Third Edition

# PREDICTING AND CHANGING HEALTH BEHAVIOUR

## Research and Practice with Social Cognition Models

Edited by Mark Conner and Paul Norman

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# Praise for this book

***"Conner and Norman's book has become the cornerstone of teaching of social cognition models in health psychology courses and the update is very welcome. The new edition retains the format that makes the book very accessible to researchers, teachers and students alike i.e. a thorough overview of each of nine theoretical approaches by prominent researchers, describing recent developments and relevant research findings. The final chapter by the editors identifies important cross-cutting issues and pointers to future trends. In sum, this is the definitive text in this important area of research and application."***

*Professor Marie Johnston, Aberdeen Health Psychology Group, Institute of Applied Health Sciences, UK*

**"Predicting and Changing Health Behaviour: Research and Practice with Social Cognition Models** ***provides an invaluable foundation for investigators who are committed to understanding and applying the latest evidence regarding the psychological factors that shape people's health practices."***

*Professor Alex Rothman, University of Minnesota, USA*

John Muir (1838–1914)

# Contents

# List of tables

# List of figures

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# Preface

The study of behaviours that influence health, the factors that determine which individuals perform these behaviours, and how to change them is a key area of research within health psychology. As the third edition of this book testifies, there is a considerable and impressive body of research in this area. The purpose of this book is to provide in a single source an overview of current research and practical details of how to apply the most widely used social cognition models to the prediction of the performance of health behaviours and to use them to change such behaviours. Social cognition models start from the assumption that an individual's behaviour is best understood in terms of his or her perceptions of the social environment. Such an approach has been widely and successfully used by psychologists to help understand a range of human behaviours, and by health psychologists to understand health behaviours in particular.

The chapters in this book bring together detailed reviews and descriptions of the most common social cognition models and their application to understanding and changing health behaviours. It is hoped that this will provide a useful resource to those interested in work in this area, and make the described approaches to understanding and changing health behaviours more accessible and more appropriately applied. Moreover, by bringing together these models, similarities and differences between approaches can be examined and the whole approach critically evaluated.

The introductory chapter examines the concept of health behaviour and briefly reviews epidemiological work on the variation in who performs the different health behaviours. It then outlines the general social cognitive approach taken to understanding and predicting health behaviour. The key features of the social cognition models described in the subsequent chapters are then outlined. Similarities, differences, and the potential for integration among these models are then discussed. Finally, the potential for using social cognition models to change health behaviours are outlined.

Following the introductory chapter are nine individual chapters describing the most widely applied social cognition models: the health belief model, protection motivation theory, self-determination theory, the theory of planned behaviour, the prototype/willingness model, social cognitive theory, the health action process approach, stage models (transtheoretical model, precaution adoption process model), and implementation intentions. Each of these 'model' chapters has been produced by prominent researchers in the area and, in general, follows a common structure. Section 1 outlines the background to and origins of the model. This is followed, in Section 2, by a description of the model, including full details of each of its components. Section 3 contains a summary of research using the model and the findings with a range of health behaviours. Section 4 examines recent developments and expansions to the model. Section 5 provides a detailed consideration of the procedures for developing appropriate measures for each component of the model. Section 6 reviews intervention studies that have been conducted using the model to change health behaviours. The final section reviews potential future directions for research with the model.

The penultimate chapter focuses on the techniques that can be used to change health behaviours, often by targeting variables outlined in the main social cognition models. As a result, this chapter follows a slightly different structure to those focusing on individual models. The final chapter considers some of the major unresolved issues relating to predicting and changing health behaviour that are common to the social cognitive approach.

The book is not intended to be a 'cookbook' of how to apply social cognition models to predict and change health behaviours. Rather, the intention is to introduce readers to the general social cognitive approach to the understanding of such behaviours, to describe the most commonly used social cognition models, to consider their differences and similarities as well as their advantages and disadvantages, and to enable researchers to apply each model appropriately to predict and change health behaviour within their own area of interest. Useful directions for future research within this paradigm are described both in the model chapters and final chapter of the book.

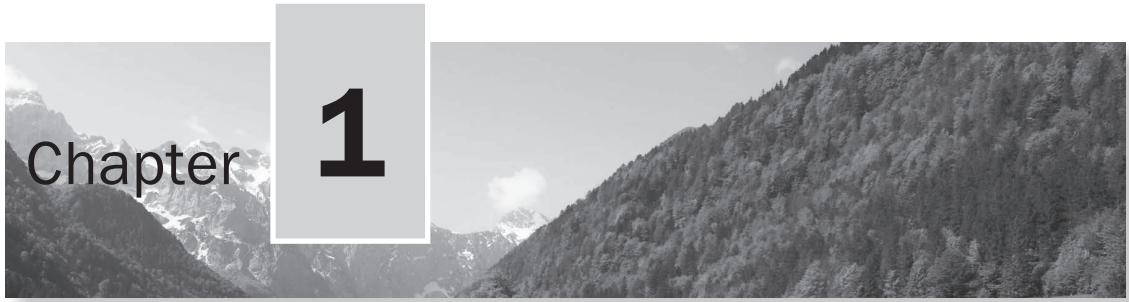
We would like to thank the authors of the chapters for all their hard work in producing such clear descriptions of these models and extensive reviews of the relevant literature. We would also like to thank Open University Press for its help and encouragement during the preparation of the third edition of this book.

*Mark Conner and Paul Norman*

# Abbreviations

| | |
|---|---|
| A | attitude towards behaviour |
| AIDS | acquired immune deficiency syndrome |
| BB | behavioural beliefs |
| BCT | behaviour change technique |
| BCTTv1 | Behaviour Change Technique Taxonomy version 1 |
| BCW | Behaviour Change Wheel |
| BI | behavioural intention |
| BSE | breast self-examination |
| CB | control beliefs |
| CDT | cognitive dissonance theory |
| CHD | coronary heart disease |
| ELM | elaboration likelihood model |
| EVP | expectancy-value perspective |
| FOBT | foecal occult blood test |
| GNAT | Go/NoGo Task |
| HAPA | health action process approach |
| HBCC | Health Behaviour Change Competency Framework |
| HBM | health belief model |
| HIV | human immunodeficiency virus |
| IAT | Implicit Association Test |
| MAP | model of action phases |
| MOST | Multiphase Optimization Strategy |
| MRI | magnetic resonance imaging |
| NB | normal beliefs |
| PAPM | precaution adoption process model |
| PBC | perceived behavioural control |
| PED | performance-enhancing drug |
| PHM | preventive health model |
| PMT | protection motivation theory |
| PWM | prototype/willingness model |
| RCT | randomized controlled trial |
| RIM | reflective–impulsive model |
| RPM | relapse prevention model |
| SAM | self-affirmation manipulation |
| SCM | social cognition model |
| SCT | social cognitive theory |
| SDT | self-determination theory |
| SES | socio-economic status |

| | |
|---|---|
| SET | self-efficacy theory |
| SEU | subjective expected utility |
| SN | subjective norm |
| SRBAI | self-report behavioural automaticity index |
| SRHI | self-report habit index |
| STD | sexually transmitted disease |
| TCS | Theory Coding Scheme |
| TDF | Theoretical Domains Framework |
| TIB | theory of interpersonal behaviour |
| TPB | theory of planned behaviour |
| TRA | theory of reasoned action |
| TSE | testicular self-examination |
| TST | temporal self-regulation theory |
| TTM | transtheoretical model |




# Predicting and changing health behaviour: a social cognition approach

Mark Conner and Paul Norman

## 1 Introduction

A considerable body of research has examined the role of social cognitive factors in predicting health behaviour (see Conner and Norman 1995, 2005; Norman *et al.* 2000). This chapter overviews the social cognition approach to understanding health behaviours; introduces key theories employed; compares theories; considers theory integration; and, finally, examines the value of the approach for changing health behaviour.

Justification for the study of health behaviours is based on two assumptions: that in industrialized countries a substantial proportion of the mortality from the leading causes of death is due to particular behaviour patterns, and that these behaviour patterns are modifiable. It is now recognized that individuals can make contributions to their own health and well-being through adopting particular health-enhancing behaviours (e.g. exercise) and avoiding other health-compromising behaviours (e.g. smoking). The identification of the factors that underlie such 'health behaviours' has become a focus of research in psychology and other health-related disciplines since the mid 1980s (e.g. Winett 1985; Adler and Matthews 1994; Conner and Norman 1995, 2005; Baum and Posluszny 1999; Norman *et al.* 2000). The importance of behaviour change to this research should not be underestimated. Although gaining an understanding of the reasons why individuals perform a variety of behaviours has often been the focus of research, this should be seen as a first step in designing better interventions to change the prevalence of health behaviours and so produce improvements in individuals' and populations' health.

The health behaviours focused on have been extremely varied, from health-enhancing behaviours such as exercise participation and healthy eating, through health-protective behaviours such as health screening clinic attendance, vaccination against disease, and condom use in response to the threat of AIDS, to avoidance of health-harming behaviours such as smoking and excessive

alcohol consumption, and sick-role behaviours such as compliance with medical regimens. A unifying theme has been that they each have immediate or long-term effects on the individual's health and are at least partially within the individual's control. Epidemiological studies have revealed considerable variation in who performs these behaviours. Approaches taken to understanding factors underlying this variation have been many and varied. A broad distinction can be made between factors intrinsic to the individual (e.g. socio-demographic factors, personality, social support, cognitions) and factors extrinsic to the individual, which can be further divided into incentive structures (e.g. taxing tobacco and alcohol, subsidizing sporting facilities) and legal restrictions (e.g. banning dangerous substances, fining individuals for not wearing seatbelts). Of the two, intrinsic factors have received most attention from psychologists, of which cognitive factors have been considered the most important proximal determinants. Models of how such cognitive factors produce various 'social' behaviours are commonly referred to as social cognition models (SCMs) and have been widely used by health psychologists. They are considered to have provided a contribution to the greater understanding of who performs health behaviours (Marteau 1989) and to explaining how extrinsic factors may produce behaviour change (e.g. Rutter *et al.* 1993). The justifications for focusing on social cognitive determinants in SCMs are twofold. First, these 'health cognitions' are assumed to be important causes of behaviour that mediate the effects of other determinants (e.g. social class). Second, they are assumed to be more open to change than other factors (e.g. personality). These justifications imply that effective interventions could usefully be based on manipulations of cognitive factors shown to determine health behaviours.

## 2 Health behaviours

Health behaviours have been defined as 'Any activity undertaken by a person believing himself to be healthy for the purpose of preventing disease or detecting it at an asymptomatic stage' (Kasl and Cobb 1966: 246). There are limitations to this conception, including the omission of lay or self-defined health behaviours and the exclusion of activities carried out by people with recognized illnesses that are directed at self-management, delaying disease progression or improving general well-being. In contrast, in the *Handbook of Health Behavior Research*, Gochman defines health behaviours as '... overt behavioral patterns, actions and habits that relate to health maintenance, to health restoration and to health improvement' (1997: 3). A useful broad definition would include any activity undertaken for the purpose of preventing or detecting disease or for improving health and well-being (Conner and Norman 1995, 2005). A variety of behaviours fall within such a definition, including medical service usage (e.g. physician visits, vaccinations, screening), adherence to medical regimens (e.g. dietary, diabetic, anti-hypertensive regimens), and self-directed health behaviours (e.g. diet, exercise, smoking). This section looks at the role of such behaviours in health outcomes, what is known about who performs these behaviours, ways of classifying these behaviours, and the broad range of factors that are predictive of the performance of such behaviours.

### 2.1 The role of health behaviours in health outcomes

Studies of the relationship between the performance of health behaviours and a variety of health outcomes have been conducted for more than 40 years (e.g. Belloc and Breslow 1972; Whitehead

1988; Blaxter 1990). For example, studies in Alameda County, California identified seven features of lifestyle – not smoking, moderate alcohol intake, sleeping 7–8 hours per night, exercising regularly, maintaining a desirable body weight, avoiding snacks, and eating breakfast regularly – that together were associated with lower morbidity and higher subsequent long-term survival (Belloc and Breslow 1972; Belloc 1973; Breslow and Enstrom 1980). There now exists a considerable body of research demonstrating the importance of a variety of health behaviours for both morbidity and mortality. For example, research into the major causes of premature death in the Western world (e.g. cardiovascular diseases and cancer) has emphasized the importance of behaviours such as smoking, alcohol consumption, dietary choice, sexual behaviours, and physical exercise (e.g. Smith and Jacobson 1988), together with gaps in primary prevention and screening uptake (Amler and Eddins 1987). In addition, several authors have pointed out that health behaviours may have a positive impact on quality of life via delaying the onset of chronic disease and extending active lifespan (e.g. Conner and Norman 1995, 2005).

Baum and Posluszny (1999) note three basic ways in which behaviour exerts its influence on health: (1) by producing direct biological changes; (2) by conveying health risks or protecting against them; or (3) by leading to the early detection or treatment of disease. So, for example, smoking may lead to changes in the cells of the lungs that predispose an individual to lung cancer; using condoms may protect against the transmission of HIV or other sexually transmitted infections; and breast or testicular self-examination can lead to detection of lumps and the early treatment of abnormalities.

## 2.2 Who performs health behaviours?

Given the impact of a range of health behaviours on health outcomes, one might expect there to be detailed information available on who performs what health behaviours and how this varies across different segments of the population. Unfortunately, although there is a growing body of research that details variations in health behaviours across the population, there is also considerable unevenness in the data and its availability. A lot more is known about the distribution of behaviours such as smoking than say testicular or breast self-examination. There is also considerable variation across countries. In the USA, for example, the Centers for Diseases Control collects and produces regular summaries for health behaviours such as smoking, alcohol consumption, physical activity, and sleep (CDC 2013). Similarly, the UK Data Service (www.ukdataservice.ac.uk) provides access to a number of key surveys that provide overview data for a range of health behaviours across the UK population as a whole (e.g. General Lifestyle Survey), together with more detailed information on specific cohorts often followed at regular intervals (e.g. Longitudinal Study of Young People in England). The data collected and made publicly available for other countries is much more varied and in many cases more limited, particularly for Third World countries. A single, publicly available source bringing together the most recent data from different nations on who performs various health behaviours would be an invaluable resource to researchers working in this area. Such data would allow researchers to make better comparisons across countries or points in time, as well as explore more specific information on differences by type of behaviour, and to explore variations by demographic variables such as gender, age, ethnic group, education, and socio-economic status.

Data for the USA (CDC 2013) reveals complex variations by behaviour and demographics. In relation to risky behaviours, the CDC report revealed that about 25% of US adults had

five or more alcoholic drinks in one day at least once in the past year, 20% of adults were current cigarette smokers, about 33% of adults were completely inactive in terms of leisure-time aerobic activity, and nearly 75% of adults never did muscle-strengthening activity. Based on demographic differences in the performance of risky behaviours, men were more likely than women to smoke cigarettes and to engage in at-risk drinking but less likely than women to be physically inactive in terms of both aerobic and muscle-strengthening activities. Adults aged 65 and over were the least likely (of all the age groups) to be current smokers or to have had five or more alcoholic drinks in one day at least once in the past year, but were the most likely to be physically inactive in their leisure time. Asian adults had significantly lower rates of at-risk drinking than white, black, American Indian or Alaska Native adults. Adults with higher levels of education were less likely than those with fewer years of education to be current smokers, and to be physically inactive in leisure time. Adults with higher family income had lower rates of cigarette smoking, physical inactivity in leisure time, and insufficient sleep, but higher rates of at-risk drinking. Married adults had lower prevalence of current cigarette smoking than all other marital status groups.

In relation to healthy behaviours, about 60% of adults had never smoked cigarettes, about 50% of adults met guidelines for aerobic physical activity, and about 25% of adults met the guidelines for muscle-strengthening activity. Based on demographic differences in the performance of healthy behaviours, men were more likely than women to meet physical activity guidelines (both aerobic and muscle-strengthening) through leisure-time activities, but women were more likely than men to be lifetime non-smokers and to be at a healthy weight. Adults aged 18–24 years had the highest prevalence for all healthy behaviours. Black adults and Asian adults were more likely than white adults to have never smoked cigarettes. White adults and Asian adults were more likely than black adults to meet guidelines for aerobic physical activity. White adults were more likely than black adults or Asian adults to meet guidelines for muscle-strengthening activity. Those with higher levels of education were more likely than those with less education to have never smoked cigarettes, and to have met the physical activity guidelines. Adults in the highest income groups were more likely than low-income adults to have never smoked, and to have met the physical activity guidelines (both aerobic and muscle-strengthening). Never-married and married adults were more likely than adults in the other marital status groups to have never smoked cigarettes.

There were also trends across time. For example, the percentage of adults who had five or more alcoholic drinks in one day at least once in the past year increased from 20.5% (2005–2007) to 23.6% (2008–2010), although adult smoking prevalence remained unchanged between 2005–2007 (20.4%) and 2008–2010 (20.2%). The percentage of adults who were completely aerobically inactive declined from 39.7% (2005–2007) to 33.9% (2008–2010).

Variations in who performs different health behaviours is of particular interest here given that the focus of the present volume is on examining the factors that might explain such variations. For example, variations across social class groups in who smokes might be fully or partially explained (or mediated) by differences across such groups in terms of attitudes, norms or intentions in relation to smoking. In addition, the importance of factors that explain differences in who performs health behaviours might vary across social class groups. Such moderation effects can be important in directing interventions more appropriately. For example, Conner *et al.* (2013) showed intentions to be better predictors of a number of health behaviours among those from higher versus lower social class groups.

## 2.3 Classifying health behaviours

The majority of the research in this volume focuses on behaviour-specific cognitions. This means that, for example, intentions to quit smoking are thought to be relevant to predicting quitting smoking but not relevant to other health behaviours. Work on health behaviour change similarly often focuses on single behaviours. However, this raises the issue of the extent to which we can generalize across health behaviours. For example, the social cognitive predictors of smoking behaviour might be different from the social cognitive predictors of fruit and vegetable consumption. Similarly, intervention techniques that help an individual quit smoking might not be useful or relevant for increasing fruit and vegetable consumption. In part, the answer to this point may depend on how similar different health behaviours are. In this section, a number of classifications of health behaviours that might inform such issues are overviewed.

One approach to classifying health behaviours has been to empirically examine which behaviours are performed together. This is sometimes known as the *frequency of engagement* approach and has identified either a single dimension (e.g. Jessor *et al.* 1998) or multiple dimensions (e.g. Roysamb *et al.* 1997), although the nature and number of dimensions identified appears to be a function of the behaviours examined. An alternative approach has been the *functional approach*, whereby health behaviours are grouped according to their function. The most common distinction in this area is between behaviours that enhance (i.e. approach) or impair (i.e. avoidance) health. Health-impairing behaviours have harmful effects on health or otherwise predispose individuals to disease, and include smoking, excessive alcohol consumption, and high dietary fat consumption. In contrast, health-enhancing behaviours convey health benefits or otherwise protect individuals from disease, and include physical activity and exercise, fruit and vegetable consumption, and condom use in response to the threat of sexually transmitted diseases. Various other sub-divisions of these two categories have been suggested. For example, Rothman and Salovey (1997) highlight the distinction between preventive health behaviours (those that aim to prevent the onset of ill health), detective health behaviours (those that aim to detect potential problems), and curative health behaviours (those that aim to cure or treat a health problem). These three categories have also been described as primary, secondary, and tertiary prevention respectively.

A different approach to classifying behaviours is based on their *key characteristics*. McEachan *et al.* (2010) noted that some studies have classified health behaviours by familiarity (i.e. degree of experience the individual has with the behaviour; Notani 1998), habitualness (based on frequency of opportunity to perform and stability of context in which the behaviour is performed; Ouellette and Wood 1998) or volitional control (i.e. degree to which the behaviour requires other resources to perform it, or is simply based on decision to act; Ajzen 1991). McEachan *et al.* (2010) measured perceptions of a number of health behaviours along a range of dimensions and identified three dimensions along which they consistently varied: (1) 'easy immediate pay-offs' vs. 'effortful long-term pay-offs'; (2) 'private and un-problematic vs. public and problematic'; and (3) 'important routines vs. unimportant one-offs'. For example, risk behaviours were clearly differentiated by being perceived as 'easy immediate pay-offs' and 'public and problematic', whereas approach behaviours such as physical activity behaviours were perceived as 'effortful long-term pay-offs'.

These different ways of classifying health behaviours clearly provide some insights into similarities and differences between health behaviours. However, to date it is unclear whether

any single classification system can provide a sound basis for generalizing from one health behaviour to another in relation to the key factors that predict or change these behaviours. Indeed, a classification system that attempted to classify health behaviours according to similarity of key determinants (e.g. intention-based behaviours) or the most effective means of changing behaviour (e.g. self-efficacy is key to change these behaviours) might be the most useful approach in this regard.

## 2.4 Predicting the performance of health behaviours

Can we understand and predict who performs health behaviours? This would contribute to our understanding of the variation in the distribution of health across society. It might also indicate targets for interventions designed to change health behaviours. As one might expect, a variety of factors account for individual differences in the propensity to undertake health behaviours, including demographic factors, social factors, emotional factors, perceived symptoms, factors relating to access to medical care, personality factors, and cognitive factors (Rosenstock 1974; Taylor 1991; Adler and Matthews 1994; Baum and Posluszny 1999).

In addition to demographic variables such as age, gender, ethnicity, and socio-economic status (see Section 2.2), social factors such as parental models are important in instilling health behaviours early in life. The influence of peers is also important, such as in starting smoking (e.g. McNeil *et al.* 1988). Cultural values are also influential, for instance in determining the number of women exercising in a particular culture (e.g. Wardle and Steptoe 1991). Emotional factors play a role in the practise of some health habits, for example overeating is linked to stress in some obese people (e.g. Greeno and Wing 1994). Self-esteem also plays a role in influencing the practise of health behaviours by some (e.g. Royal College of Physicians 1992). Perceived symptoms will control health habits when, for example, a smoker regulates his or her smoking on the basis of sensations in the throat. Finally, the accessibility of medical care services has been found to influence the use of those health services (e.g. Whitehead 1988).

Personality theory proposes that traits or combinations of traits are fundamental determinants of behaviour and there is considerable evidence linking personality and behaviour (for a general review, see Hampson 2012). Personality factors have been either positively (e.g. conscientiousness) or negatively (e.g. negative affectivity) associated with the practise of health behaviours (Adler and Matthews 1994; Steptoe *et al.* 1994; for a discussion, see Norman and Conner, Chapter 12 this volume).

Finally, cognitive factors also determine whether or not an individual practises health behaviours. For example, knowledge about links between behaviour and health (i.e. risk awareness) is an essential factor in an informed choice concerning a healthy lifestyle. The reduction of smoking over the past 20–30 years in the Western world can be attributed to a growing awareness of the serious health risks posed by tobacco use brought about by widespread publicity. A variety of other cognitive variables have been studied. These factors include perceptions of health risk, potential efficacy of behaviours in reducing this risk, perceived social pressures to perform the behaviour, and control over performance of the behaviour.

A wide range of variables, from several models, has been related to the performance of health behaviours (for reviews, see Cummings *et al.* 1980; Becker and Maiman 1983; Mullen *et al.* 1987; Weinstein 1993). For example, Cummings *et al.* (1980) had experts sort 109 variables

derived from 14 different health behaviour models. On the basis of non-metric multidimensional scaling, six distinct factors were derived:

1. Accessibility of health care services
2. Attitudes to health care (beliefs about quality and benefits of treatment)
3. Perceptions of disease threat
4. Knowledge about disease
5. Social network characteristics
6. Demographic factors.

Factors 2–5 represent social cognitive factors (beliefs, attitudes, knowledge). Such factors have been central to a number of models of the determinants of health behaviours for several reasons. These factors are enduring characteristics of the individual that shape behaviour and are acquired through socialization processes. They differentiate between individuals from the same background in terms of their propensity to perform health behaviours. They are also open to change and hence represent one route to intervening to change health behaviours. Cognitive factors represent an important area of study in health promotion because they may mediate the effects of many of the other factors discussed earlier and because they are believed to be a good focus of attention in interventions to change health behaviours. These cognitive factors constitute the content of a small number of widely used models of health behaviour. Such models have been labelled 'social cognition models' because of their use of a number of cognitive variables in researching individual social (including health) behaviours.

## 3 Social cognition approach to health behaviour

Social cognition is concerned with how individuals make sense of social situations. The approach focuses on individual cognitions or thoughts as processes that intervene between observable stimuli and responses in specific real-world situations (Fiske and Taylor 1991, 2013). A significant proportion of social psychology over the last 35 years has started from this assumption that social behaviour is best understood as a function of people's perceptions of reality, rather than as a function of an objective description of the stimulus environment. The question of which cognitions are important in predicting behaviour has been the focus of a great deal of research. This 'social cognitive' approach to the person as a thinking organism has been dominant in social psychology for the past two decades or more (Schneider 1991). The vast majority of work in social cognition can be broadly split into how people make sense of others (person perception) and themselves (self-regulation) (Fiske and Taylor 1991: 14). The focus in this volume is on self-regulation processes and how various social cognitive processes relate to health behaviour.

Self-regulation processes can be defined as those '…mental and behavioral processes by which people enact their self-conceptions, revise their behavior, or alter the environment so as to bring about outcomes in it in line with their self-perceptions and personal goals' (Fiske and Taylor 1991: 181). As such, self-regulation can be seen as emerging from a clinical tradition in psychology that sees the individual as engaging in behaviour change efforts designed to eliminate dysfunctional patterns of thinking or behaviour (Turk and Salovey 1986). Models of the cognitive determinants of health behaviour are part of this tradition. Self-regulation involves

the setting of goals, cognitive preparations, and the ongoing monitoring and evaluation of goal-directed activities. Two phases are commonly distinguished: motivational and volitional (model of action phases; Gollwitzer 1993). The motivational phase involves the deliberation of incentives and expectations in order to choose between goals and implied actions. This phase ends with a decision concerning the goal to be pursued. The second, volitional phase involves planning and action towards achieving the set goal. Research concerned with developing models that explain the role of cognitive variables in the motivational phase still dominates the area, although increasingly researchers have sought to redress this balance by developing models of the role of cognitive variables in the volitional phase (e.g. Kuhl 1984; Kuhl and Beckmann 1985, 1994; Weinstein 1988; Heckhausen 1991; Bagozzi 1992, 1993; Gollwitzer 1993) with increasing applications to health behaviours (e.g. Schwarzer 1992; Schwarzer and Luszczynska, Chapter 8 this volume; Sutton, Chapter 9 this volume; Prestwich *et al.*, Chapter 10 this volume).

Social cognition models (SCMs) describing the key cognitions and their inter-relationships in the regulation of behaviour have been developed and widely applied to the understanding of health behaviours. Two broad types of SCMs have been applied in health psychology, predominantly to explain health-related behaviours and response to health threats (Conner 1993).

The first type involves attribution models concerned with individuals' causal explanations of health-related events (e.g. King 1982). However, most research within this tradition has focused on how people respond to a range of serious illnesses, including cancer (Taylor *et al.* 1984), coronary heart disease (Affleck *et al.* 1987), diabetes (Tennen *et al.* 1984), and end-stage renal failure (Witenberg *et al.* 1983) rather than the health-enhancing and compromising behaviours of otherwise healthy individuals. More recent work on illness representations (Petrie and Weinman 1997; Moss-Morris *et al.* 2002; Hagger and Orbell 2003), based on Leventhal's self-regulation model (Leventhal *et al.* 1984), also falls into this category. This work seeks to examine individuals' reactions to a disease (or disease threat). In particular, the model delineates three stages. In the first stage, the individual forms an illness representation along five core dimensions: disease identity (i.e. the symptoms experienced as part of the condition), consequences (i.e. the perceived range and severity of the consequences of the disease), causes (i.e. the perceived causes of the disease), timeline (i.e. the extent to which the disease is perceived to be acute or chronic in nature), and control/cure (i.e. the extent to which the patient and others can manage the disease). In the second stage, the illness representation is used to guide the choice of coping efforts, while in the third stage the outcomes of coping efforts are appraised and used to adjust the illness representation. Thus in this model, individuals' perceptions of their illness are seen to have a central role in determining coping efforts and subsequent adaptation. However, a meta-analysis conducted by Hagger and Orbell (2003) of studies on illness representations only revealed evidence for a weak correlation between the control/cure dimension and specific problem-focused coping efforts (e.g. medication adherence). In contrast, stronger correlations were found between illness representations and various measures of physical and psychological well-being.

The second type of SCM examines various aspects of an individual's cognitions in order to predict future health-related behaviours and outcomes. The SCMs commonly used to predict health behaviours include: the health belief model (e.g. Becker 1974; Janz and Becker 1984; Abraham and Sheeran, Chapter 2 this volume); protection motivation theory (e.g. Maddux and Rogers 1983; Van der Velde and Van der Pligt 1991; Norman *et al.*, Chapter 3 this volume); self-determination theory (e.g. Deci and Ryan 2002; Hagger and Chatzisarantis, Chapter 4 this volume); the theory of reasoned action/theory of planned behaviour (e.g. Ajzen 1991; Fishbein

and Ajzen 2010; Conner and Sparks, Chapter 5 this volume); the prototype-willingness model (Gibbons *et al.* 2003; Gibbons *et al.*, Chapter 6 this volume); social cognitive theory (e.g. Bandura 1982, 2000; Schwarzer 1992; Luszczynska and Schwarzer, Chapter 7 this volume); and the health action process approach (e.g. Schwarzer 2008; Schwarzer and Luszczynska, Chapter 8 this volume). Another set of models focuses on the idea that behaviour change occurs through a series of qualitatively different stages. These so-called 'stage' models (Sutton, Chapter 9 this volume) include the transtheoretical model of change (Prochaska and DiClemente 1984) and the precaution-adoption process (Weinstein 1988). Finally, some recent work examining health behaviours has focused on specific volitional variables (e.g. Kuhl 1984; Gollwitzer 1993, 1999; Abraham *et al.* 1999). In particular, implementation intentions (Gollwitzer 1993) have emerged as a useful technique for changing health behaviours (Prestwich *et al.*, Chapter 10 this volume).

These SCMs provide a basis for understanding the determinants of behaviour and behaviour change. They also provide a list of important targets that interventions designed to change behaviour might focus upon if they are to be successful. Each of these models emphasizes the rationality of human behaviour. Thus, the health behaviours to be predicted are considered to be the end result of a rational decision-making process based upon deliberative, systematic processing of the available information. Most assume that behaviour and decisions are based upon an elaborate, but subjective, cost–benefit analysis of the likely outcomes of differing courses of action. As such they have roots going back to expectancy-value theory (Peak 1955) and subjective expected utility theory (Edwards 1954). It is assumed that individuals generally aim to maximize utility and so prefer behaviours that are associated with the highest expected utility.

The overall utility or desirability of a behaviour is assumed to be based upon the summed products of the probability (expectancy) and utility (value) of specific, salient outcomes or consequences. This can be represented as:

$$\mathrm{SEU}_j = \sum_{i=1}^{i=m} \mathrm{P}_{ij} \cdot \mathrm{U}_{ij},$$

where $\mathrm{SEU}_j$ is the subjective expected utility of behaviour $j$, $\mathrm{P}_{ij}$ is the perceived probability of outcome $i$ of action $j$, $\mathrm{U}_{ij}$ is the subjective utility or value of outcome $i$ of action $j$, and $m$ is the number of salient outcomes. Different behaviours may have differing subjective expected utilities because of the value of the different outcomes associated with each behaviour, and the probability of each behaviour being associated with each outcome. While such a model allows for subjective assessments of both probability and utility, it is assumed that these assessments are combined in a rational, consistent way. Outcome expectancies can be usefully classified along a limited number of key dimensions. For example, Bandura (2000) distinguishes between outcome expectancies as physical, social or self-evaluative, while Ajzen and Fishbein (1980) distinguish between social outcomes and other outcomes. More recently, Rhodes and Conner (2010) distinguished outcome expectancies in terms of positive-negative, immediate-distal, and instrumental-affective dimensions. The relative importance of different types of outcome expectancies has been a recent focus of attention (e.g. Lawton *et al.* 2007).

Such judgements underlie many of the widely used SCMs, including the health belief model, protection motivation theory, theory of reasoned action/planned behaviour, and social cognitive theory (Weinstein 1993, 2000; Van der Pligt 1994). While such considerations may well provide good predictions of health behaviours, several authors have noted that they do not provide