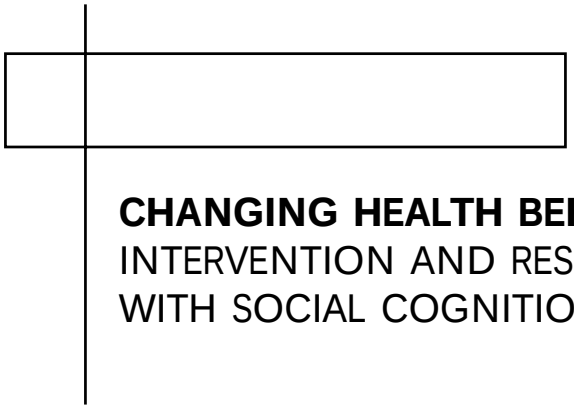

CHANGING HEALTH BEHAVIOUR
INTERVENTION AND RESEARCH WITH SOCIAL COGNITION MODELS

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1

DEREK RUTTER AND
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SOCIAL COGNITION MODELS AND CHANGING HEALTH BEHAVIOURS

1 Social cognition models

For many years, social psychological models have been at the forefront of research into predicting and explaining health behaviours. The most frequently used have been social cognition models. Until recently, however, there were few attempts to go beyond prediction and understanding to *intervention* – the systematic attempt to change people's health behaviours – but since the mid-1990s the position has changed, and there are now a number of very good, theory-driven, interventions in progress. As yet, so far as we know, there has been no attempt to bring the research together, and it is for that reason that we have produced this edited book. We have tried to include a representative cross-section of research, in that each chapter takes a particular health behaviour (sometimes more than one) and uses a particular theoretical model or framework to design and carry out the intervention. We hope that the book will appeal to academics, health professionals, and advanced students in psychology and health-related disciplines.

The starting point for the book is social cognition theory. Definitions of social cognition may vary, but the central tenet is that people's social behaviour is best understood by examining their beliefs about their behaviour in a social context, and their social perceptions and representations. Recognition of the term probably stems from the reconceptualization of social psychology that took place in the late 1960s and early 1970s. Social psychologists had struggled to demonstrate the links between attitudes and

behaviour that tradition had accepted must exist, and they turned to new concepts and models for solutions, among them the young Theory of Reasoned Action (Fishbein and Ajzen 1975). 'Social cognition' quickly became a distinctive and accepted term, and research developed apace to make the area one of the fastest growing in the discipline. By the mid-1990s, the role of social cognition models in helping to understand and predict *health* behaviours was well established in the literature, and the principal models and health-related research that each had inspired were brought together for the first time in *Predicting Health Behaviour*, edited by Mark Conner and Paul Norman, which was published by Open University Press in 1996.

The purpose of Conner and Norman (1996) was to provide an integrated and critical review of the main social cognition models and the research in health behaviour that had been published within each of the frameworks. The chapters were contributed by specialists and covered five widely used approaches: the Health Belief Model, Health Locus of Control, Protection Motivation Theory, the Theory of Planned Behaviour and Self-Efficacy. Each chapter ended with speculations about future directions. Since then, a number of developments have taken place in the literature, and they are discussed in this chapter and elsewhere in the book. First, there have been new critical reviews, some organized by model and some by behaviour. Second, there have been meta-analyses, which allow results from all the available studies that reach the author's methodological criteria to be combined statistically. Third, several writers have explored ways of modifying the existing models, or adding variables to them, in an effort to strengthen and clarify the prediction and understanding of health behaviours. And, fourth, the first interventions designed to modify health behaviours through the application of social cognition models have been designed and preliminary findings have begun to appear.

It is the purpose of this book to report some of the most important interventions that have been recently completed or are in progress. We have chosen to organize the material by behaviour, but each empirical chapter is intended to stand alone. Like Conner and Norman, we have asked contributors to follow a common format. Each chapter begins with a statement of the 'epidemiological facts' about the health problem it addresses, and describes the links between the behaviour in question and outcome. It then outlines the theoretical stance the chapter takes, generally by describing the particular form of the model it employs. The authors then report their intervention or interventions, and the chapter ends with a discussion of the implications of the findings for theory, policy and practice. The one exception to the common format is the concluding chapter, by Stephen Sutton – a final reflection on the problems that authors face and the assumptions they make in using social cognition models to develop health behaviour interventions.

2 The empirical chapters

The body of the book consists of nine empirical chapters, each concerned with a particular behaviour or set of behaviours. Chapters 2 to 4 examine risk-related behaviours (safer sex; smoking; exposure to radon gas); Chapters 5 to 7 turn to health-enhancing behaviours and screening (reducing fat intake; uptake of vitamin C; breast self-examination; participation in cervical and colorectal cancer screening); and Chapters 8 to 10 explore road safety (speeding by drivers; pedestrian behaviour; cycle helmet use). In this section of the introductory chapter, we outline the aims and objectives of the studies, and in the following section we introduce the models on which the interventions are based.

Chapter 2 is by Charles Abraham, Daniel Wight and Sue Scott. It describes a large-scale, schools-based intervention designed to encourage safer-sex behaviours. The median age for first sexual encounters continues to fall, and substantial numbers of young people are putting themselves at risk of sexually transmitted infections. The case for interventions to improve sex education and encourage safer-sex behaviours is strong and clear, but there has been little investment in setting up and testing theory-driven programmes. The SHARE project (Sexual Health and Relationships: Safe Happy and Responsible), the subject of the chapter, is a notable exception. It is currently being tested and developed in secondary schools in eastern Scotland, and it is based in the classroom. It includes a five-day training course for the teachers who deliver it, together with a teachers' resource pack of twenty sessions, and it takes place over two school years. Its theoretical base is symbolic interactionism and script theory – not encountered elsewhere in the book – and among the themes of the intervention are discussion, negotiation, sexual identity and agency. Outcome data are not yet available – the effects of the programme on young people's behaviour – but the chapter reports preliminary findings from first experiences of delivering the programme, and discusses implications for testing and developing it further.

Chapter 3 is by Lynn B. Myers and Susie Frost, and reports an intervention designed to encourage smokers to quit. Smoking is one of the world's most pressing health problems, and it is estimated that, across the globe, 450 million people alive today will die of smoking-related illnesses over the next 50 years. The benefits to the individual of quitting, however late, are considerable – the risk of lung cancer falls by 50 per cent over 10 years, for example – yet the success rates of interventions are seldom high. Two strategies have predominated: motivational (to strengthen smokers' attempts to give up) and treatment (to support abstinence by helping to overcome the effects of nicotine withdrawal, through nicotine patches and the like). The authors' intervention is motivational, and seeks to modify what smokers believe about the risks of contracting smoking-related diseases by attacking

their 'unrealistic optimism' and helping them to see the risks as they really are. The work is based on asking participants to imagine scenarios in which they develop the disease and have to think about the consequences for their lives – personal, social and work alike. The results so far have differed markedly according to how optimistically biased respondents were before the intervention started. The dependent measure was how much people's beliefs changed, and the findings showed an unexpected pattern: those who were optimistically biased at the outset became less optimistic, but those who were not became *more* optimistic. The implication is that interventions must be carefully tailored to people's initial positions.

Chapter 4 is by Neil D. Weinstein and Peter M. Sandman, and takes the argument about individual tailoring one step further. It reports a field experiment designed to encourage people to test their homes for radon gas. The basis of the intervention is Weinstein's own Precaution Adoption Process Model (PAPM), and the chapter is an instructive example of the cyclical way in which theory leads to experimental intervention, which leads back in turn to modifications to theory. Radon is a radioactive gas produced by the decaying uranium found naturally in the soil. In the USA, it is the leading cause of lung cancer after smoking. The PAPM, a stage theory, has been used to analyse a variety of health behaviours, and argues that people will be persuaded to change only if the message is matched to the stage they have reached in their thinking: unaware of the issue, unengaged, deciding about acting, decided not to act, decided to act, acting, and maintenance. The chapter focuses on two transitions: unengaged to deciding, and deciding to acting (in this case ordering a radon testing kit). The intervention was based on videos, and strong support for the model and the approach to interventions was found: there was good evidence for distinct stages; and stage-matched attacks, though expensive to produce, succeeded where others did not.

Chapter 5 is by Christopher J. Armitage and Mark Conner. It is the first of the chapters on health-enhancing behaviours, and it reports an intervention to encourage people to reduce their intake of fat. Excessive fat is known to be associated with many disorders, including heart disease and cancer, and guidelines have been produced in several countries. In the UK, for example, the recommendation is that no more than 35 per cent of food energy should come from fat, and no more than 11 per cent from saturated fat, but the average has remained above these figures for 20 years or more and shows little sign of falling. The authors' intervention was based on their newly extended version of Ajzen's Theory of Planned Behaviour (TPB), and used a randomized control design. Fat intake was measured at Time 1; three months later participants underwent one of three interventions (TPB, self-efficacy, or plain information), and five months later still their fat intake was measured again. All three interventions used leaflets. Both the TPB and self-efficacy conditions had a small effect

on total fat intake across the whole group, but all three led to a reduction among people whose normal intake was high. Thus, against prediction, all conditions produced measurable effects on behaviour; but the two theory-driven conditions were more successful than the information-only control.

Chapter 6 is by Sara Williamson and Jane Wardle, and reports an intervention to increase uptake of a new bowel cancer screening test, flexible sigmoidoscopy. Bowel cancer is one of the most common causes of cancer death in the UK and most of Europe, and in the USA. Survival rates are low but, if the disease is detected early and the pre-cancerous polyps are removed, the chance of survival is much enhanced. Flexible sigmoidoscopy (FS) allows both detection and removal, and is the current approach of choice, but uptake is low. The authors' purpose was to try to increase uptake by means of an intervention based on the Health Belief Model. The study was conducted as part of a UK national trial of FS, and used a booklet designed to reduce perceptions of barriers and increase positive beliefs among people who had declared themselves 'probably interested' in attending if offered the chance. The booklet acknowledged potential barriers, suggested possible coping strategies, allowed participants to rehearse the benefits of screening, and directed their attention to the positive emotional impact of screening. It also provided normative information and modelled ways of seeking social support. Participants were assigned at random to 'booklet' and 'no booklet' conditions, and it was found that screening intention was influenced markedly – 42.5 per cent said they were 'very likely' to attend after the intervention, against 29.4 per cent in the control condition. Whether intention has translated into action will be known shortly.

Chapter 7 is by Sheina Orbell and Paschal Sheeran. It takes a different approach from other chapters in that it reports three interventions, but all are based on the one concept, implementation intentions. The health issues addressed are practising breast self-examination (BSE), using vitamin C supplements, and attending for cervical screening. Social cognition models are generally about the *motivational* phase of planning behaviour, the processes up to intention, and stop short of trying to bridge the gap to behaviour, the post-decisional *volitional* phase. What Orbell and Sheeran do is try to increase the probability that the behaviour will occur by intervening to make people plan when and where they will execute the behaviour itself – the process of forming implementation intentions. Their technique is simple – ask participants to write down their plan and commit themselves to it – and the findings were striking. In the BSE study, 100 per cent of intenders who underwent the intervention subsequently examined themselves, against 53 per cent of intenders in the control condition; in the cervical screening study, attendance rates were 92 per cent and 69 per cent; and in the vitamin C study, significantly fewer experimental participants than

controls missed pills. Interventions using implementation intentions are both cheap and easy to conduct, and these first applications to health behaviours indicate that they produce strong and reliable results.

Chapter 8 is by Dianne Parker and is the first of the final group of three, on road safety. One of the most important contributors to road traffic accidents and to serious injuries is driving too fast. Speeding has been estimated to be second only to drink-driving as a cause and is known to be directly associated with accident death rates. Many governments impose speed limits, of course, but failure to respect them is widespread, is seldom punished severely, and is socially acceptable to many people. The intervention reported in this chapter followed a long programme of research to identify the beliefs and values that distinguish drivers who report committing violations on the road, including speeding, from those who do not. It was based on the TPB, and its purpose was to persuade drivers to slow down. Four short videos were made, each designed to change beliefs, attitudes and intentions associated with driving at 40 m.p.h. in a 30 m.p.h. area. One concentrated on behavioural beliefs, another normative beliefs, another perceived behavioural control, and another anticipated regret. All showed the same central character driving too fast along a quiet residential road and being assailed by triggers – in the normative condition, for example, members of his family and salient others disapproving of his speeding. The main outcome measure was responses to the Driver Attitude Questionnaire, a standardized index of general attitude to driving violations, and the strongest response was found for anticipated regret. This is a variable that has recently been used by the author and others to extend the TPB, and the chapter thus provides a good example of something we pointed out earlier – the way in which experimental interventions can make not only a *practical* contribution but a *theoretical* one too, testing theory and exploring ways of extending and improving it.

Chapter 9 is by Daphne Evans and Paul Norman, and turns to adolescent pedestrians. One child in fifteen is injured on the roads of Britain before the age of 16, and children aged 10 to 15 have the highest road casualty rate of the whole population. The intervention was based again on the TPB, but this time made use of theatre and drama. In the drama condition, 11–12-year-olds worked with their teacher to produce a 15-minute play about crossing the road safely, using information provided by the authors and their own observations of how they and their peers behaved as pedestrians. In the theatre condition, children of the same age watched the play as the drama class performed it. Both groups completed TPB questionnaires before and after the intervention, including items on additional variables that the authors used to supplement the model – moral norm, anticipated regret and self-identity. The theatre intervention produced changes in both behavioural and normative beliefs, while the drama condition influenced both perceived behavioural control and intention. The implications are that

school-based interventions have considerable potential, and that active engagement is the key.

Chapter 10 is by Lyn Quine, Derek Rutter and Laurence Arnold, and completes the empirical chapters with an examination of cycle helmet use among children riding to and from school. Deaths and injuries among school-age cyclists between 8 and 19 account for almost 40 per cent of all injuries to cyclists in Britain – and are probably under-reported. Accidents are most likely to occur during school journeys on weekdays, and the injuries are often to the head and brain. Helmets are known to reduce the risk of head, face and brain injury by up to 90 per cent, yet few school-age cyclists wear them. The chapter reports an intervention based once more on the Theory of Planned Behaviour, but using techniques from the Elaboration Likelihood Model of Persuasion to encourage systematic thinking about the message. The purpose of the intervention was to persuade non-wearers to become wearers. The participants were adolescents who rode to school regularly but did not wear a helmet. Participants were randomly assigned to intervention or control conditions. Initial beliefs were measured just before the intervention at Time 1. In the intervention condition, participants carried out two paper and pencil tasks, both of them designed to encourage recall and elaboration of salient beliefs about wearing a helmet: completing word and picture flow charts; and thought listing. In the control condition, participants were given similar materials and tasks, but this time concerned with a hypothetical cycling proficiency and maintenance course. The immediate effects of the intervention on attitude, subjective norm, control beliefs and intention were measured after the intervention at Time 2. Five months later, at Time 3, the long-term effects of the intervention on beliefs, intentions and behaviours were measured. It was found that 25 per cent of the intervention group were now wearing their helmets against none of the control group. There was good evidence that the difference was associated with belief change. While the intervention was time-consuming to conduct, incorporating it routinely into cycling proficiency training would be both easy and cost-effective.

3 The theoretical models

In this section of the chapter, we turn to the models or theoretical approaches on which the empirical chapters are based. A number of the authors have used extended or variant forms of the models, and they explain their choices and amendments in their own chapters. Our purpose in this chapter is to outline the original forms of the models and to indicate some of the ways in which they have been used in the literature. There are five approaches to discuss: risk perception and optimistic bias; the Health Belief Model; the Theory of Planned Behaviour; implementation intentions; and stage models.

3.1 Risk perception and optimistic bias

The literature on risk perception and optimistic bias owes most, perhaps, to Neil Weinstein. Weinstein (1980) drew attention to what he called the 'popular belief' that people tend to think they are invulnerable. We generally expect misfortunes to happen to others, he argued, not ourselves, and most members of a group will say they are less likely than the average to suffer the bad things in life and more likely than the average to experience the good things. The bias holds for a wide range of health and other outcomes, from the trivial (being ill in bed for a day or two, or having a tooth extracted) to the life threatening (having a heart attack, or being involved in a road accident). The name he coined for the bias was 'unrealistic optimism'.

Since Weinstein's first papers (Weinstein 1980, 1982, 1983, 1984, 1987), a considerable literature on unrealistic optimism has developed, and many useful reviews have been published (see for example Perloff and Fetzer 1986; Hoorens 1994; Schwarzer 1994; Van der Pligt 1994; Taylor and Armor 1996; Weinstein and Klein 1996; Van der Pligt 1998). Once descriptive research had made clear the extent of the bias, attention turned to a variety of theoretical issues, of which two in particular have recurred in the literature. The first is where the bias comes from, its origins in people's motives and cognitions, and the ways in which it may be mediated by experience. For Weinstein, the most likely *motivational* candidates were defensiveness and wishful thinking, but overall he gave more weight to *cognitive* factors. Thus, the more probable I believe an event to be, he argued, the more likely I am to believe that its probability for me is greater than average; the more I believe I can control a negative event, the more I will perceive my own probability as less than average; and if I have personal experience of the negative event, I am more likely to perceive its future probability for me as greater than average. Controllability (Van der Velde *et al.* 1992; McKenna 1993; Harris and Middleton 1994; Harris 1996; Hoorens 1996; Myers and Reynolds 2000), the debiasing effects of experience (Dolinski *et al.* 1987; Van der Pligt 1991; Van der Velde and Van der Pligt 1991; Burger and Palmer 1992; McKenna and Albery 2001) and experimental interventions to produce debiasing (Kreuter and Strecher 1995; Weinstein and Klein 1995; Stapel and Velthuijsen 1996; McKenna and Myers 1997) have all generated extensive literatures.

The second issue has been whether unrealistic optimism predicts behaviour. Weinstein (1989) argued that it probably does, or at least that it ought to, but that the literature has been bedevilled by conceptual and methodological problems. Chief among them is that most of the analyses have been cross-sectional or retrospective, so that respondents report their risk perceptions on the same occasion as their concurrent or even past behaviour (see, for example, Svenson *et al.* 1985; Dolinski *et al.* 1987; Weinstein *et al.* 1990; Weinstein and Nicolich 1993; Hoorens 1994; Gerrard *et al.* 1996).

As Van der Pligt (1994) argued, *prospective* studies are essential if causal ordering is to be disentangled, but relatively few have been reported and the results have been inconsistent (see the review by Hoorens 1994). Moreover, Otten and Van der Pligt (1992) have suggested that unrealistic optimism is in any case a much less powerful predictor than prior behaviour. There are two reasons, they argue: first, prior behaviour affects subsequent behaviour directly (Bentler and Speckart 1979); and second, perceptions of risk are themselves a product of prior behaviour, and their role is at most to *mediate* its effects. Thus, prior behaviour will absorb most of the variance, and any apparent effect of risk perception is likely to be less a 'pure' effect of perceived risk than an indirect effect of prior behaviour. Once again, if an *experimental* approach is not feasible, the most useful alternative is a prospective longitudinal design.

3.2 The Health Belief Model

The Health Belief Model (HBM: Rosenstock 1966, 1974a, 1974b) proposes that people will be motivated to carry out preventive health behaviours in response to a perceived threat to their health (see Figure 1.1). Two classes of variables are important: '(1) the psychological state of readiness to take specific action, and (2) the extent to which a particular course of action is believed to be beneficial in reducing the threat' (Rosenstock 1966: 98). Both variables, Rosenstock argued, are two-dimensional. The individual's

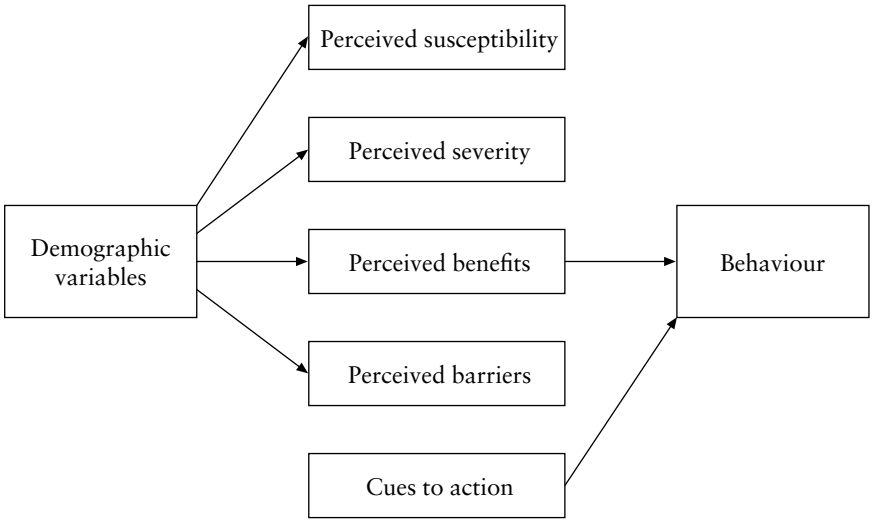

Figure 1.1 The Health Belief Model

state of readiness to act is determined by perceptions of personal susceptibility or *vulnerability* to a particular health threat, *and* perceptions of the *severity* with which that threat might affect their life. The extent to which a course of action is believed to be beneficial is the result of beliefs about the *benefits* to be gained by a particular action weighed against the costs of or *barriers* to action. Rosenstock (1966: 101) believed that the level of readiness provided the energy or force to act and the perceptions of benefits less barriers provided a preferred path of action. However, the combination of these could reach considerable levels of intensity without resulting in overt action unless some instigating event occurred to set the process in motion or trigger action in an individual psychologically ready to act (Rosenstock 1966: 102). Thus, in addition to the variables already described, a factor that serves as a cue or a trigger to appropriate action is necessary – such as having an accident oneself (in the case of road safety, for example), or recent media attention to the issue. This Rosenstock named the 'cue to action'. Some years later, Rosenstock and his colleagues also suggested that behavioural intention might be a mediating variable between the components of the HBM and behaviour (Becker *et al.* 1977). Other researchers have taken up this suggestion (King 1982; Calnan 1984; Norman and Fitter 1989; Quine *et al.* 1998).

Despite its intuitive appeal, the HBM has conceptual difficulties. Rosenstock did not specify how different beliefs influence one another, or how the explanatory variables combine to influence behaviour. As a result, different studies have used different combinations of variables, and researchers have treated variables differently in the analysis. Some, for example, have used additive models in which the combined weight of the variables is used to predict outcome, while others have combined variables – by adding vulnerability and severity (Wyper 1990; Witte *et al.* 1993), multiplying them (Haefner and Kirscht 1970; Hill *et al.* 1985; Conner and Norman 1994) or subtracting barriers from benefits (Oliver and Berger 1979; Rutledge 1987; Wyper 1990). A close inspection of Rosenstock's discussion of the model, however, seems to indicate that the dimensions are to be treated as separate influences on health behaviour and that an additive combination is consistent with the underlying theoretical principles (see Weinstein 1988 for a discussion).

A second problem is that Rosenstock offered no operational definitions of the variables and therefore researchers use different methods (Champion 1984). Perceived vulnerability is used to measure either personal vulnerability to a specific health threat or a general vulnerability to disease relative to other people. Barriers, which Rosenstock viewed as primarily psychological, are often used to assess structural impediments instead (Hill *et al.* 1985; Melnyk 1988; Simon *et al.* 1993). Several revisions to the model have therefore been suggested (Becker *et al.* 1972; Becker and Maiman 1975; Becker *et al.* 1977). Becker (1974) has argued that the value placed

upon their health by some individuals may predispose them to respond to the cues to action. Some researchers have suggested that health locus of control beliefs should be included (Wallston and Wallston 1981; Lau *et al.* 1986; Arnold and Quine 1994). Others have produced new conceptual frameworks using some of the HBM's constructs: see Schwarzer (1992), Schwarzer and Fuchs (1996), Schwarzer (1999) (the Health Action Process Approach); Rogers (1975, 1985), Prentice-Dunn and Rogers (1986), Boer and Seydel (1996) (Protection Motivation Theory).

Despite these theoretical and conceptual problems, the HBM has received sustained empirical support and is still widely used to predict health behaviours. Since the early 1990s, for example, it has been applied to mammography and cervical screening (Aiken *et al.* 1994; Fischera and Frank 1994; Champion and Miller 1996; Orbell *et al.* 1996; Brenes and Skinner 1999); breast self-examination (Champion 1990; Friedman *et al.* 1994; Savage and Clarke 1996; Millar 1997); adherence to medication (Budd *et al.* 1996; Hughes *et al.* 1997; Nageotte *et al.* 1997) (antipsychotic medication), (Brown and Segal 1996) (antihypertensive medication), (Bond *et al.* 1992) (insulin), (Abraham *et al.* 1999) (malaria medication); exercise behaviour (Corwyn and Benda 1999); safe-sex behaviours (Petosa and Jackson 1991; Abraham *et al.* 1992; Walter *et al.* 1993; Lux and Petosa 1994; Steers *et al.* 1996; Bakker *et al.* 1997); attendance at health checks (Norman and Conner 1993); delay in seeking medical care (Leenaars *et al.* 1993) (sexually transmitted infections: STIs), (Dracup *et al.* 1995) (heart attack); and many other health behaviours. Two reviews using rather different methods have examined the utility of the Health Belief Model constructs (see Janz and Becker 1984; Harrison *et al.* 1992). These are evaluated in Sheeran and Abraham (1996), who concluded that though the HBM constructs are frequently significant predictors of behaviour, their effects are usually small.

3.3 The Theory of Planned Behaviour

The TPB is an expectancy-value model that was expanded from the Theory of Reasoned Action (TRA: Fishbein and Ajzen 1975; Ajzen and Fishbein 1980) (see Figure 1.2). It provides a theoretical account of the way in which attitude, subjective norm and behavioural intentions combine to predict behaviour. According to the TRA, the best predictor of behaviour is the person's intention to perform the behaviour (for example 'I intend to do X'). Intention summarizes the individual's motivation to behave in a particular way and indicates how hard the person is willing to try and how much time and effort they are prepared to expend in order to perform the behaviour (Ajzen 1991: 199). In turn, intention is determined by two factors: attitude towards the behaviour and subjective norm or perceived social pressure to perform (or not perform) the behaviour. Attitude is the product of a set of salient beliefs about the consequences of performing the

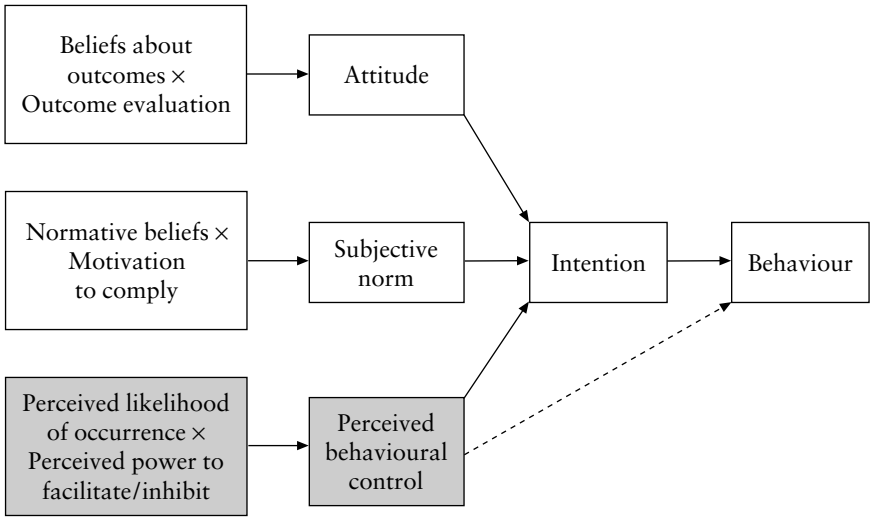

Figure 1.2 The Theories of Reasoned Action and Planned Behaviour (TPB components shown shaded in grey)

behaviour (for example 'Wearing a safety helmet would protect my head if I had an accident'), each weighted by an evaluation of the importance of each of the consequences (for example 'Protecting my head if I had an accident is good/bad'). Subjective norm is determined by the person's normative beliefs about perceived social pressure from significant others (for example 'My parents think I should wear a safety helmet') weighted by the person's motivation to comply with those others ('Generally I want to do what my parents think that I should do').

The TRA was intended to be applied to the prediction of purely volitional behaviours but, as Ajzen (1988) later argued, many behaviours are not under complete volitional control. He therefore expanded the TRA by adding the concept of perceived behavioural control, which refers to people's appraisals of their ability to perform the behaviour. According to Ajzen (1988), perceived behavioural control should predict behavioural intention and, when people's perceptions of control accurately reflect their control over behaviour, it should predict actual performance of the behaviour too. Perceived behavioural control is underpinned by control beliefs about perceptions of obstacles, impediments, skills, resources, and opportunities that may inhibit or facilitate performance of the behaviour. These may be external (for example availability of time or money) or internal (for example ability, skills).

There has been some controversy about how the construct of perceived behavioural control should be operationalized (Terry 1993; Armitage and

Conner 1999b). Ajzen and Madden (1986) first assessed it by summing the frequency of occurrence of various factors facilitating or inhibiting behavioural performance. More recently, Ajzen and his colleagues have suggested that evaluations of the power of factors likely to facilitate or inhibit performance of the behaviour should be weighted by their frequency of occurrence (Ajzen 1991; Ajzen and Driver 1991). Other authors have suggested that perceived control over behaviour (a variant of perceived behavioural control) should be distinguished from perceived confidence in one's own ability to perform the behaviour (self-efficacy) and that both constructs should be measured (Terry 1993; Terry and O'Leary 1995; Conner and Armitage 1998; Armitage and Conner 1999a; Povey *et al.* 2000; Abraham, Wight and Scott, Chapter 2 in this volume).

Both the TRA and the TPB have attracted enormous attention from social psychologists interested in identifying beliefs underpinning health behaviours that may be amenable to change, and the models have received extensive support: see Sheppard *et al.* (1988) and Van den Putte (1993) for reviews of the TRA; Ajzen (1991), Conner and Sparks (1996), Godin and Kok (1996), Conner and Armitage (1998), Ajzen and Fishbein (2000), Armitage and Conner (2000) and Armitage and Conner (in press) for reviews of the TPB; and Sheeran and Taylor (1999) and Albarracín *et al.* (2001) for meta-analyses and comparisons of the TRA and TPB. Godin and Kok (1996), in a review of the TPB's application to *health* behaviours, found that components of the TPB explain on average 41 per cent of the variance in intention; in a review of a wider range of behaviours, Armitage and Conner (in press) found that the TPB accounted for 39 per cent of the variance.

The prediction of *behaviour* from TRA and TPB variables is less impressive. Godin and Kok's (1996) review found that TPB constructs accounted for only 31 per cent of the variance in behaviour in prospective studies, while Armitage and Conner (in press) found a figure of 27 per cent. The work of other researchers has generally confirmed these findings (Sheppard *et al.* 1988; Randall and Wolff 1994; Sheeran and Orbell 1998; Sutton 1998). Since the large amount of unexplained variance is unlikely to be due to measurement error, this suggests a role for other variables.

One of the central tenets of the TRA and TPB has been that the models are 'sufficient' – that is, that variables external to the models fail to account for additional variance in intentions or behavioural performance once the effects of the models' components have been taken into account. A number of researchers have attempted to challenge this assumption and to increase the predictive power of the model by including additional variables. Many of these have been described by Eagly and Chaiken (1993: 177–93) and Manstead and Parker (1995). A number of the constructs are hypothesized to account for variance in behavioural intention over and above what is accounted for by the TPB or TRA. They include personal/moral norm or perceived moral obligation (Beck and Ajzen 1991; Boyd and Wandersman

1991; Sparks 1994; Parker *et al.* 1995; Conner and McMillan 1999; Evans and Norman, Chapter 9 in this volume); anticipated regret (Parker *et al.* 1995 and Parker, Chapter 8 in this volume; Evans and Norman, Chapter 9); anticipated affect (Van der Pligt and de Vries 1998; Bish *et al.* 2000); and affective evaluations of behaviour (Manstead and Parker 1995). A further construct, self-identity (see Evans and Norman, Chapter 9), has been proposed as an extension to the TPB to improve the prediction of intention after criticisms concerning the narrow conceptualization of subjective norm and its consistently weak prediction of intention (see Van den Putte 1993; Godin and Kok 1996; Armitage *et al.* 1999; Terry *et al.* 1999). Self-identity refers to the idea that intentions are linked to identifiable societal roles and that these roles drive intention (Armitage and Conner in press). A number of studies using a version of the TPB extended to include self-identity have found support for this suggestion (Sparks and Shepherd 1992; Sparks and Guthrie 1998; Evans and Norman, Chapter 9). Yet further research has been concerned with factors that might moderate the relationship between intentions and behaviour. These include self-schemas (Sheeran and Orbell 2000a), attention control (Orbell and Sheeran 1998) and implementation intentions (Gollwitzer and Brandstätter 1997; Orbell *et al.* 1997; Sheeran and Orbell 1999; Orbell and Sheeran, Chapter 7 in this volume).

3.4 Implementation intentions

The concept of implementation intentions comes from the work of Peter Gollwitzer. Gollwitzer (1990) and Heckhausen (1991) contend that progress towards a particular goal begins with a deliberative phase in which the costs and benefits of pursuing the goal are evaluated. The *deliberative* phase results in the development of *goal intentions* or decisions whether or not to perform the behaviour. Forming a goal intention (for example 'I intend to perform X') involves committing oneself to reaching a desired outcome. Fishbein and Ajzen's (1975) Theory of Reasoned Action is similar, in that behavioural intention is seen as the immediate determinant of behaviour. However, people frequently have difficulty in translating their goals into action. Gollwitzer (1993) also proposed an *implemental* phase, in which planning when, where and how to carry out the goal-directed behaviour ('I intend to perform X whenever Y conditions are encountered') increases the likelihood that the goal will be attained. The name Gollwitzer used for these plans was *implementation intentions*.

Gollwitzer and colleagues (Gollwitzer 1993; Gollwitzer and Brandstätter 1997; Gollwitzer and Oettingen 1998; Gollwitzer and Schaal 1998; Gollwitzer 1999) have gone on to build a considerable body of empirical evidence that formulating implementation intentions furthers goal attainment. Gollwitzer and Brandstätter (1997), for example, found that students

whose goal intention to write an assignment during the winter vacation was augmented by an implementation intention were more than twice as likely to submit their work on time as students who were not asked to form a plan. The implementation intention was concerned with precisely where and when the assignment would be written. Implementation intentions thus overcome the potential conflict between routes to goal realization and potential problems in translating goals into action (failing to get started, becoming distracted) by committing the individual to a specific course of action when the environmental conditions specified in their implementation intentions are encountered.

A number of studies have reported good evidence that implementation intentions can significantly increase the performance of health behaviours – including breast self-examination (Orbell *et al.* 1997), healthy eating (Verplanken and Faes 1999), attendance for cervical cancer screening (Orbell and Sheeran 1998), consumption of vitamin C pills (Sheeran and Orbell 1999) and mobility after joint replacement surgery (Orbell and Sheeran 2000). Orbell *et al.* (1997), for example, showed that women who were asked to form implementation intentions were more than twice as likely to perform breast self-examination as those who were not asked to do so. In a later intervention, Sheeran and Orbell (2000b) found that women in an experimental group who formed implementation intentions were much more likely to attend for cervical screening than women in a control group (92 per cent compared with 69 per cent), despite equal motivation. Further information about the studies is included in Chapter 7.

A question that remains for theory is *how* implementation intentions have their effect, and perhaps the most likely explanation is that they operate through *memory*. That is, they increase memory for behavioural action through the formation of plans involving anticipated environmental and contextual cues, which act as an unconscious reminder for the behaviour when they are encountered. The mechanism is probably similar to the cognitive mechanisms involved in habitual behaviour. Consistent with these suggestions, Sheeran and Orbell (2000b) found that implementation intentions mediate the relationship between intention and behaviour – suggesting that a strong memory trace is indeed formed when implementation intentions are made. A detailed account of the role of memory, and of the other possible mechanisms, is to be found in Gollwitzer (1999).

3.5 Stage models

The approaches we have discussed so far – risk perception, the Health Belief Model and the Theory of Planned Behaviour – can all be seen as *continuum* accounts of behaviour. Each takes one or more perceptions or beliefs, or perhaps sets of perceptions or beliefs, and tries to predict from their combined effect where the individual will lie on an outcome continuum such as

intention or behaviour. For example, one might use behavioural beliefs, normative beliefs and control beliefs in the TPB to predict how much fat people will eat, how safely they will drive, and how likely they will be to attend for health screening. The purpose of an intervention would be to change those perceptions or beliefs in an attempt to move the person up or down the outcome continuum. Stage models, by contrast, as their name suggests, see individuals as located not on continua but at discrete, ordered *stages*, each one denoting a greater inclination to change outcome, typically behaviour, than the previous one. There are currently two main stage models in health psychology, the Transtheoretical Model (TTM) of Prochaska and DiClemente, and the Precaution Adoption Process Model (PAPM) of Weinstein (see Figure 1.3).

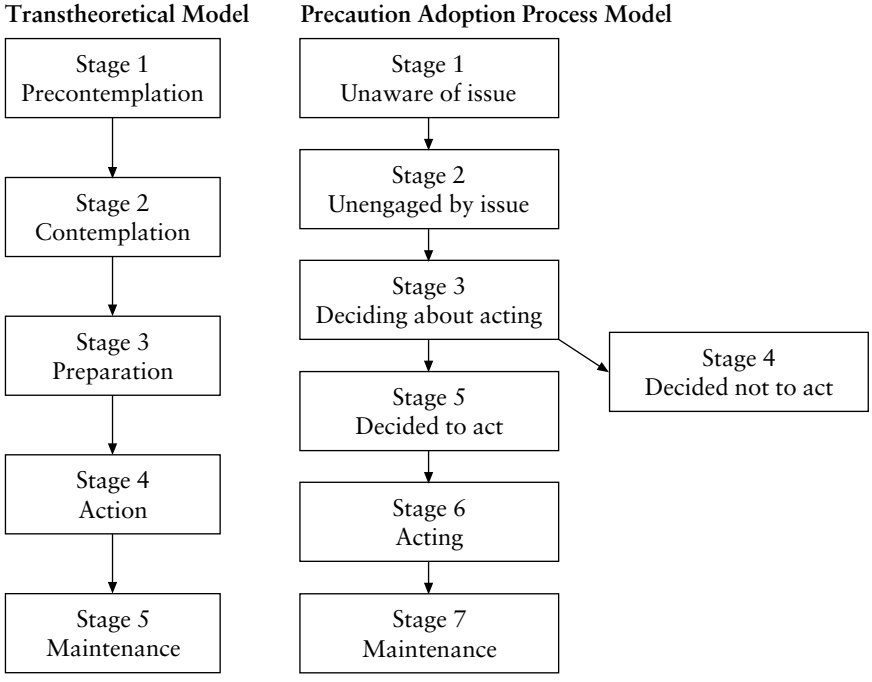

Figure 1.3 Stages of change models

The TTM proposes five stages: precontemplation (no intention of changing behaviour); contemplation (beginning to consider change, at some probably ill-defined time in the future); preparation (getting ready to change in the near future); action (engaged in change now); and maintenance (steady state of change reached). The possibility of relapse to an earlier stage is acknowledged, right back to precontemplation but not necessarily so, and the model allows that people may start the climb anew. Where an

individual is to be located is defined by previous behaviour and current intentions, and the stages are seen as mutually exclusive and cannot be straddled. The model was first applied to smoking – and has been adapted by Raw (1994) as an accessible decision chart for general practitioners – but it has since been applied to a wide variety of other health behaviours too. Reviews are to be found in Prochaska *et al.* (1994), Herzog *et al.* (1999), Sutton (1999, 2000) and Velicer *et al.* (1999), and particularly accessible accounts of the model have been published in Prochaska *et al.* (1992) and Prochaska and Prochaska (1999). Evaluations of the model's constructs, methodology and findings have been published by Sutton (1996, 1997, 2001) and by Weinstein *et al.* (1998), Kraft *et al.* (1999) and Rosen (2000a, 2000b).

The PAPM is described by its author, Neil Weinstein, in Chapter 4. As its name suggests, the model is concerned with preventive or precautionary behaviour against threat. This time, there are seven stages: unaware (not aware that there is an issue or threat); unengaged (aware but not engaged); deciding about acting (considering the possibility of taking action); decided not to act; decided to act (to adopt the precaution); acting; and maintenance. Unlike the TTM, the PAPM thus distinguishes people who are unaware from those who are aware but are not considering action; and it allocates those who have decided *not* to act to a stage of their own, separate from those who are failing to act because they have not yet thought about the issue. Further detailed comparisons between the two models are to be found in Weinstein and Sandman (1992), Weinstein (1993) and Weinstein *et al.* (1998). The model has been applied to a variety of precautionary behaviours in health – including protection against osteoporosis (Blalock *et al.* 1996), hepatitis B (Hammer 1997) and radon gas (Weinstein and Sandman 1992, and Chapter 4 in this volume); and uptake of mammography (Clemow *et al.* 2000). A review is to be found in Weinstein *et al.* (1998).

The most important debate about stage models is the one suggested at the beginning of this section – whether we really do pass through stages as we move from the beginnings of awareness to behaviour, or whether 'stages' are rather points on a continuum. There are other issues too, however. Does every stage have to be visited, in a fixed order, or can a stage sometimes be missed out? Do individuals located at a given stage all have to overcome the same barriers if they are to move on? What is it that triggers movement, and are particular triggers confined to one stage only or are they the same at all stages? Do the barriers and triggers cross behaviours, or do they differ by domain (taking precautions against radon or against pregnancy, for instance)? How are stage models to be tested empirically, and how are they to be used for designing and mounting interventions? Detailed accounts are to be found in Sutton (1996, 1997, 2001), Weinstein *et al.* (1998), Kraft *et al.* (1999) and Rosen (2000a, 2000b) – and in Chapter 4 of this volume.

4 Conclusions and future directions

To conclude the chapter, we should like to pose two questions. The first is what makes for a good intervention, and we believe the book provides a number of answers. First, and most important of all, interventions must be theory driven. Theories provide constructs, processes and hypotheses, and they point to procedures and methodologies for setting up interventions and testing their effectiveness. Without theory there is no framework or underpinning, and no progress or development. Second, interventions must tackle important health issues with identifiable associated behaviours – whether risk related, health enhancing, or any other that has serious consequences and implications. Third, processes and outcomes must be clearly defined and carefully measured, and the links between processes and procedures must be properly spelt out. Both requirements are part of having a theoretical base, and an important effect will be that the intervention can be tailored successfully to the target group or individuals. Finally, a good intervention will have implications for theory, policy, and practice, and they will be *testable* implications.

Our second question is what are the likely future directions in intervention research, and again there are strong indications in the chapters that follow. First, there will be a move towards large-scale randomized controlled trials (RCTs). Many of the interventions in the book adopt the classic 'experimental group – control group' design that is the core of the RCT, and the value of the approach for teasing out causal processes will be apparent chapter by chapter. The longer-term *added* value of full-scale RCTs will be to establish sizes of effect and reliability. Second, interventions will more frequently than now incorporate measures of *behavioural* outcome – that is, not just how much people change their perceptions, or beliefs, or intentions, but also how much they change their behaviour. Third, we must acknowledge our responsibilities to policy-makers and practitioners, and make our approaches accessible. Interventions must have an understandable theoretical base, must be easy to design, run and evaluate, and must be cost-effective. Finally, to return to our first criterion for a 'good' intervention, interventions must continue to be firmly theory driven, and we must resist the temptation to devise 'one off' attacks on behaviour based on 'common sense'. Theory provides the foundation for successful interventions, and through interventions we are able to test, and so develop, theory. From theory comes intervention and from intervention comes further theory. That, we believe, is the key theme of the book.

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