Inclusion screening, based on the title and abstract, or the full article, reduced this to 55 primary studies and systematic reviews.

No studies were identified that expressly compared the effectiveness of different theoretical approaches. Instead, the interventions described were usually based loosely on one or more theory, and the studies reported how the interventions were delivered and the behavioural change that was achieved. We therefore discuss the components of interventions that have been demonstrated as being effective in changing risky behaviour, and relate these components to the content of interventions to change speeding behaviour.

#### 4.2.1 Which theories have been used to develop interventions?

The interventions aimed at changing risky behaviours that were identified for this review were based around the following theories:

1. the Health Belief Model (HBM);
2. Protection Motivation Theory (PMT);
3. the Self-regulation Model;
4. the Social Learning Theory and Social Cognitive Theory (SCT);
5. the Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB);
6. implementation intentions; and
7. the Transtheoretical Model (TTM).

Examples of interventions based on these theories are described below.

The HBM was applied in an intervention aimed at increasing condom use. The study highlighted the importance of targeting perceived vulnerability, or invulnerability in many cases, to the outcomes of the behaviour (Bryan *et al.*, 1996). Although identifying and targeting perceived barriers was shown to be important, it was also shown that removing barriers was not enough to initiate the appropriate behaviours and that it was also important to target attitudes (Aiken *et al.*, 1994). Information booklets based on this theory that target attitudes have been shown to result in more positive norms towards screening and increased intention to be screened, without increasing anxiety or worry about screening (Williamson and Wardle, 2002).

A study that applied key components of PMT (Schaffer and Tian, 2004) found that the use of a theory-based booklet could significantly increase adherence to medication. In particular, the authors suggested that interventions should aim to improve self-efficacy by providing opportunities for joint problem-solving and through the reinforcement of skills. It was also important to identify people's perceptions of barriers to help remove these barriers, and to provide suggestions for initiating behavioural change.

The Self-regulation Model was used as the basis of an intervention to reduce heavy drinking (Neal and Carey, 2004). Individuals were encouraged to reevaluate their drinking behaviour and to identify long-term goals for which heavy drinking could be considered an inappropriate behaviour.

Social Cognitive Theory has been used in several interventions, and has been found to be a useful intervention for the adherence to HIV treatment (Smith *et al.*, 2003). It has also been used in interventions to reduce HIV risk (St Lawrence *et al.*, 1997). The intervention to reduce HIV risk comprised four sessions based around

instruction, modelling and skill rehearsal, and led to improved attitudes, self-efficacy and behavioural skill. This approach allows individuals to formulate and rehearse their reactions and behavioural responses to specific situations in which the maladaptive behaviour might arise. Cognitive approaches can be effective when delivered by means of telephone interviewing (Yabroff *et al.*, 2000). Indeed, the combination of letter and telephone counselling was found to be more effective than face-to-face counselling in achieving the desired behaviour (Saywell *et al.*, 1999).

Several studies based on Social Learning Theory have demonstrated that interventions which emphasise skill acquisition and rehearsal can be effective in changing behaviour (e.g. Hobfoll *et al.*, 1994). Increasing motivation (a central component of both Social Learning Theory and the TTM) was found to be effective in improving adherence to medication (Schroeder *et al.*, 2004), whereas supplying patient education alone was not effective.

The TPB, which has been used extensively in predicting speeding behaviour, has also been applied in an intervention to change speeding behaviour (Stead *et al.*, 2005). The study found support for all components of the theory, both in terms of intention to speed and actual speeding behaviour. Perceived behavioural control (PBC) was found to be most effective, followed by attitudes and subjective norms. Targeting PBC has been shown to achieve behavioural change in more general health behaviours, for example improving access to a screening facility is effective in increasing attendance (Legler *et al.*, 2004). The theory has been extended to include additional components, principally implementation intentions, self-efficacy and anticipated regret.

A combination of the TPB and implementation intentions was the focus of an intervention to promote workplace health and safety (Sheeran and Silverman, 2003). The results of the study suggested that an intervention based on the TPB alone was not as effective as one focused either on implementation intentions or a combination of the two. Implementation intentions are seen to be important in that they prompt certain behaviours when certain environmental cues are met and, as such, they may be of use when trying to encourage new patterns of behaviour. They have been shown to produce a highly significant improvement in the number of people undertaking the intended behaviour across a wide range of behaviours (Orbell and Sheeran, 2002).

Self-efficacy was added to the TPB in an intervention to decrease dietary fat. Three versions of an information leaflet were produced, which provided: (1) solely information, or a combination of information with material designed either to (2) change attitudes or (3) increase self-efficacy. All three interventions were effective, but the theory-guided interventions (2 and 3) were more effective in improving attitudes to reducing dietary fat, and there was a (non-significant) trend for the self-efficacy intervention to reduced dietary fat intake more than the others.

Anticipated regret was added to the theoretical components of the TPB in a study to examine the effects of viewing videos about speeding in intention to speed (Parker, 2002). Drivers viewed one of five versions of a video about speeding that targeted either:

- normative beliefs;
- behavioural beliefs;
- PBC;
- anticipated regret; or
- a control video that did not address driving behaviour.

The reported results were disappointing as the control group had the least intention to speed after viewing the video. Nevertheless, drivers who viewed the anticipated regret video had a significantly more negative attitude to speeding than the other drivers. Videos that targeted normative beliefs and anticipated regret were found to be the most effective in changing the relevant theoretical construct.

The TTM was found to be more effective than behavioural change programmes in interventions to increase adherence and screening attendance (Riemsma *et al.*, 2002). Examples of interventions were an interactive barriers counselling protocol based on stages of change, and receiving one of four mailed intervention packets based on precontemplation, contemplation, action and maintenance. The TTM has also been combined with other theoretical components. Interventions, tailored to the individual's stage of change, which provide information to decrease barriers and increase self-efficacy, can be effective (Schroeder *et al.*, 2004).

For the most part, theories were used to develop messages, information materials or interview discussion schedules, often with the aim of targeting inappropriate attitudes or beliefs. Few studies actually tested the relative usefulness of the individual components of these theories. Studies that compare theories tend to examine predictors of behaviour, rather than the effectiveness of interventions. Furthermore, because interventions tend to be multifaceted, it is difficult to separate the efficacy of the individual theoretical components. Also, because of the wide-ranging differences in methodologies and samples, no strong conclusions about effectiveness can yet be made. However, the studies still provide useful information about the content and format of effective interventions. Furthermore, a review of 42 studies of interventions to improve mammography screening concluded that the most effective interventions were those that employed a theoretical framework (Yabroff and Mandelblatt, 1999). Hence, while no clear conclusions can be drawn about which theory is most effective, it can be concluded that effective interventions should be developed from one (or more) relevant theory. Indeed, Denhaerynck's *et al.*'s (2003) review of interventions to increase attendance at mammography screening identified multi-faceted approaches as being more effective.

#### 4.2.2 *What should the intervention message contain?*

Interventions were found to be more effective when they contained **enforcement messages** (Snyder *et al.*, 2004). Enforcement messages provide information about enforcement procedures, laws or rules (e.g. information on fines, roadside checks) and outline the negative consequences associated with the behaviour.

Interventions should include **educational material**, with the aim of changing beliefs about the behaviour. However, interventions that consist solely of educational material are less effective than multi-faceted approaches (Stone *et al.*, 2002; Warsi *et al.*, 2004). Behavioural change increases when education is supplemented by additional techniques, such as interviews (Friedman *et al.*, 1996).

The relevance of materials was also of importance, with participants signalling that it was important that they felt that materials were ‘meant for them’ (Rimmer *et al.*, 1999). **Tailored materials** are more effective than generic materials (Rimmer *et al.*, 1999; Revere and Dunbar, 2001; Yabroff, 2003). An intervention to promote condom use among young women used a computer-generated self-help magazine that was individually tailored to responses on survey items, and this approach was found to increase reported condom use (Scholes *et al.*, 2003). The majority of the sample reported that the materials used were relevant to them. The authors also outlined a number of other health contexts where this approach has been successfully applied.

**Personalised normative feedback** has also been found to be effective (Neal and Carey, 2004). This involves an individualised summary of data (e.g. the individual’s speeding behaviour and their responses to road stressors) obtained following an intervention session, along with a comparison made to normative data (the general population or non-speeders). The concept of normative feedback is linked to the **Self-regulation Model** as the feedback regarding one’s own behaviour is compared to a normative standard and this can trigger a self-evaluation process.

The **framing of messages** (providing information about the gains to be had or, alternatively, providing information about the losses that could result from a particular behaviour) was also found to be important. This is a key aspect of the presentation of information for decision making. Altering the frame of an educational message is a straightforward task. The findings of the study, which concerned mammography attendance, suggested that loss-framed messages were more effective than messages that highlighted the benefits of a particular behaviour (Banks *et al.*, 1995). It may be that loss-framed information increases a person’s perception of their risk and that this change in risk perception initiates a behaviour change.

Rothman and colleagues (Rothman *et al.*, 1993) carried out an intervention where they altered the **attribution** content of the messages. Internal attribution messages emphasise an individual's own responsibility for a particular behaviour and were found to be more effective than external attribution messages (which emphasise the responsibility of others or of authority for controlling a behaviour).

It is important for interventions to address motivation in addition to providing information. In their study of adherence to medication, Schroeder *et al.* (2004) found that patient education alone was largely unsuccessful, whereas the addition of a component to address patient motivation increased adherence significantly. However, Volmink and Garner (1997) found health education to be the most effective intervention to increase adherence to tuberculosis treatment. While giving patients monetary incentives to attend was effective when used in isolation, it did not produce any further increase in attendance when added to patient education. Hence, interventions to target motivation should address the value that individuals place on the recommended behaviour or desired outcome, rather than offer short-term or monetary incentives.

#### 4.2.3 *What format should the intervention use?*

Interventions should be delivered personally, rather than by means of mailed information materials, even when the information is tailored to each individual's needs. It is important that interventions are **interactive**, as interventions that were delivered statically (limited participant involvement) were found to be less effective (Yabroff *et al.*, 2001). This is in line with Social Learning Theory, which states that learning is achieved by first organising and rehearsing the modelled behaviour and then enacting it overtly. Furthermore, coding modelled behaviour into words, labels or images will result in better retention than simply observing. In addition, introducing face-to-face counselling can also improve the outcome of interventions (Champion *et al.*, 2003).

The use of **cognitive strategies** within interventions appears to be more effective than the use of behavioural or sociological components (Yabroff *et al.*, 2000). Cognitive strategies are concerned with the provision of new **information** and with **education** in order to increase knowledge and clarify misconceptions. In comparison, behavioural strategies include the use of telephone or mailed reminders, with the aim of initiating a particular behaviour while sociological strategies might use peer or social norm information to promote the behaviour.

The role of additional **reminders** following an intervention was highlighted in a number of studies (Costanza *et al.*, 2000; Saywell *et al.*, 1999; Taplin *et al.*, 2000). For a behaviour, such as mammography screening, or cervical screening, the use of reminder telephone calls or letters has been shown to significantly increase attendance (Stone *et al.*, 2002; Taplin *et al.*, 2000; Yabroff *et al.*, 2003), and reminder letters are particularly effective in increasing attendance when used in

combination with telephone counselling (Saywell *et al.*, 1999). Reminders should not be used as a stand-alone method of behavioural change (Volmink and Garner, 1997), such as sending drivers reminders not to speed, but should be used to refresh and reinforce a previously delivered intervention.

#### 4.2.4 *How might this be applied to speeding interventions?*

Details obtained from speeding interventions that are currently in use highlight a number of approaches, which are outlined below. There are wide-ranging differences in the combination of approaches used in the interventions, and they map onto several of the models of health-related behaviour:

- **Information and education** (cognitive strategies) are provided by a number of the speeding interventions, which examine the principles of good driving, facts about speeding (including statistics) and hazard perception. **Coding** information is also used in some interventions, such as labelling 35 mph as the ‘killing speed’.
- **Enforcement messages** are also used, which focus on the consequences of speeding (e.g. fines, speed cameras) and may include presentations by police officers.
- **Instruction, modelling or skill rehearsal** are included in some of the speeding interventions which have a practical component involving a driving session with an instructor and also which focus on situations where maintaining the speed limit can be viewed as difficult. Such interventions may also include a demonstration drive to show more appropriate behaviour.
- **Attitudes** are targeted by a number of the courses that focus on participants’ perceptions of the acceptability of speeding.
- **Framing** is covered to some degree by interventions that focus on the negative outcomes, and this may include a talk from a paramedic who has attended a road-side collision, a victim or a relative of someone who has died or information from a police officer.
- **Barriers** are tackled by interventions that focus on the excuses provided by clients regarding their speeding behaviour (e.g. did not see speed limit sign, did not know the road). This is most likely to be an **interactive** approach and may offer the opportunity for **joint problem-solving**.
- **Attributions** are targeted by interventions that focus on responsibility awareness, and that the driver (rather than employers or other road users) is responsible for the speed at which he or she drives.

- **Reminders** are provided by some of the speed interventions in the form of booklets, key rings, etc., mailed to drivers some months after their attendance on a course. These remind drivers about the course content, and encourage them to maintain their adherence to the speed limit.

### 4.3 Combined conclusions

No studies were identified that expressly compared the effectiveness of different theoretical approaches. The reviews provide evidence that effective interventions should target:

- attitudes (beliefs and values) towards speeding, taking into account individual drivers' readiness to change, and increasing their motivation to drive at an appropriate speed;
- beliefs about the acceptability and ubiquity of speeding (norms);
- perceptions of responsibility for each driver's choice of speed (attributions);
- perceptions of the benefits of speeding (response costs);
- perceptions of the likelihood of drivers being detected if they speed (susceptibility);
- negative consequences of crashing or being caught speeding (anticipated regret);
- perceived barriers to driving at an appropriate speed (PBC);
- the way in which speeding makes drivers feel (affective beliefs);
- drivers' perceptions of their ability to drive at an appropriate speed (self-efficacy); and
- when and where drivers will reduce their speed (implementation intentions).

For example, interventions might be designed to:

- undermine the perception that speeding is associated with benefits;
- promote the idea that there are costs, other than crashing, associated with speeding;
- promote the idea that drivers have control over the speed they adopt and that barriers to driving slowly are easy to overcome;
- undermine the effect of normative pressure on driving fast; and
- promote the affective benefits of driving more slowly.

The reviews indicated that self-efficacy (and PBC) may be a particularly important target because of its strong association with behaviour and the fact that there is good evidence about how to intervene effectively. Persuasive messages should be paired

with strategies that promote elaboration (e.g. group discussion), and there should be interactive sessions on joint problem-solving in order to help individuals identify and adhere to appropriate speeds. Drivers should be reminded that speeding is illegal. Reminders of the key messages should be sent to drivers some months after the course. Interventions developed to change the speeding behaviour of the worst offenders may need to be different from those designed to prevent/reduce speeding in the general population.

## 5 EXISTING INTERVENTIONS TO CHANGE SPEEDING BEHAVIOUR

In this section we review the literature on interventions that aim to change speeding behaviour, and we summarise the content of the different speed awareness courses running in the UK as of January 2005. Full details of the review and the content of the courses can be found in Fylan *et al.* (2005b)

### 5.1 The evidence base of interventions aimed at changing speeding driver behaviour

The literature search revealed over 3,500 articles, and inclusion screening reduced this to 11 studies that report independent interventions. Studies included in the review had to address speeding as an area for behaviour change, but did not have to focus exclusively on speeding. Both empirical studies and meta-analyses were eligible for inclusion, but discussion papers or discussion-based review papers were excluded. The review questions were:

1. What interventions have been used to change speeding behaviour?
2. To what extent have these interventions been effective?
3. Is there any evidence to suggest that different interventions might be required for different types of speeding driver?

The 11 interventions are described below.

Ben-Ari *et al.* (2000) explored driving speed in 55 male drivers (aged 18–21) in the Israeli army. The theoretical framework used was Terror Management Theory, which suggests that when mortality is made more salient we engage in activities to enhance our self-esteem. Appeals that are threat based (and therefore increase mortality salience) will then direct drivers to increase their self-esteem. Participants were allocated randomly to view a road trauma film or a control film. The road trauma film showed a young man describing a car accident he had experienced, and contained scenes of firemen trying to rescue the driver, and lots of blood and screaming. The control video was a food commercial. Participants were also assessed as having low or high driving relevance to self-esteem. Drivers with high driving relevant to self-esteem who had viewed the trauma video drove faster (in a driving simulator) than those who had viewed the control film. Drivers with low driving relevant to self-esteem who had viewed the trauma video drove slower than those who had viewed the control film. Driving speed increased from the first to the fourth trial, which may indicate that repeated exposure to the simulator led to participants feeling more confident in the simulator and, as a result, they increased their driving speed. The driving simulator was based on a video game, which are

normally driven very fast without negative consequences, and so the validity of the study is poor.

Donovan *et al.* (1999) recruited 326 self-reported speeding drivers (aged 17 to 39) from suburban shopping centres in Western Australia. The study aimed to find out whether the cost of an advert influenced its effectiveness. Four different road safety adverts about speeding were selected:

1. **Courthouse** – young man leaving court, discussing penalties with friends. Through flashbacks we learn that his girlfriend was hospitalised through unsafe driving. Low on emotion, and it did not show the accident (cost \$80,000).
2. **Courtroom** – four executives driving to a meeting. Driver tries to overtake on the inside and kills a man changing a tyre. Graphic portrayal of accident. Driver taken into custody. Shown crying in witness box as dead man's wife looks on (cost \$275,000).
3. **Speed camera** – shows a family eating dinner and discussing speed cameras. Teenage male scoffs and criticises their revenue-raising function. Father warns him not to speed. Shown again later, but son is paralysed and being spoon fed. Did not show accident (cost \$30,000).
4. **Don't lose it** – two men and a woman talk about their accident caused by speeding, their physical injuries, loss of licence and other consequences (cost \$20,000).

The participants were allocated randomly to one advert, which they viewed twice. Participants' perceptions of the main message, the clarity of the message and their emotional response were recorded. The main outcome measure was intention to speed, and intention to ask the driver to slow down when travelling as a passenger. The results indicated that the Courthouse advert was significantly less effective than other adverts on intention to speed. The Courthouse advert was significantly less effective than the Courtroom advert on intention to ask the driver to slow down. The Courthouse advert was disliked more than other adverts, and was thought to be more confusing. The authors suggested that this advert failed to use forceful or credible appeals to emotion. They concluded that adverts do not have to be very expensive to be more effective.

An advert-based intervention to change attitudes to speeding has been reported in several places by Parker (e.g. Parker *et al.*, 1996). The theoretical framework used was the Theory of Planned Behaviour (TPB), and adverts shown to participants (238 people, aged 17–40) were developed from previous work examining the social cognitive predictors of speeding. Drivers viewed one of four adverts designed to target different components of the TPB, or a control advert:

1. **Normative beliefs** – the driver gets out of the car and the passengers complain to the camera about his driving and say they are not impressed by it. Three different passengers (partner, same-sex friend, son).
2. **Behavioural beliefs** – intended to show that a quiet residential road can be full of hazards. By keeping to the 30 mph limit you can increase the likelihood of dealing with these hazards.
3. **Perceived behavioural control (PBC)** – the driver complains about difficulty in keeping a modern car to the limit, and the viewer hears a voice pointing out that the driver, not the car, is in control. The driver complains about being tailgated, and the voice points out that it is the driver's foot on the accelerator, and that he is free to choose his own speed.
4. **Anticipated regret** – aims to persuade the viewer that speeding on a residential road is wrong, even if nothing happens as a result. The driver is shown helping an elderly pedestrian across the road after she had been startled by a speeding car. He agrees that drivers should slow down on residential roads. Then he gets into his own car and drives off, then notices that he's doing 40 mph – the same speed he labelled as inconsiderate and dangerous.

Small groups of drivers viewed one of the videos twice then listed the thoughts that occurred to them while viewing the film. The main outcome measures were intention to speed and attitude to speeding, which was measured by the short version of the Driver Behaviour Questionnaire (with just one item about speeding) and the speeding scale of the Driver Attitude Questionnaire. The results indicated that the videos were not effective in changing TPB constructs, and often had the opposite effect to that intended, for example the PBC video group reported lower perceived control than the other groups. All intervention groups had lower mean scores for intention to speed and attitude to speeding than the control group, but the only statistically significant result was that the anticipated regret group had a more negative attitude to speeding than the control group. It should be noted that participants had to list their thoughts about the videos, which would increase elaborative processing, and would be unlikely in more naturalistic viewing conditions. Some participants made negative comments on the technical and dramatic contents of the videos, which perhaps made the message less credible.

Rossiter and Thornton (2004) also examined the effect of two different anti-speeding adverts on 37 young Australian drivers. The adverts lasted for five minutes:

1. **Pizza (fear relief)** – a pedestrian is hit by a car and a surgeon provides commentary on the injuries and the role of speed in causing them, and recommends that drivers reduce speed.
2. **Trike (shock)** – a child rides a trike into a road and is hit by a car.

The participants attended once a week for three weeks to view the advert and rate the fear and relief the adverts generated, and they also undertook a video speed test. Their speed was compared with that of a control group who had not viewed either advert. The fear relief advert showed a greater reduction in speed (2.2 kph for moderate repetition, and 3.1 kph for heavy repetition) than the shock advert. Female drivers showed a reduction in speed for all adverts following moderate and heavy repetition. Males showed an increase in speed for the shock advert following moderate repetition, and a small decrease following heavy repetition. Hence the fear-relief advert – which showed how to reduce the threat (i.e. slow down) – was more effective, particularly for males. No statistics were presented, so it is difficult to evaluate the mean scores presented and, furthermore, the task of rating fear and relief during viewing may have increased the depth of processing of the advert, which may not occur during more naturalistic conditions.

Stead *et al.* (2005) reported on the results of the Foolspeed project for the Scottish Executive in 2002. The target group was the general driving population in Scotland, but particularly males age 25–44. The study was a four-year longitudinal cohort study conducted as part of the Scottish Road Safety Campaign (Foolspeed) 1999–2001, with data collected at four time points. At baseline, 550 participants were recruited, of which 287 remained in the study throughout. The theoretical framework of the intervention was the TPB. Development of the adverts was informed by previous research and focus groups that explored beliefs and norms, and feelings about road safety advertising. The focus group results indicated that credibility and empathy with driving difficulties would be the optimal approach. The interventions were three TV/cinema adverts targeting attitude, subjective norm or PBC. Local recognisable scenes were used:

1. Attitudes – **Mirror** (1999) – aimed to challenge the belief that speeding in town saves time, that the driver is in full control, and that speeding can cause accidents. It showed a male driver in his 30s.
2. Subjective norms – **Friends and Family** (2000) – highlighted the mismatch between the driver's favourable view of their own driving and the irritation/anxiety of passengers. It aimed to increase drivers' motivation to please others. It showed a male driver in his 30s.
3. PBC – **Simon Says** (2001) – tried to increase perceptions of control over drivers' behaviours by depicting internal and external pressures and showing that they can be resisted.

The adverts were shown as part of a mass-media advertising campaign, and through public relations and corporate sponsorship. Questionnaires assessed the response to the adverts: awareness; recall, comprehension; identification; involvement (affect); and perception of key messages. The main outcome measures were intention to speed, and self-reported speeding. The results showed that awareness of the campaign was not a significant predictor of intention to speed or reported speeding.

Only 20–33% of participants recalled the adverts. The TPB predicted 47–53% of variance in intention to speed and 33–40% of variance in self-reported speeding on 30 mph roads. PBC was found to be the most powerful predictor of intention. Reported speeding behaviour at the end of the study was predicted by higher baseline PBC, intention to speed and younger age. The majority of participants liked the attitude advert, and frequent speeders reported that the advert was targeted at them and that it made them feel that they drove too fast. Similar results were obtained for the PBC advert, but the subjective norm advert showed little difference in response between frequent and infrequent speeders. Attitudes towards speeding became more negative and were significantly related to awareness of the attitude advert. The study would have been stronger if it had used speed-related offences as an additional outcome measure.

Ulleberg (2001) reported a school-based study of 643 young drivers (aged 18–23) in Norway. The intervention comprised two movies, delivered by a campaign team during visits to schools. In addition, teachers were given a manual on traffic safety, which formed the basis of a traffic safety project for students. Reminders were also used in the form of commercials, posters, CDs, T-shirts, web pages and a competition on traffic safety knowledge. The participants were classified into different clusters, which were determined by personality scores. These were:

1. calm and emotionally well-adjusted, low normlessness, high altruism;
2. low altruism and anxiety, high sensation-seeking, aggression, irresponsibility and confidence;
3. high anxiety and altruism, low sensation-seeking, normlessness and driving anger;
4. high sensation-seeking and altruism;
5. high sensation-seeking, aggression, anxiety and driving anger; and
6. low sensation-seeking and altruism.

The measures were sensation seeking, aggression, anxiety, altruism, normlessness, driver anger scale (seven items) and risk taking. The main outcome measures were satisfaction with the campaign, judgements of meaning, interest, relevance, concern, and judgements of how positive/negative the campaign has been. The results indicated that low-risk clusters (1 and 3) rated the campaign higher than high-risk clusters (2 and 5). Females rated the campaign higher than males. While the theoretical framework was not stated explicitly, its use of role models could tap the subjective norm of the TPB, or Social Learning Theory. The authors did not measure speeding behaviour or intentions, so no conclusions can be drawn about the effectiveness of the intervention to change speeding behaviour. However, the differential response of clusters is in accordance with other studies that show high-risk drivers perceive campaigns/interventions to be less relevant.

Glendon and Cernecca (2003) studied the responses to anti-speeding messages of 117 young drivers (aged 17–25) in an Australian university. Twelve anti-speeding messages were compared:

10 kph less will save lives;

- be patient, not a patient;
- check speed – fines up to \$240;
- don't fool yourself, speed kills;
- drive within the speed limit;
- focus on speed – slow down;
- slow down – radar is around;
- speed cameras – a new focus on saving lives;
- speed cameras – obey the speed limit;
- speeding – it's not worth the risk;
- speeding wrecks lives; and
- the faster you go the greater the impact.

Self-reported speeding, perceived vulnerability to speeding-related accidents, age, gender and the number of years participants had held their driving licence were assessed by means of a questionnaire. Participants were asked:

- How effective do you think the road sign would be in reducing speeding in general?
- How much do you personally agree with the message?
- How likely would you personally be to exceed the speed limit after viewing the sign on a roadway?

The results indicated that messages with an enforcement theme (fines or speed camera) were perceived to be the most effective and were associated with the lowest levels of intention to speed. Males reported that they would be more likely than females to speed having viewed the messages. No gender differences were found in intention to speed after viewing different types of messages, but there was a trend for females to be more responsive to non-enforcement messages. The study demonstrates that intention to speed was changed most by enforcement messages, however attitude to speeding was not measured and this could be viewed as a limitation of the study.

Walton and McKeown (2001) reported an intervention aimed at 113 young drivers (mean age 21) at a New Zealand university. The participants were shown five slogans:

1. The faster you go, the bigger the mess.
2. Slow down, speed kills.
3. She was only four and I killed her (related just to a 50 kph zone).
4. Do not fool yourself – speed kills.
5. It is in your hands, concentrate or kill.

The measures were:

- perceived usual speed of self and others on 50 and 100 kph roads;
- recall of having viewed the adverts previously;
- age; and
- gender.

The participants were categorised into two groups. The biased perception group incorrectly reported driving slower than average: 21% of drivers in 100 kph and 31% in 50 kph zones fell into this group. The second group comprised all other drivers. The main outcome measures were perceptions of advertising slogans, rated on a continuous scale from ‘intended for people like me’ to ‘intended for others’. The results indicated that the biased perception group was significantly less likely to perceive that the adverts were aimed at them (non-significant for slogan 5). No age or gender effects were found. Around half of the drivers believed that the adverts were targeted at others.

Gregersen *et al.* (1996) undertook a large controlled trial with over 4,000 professional drivers in a Swedish telephone company. The intervention was for general driver improvement but it included a speed component. Four different interventions and a control condition were compared:

1. Driver training – manoeuvring, skid training and a commentary drive (the latter aims to improve speed adjustment and to realise stopping distances and fuel consumption).
2. Campaign – five meetings over a year that addressed aims, driving in darkness, stopping distances, winter driving, unprotected road users, loading, summary and discussion. Videos were shown and pamphlets provided.
3. Group discussion – three one-hour meetings of small (8–15) groups of drivers discussing road safety problems and what to do about them. The company had pledged to do their best to act upon suggestions made in the group discussions.

4. Bonus – money set aside for each driving unit, a sum deducted for each accident, and after one year the remaining amount was used for a group activity or purchase.
5. Control (no intervention).

The data were analysed two years retrospectively, at baseline, and two years prospectively. The discussion condition was based on results of trials of discussion groups for improving road safety:

- 60-minute warm up;
- 40-minute discussion in small groups to identify problems at workplaces;
- discussion of which problems could be solved by individuals and which ones by the company;
- discussions about measures and changes in driver behaviour; and
- employees writing down on a piece of paper a change in practice.

Driver training was delivered by the National Society for Road Safety. The campaign was delivered by trained employees during work time. The discussion groups were led by one of the drivers from the same unit who had attended an introductory meeting. The bonus scheme was explained during a meeting but no follow-up information was given. Working groups were allocated randomly to one of the interventions or to a control. The results indicated that driver training (risk ratio 1.67) and discussion groups (2.26) gave the largest reduction in accidents, followed by the bonus (1.31). No reduction was found in the campaign (0.82) or control groups. The discussion group showed the largest reduction in accident costs, which dropped by 38%, although no statistical analyses of these costs were presented. Statistical analyses were limited and few details were provided.

A comparison of the different approaches to reduce the crash risk of drivers in California was reported by Helander (1984). Drivers involved in a fatal accident, or involved in three accidents in a one-year period, or one accident plus two or more negligent operator points in one year, were included. Drunk drivers were excluded. In total, records from over 31,000 drivers were assessed. Three intervention groups and a control group were examined:

1. standard re-examination (driving test & discussion of accident, which can lead to further training if the test is failed);
2. accident avoidance session (discussion of accident avoidance techniques plus pamphlet);
3. mailed educational pamphlet ('It wasn't really my fault') and self-administered test; and
4. a no-contact control group.

Drivers were allocated randomly to conditions. Age and gender were recorded, and the main outcome measure was accident involvement one year post-intervention. The results demonstrated that the re-examination group had significantly fewer accidents than the control group. Statistics were not presented, but the accident avoidance intervention drivers had fewer accidents than the re-examination group. There was a trend for older females to be less responsive to interventions than younger females, and for older males to be more responsive than younger males. Females showed a trend to respond more than males to the mailed pamphlet condition. It should be noted, however, that the results were not analysed separately for drivers whose offence was speed related.

Masten and Peck (2004) undertook a meta-analysis of the driver improvement programmes in the USA. One hundred and six individual interventions were included and categorised in terms of the type of intervention and the orientation of intervention. Intervention type was found to account for 39% variance in effect size. The results shown in Table 5.1 were found for intervention crash risk effect size and violation risk effect sizes (larger positive effect sizes indicate greater reduced risk).

<b>Interventions</b>	<b>Crash risk effect size</b>	<b>Violation risk effect size</b>
Educational/information	0.004	0.007
Group meeting	0.023	0.059
Individual meeting	0.045	0.084
Letter	0.022	0.042
Licence suspension/revocation	0.113	0.190
Licence extension	0.048	-0.001
Contingent point reduction	0.015	0.052
Probation	-0.036	0.122

The results indicate that suspension and revocation of a licence are most effective but the authors argue that this is most likely due to decreased exposure to driving. Treatment orientation accounted for 35% of effect size, and while the authors state that four orientations had a significant effect, they do not state which ones. The authors were contacted and asked for further details of the study. They supplied the data shown in Table 5.2 on effect sizes for the crash risk and violation risk for the three different orientations used in group meetings (positive effect sizes indicate reduced risk).

**Table 5.2: Data on effect sizes for the crash risk and violation risk for the three different orientations used in group meetings)**

Orientation	Crash risk effect size	Violation risk effect size
Threat	-0.036	0.075
Education/information	0.047	0.098
Changing behaviour/attitudes	0.013	0.040

These data suggest that, for group meetings, providing education and information is the most effective means of reducing crashes and driving offences. Further, the data suggest that threats are not an effective means of reducing the risk of crashing, but are more effective in reducing the risk of further driving offences than attempts to change attitudes and behaviour. Interestingly, for individual meetings and warning letters, threats were the most effective approach. While it should be noted that these data are not exclusively for speeding drivers, and are restricted to interventions based in the USA, they provide convincing evidence for the key role of education and information in changing driver behaviour.

Overall, few of the interventions identified were based on a theoretical framework of behavioural change, although the content of the interventions could sometimes be related to one or more theory. The most common intervention type was a video or commercial: six of the studies used this approach. Two studies were based on the TPB. Stead *et al.* (2005) provided support for the TPB to predict speeding intentions, but recall of the advertisements (which at 20–33% was low) was not related to TPB constructs or intention to speed. Similarly, the videos shown in the study by Parker *et al.* (1996) did not produce the desired changes in the relevant theoretical construct. While the authors suggest that the low budget available for making the videos might have influenced the results, the cost of anti-speeding adverts was not found to be related to their impact, and that the content was more important than the budget (Donovan *et al.*, 1999). This study found very little difference in the reported intention to speed between viewers of four different adverts of similar content. The least effective advert was judged as being less liked, less clear, and did not include substantial emotion, threat or shock. However, an advert based solely on shock was found to be less effective than one that contains a degree of fear and shows how safe driving can remove this fear (Rossiter and Thornton, 2004). Although, anti-speeding slogans with an enforcement theme (fines or speed camera) are more effective. Gender differences were observed in several of the studies, with females being more responsive than males. Overall, the research reported here suggests that interventions based solely on films, advertisements or slogans are unlikely to change speeding behaviour.

Four studies used mixed methods: two of these used a multi-faceted intervention in a school setting, and two were based in a real-life environment – drivers who had been referred by enforcement agencies (Helander, 1984) or professional drivers in an occupational setting (Gregersen *et al.*, 1996). These studies compared different

intervention approaches, usually driver training, discussion groups, and educational material. While neither study addressed speeding specifically, their naturalistic setting makes them of particular interest. The first (Helander, 1984) found that an intervention based on a discussion of techniques to avoid accidents, and an educational pamphlet, was most effective in reducing crash risk. The second (Gregersen *et al.*, 1996) again found that discussion groups were most effective in reducing the number of accidents that drivers were involved in. Driver training, which included a practical session, was also effective, although slightly less so than the discussion groups.

Our previous review of speeding drivers provided support for four different sub-groups (see Section 3.2):

- unintentional speeders;
- moderate occasional speeders;
- frequent high speeders; and
- socially deviant drivers.

The current review provides evidence to suggest that effective speed awareness courses should include an element of threat and shock, but not exclusively so. Methods of driving more safely, and thereby reducing the threat, should be included. The enforcement consequences of speeding (e.g. fines, licence points resulting in higher insurance premiums, possible disqualification) should be highlighted. There is no evidence to suggest that this component would be any more or less effective for the different groups of speeding drivers.

Interventions should not be based solely on videos or educational material, but should include group discussions that address driving problems and how to solve them. Where possible, intervention materials should be tailored to individual drivers. In the study of professional drivers, peer-led discussion groups were most effective in reducing accidents, and while there is additional evidence that discussion is a necessary component of changing behaviour, it cannot be concluded that the peer-led (or peer-involved) make-up of the group is vital. Nevertheless, it suggests that speed awareness courses should comprise peers, which might be of particular importance for the younger, socially deviant drivers.

The drivers that are most likely to speed are the most difficult group to change. The frequent high speeders and the socially deviant drivers (particularly males) are likely to require more material on why the speed awareness courses are relevant to, and aimed at, them. These groups of speeding drivers are also likely to require additional material designed to change their attitude towards speeding. Effective material for these drivers was found to challenge their beliefs that speeding in town saves time, that the driver is in full control, and that speeding does not cause accidents. The

moderate occasional drivers are more likely to require information on their perceptions of biased speed being incorrect.

## 5.2 Speed awareness courses in the UK

Eleven speed awareness courses run by Safety Camera Partnerships were identified as of March 2005, 10 are currently running and one has ceased. The courses are run by:

- Avon and Somerset;
- Gloucestershire (no longer running);
- Humberside;
- Kirklees;
- Lancashire;
- Leicestershire;
- Lincolnshire;
- Northamptonshire;
- Staffordshire;
- Thames Valley; and
- Warwickshire.

### 5.2.1 *Course types*

The courses can be broadly divided into three types:

- classroom-based presentations and discussions together with a driving demonstration and practice;
- classroom-based presentations and discussions without the practice element; and
- a seminar.

The first two types of course typically limit the number of drivers attending each course so as to facilitate discussion. The third type is conducted with a large number of drivers in a lecture-based format. One course (Thames Valley) also includes a computerised driving behaviour questionnaire and hazard perception test, which provides drivers with a personalised risk profile.

### 5.2.2 *Target drivers*

The majority of the courses target drivers detected speeding just above the 30 mph enforcement limit, usually 35–39 mph. Some of the courses are very specific and

will only invite drivers at a specific speed, e.g. 36 mph, to attend. There are three exceptions to this:

- Humberside runs two types of course. One is the standard course for drivers speeding in urban environments (35 mph in a 30 mph zone, and 46 mph in a 40 mph zone). The second is for drivers speeding on motorways or rural roads at enforcement levels in 50, 60 and 70 zones. The instructors report that the two courses will, in future, be combined.
- Thames Valley runs two types of course. One is the standard course for drivers speeding in urban environments at the enforcement level of 35 mph in a 30 mph zone. This is a three-hour course involving one hour of computerised driving questionnaires and hazard perception tests, followed by two hours of presentations. The majority of drivers (96%) attend this lower speed course. The second type of course is for drivers detected driving at excessive speeds: 50 mph in a 30 mph zone. This begins with the same three-hour format as the lower speed course, and is supplemented by a two-hour practical session.
- Staffordshire and Lancashire have recently made their course available to drivers just over the enforcement limit in 30, 40, 50 and 60 mph zones. The majority of clients are detected in 30 mph zones.

### 5.2.3 *Course aims*

The courses have very similar stated aims, although some are more applied than others, for example the Warwickshire course aims to enable drivers to develop individual plans that recognise the need to drive at an appropriate speed resulting in the reduction of death and serious injury.

### 5.2.4 *Cost of the courses*

The majority of the theory and practical courses charge in the region of £90, and the theory-only courses cost around £60. All drivers who attend the courses have their fixed penalty fine and three licence points waived. The exception to this is drivers attending the excessive speeding course in Thames Valley, who receive three licence points and a £60 fine (drivers who fail to complete the course are referred back to the police for possible prosecution).

### 5.2.5 *Course content*

Details of the content of each of the courses is shown in Fylan *et al.* (2005b). The courses tend to have a common core content (with the exception of Lincolnshire):

- the reasons people have for speeding;
- the consequences of speeding (to self and others, financial, injury), sometimes including a video testimony of parents of a child killed by a speeding driver;

- awareness of each driver's individual responsibility for driving safely;
- stopping distances, and how much they increase with speed;
- the likelihood of death and serious injury for pedestrians hit at increasing speeds;
- the purpose of speed cameras, the criteria used for situating the cameras, and the statistics on accidents at camera sites;
- how to identify the speed limit of the area in which you are driving;
- hazard perception;
- practical tips for decreasing the risk of speeding in the future;
- how to drive more safely; and
- changing speed to suit driving conditions – selecting an appropriate speed.

### 5.2.6 *Practice element*

Four of the courses contain a two- or three-hour practical session in which two or three drivers practise their driving with an advanced driving instructor (ADI). The standard format is that the ADI conducts a commentary drive in which he or she talks through the hazards they detect and the driving choices they are making, including but not exclusively speeding. Clients are asked to identify hazards, and may complete a commentary drive. Throughout the practical sessions drivers are encouraged to discuss their beliefs about selecting the correct speed, and debate is encouraged, for example whether driving faster saves any time in an urban setting. Drivers then return to the classroom for a brief final discussion of their drive and the day.

## 5.3 **The content of speed awareness courses mapped against effective intervention components**

The content of all 10 speed awareness courses is shown in Table 5.3, mapped against the components of the interventions most likely to change speeding driving behaviour. Individual course mapping is shown in Fylan *et al.* (2005b).

Table 5.3: The content of 10 speed awareness courses mapped against the components of the interventions most likely to change speeding driving behaviour	
Area	Details
Beliefs about speeding	<p>Speeding is not safe; speeding is serious; speeding causes crashes and pedestrians have less chance of survival at higher speeds: 20% of pedestrians die when hit at 30 mph but 80% at 40 mph. 30% accidents are caused by speed; more people die from speeding than from drink/drug driving. Speeding drivers are 3–5 times more likely to crash</p> <p>Driving in fourth gear, and faster, decreases (rather than increases) fuel economy so is bad for the environment</p> <p>Reasons for speeding – addressed own and others’ beliefs on speeding as necessary or appropriate. Reasons for speeding (e.g. being late and inattention) are excuses. Inappropriate speed is not always exceeding the limit</p> <p>Speeding does not get you there faster. Speeding does not save time: driving at 38 mph rather than 30 mph over a five-mile journey saved 75 seconds</p> <p>Consequences of speeding range from nothing to prison or death</p> <p>While modern cars have better brakes and are safer, most of the stopping distance is reaction time, which has not changed</p> <p>Urban speeding kills kids: the UK has the second worst record in Europe for killing kids. 3,500 people die on the road every year. Speeding has not been considered a real crime but this is changing</p> <p>Everybody speeds. Speeding causes injury: statistics on injury and crashes pre- and post-cameras. Speeding causes injury: video shown about where a driver would have stopped if travelling at 30 mph, but were speeding and so hit a child</p>
Values about speeding	<p>Drivers have a responsibility to be safe for themselves, their families, passengers and other road users. Drivers who crash do not intend to kill anyone: intention is not relevant</p> <p>Speeding can kill and it is wrong to kill – it causes extensive grief. You should not cause an accident. Speeding is unnecessary</p> <p>Safety is good, we do not want to put friends or family in danger</p> <p>Speeding is risk taking</p> <p>It is wrong to kill. Arriving a little late is not very important. It is not so important to arrive on time to justify speeding. Speeding causes damage to the driver, pedestrians and the environment</p>

**Table 5.3: (continued)**

Area	Details
<p>Driver's responsibility for speed choice</p>	<p>External reasons for speeding (e.g. being late, being tailgated, not knowing the speed limit) are excuses. The driver has control of their own speed</p> <p>The driver is at fault if he or she crashes – drivers must choose an appropriate speed. Nobody intends to kill but speed can turn a driver into a criminal or murderer</p> <p>Personality factors. If there is a crash it is the driver's fault – cannot blame it on a lack of speed bumps or railings</p> <p>The driver behind – tailgaters – does not control the car and the speed you drive at – you do</p> <p>The driving environment and obligations to other people are excuses – the driver chooses the speed at which they travel</p> <p>Environment, vehicle, and circumstances, but the driver is responsible. 95% of crashes are due to driver error</p> <p>The driver should manage their time so that they are not in a rush. Should know where the safety cameras are located</p> <p>Need the self-discipline to select one's own driving speed</p> <p>Drivers are responsible for their own choice of speed – anything else is an excuse. Drivers must be accountable for the speed they choose to travel at</p>
<p>Identifying oneself as a speeder</p>	<p>While some drivers speed much more (e.g. 50 mph in a 30 mph zone), they are in a minority. The majority of speeders drive at 35–39 mph – they are the problem</p> <p>Speeding by 5–10 mph is still speeding</p> <p>Group discussion on who speeds – everybody agreed that they were a speeder</p> <p>Pre-course beliefs that other clients would be 17-year-old lads. Speeding drivers are not all teenagers, but everybody attending the seminar is a speeding driver and all ages were represented. Driving at 35–39 mph in a 30 mph zone is speeding</p> <p>Appropriate speed is not the speed limit</p> <p>Everybody on the course has been caught speeding. Speed is a choice that drivers make</p>
<p>Likelihood of being detected/crashing</p>	<p>Speed cameras and mobile units are placed throughout the county and will detect speeding drivers. Map of safety camera locations</p> <p>Stopping distance increases with speed, so speeders are more likely to crash. You are 3–5 times more likely to crash if you speed. Speeding is the main cause of 30% of all crashes</p> <p>Statistics on the number of accidents</p> <p>One driver crashes every second</p> <p>Inappropriate speed causes crashes. Many more people are killed or injured on local roads than through crime</p>

<b>Table 5.3: (continued)</b>	
<b>Area</b>	<b>Details</b>
Negative consequences of being caught	<p>Fines, points and increased insurance costs. Loss of licence would mean restricted mobility, hassles and possibly loss of friends</p> <p>Could lose what is important to you</p> <p>Could lose your job, which can have severe financial consequences – loss of house, breakdown of relationships. Speeding could affect lots of people, not just the driver</p> <p>Affective consequences: anger, frustration and embarrassment</p> <p>The consequences of speeding can range from nothing to being killed</p>
Negative consequences of crashing	<p>Death and serious injury to others. Photograph of police station and a prison cell. Each fatal accident costs £1.2 million</p> <p>Injury or death to oneself, passengers and pedestrians. The ‘ripple effect’ in which one crash could cause negative effects to hundreds of people. Even if you do not intend to kill, you could be imprisoned</p> <p>Cost to the NHS: if staff are dealing with a crash, they are not dealing with routine waiting-list cases, so somebody’s operation is cancelled</p> <p>Cost to the local people</p> <p>Video of parents talking about their daughter killed by a speeding driver. Video of crash test – cars are not as safe as you think, and a crash causes serious injury. Stressed death and injury</p> <p>Policeman’s account of a fatal road incident</p> <p>Pain, grief and guilt</p> <p>Graphic adverts shown about the consequences of crashes</p> <p>Damage to the car. Injury to yourself and others. If you die your partner/spouse will meet somebody else and your children will grow up without you, raised by a stranger</p> <p>Inconvenience to family, injury, writing the car off and having to wait for the insurance money before getting a new car. Increased insurance costs</p>
Barriers to not speeding	<p>Practical tips on dealing with: modern cars being difficult to drive at 30 mph (use third gear); rushed (plan journey with plenty of time); tailgaters (ignore or slow down and let them pass); do not realise speed (include instruments on scanning); do not know the limit (lamp-post rule)</p> <p>Not knowing the limit</p> <p>Distractions</p> <p>Drugs/alcohol, fatigue and stress. Peer pressure</p> <p>Self-discipline</p> <p>Not knowing the area</p>

**Table 5.3: (continued)**

Area	Details
Good/bad feelings from speeding	<p>Speeding makes you feel stressed. Acknowledged that speeding can give you a buzz but no course addressed this. How you would feel if you caused an accident because you were speeding?</p> <p>Thrill of speeding is addressed in the Thames Valley driving style assessment</p> <p>Clients are asked to consider how they would feel if they hit somebody, the victim's family arrived and asked why they were speeding. How you would feel if a family member was killed because of your speeding</p>
When and where drivers will comply with the speed limit (implementation intentions)	<p>Common danger points for drivers. Noted that while the formal part of the course has finished, it is really just the beginning. Reinforced that now clients know the facts, they must make a decision about the speed they are willing to travel at</p> <p>Clients have to write down what they are taking away from the course</p>
Messages from enforcement agencies	<p>Speeding is illegal. Partnership includes the police and the council. Seminars delivered by current or ex-police officers</p>
Personalised feedback	<p>Own reason for speeding revealed as an excuse</p> <p>Individual performance on hazard test. Results of own questionnaire. Course booklets with spaces for clients to complete questions about their driving and the situations surrounding speeding</p> <p>Feedback during practice drive. Constructive comments and written feedback on driving from an ADI</p> <p>In the Thames Valley course, drivers receive a copy of their driving style assessment and a hazard perception test is completed by each driver</p>
Interactive sessions/ problem solving	<p>Interactive presentation style and lots of discussion using an approach in which clients find out through discussions and discovery</p> <p>The reasons that people speed are discussed and identified by the group as being excuses</p> <p>Clients have a personal work booklet, which is shared with the group and commented on by the instructor</p> <p>National speed limits and how to tell the limit</p> <p>Crash scenarios</p> <p>Problem solving about where drivers would stop if travelling at different speeds, and if they would hit a pedestrian emerging from in front of a bus</p> <p>Discussions on the consequences of crashing and the negative consequences of speeding</p> <p>Use of the <i>Highway Code</i> booklet for problem solving on road rules and safe driving</p> <p>Hazard perception, reasons for speeding, e.g. why people speed, what practical steps could you take to drive at an appropriate speed</p> <p>Discussion of whether any of the clients has known anybody who has been killed or injured. Some had or had observed a crash. This was a very powerful illustration of the consequences of speeding</p> <p>Discussions of what you can do – coping strategies, e.g. concentration, leaving more time</p>

<b>Table 5.3: (continued)</b>	
<b>Area</b>	<b>Details</b>
Develop and rehearse skills	<p>Identifying the correct speed limit</p> <p>Visual searching</p> <p>Hazard perception tasks</p> <p>Practical tips given for controlling speed and reacting to tailgaters</p> <p>The pack given to clients contains a leaflet on speed limits</p> <p>Practical drive to gain skills and confidence in the ability to drive within the limit. Feedback on driving skills given by instructor</p> <p>Selecting an appropriate speed</p> <p>The use of anticipation, space and appropriate speed</p>
Information coding	<p>Only a fool breaks the two-second rule</p> <p>COST (concentration, observation, space, time). COAST (concentration, observation, anticipation, space, time)</p> <p>Killing zone</p> <p>Crash magnets</p> <p>SLOW (speed low, observe warning)</p> <p>Look OUT (over, under through)</p> <p>Cameras are yellow. Camera signs</p>
Post-course reminders	<p>Clients are requested to return their evaluation forms</p> <p>Clients are given a Think! key ring. Results of questionnaires are sent to clients</p> <p>Clients are provided with an information pack on safe driving, Advanced Driving, and a DVD of the main course content. Reminders, including speed booklets, tyre gauge and high-luminance vest are sent in 3-4 months</p> <p>The personal speed booklet could act as a reminder if kept in the car</p>

## 6 EVALUATING SPEED AWARENESS COURSES

All current speed awareness courses evaluate clients' perceptions of the quality of the course with respect to the venue, the style and knowledge of the presenters, and the relevance of the content. Some courses also ask about the quality of the joining instructions they were sent. While monitoring these areas is of value in order to maintain client satisfaction, it is also important to evaluate the effectiveness of the course in reducing speeding.

Five courses (Kirklees, Lancashire, Lincolnshire, Northamptonshire and Warwickshire) evaluate clients' intentions to speed, or their attitude towards speeding, following the course. One course (Leicestershire) is currently running an evaluation to find out about (among other things) any changes that clients have made to their driving since the course (e.g. further driver training, better journey planning, no change). Only three courses (Humberside, Lincolnshire and Northamptonshire) reported that they have monitored re-offending rates for drivers who chose to attend the course and those who chose to accept the fixed penalty fine and points. Kirklees have monitored re-offending for clients who have attended the course, but do not have re-offending statistics for drivers who chose not to attend. The following evaluation statistics were supplied by the individual course organisers and, where appropriate, statistical significance has been calculated. The results are summarised in Table 6.1.

**Table 6.1: Summary of re-offending rates for attenders and non-attenders of four different courses**

	Follow-up	Attended	Not attended
Humberside	12–18 months	40 (8%)	125 (25%)
Kirklees	12 months	13 (4.9%)	Not available
Lincolnshire	6–12 months	23 (5.2%)	46 (10.4%)
Northamptonshire	12 months	84 (7%)	125 (9%)

In Humberside, re-offending data from 500 drivers who attended the course were compared with 500 drivers who were travelling at a slightly higher speed and so were not eligible to attend. The data indicated that 8% of drivers who attended the course and 25% of those who did not attend the course received a further speeding offence. These data suggest that the course is associated with a statistically significant decrease in speeding ( $\chi^2 = -52.44, p < 0.0001, 1$ -tailed). However, the two groups of drivers may not be comparable: the non-attenders were travelling at a slightly higher speed than the attenders. Furthermore, the speed at which drivers were invited to attend the course changed over the duration of the study from 37 mph to 35 mph. Finally, the groups were not matched for the number of existing licence points. The results must therefore be interpreted with caution.

In Lincolnshire, a questionnaire was sent to 3,209 drivers convicted of speeding, of which 996 (31%) were returned: 448 from people who had attended a seminar (49% response rate) and 548 who did not (24% response rate). Most drivers who attended the seminar reported that they had changed their attitude to driving at inappropriate speeds (87%), and that they had changed their driving habits (85%). Fewer drivers who did not attend reported that they had changed their attitude (76%), and their driving (75%). These differences are statistically significant: people who attended the course were more likely to report that they had changed their attitude towards speeding ( $\chi^2 = 17.71, p < 0.0001$ , 1-tailed) and their driving habits ( $\chi^2 = 16.63, p < 0.0001$ , 1-tailed) than those who did not attend. However, the evaluation data highlight the problem with self-reported behaviour: there was no significant difference in re-offending between people who reported that they had changed their driving habits (7% re-offended) and those who reported that their driving habits had not changed (10% re-offended) ( $\chi^2 = 1.72, p = 0.125$ , 1-tailed). Re-offending rates were compared for drivers who attended the seminar and those who received the fixed penalty. Of those who attended, 5% were detected speeding again, compared with 10% of those who did not attend. The course is therefore associated with a statistically significant decrease in speeding ( $\chi^2 = 8.37, p = 0.002$ , 1-tailed).

In Northamptonshire, 1,201 drivers attending the course between July and December 2001 were tracked by the Driver and Vehicle Licensing Agency (DVLA) in order to see if they had re-offended in the following year. All these drivers had been travelling at 37 mph in a 30 mph limit. They were compared with 1,365 drivers who declined the course. Of the attenders, 84 (7%) were detected speeding again, and a further five (0.4%) committed separate offences. Of the non-attenders, 125 (9%) re-offended, and a further 24 (1.8%) committed separate offences. The results indicate a 23% reduction in committing a further speeding offence and a 32% reduction in committing any driving offence. The course is associated with a statistically significant decrease in speeding ( $\chi^2 = 3.75, p = 0.031$ , 1-tailed).

In Kirklees, re-offending statistics were available for 378 drivers who had attended the course six months previously. Of these, five were subsequently detected speeding (1.3%). No figures were available for drivers who did not attend, or for before the course was introduced.

All the courses that have measured re-offending show a statistically significant reduction following attendance on the course. The data provided have very different baseline re-offending rates, however, so it is not appropriate to compare their results directly.

In Lancashire, an independent evaluation of the effect of the course on self-reported driver attitude and self-reported speeding was undertaken. Statistically significant improvements ( $p < 0.001$ ) in driver attitude and in self-reported speed choice are reported across road types, but self-reported speed may not be a valid measure of

actual speed, particularly as many of the drivers attending the course may be unintentional speeders.

In summary, the course evaluations have assessed clients' perceptions of the joining instructions they received, the quality of the venue, the style of the instructors, and the content of the course sessions. This is important to ensure that the course is perceived to be of high quality, but it does not assess how effective the course has been in meeting its intended outcome of changing driving behaviour. Some courses have evaluated clients' self-reports of whether their attitude has changed, and whether they intend to change their driving. This method moves closer to assessing a change in speeding behaviour, but the data provided by the Lincolnshire partnership indicate that drivers who reported that the course had changed their attitude towards speeding are no more, or less, likely to have a subsequent speeding offence than those drivers who reported that their attitude had not changed. Furthermore, drivers who reported that they had changed their driving were no more, or less, likely to have a further speeding offence than those drivers who reported that their driving behaviour had not changed. Hence, use of self-reported speeding is not a valid measure and should not be used in the course evaluations.

Instead, the evaluation should relate directly to the aims of the course. We suggest that any evaluation should include a questionnaire to assess the following:

- clients' perceptions of the joining instructions that they were sent, the quality of the venue, and the style of the instructors;
- clients' perceptions of the relevance and value of each of the sessions included in the course;
- clients' reports of which sessions they found most useful, and the reasons why;
- clients' reports of how likely they will be to choose to drive at an appropriate speed (intentions);
- clients' reports of how confident they are in identifying the speed limit of different roads;
- clients' reports of how confident they are that they can put the knowledge gained into practice; and
- clients' attitudes toward speeding, and their subjective norms regarding speeding.

A questionnaire on intentions to speed, attitude towards speeding and subjective norms regarding speeding, and confidence in identifying the correct speed limit, should be sent to clients with the joining instructions and be collected at the start of the course. They should be asked to complete the same questionnaire directly after the course, and the two questionnaires should be analysed to assess the impact of the course on attitudes, intentions and confidence in identifying the speed limit. While

the pre- and post-course questionnaires would have to be matched, questionnaires should be anonymous, and clients should be assured that their individual responses cannot be identified.

We further suggest that an evaluation should assess the effectiveness of the course in changing speeding behaviour. This should be undertaken by recording subsequent speeding offences in a group of clients who have attended the course and in a matched group who have not attended. Speeding offences should be recorded nationally rather than at a local level. The follow-up period should be a minimum of six months. Finally, we suggest that the proportion of drivers offered the course who choose to attend (i.e. uptake rates) should be monitored.

A large-scale prospective research study would be required to evaluate differences in effectiveness between the different speed awareness courses.

## **PART 2 EXPERT GROUP MEETING**

### **7 REVIEW OF EFFECTIVE INTERVENTIONS FOR SPEEDING MOTORISTS**

#### **7.1 Introduction**

An expert group meeting was held on 21 September 2005, attended by the researchers, two independent scientists, and representatives of the Department for Transport (DfT), the Driving Standards Agency (DSA), the Parliamentary Advisory Council for Transport Safety (PACTS), the Association of National Driver Improvement Scheme Providers (ANDISP), the Association of Chief Police Officers (ACPO), and safety camera partnerships. The meeting aimed to discuss the research review on effective interventions for speeding motorists, with a view to agreeing a set of recommendations that translate the research findings into feasible practical recommendations for police forces and course providers. During the meeting the report authors presented the findings of the literature review, the background to the speed awareness courses, and the basis on which the evidence base for their recommendations were made. The expert group discussed the implementation of the research results in view of the practical operational constraints, leading to agreement of the recommendations of the expert group, described in Section 7.2. After the meeting, the report authors mapped the existing ACPO-recommended course onto the effective intervention components, and this mapping is described in Section 7.3. The scientists agreed to continue working on the course content after the meeting in order to generate ideas for effective information content and exercises, and their work is described in Section 7.4. Finally, the scientists agreed an evaluation methodology, which is outlined in Section 7.5.

#### **7.2 Expert group meeting discussions and agreements**

The discussion covered the following points.

##### **7.2.1 *What are the aims of the course?***

Those present were asked to describe their organisations' view of the aims of the speed awareness course. The different groups had different aims for speed courses:

- the police – to give a second chance to people who made genuine mistakes;
- ANDISP – casualty reduction, through increasing compliance;
- PACTS – greater compliance with road traffic law;

- the scientists – reducing speeding behaviour by increasing intention to comply, and to increase the ability to carry out intention to comply;
- DSA – education, awareness to raise standards and reduce casualties; and
- DfT – rehabilitation rather than punishment.

The UK Police Service, who are responsible for contracting these courses, also see a benefit in that they divert people who made a genuine mistake and were caught speeding just over the enforceable legal limit away from the criminal justice system. It was agreed that the aims of the stakeholders present did not conflict and, therefore, it should be possible to accommodate them within one single scheme.

### **Agreed aims**

To reduce casualties, encourage greater compliance with the law and good road use, and offer a behavioural change intervention.

#### **7.2.2 *Who is the course targeted at?***

Police representatives stated that drivers caught just over the enforceable speed limit are the target, and they believe them to be people who made a genuine mistake at the time. The discussion centred on:

- the belief that there is one group of people who intend to comply with speed limits, and they should go on the course if they are caught just above it, and there is another group who do not intend to comply, and there should be a different course for them;
- how you cannot infer the presence or absence of intention to speed from the observed speed someone was caught travelling at;
- the fact that there is wide variation in observed speeds in unintentional and intentional speeders;
- the profiles of the four groups of speeding drivers identified by the research review; and
- the fact that all four groups are represented in the current attenders of speed courses, and that all benefit from core interventions, with the two more deviant groups needing specific components to be included.

The discussion concluded that, given the fact that courses will be offered to people based on the speed at which they are caught, it would be greatly beneficial to ascertain to which of the four groups they belong so that the core component can be delivered to all, with some additional tailored components for the most deviant two groups.

### 7.2.3 *Constraints on the course that may impact on its format and content*

#### **Course fee**

Acceptable maximum costs and the effects of costs – monetary and other – on take-up rates and regional migration, and on other operational issues, were discussed. Implications for course format (number of sessions, classroom and on-road course provision) were included. The participants concluded that the costs should be a level that does not have an adverse effect on uptake. Further research is required to determine the cost at which uptake would be affected.

#### **Length and format of course**

The minimum, the practicable and the ideal length of the intervention were discussed. The discussion concluded that:

- an effective intervention could not be delivered in less than half a day (minimum length);
- in order to include all the constructs recommended, a full day is needed and this is possible (practicable length);
- research evidence suggests that longer courses are more likely to be effective; and
- scientific knowledge also suggests that a benefit would be gained from delivering the course across two sessions, delivered at some time interval (e.g. a week apart), but difficulties of scheduling and trainer deployment may make this difficult.

The group agreed to consider the development of a course that is either one full day or two half days separated by a week, when a driving ‘homework’ task should be completed.

#### **Course content**

##### **Classroom only versus classroom and on-road driving course**

The ANDISP representatives argued for an on-road driving component to the course given their local, early pilot work which indicated that people on a theory course did not apply what they had learned in their course’s classroom part and did not achieve behavioural change. Representatives of the police pointed out that the evidence base for including a driving element is unclear, and it would be difficult to run a course with a driving component for many reasons: driving instructor capacity; the extra cost; and the potential impact on uptake rates. The group discussed the issues raised, with the following points made:

- The research review suggested that the practical element might not be required for everybody, even though the review did not identify evidence specifically regarding the relative effectiveness of theory versus theory and practical contents. The evidence base is not strong for a driving practical element to be compulsory to achieve a change in attitude and behaviour.
- The description by ANDISP of the current on-road driving component seems to imply that the practical component tackles the construct of self-efficacy.
- Self-efficacy is important to address but this might be achieved by means of either classroom or on-road interventions – we do not, as yet, know which is more effective.

The participants agreed that the group will recommend three course structures of various robustness, with a further recommendation for ACPO and the police forces to undertake the best possible given the available resources and constraints.

#### **Content and method of delivery**

The outcome of the discussion on this topic was that:

- all constructs identified by the research review should be included in the courses;
- the ACPO course model is a start point and the findings of the current research will be used to further improve it;
- some prescription on course content is needed, but this should be limited to essential parameters to be achieved while allowing the flexibility to tailor the intervention to individual attenders;
- the method of delivery is important, with elaboration and one-to-one and group discussion being essential. The focus on elaboration, discussion and problem solving is vital, and methods that make attenders engage and interact with the material should be used;
- quality assurance should be monitored closely. While the possible on-road driving could be monitored by DSA, it is not yet clear what mechanism for monitoring classroom content should be put in place. Providers should consider good models from occupational training – a rigorous evaluation with a percentage (e.g. 10%) of courses observed would be ideal. The cost of this validation could be covered within the course fee; and
- there is evidence that post-course reminders work. The group agreed that such reminders, by way of posted leaflets with key messages mapped onto the constructs recommended by the review, should be sent to all attenders some weeks after course completion. This should be a checklist of things drivers have to put in practice. A constant reminder – such as a key ring with key messages might also be useful.

The group agreed to recommend the following course formats, in ascending order of preference:

- half-day classroom;
- half-day classroom and half-day practical, with or without a one week period separating them; and
- half-day classroom and half-day practical, and a half-day classroom discussion one week later.

### **Evaluation of courses**

The following points were covered in the discussion:

- the majority of current evaluations are of client acceptance, which does not assess performance against the stated course aims;
- courses should be evaluated using methods recommended by the group;
- the opportunities for collecting baseline data before the proliferation of these courses, as well as the opportunities to collect data from various control groups, should be explored in the near future – the lag before courses come online could enable baseline data to be collected; and
- evaluation is likely to be affected by the individual force's enforcement policy.

### **Other points of discussion**

Various operational issues have been clarified. These include:

- the delay between the speeding offence and the referral to, and completion of, a course;
- the incentive to participate;
- the independence of police as one current source of variation in practice;
- their need to prioritise course take-up; and
- the need to work using the APCO course model as the basis.

In view of the research review, it was important to recognise that there may be different courses required for sub-groups of speeding drivers – the research has demonstrated that the aims of the course would be different for different groups of drivers. The discussions focused on the appropriateness of 'one course fits all' and the ability of the courses proposed here to be flexible and allow material to be tailored for individual drivers, while maintaining a core intervention that appears to be beneficial across speeder sub-groups. Factual inaccuracies in current courses were revealed by the research review, and it would be useful to have a common driver information pack in order to ensure that the information is accurate.

### 7.3 ACPO model mapped onto the effective intervention components

Details of the ACPO-recommended speed awareness content were provided for the researchers, and its content (together with likely discussion points provided by the Chair of ANDISP) was mapped against the effective intervention components identified in the research reviews. This mapping is shown in Table 7.1.

<b>Table 7.1: Mapping of the ACPO-recommended speed awareness content against the effective intervention components identified in the research reviews</b>	
<b>Area</b>	<b>Details</b>
Beliefs about speeding (including norms)	<p>Driver or rider error is a contributory factor in 95% of crashes</p> <p>Speeding is not safe: you are 3–5 times more likely to crash if speeding</p> <p>Speeding is dangerous: % of pedestrians killed when hit at 20, 30 and 40 mph</p> <p>DfT DVD 'this car is travelling at 35 mph': cars need more distance to stop when travelling at a higher speed. While modern cars have better brakes and are safer, most of the stopping distance is reaction time, which has not changed</p> <p>3,500 people die on the road every year. Speeding has not been considered a real crime but this is changing</p>
Values about speeding	Speed kills and killing is wrong
Driver's responsibility for speed choice	Environment, vehicle and circumstances, but the driver is responsible
Identifying oneself as a speeder	Not covered
Likelihood of being detected/crashing	Safety cameras will detect speeding drivers. One driver crashes every second
Negative consequences of being caught	Fines, licence points, increased insurance costs, possible loss of job. Each client is at risk
Negative consequences of crashing	Fines, licence points, increased insurance costs, possible loss of job. Injury to yourself and others, killing yourself or somebody else. Imprisonment
Barriers to not speeding	Clients write down what causes them to speed, then they identify how their speeding behaviour could be changed. For example, too difficult to drive at 30 – use third gear. Do not know speed limit – how to tell the speed limit in different zones. Late – manage your time better. Tailgaters – ignore. Self-discipline
Good/bad feelings from speeding	How the driver felt when they received their speeding ticket
When and where drivers will comply with the speed limit. (implementation intentions)	Clients write down a pledge about their future driving – could be tailored to address those driving situations that they have identified as when they are most likely to speed
Messages from enforcement agencies	The safety camera partnership is the council and the police

Table 7.1: (continued)	
Area	Details
Personalised feedback	Performance on the hazard perception test. Constructive comments and written feedback on driving from an ADI for courses that include an on-road element
Interactive sessions/ problem solving	An interactive presentation style, with group work and discussions. Individual work may be completed in personal speed booklets, which can be shared with the group and the instructor. The <i>Highway Code</i> booklet can be used for problem solving on road rules and safe driving
Develop and rehearse skills	Hazard perception tasks in theory session and in practical. When driving, the use of anticipation, space and appropriate speed
Information coding	Look OUT – over, under, through – was covered on the practical
Post-course reminders	Clients are provided with an information pack on safe driving. Information on Advanced Driving. A DVD of the main course content can be provided. Reminders can include speed booklets and key rings, etc.

## 7.4 Further post-meeting work on course content by the scientists

The scientists (both the researchers and the independent scientists) were asked by the group to develop evidence-based suggestions of the components that might be included in both classroom-based and on-road driving situations. They were also asked to develop a methodology for evaluating courses. The combined responses are shown in Table 7.2.

## 7.5 Suggestions from scientists on course evaluations

It was discussed that the evaluation should include both intentions and attitudes to speeding, and also changes in each of the constructs that the course aims to address (e.g. self-efficacy, normative beliefs). Measures should be taken at three time points: before the course; directly afterwards (clients should complete and return their questionnaires at the course rather than at home so as to reduce data loss from non-returned questionnaires); and 12 months after the course.

The measures to be taken before the course are:

- attitudes to speeding – the Manchester Driver Attitudes Questionnaire (Parker *et al.*, 1996);
- intention to comply with the speed limit, and self-reported preferred speed;
- beliefs about the acceptability and ubiquity of speeding (subjective norms);
- perceived barriers to complying and confidence in the ability to comply with the speed limit (PBC and self-efficacy);

<b>Table 7.2: Suggestions from scientists on course components</b>		
	<b>Classroom intervention example</b>	<b>On-road driving intervention example</b>
Beliefs about speeding	<p>Challenge behavioural beliefs about speeding. For example, if it is OK to speed on someone else's residential street, what do drivers think about speeding on their own residential streets? Or, we all think 'it won't happen to me' but we cannot all be right in thinking this, can we? We are all vulnerable to being detected and being accident-involved</p> <p>Participants are required to self-generate a number of costs and benefits of speeding, and a group discussion could bring these together</p> <p>Challenge beliefs that speeding is safe by providing statistics on the role of speed in crashes, and the speed at which a pedestrian would be hit when travelling at different speeds</p> <p>Task to identify hazards during a video clip when travelling at 30 mph and 38 mph – it is much more difficult at higher speeds</p> <p>Discussion aimed at getting drivers to realise that fast driving is not skilled – skilled driving involves identifying an appropriate speed, and this is often well below the speed limit</p>	<p>Get drivers to drive down residential streets or shopping streets at their normal speed and then ask them to drive at a speed they would find reasonable if they lived on this street or were shopping in the street in question</p> <p>Get drivers to identify hazards and encourage them to recognise that conditions are never perfect and that dangers are always present</p> <p>Encourage drivers to watch the progress of speeding drivers and how (un)likely it is that speeding saves time in urban environments</p>
Values about speeding	<p>How cool is it to speed? Give drivers a passenger's perspective on their speeding – perhaps by getting them to reflect on how they feel when they are passengers in a speeding car when someone else is driving</p> <p>Ask how cool it really is to drive fast to impress a friend, and how likely it is that the friend is actually impressed</p> <p>How important is it to be fast rather than skilled?</p> <p>Is it more important to drive fast or to have more available money as you have to pay fines or increased insurance costs?</p> <p>Discussion to make benefits of speeding seem less likely, and the costs more likely</p>	<p>When speeding motorists are encountered, get drivers to make assessments of the speeders' behaviour. Then point out that others see their behaviour the same way</p>
Driver's responsibility for speed choice	<p>Challenge the view that speeding is someone else's fault by focusing the discussion around the sheep-like behaviour of the conforming speeder</p> <p>Group discussion to identify the different sources of pressure from other road users to speed, and to change the relative importance given to each influence</p> <p>Identifying/rehearsing methods of resisting pressures to speed, e.g. from tailgaters</p>	<p>Focus on getting drivers to learn to drive comfortably within speed limit. This may mean getting them used to driving in third gear</p> <p>Help drivers to respond appropriately to tailgaters</p>

**Table 7.2: (continued)**

	<b>Classroom intervention example</b>	<b>On-road driving intervention example</b>
Identifying oneself as a speeder	<p>Get drivers to be frank about the circumstances in which they speed and to find it acceptable or unacceptable to speed</p> <p>Provide statistics on speeding and the role of a few mph more in crashes and injuries to help drivers to realise that 35 mph is speeding (i.e. it is not just the boy racers that are the problem)</p>	<p>Ask drivers to report on what speed they would normally drive at on these roads, and what would lead them to drive faster or slower</p>
Likelihood of being detected/ crashing	<p>Give information about the frequency with which speed is a contributory factor in crashes. Speeding may not inevitably lead to accidents but if you have an accident, it is more than likely that speed was a contributory factor, and that by driving less fast one could have avoided the accident</p> <p>Note that the number of speed cameras means that it is now much more likely that drivers will be detected</p>	<p>Point out speed cameras and accident black spots in the neighbourhood, citing annual statistics for injury and 'killed or seriously injured' (KSI) accidents in the area or county</p>
Negative consequences of being caught	<p>Focus the discussion here on the 'hidden' negative consequences, such as the greater cost of getting car insurance, and the implications of being banned from driving, such as the loss of a job and social life, and increased day-to-day hassles</p>	<p>Explain the points and financial penalties that would ensue from being caught driving at their preferred speed on given roads</p>
Negative consequences of crashing	<p>Discussion of the following:</p> <p>Death or injury</p> <p>The widespread effect of just one injury or death on the victim's family, workplace and community</p> <p>The effect on the driver's own family if they were to die or be injured or imprisoned</p> <p>The cost to the NHS, including the cost to other people who have operations cancelled</p> <p>Focus on the negative feelings that one would experience: regret (because one was responsible, at least in part, for what happened) and/or guilt (for damage caused to others and self)</p>	<p>Not easy to do on the road! Perhaps best done by driving past a point where a serious accident is known to have occurred and describing what happened to those involved</p>

<b>Table 7.2: (continued)</b>		
	<b>Classroom intervention example</b>	<b>On-road driving intervention example</b>
Barriers to not speeding (reduce barriers and thereby increase self-efficacy)	<p>Get drivers to list these and then to think about how they could arrange matters so that these barriers were removed. For example, if time pressure is a barrier to not speeding, allow more time to get to a destination; if the car just seems to speed up, try driving in third gear. This could also be achieved by group discussions, persuasive communications, or by a testimony from a previous course attendee</p> <p>Learning to identify the speed limit in different road settings</p>	<p>Take drivers out on roads where most drivers speed, and get them to drive just under the speed limit, and provide them with coping strategies for dealing with perceived pressure from other vehicles</p> <p>Practising driving in third gear</p> <p>Feedback from the instructor on how to judge what represents an appropriate speed</p> <p>Practise identifying the speed limit, and noting how frequently sign repeaters occur, so even if you are unsure of the limit, you do not need to drive very far at a low speed before you find out</p>
Good/bad feelings from speeding (affective beliefs)	<p>Good feelings: thrill factor. Would it not be healthier to get one's kicks in contexts (extreme sports, for example) where the only one whose life is at risk is oneself? Is it really appropriate to feel good about putting other people at risk?</p> <p>Bad feelings: already referred to above. Regret and guilt are potentially powerful weapons here. We are ready to criticise others for their selfish and dangerous behaviour on the road. Are we immune from doing the same things? (hypocrisy)</p> <p>The good feelings that can arise from driving more slowly, such as feeling less anxious and feeling more in control</p> <p>We underestimate the extent to which emotion influences our behaviour. We need to gain control of our driving, not let our emotions control us</p>	<p>Get drivers to talk about feelings while driving. Focus on the relaxation benefits of driving less quickly and the self-esteem benefits from knowing that you are driving more safely</p> <p>Point out how much more effort it is to increase the level of concentration required to offset increased speed.</p>
When and where drivers will speed (implementation intentions)	Drivers list a number of contexts in which they commonly speed, or are tempted or pressurised to speed. They could then be encouraged to form a plan of how they could adhere to the speed limit in response to a cue in each context	Drivers could try out their plans
Messages from enforcement agencies	<p>Have police and fire service personnel talk about their experiences of attending crashes</p> <p>Remind drivers that speeding is an offence</p>	Not easily done on the road

<b>Table 7.2: (continued)</b>		
	<b>Classroom intervention example</b>	<b>On-road driving intervention example</b>
Personalised feedback	<p>Use self-identification as a speeder (see above) as the basis for tailoring feedback that is suited to the driver's stated beliefs and practices</p> <p>Self-completed questionnaire of risk profile or speeding typology</p> <p>Specific, concrete sub-goals to complete, printed records for self-monitoring, assignments that drivers complete and send in to course organisers</p>	Tailor feedback on driving style to what is known about the driver from classroom responses and discussions
Interactive sessions/ problem solving	<p>Most of the above could be best achieved by having short introductory talks/videos, followed by a classroom discussion and/or breaking out into smaller groups to come up with the best way to tackle particular aspects of the speeding issue</p> <p>Using the <i>Highway Code</i> to find things out</p>	If particular problems have been identified in a classroom session, address these problems on the road
Develop and rehearse skills	<p>Specific exercises to be put into practice between classroom sessions (if there is to be more than one session), plus report back to class at the next session</p> <p>Exercises could be related to the barriers drivers commonly report, such as not knowing the speed limit. For example, drivers could be told speed limit rules, then would be presented with a series of video clips or photographs and asked to identify the speed limit</p>	Put the skills exercises into practice on the road
Information coding	Slogans that summarise the essence of the course, with emphasis on memorability and vividness. For example, 'Dead men don't speed'	Get drivers to repeat the slogans at particular points during the drive (e.g., when first getting into a vehicle)
Post-course reminders	<p>Follow-up leaflets or postcards containing the essence of the course, distilled in a few simple slogans</p> <p>Cues such as windscreen stickers or key rings</p>	Follow-up personalised feedback on driving style and skills, noting areas where the driver needs to pay particular attention

- beliefs about how speeding makes you feel (affective beliefs);
- beliefs about the likelihood of being caught speeding or crashing when speeding;
- beliefs about the negative consequences of crashing or being caught; and
- beliefs about the driver's responsibility for selecting an appropriate speed.

The measures to be taken at the end of the course are:

- all the pre-course measures; and
- local quality-control questions about the instructions, venue and instructors may also be included for local analysis.

The measures to be taken 12 months after the course are:

- all the pre-course measures;
- re-offending rates, collected nationally and compared with baseline re-offending rates for areas not currently running courses with the same enforcement limit; and
- if possible, accident rates.

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