



GSR Behaviour Change Knowledge Review

Reference Report: An overview of behaviour change models and their uses

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Contents

1. Introduction	1
2. Understanding Behaviour	5
2.1 Economic assumptions	5
2.2 Behavioural economics	7
2.3 The role of information and the value action gap	10
2.4 Values, beliefs and attitudes	11
2.5 Norms and identity	15
2.6 Agency, efficacy and control	18
2.7 Habit and routine	22
2.8 The role of emotions	24
2.9 External factors	26
2.10 Self regulation	29
2.11 Societal factors	32
3. Using Behavioural Models	34
4. Understanding Change	39
4.1 Changing habits	39
4.2 Change in stages	41
4.3 Change via social networks	44
4.4 Change as learning	47
4.5 Change in systems	51
5. Applied Approaches to Change	57
6. Issues Around Intervening	64
6.1 Ethical issues	64
6.2 Equity issues	65
6.3 Side effects	67
7. Using Behavioural Models with Theories of Change	68
Appendices	70
i) Tables matching behaviours to models	70
ii) Methodology	74
iii) Organisations and Individuals Contacted	76
iv) Electronic bibliography	77
v) References	77

1. Introduction

This report has been designed to accompany the Practical Guide to Behaviour Change models¹. It provides a descriptive account of over 60 social-psychological models and theories of behaviour and discusses some issues to consider when using models. It also provides additional resources in the Appendices to enable readers to access the vast amount of literature in this area and see where models have been used to address particular behaviours previously.

This review makes the distinction between models of behaviour and theories of change. This is primarily an explanatory step, taken to highlight the different uses (and limits) of the types of models and theories incorporated in the behaviour change literature. Models of behaviour help us to understand specific behaviours, by identifying the underlying factors, which influence them. By contrast, theories of change show how behaviours change over time, and can be changed. While behavioural theory is diagnostic, designed to explain the determinant factors underlying behaviour, change theory is more pragmatic, developed in order to support interventions for changing current behaviours or encouraging the adoption of new behaviours. While the two bodies of theory have distinct purposes, they are highly complementary; understanding both is essential in order to develop effective interventions.

The distinction is stressed throughout this review, but its value is most apparent in the context of practical guidance. It underlines that an understanding of behaviour alone provides insufficient clues on which to base effective processes for changing behaviour. Theories of change suggest intervention techniques which can be effective in bringing about change, as well as broad approaches to intervention design, implementation and evaluation which can underpin effective policy planning and delivery. However, seen from a purely conceptual perspective, the distinction between theories of behaviour and theories of change can appear less clear-cut. There are considerable overlaps between the two bodies of theory; for instance, behavioural models tend to be linear (showing the relationships between influencing factors as a series of arrows), models of change tend to be circling, incorporating feedback loops. Alternatively, while behavioural models tend to describe specific behaviours, models of change more commonly depict generic processes of change. However in both these examples the distinctions do not hold fast, as some models predominantly of one type show characteristics of the other. Classifying models of behaviour change into discrete types based on their attributes is an apparently impossible task.

The structure of the report is as follows:

Section 2 – Understanding behaviour

Provides a description of Behaviour Change models. The section starts with a brief overview of economic theory, which represents a starting point for examining human behaviour and then moves onto more complex behavioural economic principles and models from social psychology - both of which build upon economic theory. The models are divided between those showing the factors influencing behaviour at the level of individuals, and those showing factors impacting from higher levels of scale, such as society as a whole.

Section 3 – Using behavioural models

Sets out key considerations when using behavioural models

¹ Available on the GSR website: www.gsr.gov.uk

Section 4 – Understanding change

Provides an overview of a range of theories of change from a variety of disciplines

Section 5 – Applied approaches to change

Describes some of the more overarching approaches to changing behaviour often used in policy contexts

Section 6 – Issues around intervening

Outlines wider contextual issues around intervening, including issues of ethics and equity

Section 7 – Using behavioural models with theories of change

Introduces a practical approach to designing behaviour change interventions based on learnings from theory

To help readers to use this report as a reference resource, **Table 1** below organises the models and theories cited under the section headings used in the report. Many of the models featured are cited in several places throughout the report; in the table, the models are linked to the section where they are described at the most length. The task of model selection is further covered in the Practical Guide and two further tables are supplied there, which explicitly map the models onto specific behaviours and policy problems. While detailed instructions on how to use the Tables are given in the Guide, the tables are also reproduced in this Reference Report (see Appendix i) below).

Table 1: An Index to the Featured Models and Theories

Section	Models & Theories	page	figure
Models & Theories of Behaviour at the Individual Level			
2.1 Economic Assumptions	Expected Utility (EU) Theory	7	
2.2 Behavioural Economics	Principles of Hyperbolic Discounting, Framing, Inertia	8	
	Simon's Bounded Rationality (1955)	8	
	Tversky and Kahneman's Judgment Heuristics (1974)	9	
	Kahneman and Tversky's Prospect Theory (1979)	9	
	Stanovich and West's System 1/System 2 Cognition (2000)	9	
2.3 The Role of Information	(Information) Deficit Models	10	2.1
	Awareness Interest Decision Action (AIDA)	10	
	The Value Action Gap (eg. Blake 1999)	10	2.2
2.4 Values, Beliefs and Attitudes	(Adjusted) Expectancy Value (EV) Theory	11	
	Fishbein and Ajzen's Theory of Reasoned Action (TRA), (1975)	11	2.3
	Rosenstock's Health Belief Model (1974)	12	2.4
	Rogers' Protection Motivation Theory (1977)	12	2.5
	Stern et al's Schematic Causal Model of Environmental Concern (1995)	14	2.7
	Stern et al's Values Beliefs Norms (VBN) Theory (1999)	15	2.8
	Petty and Cacioppo's Elaboration Likelihood Model of Persuasion (ELM) (1986)	15	
	Fazio's MODE Model (1986)	15	
2.5 Norms and Identity	Schwartz's Norm Activation Theory (1977)	16	2.9

	Sykes and Maza's Norm Neutralization Theory (1957)	16	
	Cialidini's Focus Theory of Normative Conduct (1990)	17	
	Rimal et al's Theory of Normative Social Behaviour (2005)	17	
	Turner and Tajfel's Social Identity Theory (1979)	17	
	Turner's Self Categorisation Theory (1987)	18	
2.6 Agency, Efficacy and Control	Aizen's Theory of Planned Behaviour (TPB), (1986)	13	2.6
	Bandura's Theory of Self Efficacy (1977)	19	
	Hovland's Theory of Fear Appeals (1957)	19	
	Kolmuss and Agyeman's Model of Pro-Environmental Behaviour (2002)	20	2.11
2.7 Habit and Routine	Triandis' Theory of Interpersonal Behaviour (TIB), (1977)	21	2.12
	Gibbons and Gerrard's Prototype/Willingness Model (2003)	22	2.13
2.8 The Role of Emotions	Slovic's Affect Heuristic (2002)	24	
	Loewenstein et al's Risk As Feelings Model (2001)	25	2.14
2.9 External Factors	Spaagaren and Van Vliet's Theory of Consumption as Social Practices (2000)	28	2.16
	Giddens' Theory of Structuration (1984)	28	
2.10 Self Regulation	Carver and Scheier's Control Theory (1982)	30	2.17
	Bandura's Social Cognitive Theory of Self Regulation (1991)	31	2.18
Models & Theories of Behaviour at Higher Levels of Scale			
2.11 Societal Factors	Vlek et al's Needs Opportunities Abilities (NOA) Model (1997)	32	2.15
	Dahlgren and Whitehead's Main Determinants of Health Model (1991)	32	2.19
Theories of Change			
4.1 Changing Habits	Lewin's Change Theory (1947)	40	
	Bandura's Mastery Modelling (1977)	40	
	Gollwitzer's Implementation Intentions (1993)	41	
4.2 Change in Stages	Prochaska and Di Clemente's Transtheoretical Model of Health Behaviour Change ('Stages of Change' Model) (1983)	41	4.22
4.3 Change via Social Networks	Rogers' Diffusion of Innovations (1962 onwards)	44	
	Gladwell's Mavens, Connectors & Salesmen (2000)	45	
	Network Theory	46	
	Social Capital	46	
4.4 Change as Learning	Information-Motivation-Behavioural Skills (IMB) Model	47	
	Monroe et al's Framework for Environmental Education Strategies (2006)	47	4.23
	Vare and Scott's ESD1/ESD2 (2007)	48	
	Argyris and Schon's Double Loop Learning (1978)	49	4.24
	Schein's Organisational Culture (1985)	50	
4.5 Change in Systems	Systems Thinking	51	
	Foresight's Obesity System Map (2007)	53	4.26

	Scharmer's Theory U (2007)	56	4.28
Models and Frameworks			
5. Applied Approaches to Change	McKenzie-Mohr's Four Steps of Community Based Social Marketing (CBSM) (2000)	57	
	Andreasen's Six Stage Model of Social Marketing (1995)	57	5.29
	Gardner and Stern's Principles for Intervening to Change Environmentally Destructive Behavior (1996)	18	2.10
	Bartholomew et al's Intervention Mapping (IM). (1998)	59	5.30
	Defra's 4Es Model (2005)	60	5.31
	Knott et al's Cultural Capital Framework (2008)	61	5.32
	Department for Communities and Local Government's Model of Community Empowerment (2008)	62	5.33
	Implications from Chapman's System Failure (2004)	63	

2. Understanding Behaviour

The literature on the factors influencing human behaviour is very extensive: it has been described as “*enormous*” (Maio et al 2007) and “*bordering on the unmanageable*” (Jackson 2005). This research evidence is drawn from diverse disciplines (predominantly within economics, psychology and sociology) and it spans myriad human behaviours. The behaviour change agenda across government is most developed in the policy areas of environment, health, and transport. Through this recent work, there is growing consensus on what the scope of the relevant evidence base might be; indeed, this study has included thirteen reviews of the literature, all conducted in the last five years and predominantly focusing on social-psychological models.

This first section of this report attempts to summarise briefly some of the principle theories and models of behaviour.

2.1 Economic assumptions

Standard economic theory represents the starting point for modelling many aspects of human behaviour. Behaviours which involve a choice between options with clearly perceived costs and benefits for the decision maker are particularly suited to analysis based on economic theory. Economics often uses rational choice as a tractable assumption which is ‘fit for purpose’ over a wide range of economic analysis. Rational choice theory traditionally assumes that individuals make behavioural decisions based on a calculation of the expected costs and benefits of a behaviour. Strictly speaking, rational choice theory requires only ‘well-ordered’² and consistent preference mappings over the relevant period; it does not attach any welfare attributes to these preferences. An individual’s own preferences could even be detrimental for that individual and irrational by most reasonable criteria, but if well ordered and consistent throughout the analysis then rational choice theory can be applied for the purposes of analysing choice behaviour.

Rational choice models are often called **(Subjective) Expected Utility (EU or SEU) models**. The principle of Expected Utility is central to **Consumer Preference Theory** (eg. Begg et al 2003, in Jackson 2005). The Theory balances four elements: the consumer’s available income, the price of the goods, the consumer’s tastes or preferences, and the assumption of utility maximization. Rational choice theory is notably silent on the origins of the individual’s preferences; they are “*exogenous to the model*”.

For most purposes individuals’ preferences in economic models of consumer choice are assumed to follow the principle of utility maximisation. In such models, utility can best be thought of as levels of satisfaction, happiness or personal benefit. By using the assumption that individuals act in order to maximise personal subjective benefits, economists are more able to apply powerful mathematical techniques for modelling behavioural outcomes (techniques which can also address ‘constrained maximisation’). However, working on the assumption of utility maximisation also gives rise to a critical stereotype of ‘homo economicus’, an amoral self that would, for example, murder without hesitation for financial gain, so long as the risk of penalties did not outweigh that gain.

The notion of utility can also include the welfare of others as a component of one’s own utility, however it is fair to say that economics has traditionally adopted an analytical approach based on ‘atomistic’ or socially-isolated individuals acting in pursuit of their own

² Satisfying axiomatic conditions e.g. if A is preferred to B and B is preferred to C then A must be preferred to C

interests. This assumption often provides useful analysis, but it also has serious limitations. For example, relying only on atomistic individual agents may result in the 'tyranny of small decisions' whereby the outcome of millions of individual decisions is at odds with what people collectively want. For example, no one wants to be the only person paying tax, but most taxpayers may value a certain level of taxation as a collective requirement for the 'common good'.

Nevertheless standard economic theory assuming the individual to be a rational man acting in his own interests can provide many powerful insights for human behaviour. In rational choice theory, costs and benefits are not necessarily defined in terms of money, and this approach has been found to be useful for analysing a very wide range of human behaviours not usually associated with economics, for example sex, crime, religion and wars (see eg. Harford 2008). This has led to a much wider range of phenomena being analysed by economists over the last fifteen years or so. It has also meant economists becoming more concerned with the origins of preferences and the deeper antecedents of behaviour. Diane Coyle, 2007 has described this as economics returning to its "*rich and humane Enlightenment roots as the scientific study of collective human behaviour*". For example, economists are prominent in the new debates and empiricism on well-being and happiness. In interpreting different behavioural outcomes, economists now work with analysts from other disciplines to explore the extent to which less rational factors also apply, including the 'endogeneity' of preferences.

It is still the case however, that economists often employ a simple set of facilitating assumptions:

- decisions are made in a stable state: our preferences are fixed;
- individuals have access to all the relevant information bearing on the decision;
- they are fully able to process this information in order to reach the optimal (utility maximising) decision.

Of course, economists know these assumptions are not literally true. For much of economics, descriptive realism is far less important than the analytical power of assumptions. For example, snooker champions do not actually work out Newtonian Laws of motion in complex equations, but it can appear as if they are doing this. Standard economic theory assumes that individuals act rationally in order to make analysing complex behaviours easier and enable the hypothesising of likely courses of action. For Tim Harford, rational choice theory offers "*a rigorously simplified view of the world*" (Harford 2008). In this view, people act rationally most of the time, but they are not the walking calculators of utility sometimes caricatured as 'homo economicus' (see eg. Persky 1995 in Harford 2008). Similarly, even when a number of factors are known to influence a behaviour, the assumption of rationality can be sufficient to explain the outcome (the London congestion charge being one example). Another consideration is that apparently irrational behaviour can have very rational explanations. A simple example is store cards which charge much higher interest rates than other forms of credit; however, store cards offer alternative benefits, for instance that they can be settled in cash such that their existence is easier to conceal. By analysing the way in which our decision making accounts for the behaviour of others, game theory has shed much light on behaviours previously thought to be irrational (see eg. Harford 2008).

Another aspect of rational choice theory which is often overlooked is that in a competitive market process there only needs to be a sufficient number of rational agents at work for the outcome to appear as if a wholly rational process produced it. This is because where there is irrationality there will usually be an incentive for rational agents to exploit this irrationality, with the result that its effects are eliminated. An example is individuals' best intentions on joining a health club; people often overestimate the extent to which they will use the facilities. Health clubs will attempt to exploit this by attracting these over-estimators

with higher joining-up fees but a low usage fee. This means that health clubs can profit greatly by attracting as many people as possible to otherwise under-used facilities. In practice, competition between health club owners tends to drive down joining fees until the outcome reflects actual members' behaviour. Financial markets often demonstrate super rationality even when many investors are ill-informed. Market processes then can be the 'crane' that makes a rational outcome emerge even where there is much irrationality.

Understanding that rational choice is an assumption not a guiding principle in economic analysis, its value lies in being able to isolate some of the processes at play in determining behaviours. The assumption of rationality is also a useful base from which to build in greater complexity. Thus economic analysis can expand to include considerations of asymmetric (or partial) information, risk aversion, and varying preferences over time (some of these are introduced under 'Behavioural Economics', 2.2 below). It is ultimately not the descriptive truth of the working assumptions that should be judged, but their capacity to support productive analysis, although it is also vital that they are appropriate to the behaviour in question, and do not become a misleading metaphor. Given the inherently reductionist approach of standard economic theory, an insight into the factors determining behaviour gained from other disciplines will also be required to build up a complete understanding of a behaviour.

The assumptions of standard economic theory highlight the role of information in economic models of behaviour. Despite the limitations to rational choice theories, past attempts by government to deliver behaviour change have favoured the economic tools of information and incentives (see Demos/Green Alliance 2003, Talbot et al 2007, Lewis 2007). Such interventions plot a linear relationship between government at the centre and individuals, and base their strategy for behaviour change on a rational man approach. Not only is this an incomplete approach but there are social and political norms that limit the degree to which financial levers may be applied. For example, it is well-documented that alcohol taxation can reduce alcohol consumption, even where exhortation and information fails to do so (see eg. Dahlgren and Whitehead 2007). However using only this approach to reduce anti-social and health problems would mean penalising all responsible drinkers and go against principles of fairness (see eg. Pearce 2007, discussed in Section 6 below). As in this example, much behaviour is irrational, self-harming, and driven by habit, and in such cases choice-based models may not provide a useful starting point from which to develop policy.

The assumption that people act primarily from self-interest goes beyond government. Being the earliest model of human behaviour, **Expected Utility Theory** has long served as the benchmark for models of cognitive decision making; other models are understood as deviations from that standard (Loewenstein et al 2001). Acknowledging this heritage, this section of the review will follow that course, and in presenting the numerous factors which are known to influence behaviour, suggest further limitations to the economic model of rational choice.

2.2 Behavioural economics

The simple rational choice model has proven itself to be a useful predictor of choice over a very wide range of phenomena. Nevertheless, there are areas of human behaviour where rational choice can be an unhelpful assumption. To complement economics, theorists have sought to build bridges between economic theory and learnings from psychology. Behavioural economics is a general label for the overlap between these two disciplines, aiming to account for human limitations in the decision making process. Evidence from common experience shows that individuals' preferences do not remain constant.

Psychological experiments have also been used to demonstrate that the rational choice assumption is not realistic.

However, behaviour in a laboratory experiment setting is not necessarily a reliable guide to behaviour in a real world context. For example, when the costs and benefits of a behaviour are hypothetical people do not necessarily respond in the same ways as they would if the costs and benefits were actual and personal. At the same time observation can also be an unreliable indicator of the underlying influences on behaviour. Economic and psychological approaches can be highly complementary; for example while a concern for fairness, altruism and risk aversion can appear to contradict the assumption of rationality, rational choice models may still prove useful if a wider definition of utility which incorporates such concerns can be applied.

Behavioural economics provides numerous principles combining economic and psychological theory, all of which serve as qualifications to rational choice theory. These principles have been summarised in a review for policy audiences by the New Economics Foundation (Dawney and Shah 2005). Some of the most widely applied principles are:

- **Hyperbolic Discounting**

In prospective decision making, people tend to offset long-term benefits against short-term rewards; this calculation results in a discount rate. Different people apply different discount rates (eg. those in disadvantaged groups tend to have high discount rates, showing a greater preference for short-term rewards – see Halpern et al 2003), while an individual's discount rates vary according to the behavioural decision in question (eg. different products attract different rates; airconditioning is commonly highly discounted – Wilson and Dowlatabadi 2007). Such considerations mean that the rates applied vary across the timeframe of the decision (hence they are 'hyperbolic'), with the result that people's preferences appear inconstant. However, it is not clear that this always contradicts rational choice. For example, it may appear that people are irrational in not providing sufficiently for their own pensions, but life expectancy is uncertain, investments are uncertain, health is uncertain and people may simply prefer to consume when younger even as they wish they had more for their old age. (For more information on discounting, see HMT 2003.)

- **Framing**

The decision made by an individual depends on how the available choices (the 'reference frame') are presented to them. Framing the same choice in terms of losses instead of gains can alter the decision made, as can presenting the items in a different order (see Talbot et al 2007, Harford 2008).

- **Inertia**

When faced with a difficult decision or one involving too much choice, people may choose not to change their behaviour at all, or to choose the easiest option (the path of least resistance). This principle is often in evidence in financial decisions (such as investments, or changing energy supplier – see Talbot et al 2007, Wilson and Dowlatabadi 2007).

The reaching out of economic theory towards psychology can be traced back to the economist Herbert Simon, who in the 1950s compared accounts of decision making from the two disciplines. Simon evolved the concept of '**bounded rationality**' to explain how, even when individuals are pursuing utility, their decision making processes are 'bounded' by psychological and environmental constraints (see eg. Jackson 2005, Wilson and Dowlatabadi 2007). Thus personal abilities and situational factors (including how choices are presented, and also the context in which the decision is made, for instance under time pressure) limit people's capacity for deliberation. This process is not irrational but less rational, arising from an attempt to maximise cognitive efficiency in reaching a decision

quickly or easily by reducing the 'cognitive load' which deliberative thought places on the brain. Bounded rationality itself is consistent with economic assumptions of rationality, as basing decisions on broad options (rather than weighing each item) reduces the costs of gathering and processing the information required to make a totally rational calculation.

The psychologists Daniel Kahneman and Amos Tversky advanced this thinking through their research on decision making under uncertainty. They were intrigued by the observation that people's intuitive responses (under time pressure) deviated from their deliberative responses based on knowledge (this was even the case among experts in the area at issue). Kahneman and Tversky proposed the theory of '**judgement heuristics**', rules of thumb which reduce probability calculations into simpler judgements. These heuristics act as useful shortcuts to reaching decisions, but also lead to systematic errors of judgement ('biases' – see Kahneman 2002). Heuristics can thus be used to explain idiosyncracies in our apparently rational decision making. Tversky and Kahneman's paper 'Judgement Under Uncertainty' (1974) identified three heuristics (and 12 resulting biases) as follows:

- **Representativeness**
Decisions on likely outcomes are not made based on probability (the 'base rate') but on their likeness to previous outcomes (hence the 'gambler's fallacy', that the next coin toss will come up the reverse of this one).
- **Availability**
The likelihood of an event is assessed by the ease with which it can be recalled (thus memorable, and traumatic, events are deemed more likely).
- **Adjustment/Anchoring**
When a reference point (or value) is given, people will make assessments based on adjustment from that point; if no reference point is given they may assume one. Kahneman and Tversky's **Prospect Theory** (including that changes in wealth are more influential than mean states, and losses are more influential than gains) follows on from this principle.

The core concept linking judgement heuristics is 'accessibility', that the rule of thumb is more accessible than the probability-based calculation, and thus is preferred (especially under time pressure or while under a heavy cognitive load). More recently, Kahneman and Frederick (2002, in Kahneman 2002) found heuristics to be operating through a process of attribute substitution: instead of judging the target attribute of the decision frame, we judge the heuristic attribute which we have automatically substituted for it. This explanation draws on recent understandings of cognition as a dual process, for instance, Stanovich and West's description of **System 1/System 2 cognition** (2000, in Kahneman 2002). In this theory, System 2 is 'reasoning', being deliberative, effortful and slow; reasoning generates explicit judgements. System 1 is 'intuition', being fast, automatic and effortless; we are often not conscious of intuitive responses, which result in impressions. Being a dual process, both Systems run simultaneously; in intuitive decisions, System 2 takes impressions from System 1, monitors them (often casually) and makes explicit judgements based upon them. The process of heuristic-based decision making by substitution follows this model.

This work on heuristics is important, not just for the explicit principles it generates (which policies directed at more deliberative decisions should account for), but because it conceptualises decision making as being both more and less rational. In turn this is key to understanding behaviour: many decisions are based on System 1 processing, and involve only low levels of deliberation. Meanwhile the concept of a heuristic has wider applications in demonstrating how much of our behaviour bypasses effortful deliberation.

2.3 The role of information and the value action gap

Standard economic assumptions of rational choice foreground the role of information in determining behavioural outcomes. Rational choice theory thus results in linear models of behaviour; researchers from other disciplines have termed these **(information) deficit models**. In such rational models, information generates knowledge, which shapes attitudes, which lead to behaviour (Kolmuss and Agyeman 2002 – Figure 2.1). The **AIDA** model in marketing theory (Awareness Interest Decision Action) is another example of an information-based rational choice model.



Figure 2.1: A linear model of pro-environmental behaviour [reproduced from Kolmuss and Agyeman 2002]

While these linear models have clarity, it is widely noted that in practice information alone is insufficient to lead to action (see eg. Kolmuss and Agyeman 2002, Demos/Green Alliance 2003, Talbot et al 2007). Information is nonetheless prerequisite for many behaviours, as a source of knowledge. For instance, timetables enable people to use buses instead of driving, while nutrition information can help people to make healthy eating choices. Information also performs a persuasive function, as seen in much marketing and communications activity.

Yet while information can play a significant role in shaping attitudes, the relationship between attitudes and behaviour is often less strong. Put colloquially, there is a difference between what people say and what they do. An example of this disconnect is provided by the environmental educator Martha Monroe who addresses the question “...*why, if people care about polar bears, they still drive SUVs*” (Monroe 2006). The disparity between attitudes and actions has been termed the ‘**Value Action Gap**’.

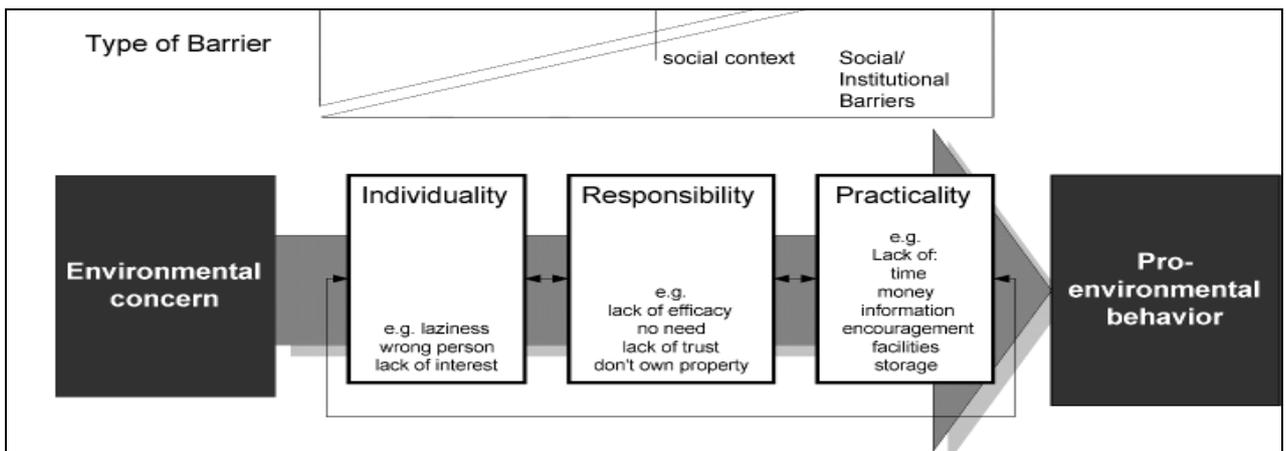


FIG. 5. Barriers between environmental concern and action (Blake, 1999).

Figure 2.2: Blake’s Value Action Gap (1999) [reproduced from Kolmuss and Agyeman 2002]

In the context of pro-environmental behaviour, the Value Action Gap has been diagrammed by Blake (1999 – in Kolmuss and Agyeman 2002 – Figure 2.2 above).

Rather than the Gap appearing as a void, it is filled with barriers blocking the progress from values to action. In this model, inaction is not down to information deficit or a lack of rationality; instead, the presupposed decisional flow is blocked by other factors intruding into the process. Blake cites Redclift and Benton’s explanation for inaction: “*This is not because... ‘we’ are irrational but because the power to make a significant difference... is immensely unevenly distributed*” (in Kolmuss and Agyeman 2002).

Blake identifies three barriers coming between pro-environmental concern and behaviour: individuality, responsibility, and practicality. Although not standard psychological concepts, these barriers draw upon many of the factors common to social-psychological models of behaviour. However, rather than conceptualising factors as barriers preventing rational action, most social-psychological models aim to present a wide range of factors determining end behaviours, and to show the relationships between these factors. Such models are discussed below.

2.4 Values, beliefs and attitudes

The simplest form of social-psychological model of behaviour is **Expectancy Value (EV) Theory**. The Theory presents attitudes as the result of a calculation in which I balance my beliefs about an object (or behaviour) with the value I attach to those characteristics. EV is essentially a rational choice theory, but approached from the discipline of psychology; attitudes are still the product of linear deliberation (such as in EU models), but the difference is that the Theory explores the antecedent factors contributing to attitudes.

The attitudinal component based on an EV calculation is a common factor in many social-psychological models of behaviour. In some of the earliest models, it is the dominant factor, eg in Fishbein and Ajzen’s **Theory of Reasoned Action (TRA)**, (1975 – Figure 2.3).

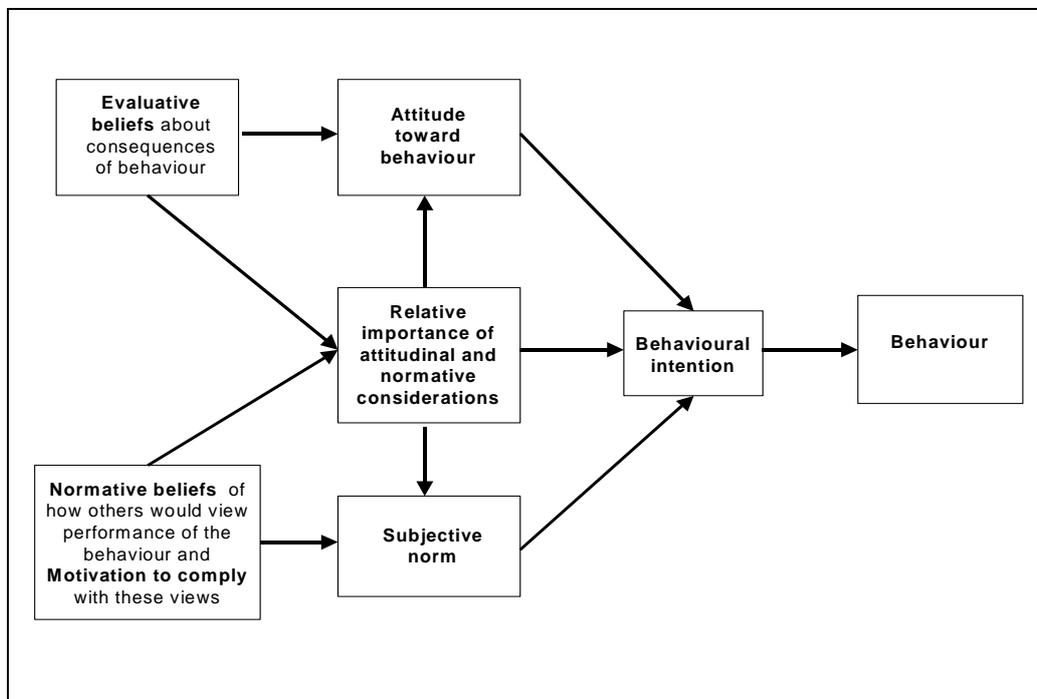


Figure 2.3: Fishbein and Ajzen’s Theory of Reasoned Action (TRA), (1975)

The TRA holds that my beliefs about behavioural outcomes and my evaluation of those outcomes determine my attitudes to the behaviour. The TRA then bridges the gap between attitudes and behavioural outcomes by inserting the construct of ‘intentions’; the TRA holds that intentions directly lead to behaviour. However, other factors than attitudes also impact

on intentions ('subjective norms' in the case of the TRA). Including extra factors results in such models being classified as 'adjusted expectancy value' models.

Well-known models based on expectancy value theory include the **Health Belief Model** (HBM - Rosenstock 1975, in Becker et al 1977 - Figure 2.4).

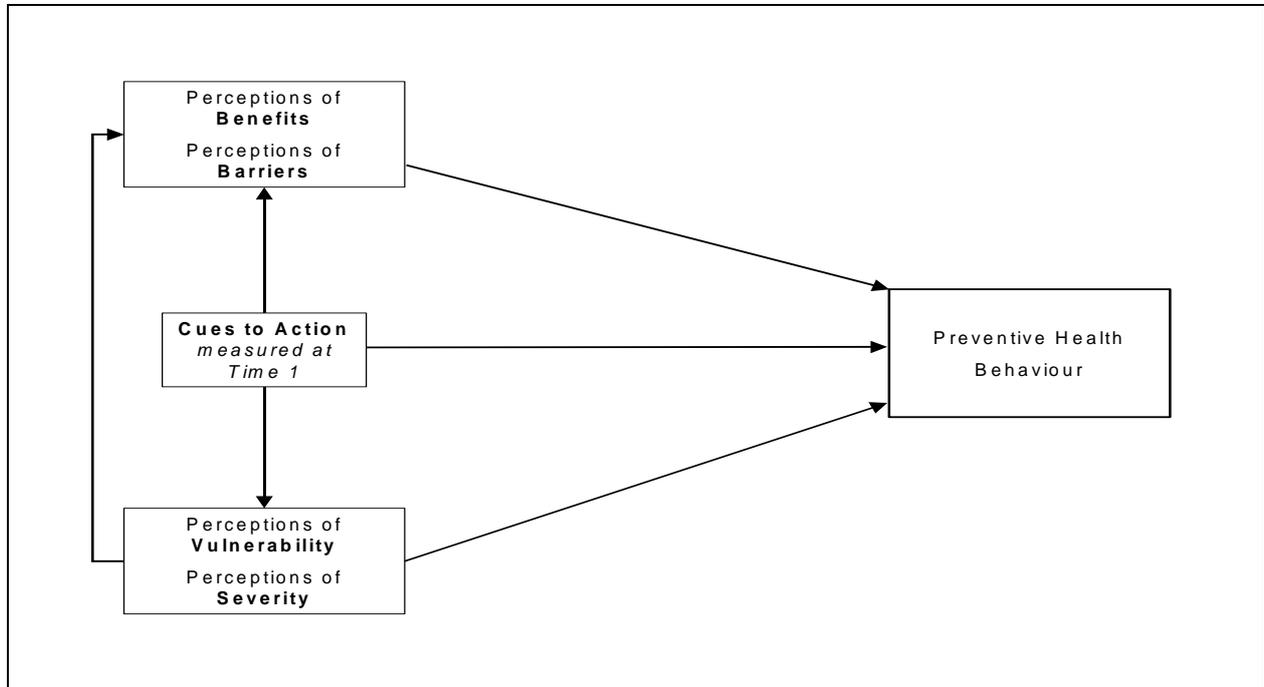


Figure 2.4: Rosenstock's Health Belief Model (1975)

Rogers' **Protection Motivation Theory** (Rogers 1975 – Figure 2.5 below) is also based on expectancy value theory. In this model, the 'protection motivation' construct acts as the mediating variable between attitudes and the end behaviour (in place of intention in TRA).

Like the TRA, both the HBM and Protection Motivation Theory are deliberative, construing behaviour as a decision making process. Both are also consequentialist, assuming behaviour to involve planning ahead, based on outcome expectations (EV models can thus also be called means-end theories). They may be considered multi-linear, as multiple factors are shown to contribute to behavioural outcomes.

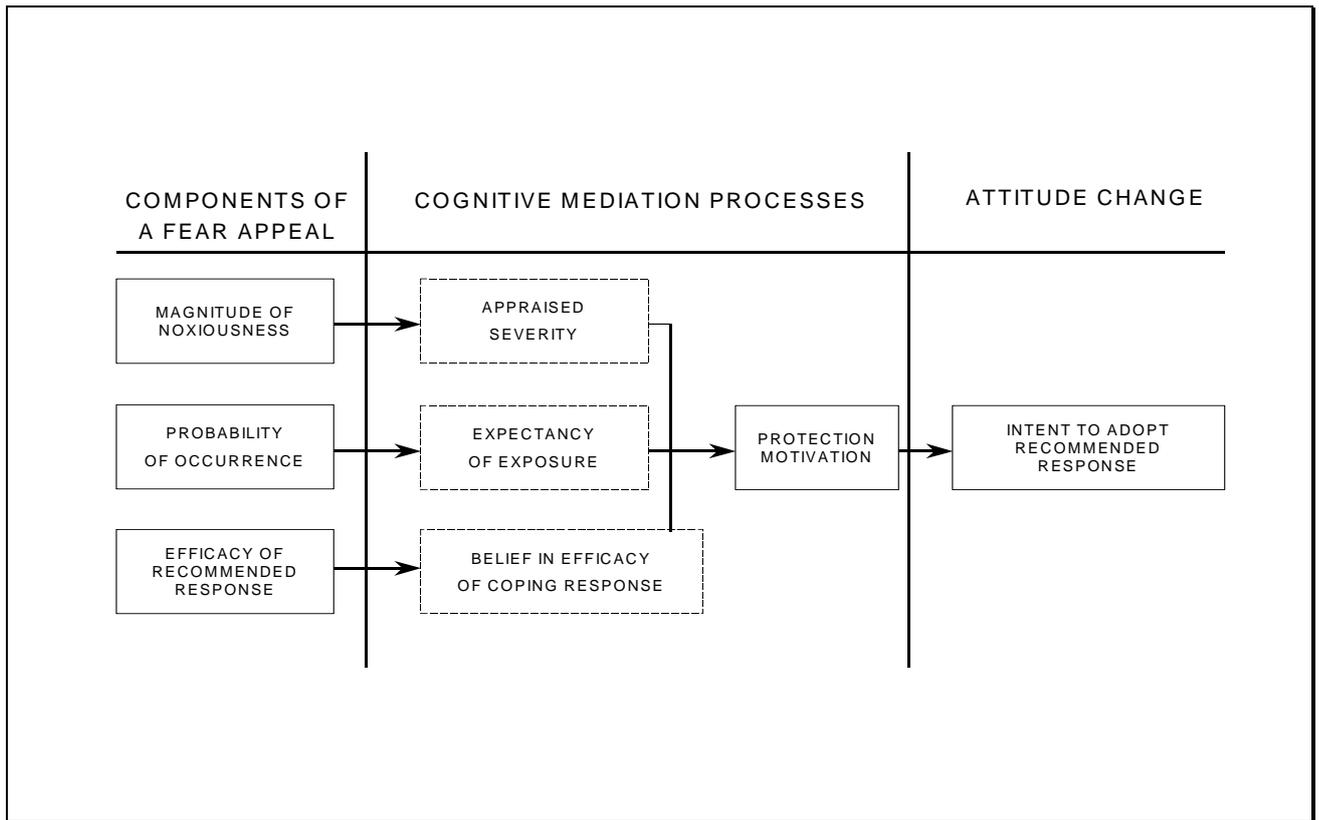


Figure 2.5: Rogers' Protection Motivation Theory (1975)

As EV models become more extended (and thus more 'adjusted') through the inclusion of additional factors, so the relative influence of attitudes in predicting behavioural outcomes declines. This pattern can be seen as Ajzen extended the TRA into the even more widely-used **Theory of Planned Behaviour** (TPB, first published in 1986, in Ajzen 1991 - Figure 2.6).

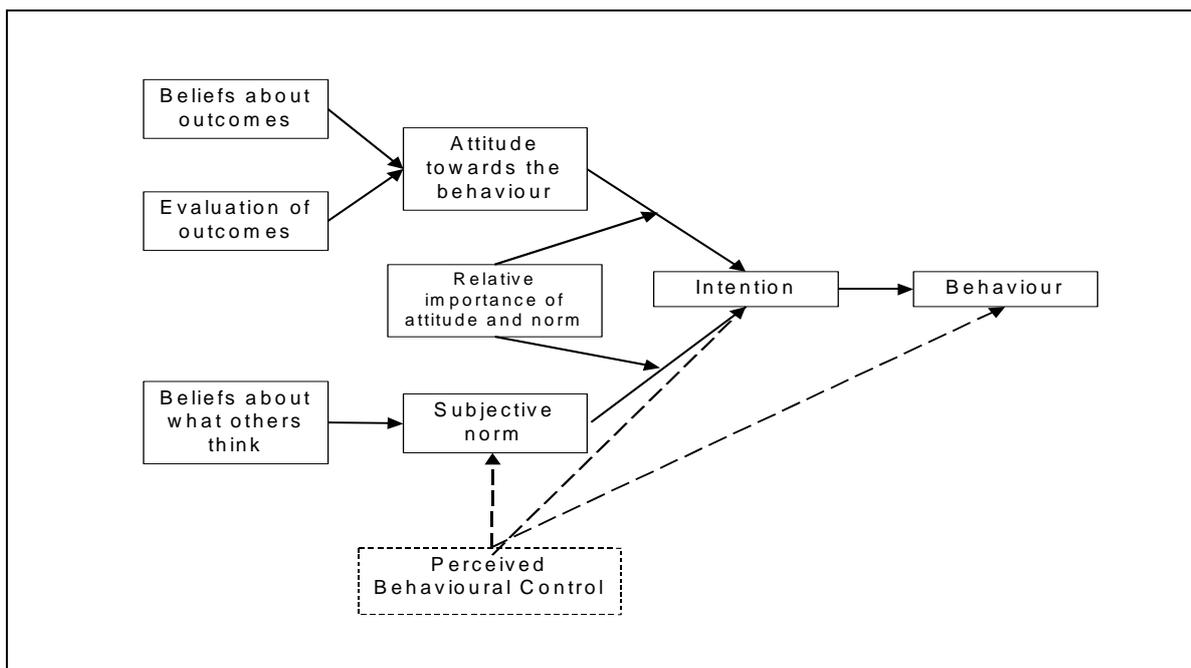


Figure 2.6: Ajzen's Theory of Planned Behaviour (TPB), (1986)

Although the TPB includes additional factors which mean that for many behaviours it is more predictive of outcomes than the TRA (ie. it can account for more of the statistical variance in the end behaviours), the TPB is still an adjusted expectancy value model. However psychological understandings of behaviour have continued to evolve, to the point where attitudinal factors are often found to be relatively minor contributors to behavioural outcomes. For instance, in a meta-analysis of pro-environmental behaviours, Fliegenschnee and Shelakovsky (1998, in Kolmuss and Agyeman 2002) found that at least 80% of the factors influencing behaviour did not stem from knowledge or awareness.

It should be emphasised that attitudes are defined as being specific to the behaviour in question. Indeed in the TRA it is stressed that the attitudes must be measured in relation to the specific behaviour in question (and not behaviours of that type) in order to maximise the predictive power of the attitudinal construct. EV theory shows that beliefs are antecedent to attitudes; in the TPB beliefs are shown as the “*underlying foundations*” of behaviour (Ajzen 1991). Paul Stern and colleagues’ hierarchical **Schematic Causal Model of Concern** (Stern et al 1995 – Figure 2.7) similarly places beliefs above attitudes, being more broad-based expressions of a general worldview, and less specific to a behaviour. However Stern disagrees with Ajzen by placing values at the top of the hierarchy; values are conceptualised as broad-based dispositions which are constructed earlier in life than beliefs and attitudes; they are also more stable over time. At the same time, values are less effective at predicting specific behavioural outcomes than attitudes; in Stern et al’s schema, they are further removed from the end behaviour.

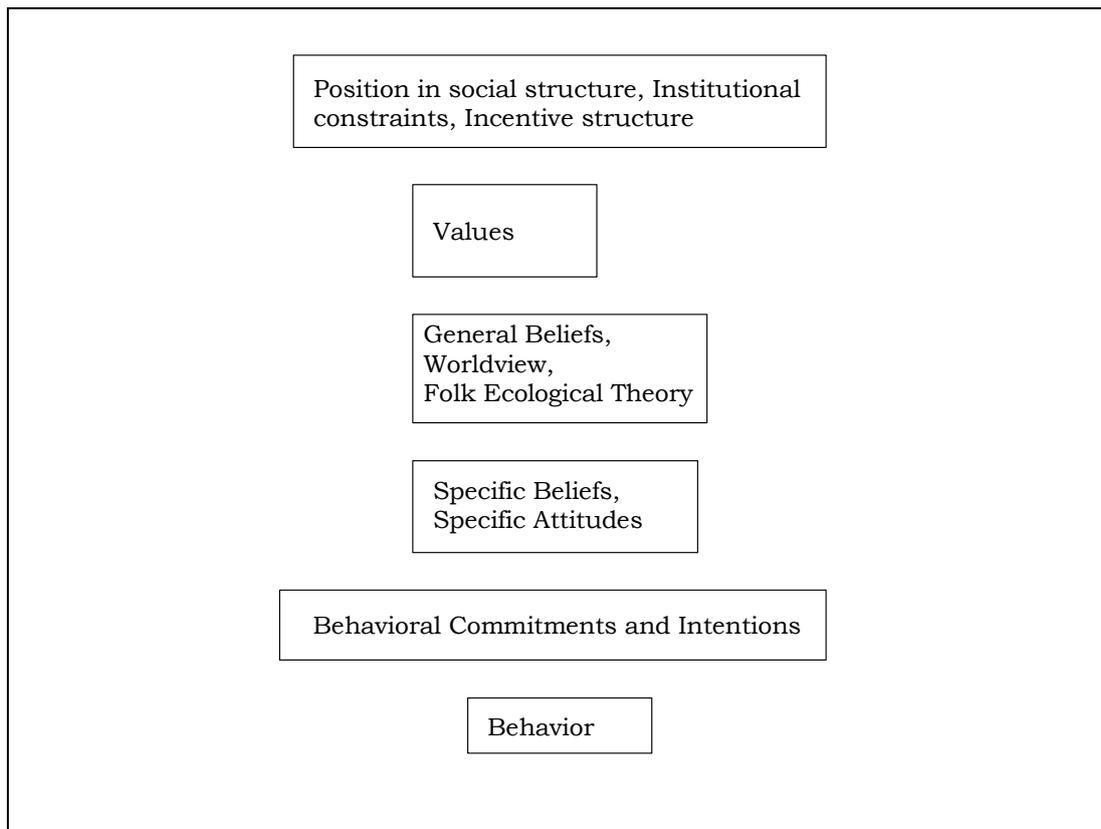


Figure 2.7: Stern et al’s Schematic Causal Model of Environmental Concern (1995)

A similar hierarchical ordering is shown in Stern et al’s **Values Beliefs Norms (VBN) Theory** of pro-environmental behaviour (1999), which goes beyond EV-based models in linking general values to specific behaviours (Stern 2000 – Figure 2.8).

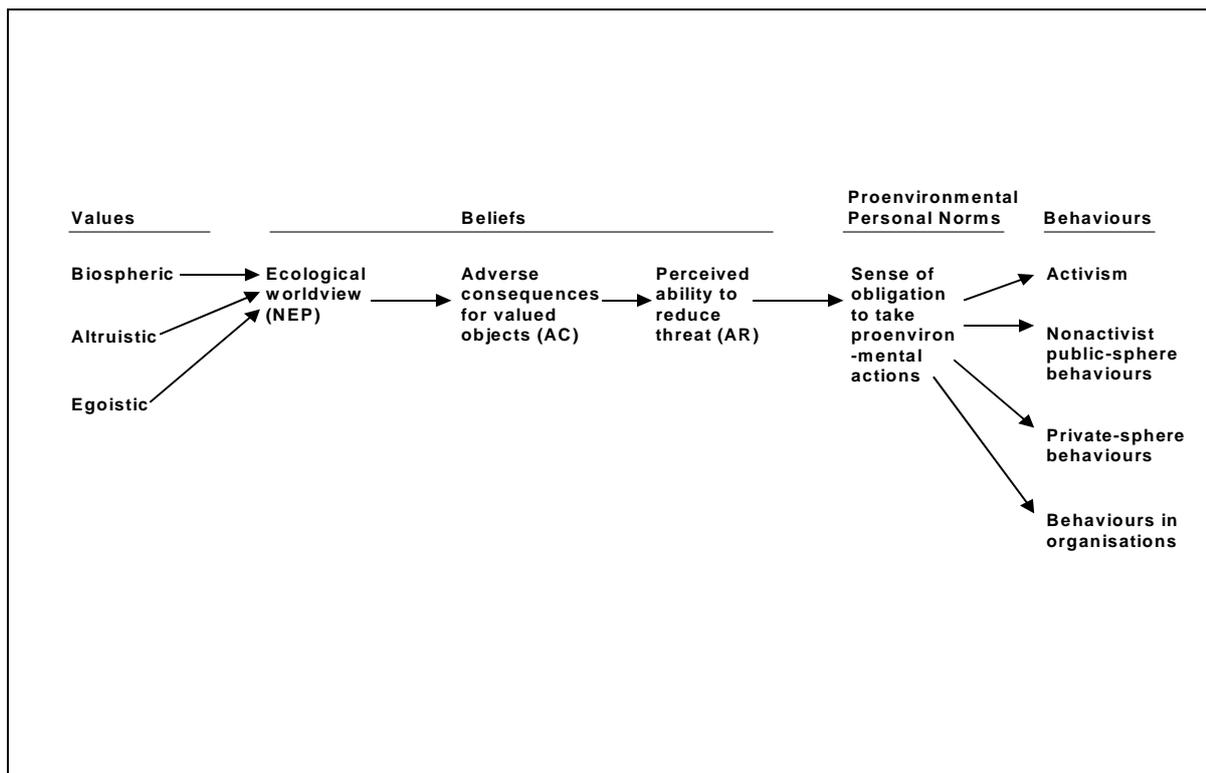


Figure 2.8: Stern et al's Values Beliefs Norms (VBN) Theory (1999)

As well as flowing from values and beliefs, social-psychological theory shows how attitude formation is subject to external influence. The concept of persuasion is an obvious example, although modelling persuasion proved problematic for psychologists, until the development of Petty and Cacioppo's **Elaboration Likelihood Model** (ELM, 1986 – in Bagozzi et al 2002 and Jackson 2005). Like the System 1/System 2 model of cognition, ELM is a dual process model, which describes how messages are processed via two routes: peripheral and central processing. The central route involves effortful deliberation, while the peripheral route is less conscious. The balance between the routes is determined by the individual's levels of motivation and ability, which in turn can be influenced by the context and the message. Consideration of the message generates an emotional response (affect) which in turn leads to attitude formation; processing via the central route creates stronger and more durable attitudes. The ELM clearly has important implications for communicators, but it also points to a more complex, and less sequential, understanding of behaviour than EV models present.

Finally, it should be noted that not all attitudinal influence on behaviour is mediated by intentions; sometimes attitudes can generate behaviour without any conscious deliberation being involved. Fazio's **MODE model** is based on EV theory, but omits the intention construct, replacing it instead with definition of the event (1986 – see Bagozzi et al 2002). The MODE model also describes a dual process, whereby under time pressure, accessible attitudes determine behavioural outcomes, as a kind of attitudinal heuristic. When under less cognitive pressure, decision making is more deliberative, and follows the paths described by the TRA (see Terry et al 2000).

2.5 Norms and identity

Put simply, "*Norms guide how we should behave*" (McKenzie-Mohr in Darnton 2007).

The TRA's major adjustment to EV theory was the inclusion of social norms (as well as the concept of intention). Norms appear in the TRA as 'subjective norms', defined as a

person's "perception that most people who are important to him think he should or should not perform the behaviour in question" (Ajzen and Fishbein 1980, in Jackson 2005). Like attitudes, norms are specific to a behaviour (eg. the norm to recycle). The social component which norms represent is fundamental to psychological understandings of behaviour, and offers a further challenge to standard economic theory, working on the assumption of the rational man as an individual acting in isolation to maximise his subjective utility. Norms are conceptualised differently by different theorists and observing these distinctions is vital to anyone seeking to use social influence to change behaviour.

While norms is generally used as a term to describe social norms, Shalom Schwartz presented the distinct but complementary concept of personal norms (Schwartz 1977). Personal norms are defined as feelings of moral obligation to act, which are free from social expectations. Schwartz used the theory to explain altruistic or 'helping' behaviours, a class of behaviour which has proved problematic to utility-based theories (including Darwin's). Schwartz presents personal norms as arising from an individual's innate values (we may recall Stern's VBN model), but he also describes them as being internalised from social norms ("originating in social interaction but anchored in the self" – *ibid.*). The key distinction between personal and social norms is that the influence of social norms is seen to be dependent on external sanctions, whereas the only sanctions applying to personal norms are internalised, measured in terms of discrepancy with an individual's self concept (ie. his sense of self). Guilt is one emotion that could arise from such a discrepancy. Personal norms are found to be better predictors of altruistic behaviours than social norms; they have also been found to be more effective at predicting a range of pro-environmental behaviours (Thogersen 2007), although distinguishing between these two closely-related factors in research experiments is clearly challenging.

In theories of both personal and social norms, it is held that norms are constantly present in cognitive processes, but that they only exert a significant influence when they become salient. Schwartz's **Norm Activation Theory** (Schwartz 1977 - Figure 2.9) describes the process by which personal norms are activated.

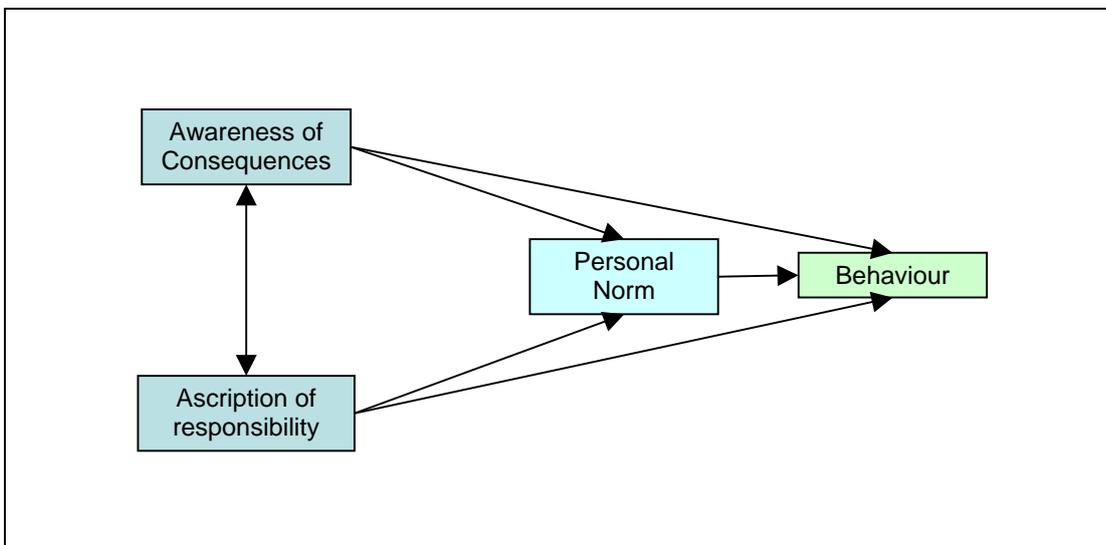


Figure 2.9: Schwartz's Norm Activation Theory (1977) [reproduced from Jackson 2005]

Norm activation essentially involves two stages, the first in which an individual feels an awareness of the consequences of their own action for others (AC), and the second in which the personal costs of acting are calculated with the result that responsibility may be denied (DR). Thus the model is also good for explaining why people fail to help in certain circumstances; an earlier norm-based model, Sykes and Maza's **Norm Neutralisation**

Theory, was specifically designed to cover such delinquent behaviour (1957 - in Burgess and Nye 2006).

An equivalent activation process for social norms was proposed by Cialdini in his **Focus Theory of Normative Conduct** (Cialdini et al 1990). Cialdini makes the important distinction between two types of social norms: 'descriptive norms' which specify what is done, based on the observation of the majority of others, and 'injunctive norms' which specify what ought to be done. Cialdini notes that these two kinds of social norm usually act in the same direction, but that this is not always the case. Tim Jackson gives the example of motorway driving (Jackson 2005): if other drivers around him are driving over the speed limit, he may be likely to do the same (following the descriptive, not the injunctive, norm). If he sees a police car up ahead, he is likely to reduce his speed; the police car performs a focusing function, making the injunctive norm salient. The police car also provides an element of 'surveillance', the sense of foreboding that sanctions may be imposed which is a requirement for adherence to injunctive norms. The focusing function is also required in activating descriptive norms. In his experiments on littering, Cialdini found that when a research confederate dropped litter in an otherwise clean street, individuals under research tended not to litter themselves. Instead of mimicking the confederate, his littering drew their attention to the descriptive norm showing that most people had not littered.

More recent work by colleagues of Cialdini's has underlined the importance of distinguishing between the two types of norms when using them as the basis for behaviour change interventions (Schultz et al 2007). The experiments were undertaken in the context of alcohol use by US college students; the research noted that the majority of colleges have undertaken information campaigns which operationalise descriptive norms, by attempting to debunk the myth that heavy drinking is widespread among their peers. By using trial communications of their own, the researchers found that messages based on descriptive norms could have a ('destructive') boomerang effect on those students who already drank less than the level stated in the communications. They note that, when used in isolation, the descriptive norm acted as a "*magnet*", drawing individuals to achieve its stated level of behaviour. However, by adding a message based on injunctive norms (not to drink) to the communication, a positive 'reconstructive' effect was achieved.

In some cases, descriptive norms have also been shown to influence behavioural outcomes directly. This is especially the case in 'morally neutral' situations, as demonstrated in Milgram's famous experiment where one research confederate standing in the street and staring up into the sky caused a crowd of people to gather round him and do likewise (1969, in Cialdini et al 1990). Attempts have also been made to conceptualise descriptive norms as the underlying determinants of individual behaviour, for example in Rimal's **Theory of Normative Social Behaviour** (Rimal et al 2005).

Theorists are unanimous in construing social norms as instruments for maintaining the coherence of the groups to which they relate. Kurt Lewin describes 'group standards' as serving this function in his early work in social psychology (Lewin 1951). Schwartz similarly sees the primary function of social norms as "*preserving the welfare of the collective*" (Schwartz 1977). Norms are thus shown to mediate between the identity of the individual and that of the group. Turner and Tajfel's **Social Identity Theory** breaks down the processes at work in this relationship (1979, in eg. Terry et al 2000). The Theory is used to explain the processes by which groups of individuals (however arbitrarily assembled) tend to differentiate themselves from one another. The two processes described are 'categorization', by which individuals identify themselves with like others in an in-group and differentiate themselves from the out-group, and 'self enhancement', through which individuals favour the in-group, and promote themselves relative to others.

Turner further developed the process of categorisation in his **Self Categorisation Theory** (1987, in Terry et al op. cit.), which described how the process of constructing the in-group begins with the individual creating a 'group prototype', based on a set of values, beliefs, actions and feelings. In that process of construction, the individual blends his own identity with that of the group and develops shared standards. Terry describes the self-reinforcing relationship of group and individual identity in the Theory, saying "*norms are inextricable properties of groups that influence individuals through self-categorisation*".

The implication of these theories for those seeking to bring about lasting behavioural change is that they must also engage with social norms, and notions of identity. While identity is influential in shaping behaviour, behaviour is also undertaken as a means of defining our sense of identity. This is a central line of narrative in Tim Jackson's review of behavioural theory in which he demonstrates how self identity is constructed through the consumption of goods and services. As part of this thesis, he cites Giddens' analysis of ever-increasing consumer choice as generating "*dilemmas of the self*" (1991, in Jackson 2005). In this complex and shifting dynamic, it may not be possible to target individuals' sense of identity directly, but an understanding of social norms suggests that it is possible to highlight those factors, and bear on those processes by which social norms are internalised, and self identity defined.

2.6 Agency, efficacy and control

Along with attitudes and norms, agency is the third common element of most adjusted expectancy value models. Agency can be defined as an individual's sense that they can carry out an action successfully, and that that action will help bring about the expected outcome. The broad concept of agency appears in most social-psychological models, but in a variety of different guises. It is common in the pro-environmental literature, and in health (for instance in the Health Belief Model, where it appears as an 'enabling factor' or 'self efficiency' in some versions – see eg. Conner 2002). In political thought, agency also is key to models of voter turnout: agency is inherent in 'pivotality', the driving belief that one's vote could determine the final outcome (the 'paradox of voting' is that the odds of it doing so are very low, as Kahneman noted – see Clarke et al 2004).

For the sociologist Anthony Giddens, agency is simply the power to act (Giddens 1984); he deliberately omitted the subjective (belief-based) dimension which makes agency so indispensable to psychologists. In his Structuration Theory, Giddens opposes agency (the force exerted by the agent) and structure (the rules and resources of society). Because individuals have agency, they are also described by Giddens as 'actors', and this is consistent with other social-psychological theorists, such as Paul Stern (eg. in **Gardner and Stern's 'Principles for Intervening...'** in Stern 2000 – **Figure 2.10**). Reflecting this thinking, in a review on pro-environmental behaviour change Darnton concluded that the audience for an intervention should not be regarded "*as a passive target...but as actors who themselves are at the heart of the change process*" (Darnton et al 2006). It is after all their behaviour which is to change.

- A. Use multiple intervention types to address the factors limiting behaviour change
 - 1. Limiting factors are numerous
 - 2. Limiting factors vary with actor and situation, and over time
 - 3. Limiting factors affect each other
- B. Understand the situation from the actor's perspective
- C. When limiting factors are psychological, apply understanding of the human choice process
 - 1. Get the actors' attention; make limited cognitive demands
 - 2. Apply principles of community management (credibility, commitment, face to face communication etc.)
- D. Address conditions beyond the individual that constrain pro-environmental choice
- E. Set realistic expectations about outcomes
- F. Continually monitor responses and adjust programmes accordingly
- G. Stay within the bounds of actors' tolerance for interventions
- H. Use participatory methods of decision-making

Figure 2.10: Gardner and Stern's Principles for Intervening to Change Environmentally Destructive Behaviour (1996)

In the context of pro-environmental behaviour change, action researcher David Ballard defines agency in terms of a person's belief that they can take "*meaningful action*", i.e. that their action will be effective in creating positive outcomes (Ballard and Ballard 2005). Public responses to climate change are commonly characterised by a lack of agency, for instance, the sense that the problem is too large for individuals to make a difference. Ballard identifies a contrasting minority of climate change champions for whom agency is felt in a visceral way as an obligation to act; this version of agency can be read as spanning personal norms, agency, and emotions. In common with other commentators, Ballard finds that agency is accumulated through personal experience, although he also contends that agency can be acquired or learnt, primarily through working in groups with likeminded others. "*Groups offer agency*", he writes, through sharing personal experiences and building shared commitment.

Self efficacy is the most widely used conceptualisation of agency in social-psychological models. Bandura's version of the concept is the most popular; he defines self efficacy as "*the conviction that one can successfully execute the behaviour required to produce the outcomes*" (Bandura 1977). Bandura advocated the self efficacy construct for use in frameworks analysing "*fearful and avoidant behaviour*"; the concept can be derived from Hovland's **Theory of Fear Appeals**, in which it appeared as "*belief in the effectiveness of coping responses*" (1953, in Rogers 1975). Self efficacy also appears in another model of responses to fear appeals, Rogers' Protection Motivation Theory (Rogers 1975 – Figure 2.5). Rogers' and Bandura's conceptualisations are particularly similar; in both models self efficacy mediates the influence of motivations on behaviour - if the behaviour is deemed impossible it will not be undertaken (despite motivation being present).

Self efficacy determines both the initiation and the continuation of behaviour: whether to attempt the behaviour, and how long to sustain it before giving up. Self efficacy arises chiefly from past behaviour ('performance accomplishments', or "*personal mastery experiences*" for Bandura, op. cit.). For Bandura, self efficacy can also be acquired through vicarious experience, although it is noted that this is not such a reliable indicator of the likelihood of one's achieving a particular outcome. Lastly, Bandura suggests that verbal persuasion and emotional arousal can also help increase self efficacy, although ultimately proof of mastery through personal experience is needed. Like attitudes in Ajzen and Fishbein's models, self efficacy is deemed most predictive when measured in relation to the specific behaviour in question. Also like the attitudinal construct, self efficacy is seen as the product of a deliberative calculation, here about how much effort to expend on a given behaviour (Bandura suggests that self efficacy calculations are performed in a dedicated "*central processor*"). However, in contrast to theoretical accounts of attitudes and norms, self efficacy is not construed as determining behaviours alone; instead it requires "*appropriate skills and adequate incentives*" to be in place.

Ajzen borrowed Bandura's self efficacy for his Perceived Behavioural Control (PBC) construct in the Theory of Planned Behaviour (TPB, Ajzen 1991 – Figure 6). Indeed the inclusion of PBC is the principal revision to the earlier TRA. Ajzen developed the TPB to allow analysis of "*behaviours lacking total volitional control*"; nonetheless it still operates on deliberative lines, being a (further) adjusted EV model. The concept of behavioural control is fundamental to psychology; in presenting PBC, Ajzen refers back to Rotter's use of control in 1954.

Control is still present in some models developed since the TPB, for instance Kolmuss and Agyeman's **Model of Pro-Environmental Behaviour** (Kolmuss and Agyeman 2002 – Figure 2.11). Kolmuss and Agyeman explain the 'locus of control' construct they use through reference to Newhouse (1991) who differentiated between people with an internal locus of control (and thus high agency) and those with an external locus of control (thus low agency). Unlike self efficacy and PBC, the locus of control is not behaviour-specific, but a general dispositional characteristic.

A similar internal/external distinction can be made between Perceived Behavioural Control (broadly internal) and actual behavioural control (based on material circumstances, or 'facilitating conditions' – Triandis 1977). PBC is a perception of the "*ease or difficulty*" of performing a behaviour (Ajzen 1991) which in turn is based on an assessment of the material limits to that behaviour; however Ajzen argues that PBC is of "*greater psychological interest*" than measuring the material limits per se. Ajzen uses PBC as a proxy measure for actual behavioural control, and notes that it can substitute for control when an individual's perceptions are realistic. As Bandura observed however, this is not always the case; Ajzen reportedly commented to the health psychologists Armitage and Conner that "*when PBC is inaccurate, all kinds of possibilities open up*" (Armitage and Conner 2001).

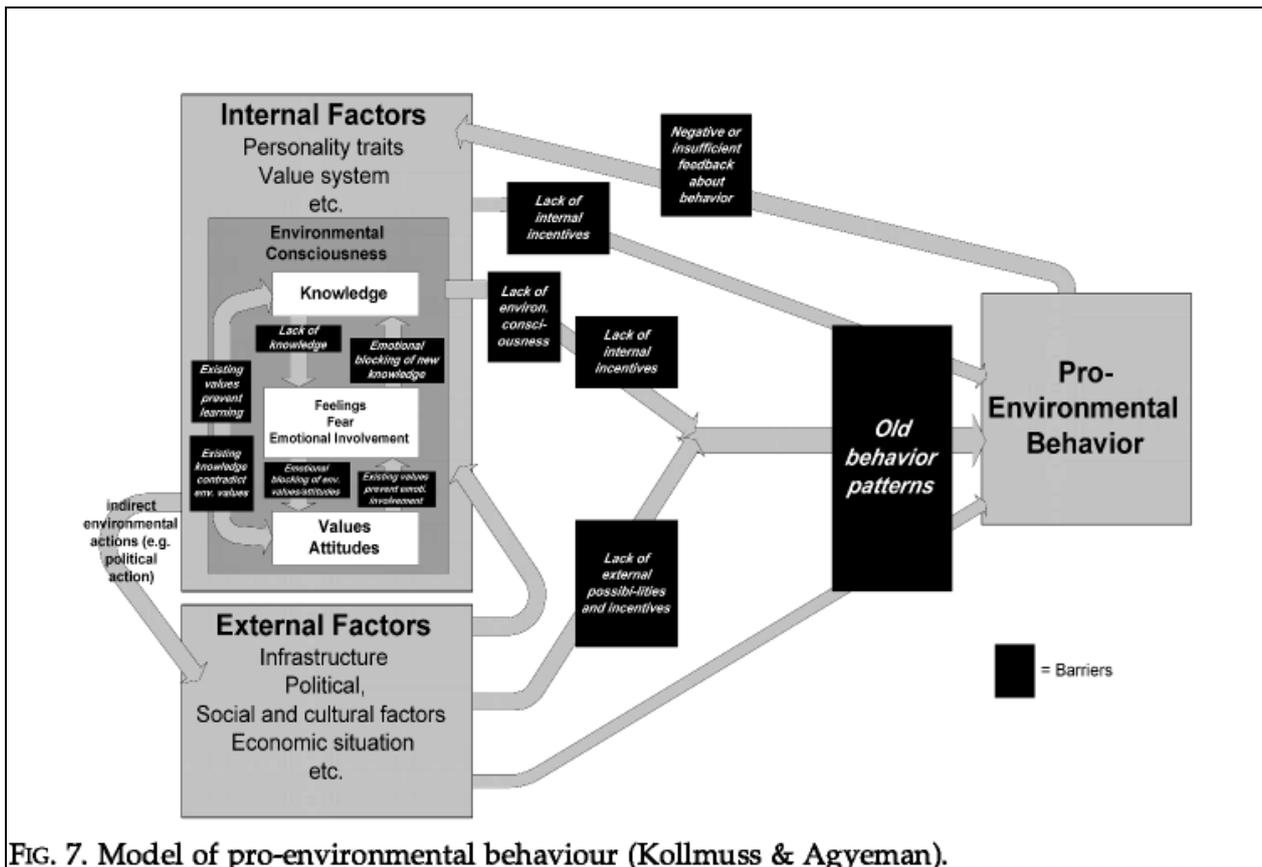


FIG. 7. Model of pro-environmental behaviour (Kollmuss & Agyeman).

Figure 2.11: Kolmuss and Agyeman’s Model of Pro-Environmental Behaviour (2002) [reproduced from Kolmuss and Agyeman 2002]

Armitage and Conner report that comment in a paper showing the results of a meta-analysis of research studies which had used either PBC or the self efficacy construct to predict behavioural outcomes. While Ajzen originally claimed that PBC and self efficacy were interchangeable, and essentially the same concept under different names, Bandura had countered that PBC was the more solidly external, while self efficacy was more internalised and purely cognitive. The distinction can be understood by an example from healthcare: when it comes to handwashing, health practitioners tend to have high self efficacy (believing themselves well able to do it). However, they may report lower PBC, due to external constraints such as a lack of time. Armitage and Conner’s analysis led them similarly to differentiate between the two constructs; given the variation in predictiveness that their analysis revealed, they recommend that studies using the TPB adapt it to substitute self efficacy for PBC.

2.7 Habit and routine

While the TPB is the best known and most widely-used social-psychological model of behaviour, it does not explicitly incorporate some factors which research shows to be significant in influencing specific behaviours. Habit is one such factor, which is highlighted by Harry Triandis in his **Theory of Interpersonal Behaviour** (TIB, Triandis 1977 – Figure 2.12).

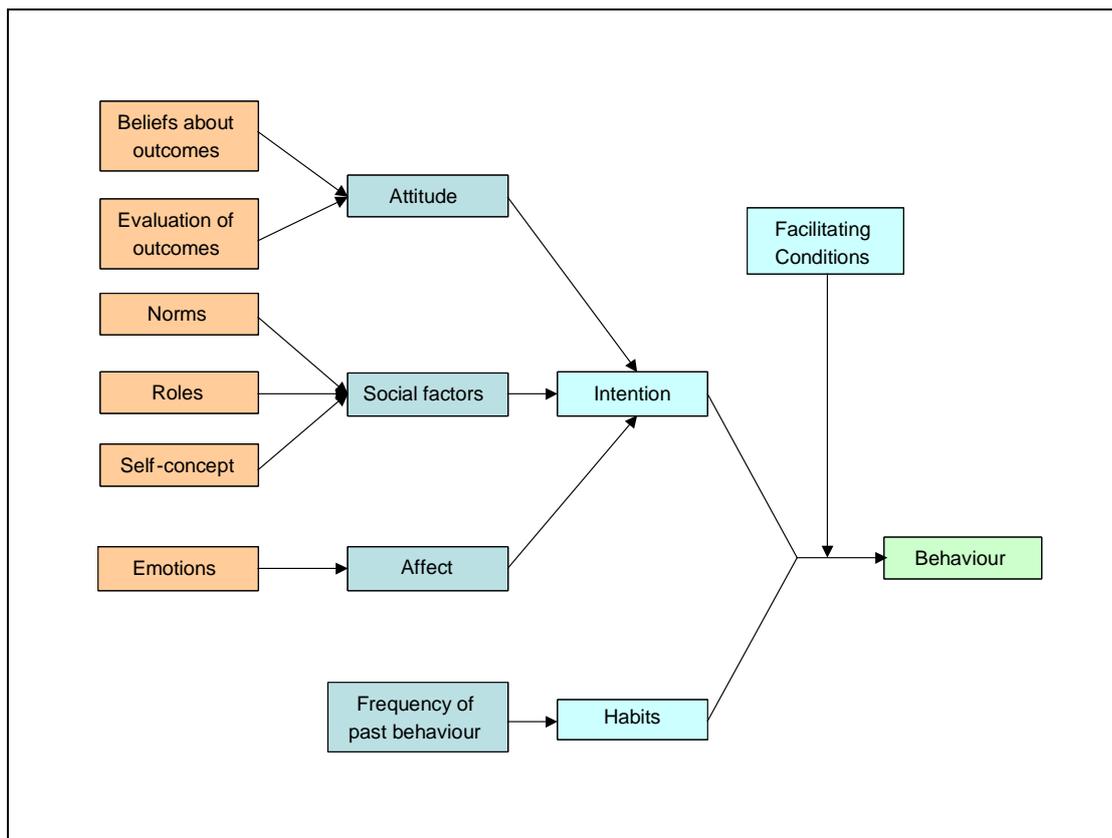


Figure 2.12: Triandis' Theory of Interpersonal Behaviour (TIB), (1977) [reproduced from Jackson 2005]

The TIB is an adjusted expectancy value model, like the TPB (which it predates), but through the inclusion of habit, it offers an alternative view to that put forward by the TPB, of behaviour as the result of a solely deliberative process. Whereas the TPB holds beliefs as the “*underlying foundations*” of behaviour (Ajzen 1991), habit is seen as the primary determinant in the TIB (Triandis 1977). Triandis ranks the top three factors in the Theory in terms of their determining the probability of action, as follows: i) habit ii) intention iii) facilitating conditions. In experimental research into students' car use behaviour, the social psychologists Bamberg and Schmidt contrasted the two approaches of the TIB and the TPB, and compared the models' predictive power in the context of car use (Bamberg and Schmidt 2003). They found the TIB to be more predictive of the outcomes than the TPB, due to the model's emphasis on habit.

Rather than an adjusted expectancy value model (like TPB), it is easier to see the TIB as a dual process model; the diagram shows how intention and habit represent separate paths to the behavioural outcome. Triandis describes how, as experience of a behaviour is acquired, the influence of habit increases, and that of intention declines (Triandis 1977). This shift over time charts a process of routinisation, or increased automaticity. A similar dynamic is at play in the **Prototype/Willingness Model** from health psychologists Gibbons and Gerrard (Gibbons et al 2003 – Figure 2.13), which was developed to describe ‘risky behaviours’ among young people, such as drinking and drug use.

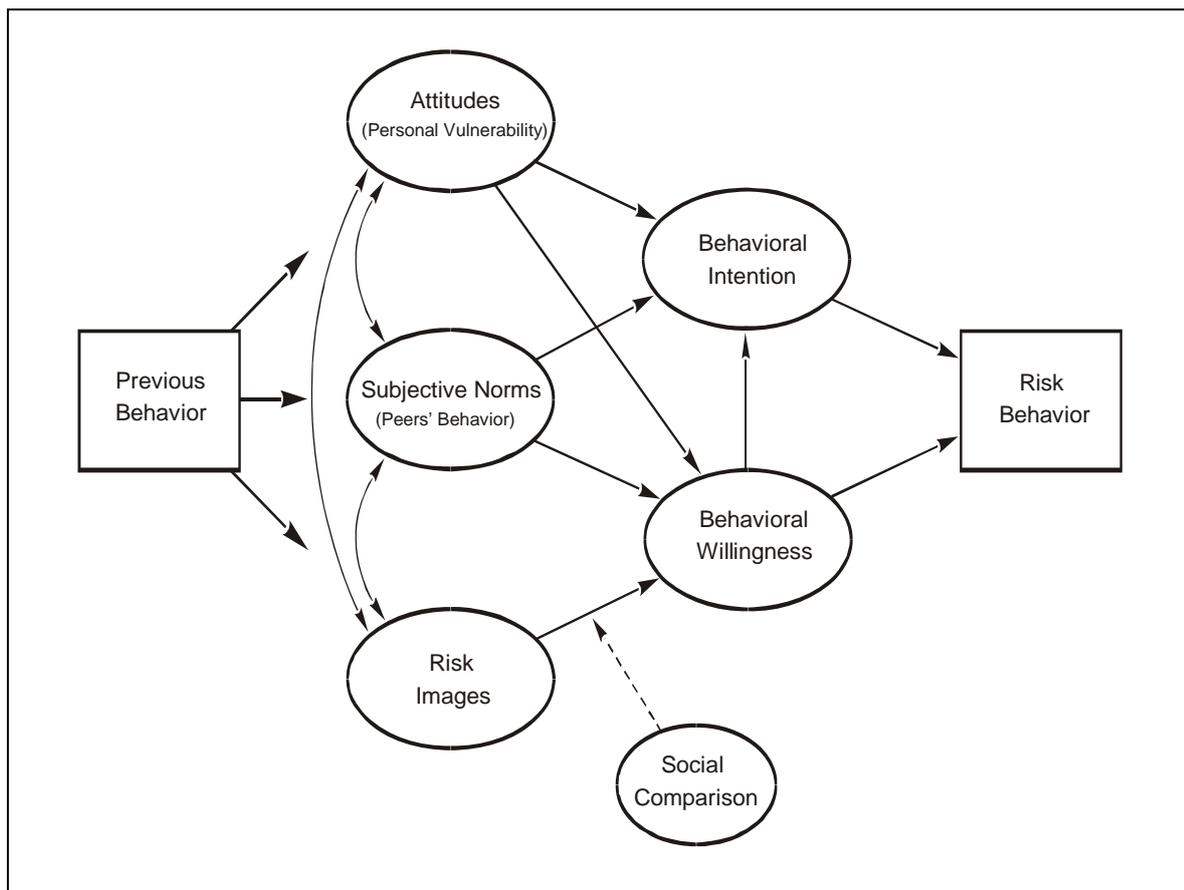


Figure 2.13: Gibbons and Gerrard's Prototype/Willingness Model (2003)
[reproduced from Gibbons et al 2003]

The Prototype/Willingness Model is also a dual process model, with a rational path (based on intention, or 'behavioural expectation') and a 'social reaction' path (based on 'behavioural willingness'). As young people acquire more experience of a risky behaviour so intentions become more significant in predicting that behaviour, and they effectively move up the model. However, this model demonstrates a twist to Triandis' Theory by showing that for 'less appropriate' behaviours, habit works counter-intuitively: as people begin to develop 'bad habits' so their behaviour becomes more not less deliberative. In later stages of drink and drug use (such as addiction) the relationship flips once again, and the habitual behaviour becomes counter-intentional.

Triandis defines habit as *"situation-behaviour sequences that are or have become automatic.... The individual is not usually 'conscious' of these sequences."* (Triandis 1980, cited in Bamberg and Schmidt 2003). In the TIB habit is measured in terms of the frequency of the behaviour in the past, but it is activated by a system of cues triggered in response to a situation or environment. Again, we might recall the generation of 'impressions' in System 1 cognition. Triandis himself cites Pavlov's theory of Classic Conditioning in which people (or famously dogs) respond to the cue (the bell ringing) as they would to the behavioural stimulus it is substituted for (food in the bowl) (Triandis 1977). In the context of Bamberg and Schmidt's experiment, habit explains why, if it's raining, I automatically get in the car. Habit thus serves as a heuristic or shortcut, minimising the cognitive load required to make frequently-repeating decisions.

Also addressing the role of cues, Cialdini writes how routinised behaviour becomes detached from the original motivating factors; changing those factors (eg. attitudes or intentions) will not necessarily change the habit, as their power in influencing the behaviour

has become attenuated (cited in Maio et al 2007). In this dynamic, habitual behaviours can be seen to bypass deliberative processes. Intervention techniques for changing habits thus include the rehearsal of conscious behavioural cues, and goal setting, which is designed to bring habitual behaviours back under cognitive control (Maio et al 2007 – see 4.1 below).

The groundbreaking social psychologist Kurt Lewin presented a different view of the process of habitual behaviours, not based on behavioural cues but on group standards (Lewin 1951). For Lewin, what makes habits stick is group values (as discussed above under 'norms'). Behavioural constancy reflects the need to maintain the integrity of the group (and in so doing, self identity). Lewin thus closely relates norms and habits, and his theoretical work on change requires group participation if lasting change in habits is to be brought about (see 4.1 below). Lewin noted that habit itself is hard to conceptualise. As the theories presented here have shown, it arises from the frequency (and recency) of past behaviour, but it is more than just repeated choice. It is the automatic element of habit that differentiates it from past behaviour, and makes it cohere into patterns of routine.

Routine is a key concept in **Structuration Theory**, resulting from the circular ('recursive') flow of the self through "*the sustained activities of day to day life*" (Giddens 1984). Structuration also includes the dualist division of consciousness into 'practical' and 'discursive' consciousness. For Giddens, practical consciousness is implicit: "*all the things an individual knows about how to go on in the context of social life*". When given voice (post-rationalised) these 'things' move into discursive consciousness. The central recursive process in Structuration called 'reflexiveness' describes a continual monitoring of our own behaviour and that of others, based on which we adapt our behaviour accordingly. This process, of which we are not aware much of the time, occurs in the practical consciousness. The reflexive process is inherently conservative, aiming to reproduce the existing social system it apprehends, and thus it perpetuates routines. For Giddens much behaviour in day to day life is "*not directly motivated*", but beneath deliberation, being driven by practical consciousness (similar to a System 1 process). Social psychologists tend to agree with this conclusion. For example, Paul Stern has written "*Many environmentally significant behaviours are matters of personal habit or household routine...and are rarely considered at all.*" (Stern 2000).

2.8 The role of emotions

In another variation from most adjusted expectancy value models, the TIB explicitly includes the purely emotional factor of 'affect' (Triandis 1977 – Figure 12). This represents a further dilution of the deliberative assumption in models like the TPB. Unlike habit, which has a direct influence on behaviour in the TIB model, affect is incorporated as part of the process of intention formation. For Bamberg and Schmidt, intention in the TIB is generated via two paths: cold cognition (the expectancy value construct) and hot evaluation (the affect factor, or emotional response) (Bamberg and Schmidt 2003).

This analysis of the behavioural decision process again recalls the model of System 1/2 cognition, in which System 2 makes judgements based on System 1's impressions (Stanovich and West 2000, in Kahneman 2002). Emotion as a basis for decision making was formalised in Slovic's concept of the '**affect heuristic**' (2002, in Kahneman op.cit.). Slovic, a longtime co-researcher with Kahneman, used the heuristic concept to explain the role of emotions in attitude formation, a topic which had proved resistant to theorising. The central principal of substitution is at play in the affect heuristic, in which attitudes are formed based on the emotional response to the behaviour not on the 'target attribute' of the behaviour itself. Thus the affect heuristic also addresses the 'affect as information hypothesis' (Loewenstein et al 2001). The majority of Slovic's work has related to

perceptions of risk and their influence on behaviour, and the affect heuristic evolved from that work, in which people often base their personal assessments of risk not on probabilities, but quick emotional responses.

The ‘affect as information’ hypothesis and the affect heuristic both assume that emotions are congruent with attitudes. However, as Loewenstein and colleagues demonstrate, that is not always the case; clear examples are provided in the psychological conditions of anxiety and phobias. Here people’s behaviour is driven by their emotions, even though they know they have nothing to fear. Spurred by such observations, the researchers developed the **Risk as Feelings Model** (ibid. – see Figure 2.14), which demonstrates how behavioural outcomes can run counter to the perceived best course of action.

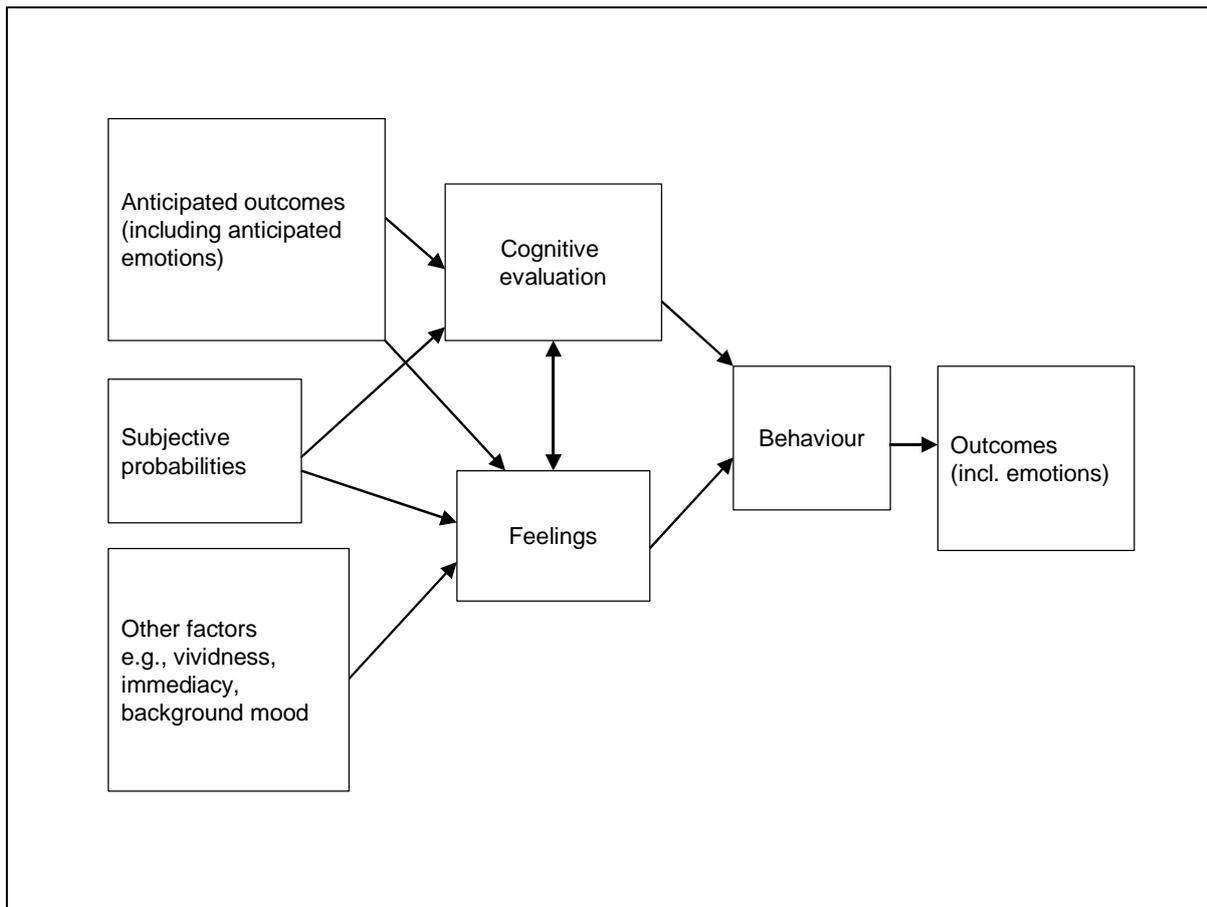


Figure 2.14: Loewenstein et al’s Risk as Feelings Model (2001)

Like the TIB, Risk as Feelings is a dual process model, but instead of habit, the model identifies a direct path between emotion and behaviour. However, the model also follows the TIB in showing emotion also to influence attitude formation (as ‘cognitive evaluation’) at the start of the process. As well as emotions impacting in two places, Risk as Feelings also has a temporal dimension: the theory observes how fears grow as the moment of action grows nearer, although the factors involved in the original cognitive evaluation remain unchanged. When emotions eventually overcome intentions, the result is “*chickening out*”.

Fear offers a clear example of the influence emotions can have on behaviour; in extreme cases it demonstrates how emotions can determine behavioural outcomes alone, without any deliberation occurring. However, emotions are more commonly construed as influencing through other social-psychological factors, such as attitudes as in the TIB. It may be recalled that the **Elaboration Likelihood Model of Persuasion** (Petty and

Cacioppo 1986, in eg. Bagozzi et al 2002) also has emotions preceding attitude generation. In that model, the first response to the information stimulus is emotional, from which attitudes then result.

As well as the emotional component in attitude formation, the evidence suggests a link between emotion and agency. For instance, this review has already discussed David Ballard's work on climate change champions (Ballard and Ballard 2005). Ballard identifies the principal qualities of such a champion as "*passion and the thirst for agency*"; in so doing he suggests emotion working alongside, and within, agency in spurring action. Also in the pro-environmental context, Kolmuss and Agyeman cite Grob's finding that the stronger a person's reaction to a problem is, the more likely they are to engage with it (1991, in Kolmuss and Agyeman 2002). In this formulation, emotion appears to act as an activation mechanism for personal norms.

Emotion is already inherent in Schwartz's concept of personal norms in his **Norm Activation Theory** (Schwartz 1977). Schwartz's definition of the Awareness of Consequences (AC) factor driving norm activation is "*a feeling of moral obligation*", which is explicitly unrelated to intentions. Similarly norm deactivation is based on the construct of 'denial of responsibility' (DR), again an emotional response. In the context of climate change, Kolmuss and Agyeman cite the three emotional strategies of denial, delegation and distancing as common means of avoiding taking action (Kolmuss and Agyeman 2002).

Finally, emotion also combines with habit. In Lewin's theories on change, while the maintenance of habits relates to preserving group standards, breaking habits requires an "*emotional stir-up*" (Lewin 1951). The emotional stir-up catalyses change by disrupting the flow of routine behaviour based on the group standards; it is easy to recall Giddens' practical consciousness here, regulating the flow of day to day events. As well as underlying many less rational behaviours, emotion can be used to break habits, by raising them up to conscious scrutiny (see 3.1 below).

2.9 External factors

It is self evident that, as Triandis writes, "*the presence or absence of facilitating conditions*" constrains behavioural choice. For instance, without a bus there is no bus use, and without drugs, no drug use. This observation can account for indirect (or 'upstream') interventions aiming at changing behaviours (in many instances such interventions are also deemed more cost effective than direct ones – see eg. Halpern et al 2003, Maio et al 2007). Theorists and practitioners alike acknowledge that the external conditions must be right for behaviour change to result. Thus Gardner and Stern's Principles require that interventions address "*the conditions beyond the individual*" as well as "*psychological*" factors (Stern 2000). The social marketer Doug McKenzie-Mohr goes further in advising that if sufficient resources are not available to remove the external barriers preventing behaviour change, then the intervention should be abandoned (2000, in Darnton 2007). However social-psychological theory reveals the dynamic to be more complex than a division between internal and external barriers.

Being concerned with the psychological factors which influence behaviour, most social-psychological models do not explicitly feature external factors. Like preferences in standard economic theory, external factors tend to be left 'off the model'. However, rather as emotions are often not shown explicitly, but incorporated within other variables, so external factors are embedded within other variables, most commonly the constructs of agency or control (see 1.6 above). Thus the TPB includes Perceived Behavioural Control (PBC), which is an internal measure (an individual's beliefs) of actual levels of control (their material circumstances) (Ajzen 1991). As an alternative to the TPB, the TIB includes

‘facilitating conditions’ as its control component (Triandis 1977 – Figure 12). As the name implies, facilitating conditions are more solidly external than the PBC construct, but while they are not belief-based, they are also not simply external. Triandis includes in the construct a person’s ability to act, their state of arousal (eg. hunger) and their knowledge of the behaviour.

It is an easy task to think of external barriers to a behaviour (such as not having a kerbside recycling collection) and only slightly less easy to think of internal barriers (such as a lack of supportive attitudes). There are other factors which are often reported in research as barriers to undertaking behaviours which are less clear cut, such as cost or convenience. The case of cost can be illustrated by Vlek et al’s **Needs Opportunities Abilities (NOA)** model of consumer behaviour (1997, in Gatersleben and Vlek 1998 – Figure 2.15).

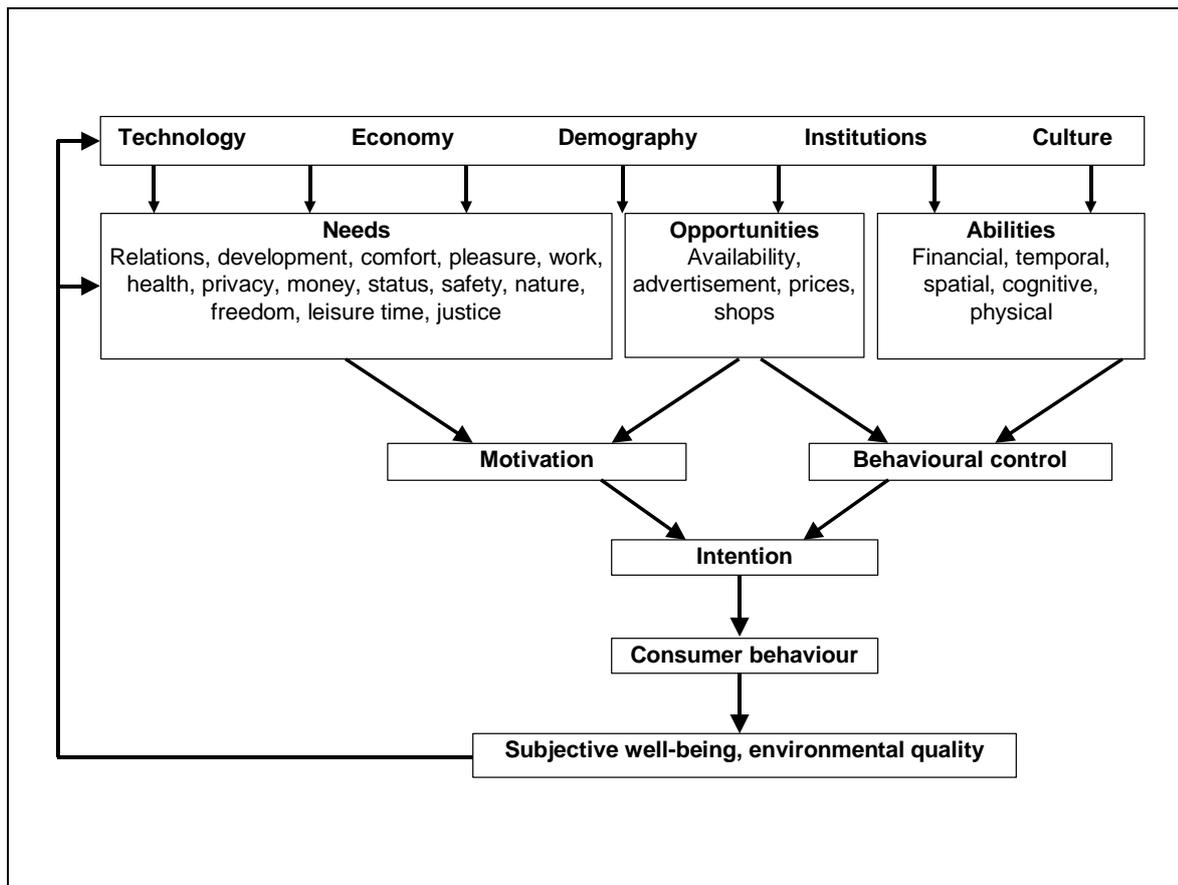


Figure 2.15: Vlek et al’s Needs Opportunities Abilities (NOA) Model (1997)

In the NOA model, ‘Opportunities’ include factors external to an individual, ‘abilities’ internal factors – however, cost spans both sets of factors, being a combination of price (‘opportunities’) and available income (‘abilities’). In the face of such evidence it is more appropriate to regard barriers as constructs, reflecting individuals’ perceptions of external limits. In her analysis of research on Global Action Plan’s (GAP’s) Action at Home scheme (which supports householders in making pro-environmental behaviour changes), Kersty Hobson writes of barriers not as obstacles to be lifted but as opportunities for “*rich moral conversations*” (Hobson 2001). Many barriers are not “*solidly external*” but are constructed through the interaction between ourselves and the world in day to day behaviour. This in turn has implications for interventions aiming to remove external barriers to behaviour – both the material context and individuals’ perceptions of it must be addressed.

The concept of behaviour as social practice reflects this interrelation between internal and external forces in determining our behaviour. Spaagaren and Van Vliet's **Theory of Consumption as Social Practices** (2000, in eg. Jackson 2005, Burgess and Nye 2006 – Figure 16) represents the interaction diagrammatically, showing behaviour as produced between lifestyles and systems of provision. It is important to note that neither of these factors is wholly internal or external, but each is shaped in response to the social practices it helps to determine.

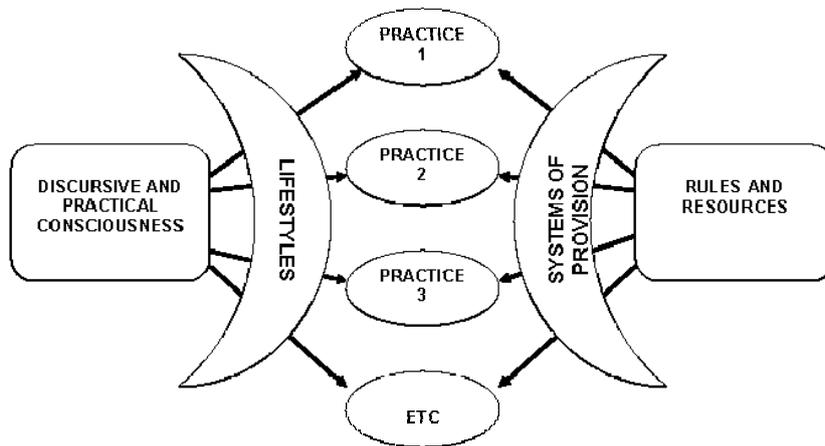


Figure 2.16: Spaagaren and Van Vliet's Theory of Consumption as Social Practices (2000)
[reproduced from Burgess and Nye 2006]

From the discipline of sociology, Elizabeth Shove explains the constructs of comfort, cleanliness and convenience, and how these evolve through social practice (Shove 2003). Such constructs in turn determine our behaviours, and can result in 'lock in' whereby we are unable to change our behaviour (see also Sanne 2002, eg. in Jackson 2005). We are locked into our patterns of behaviour both by the systems of provision that are available (eg. airconditioning systems), and the conventions which our lifestyle has adopted (eg. a standard comfortable temperature, or 'comfort zone' – Shove 2003). Shove goes beyond sociology to adopt a socio-technical perspective, in which individuals and institutions co-evolve and generate behavioural routines.

Such elements are also found in **Structuration Theory** (Giddens 1984), which explores how we recreate the world in which we live through social activity. Structuration is a complex general social theory which presents the dual forces of agency and structure (as introduced above). A principal aim of the Theory was to break down the subjective/objective dichotomy in social science. Thus structure is not a solid other, but is only revealed by individual agents through their action; similarly the material world does not possess structure, just the potential for individuals to perceive it. Structure is defined as the rules and resources within which the individual must move, but which only take shape through their being observed in individuals' behaviour. To clarify this dynamic, Giddens gives the example of speaking English grammatically: "*When I produce a grammatical utterance, I draw upon the same syntactical rules as those which the utterance helps to produce*". Structuration Theory thus reveals social practice to be recursive, based on the duality of structure "*...in which the properties of social life are constantly recreated out of the very resources which constitute them*".

At their most basic level of internal/external opposition, the theories outlined above recognise that there are factors beyond an individual's control which determine their behaviour. Yet theory goes beyond this binary distinction to reveal behaviour as a social practice based on interactions between ourselves and the world, which both provide for and constrain our behaviour, and through which we create both the external world and our self identity. These recursive models of behaviour have an element of change built into them, in the form of the flow of feedback between inputs and outputs. At their most complex, these models break down the internal/external dichotomy, and so pull away from linear (albeit multilinear) social-psychological models.

2.10 Self regulation

Models of behaviour based on feedback take a fundamentally different view of behaviour to the (multi)linear or 'consequentialist' understanding shown by social-psychological models which are based on Expectancy Value Theory. Instead of behaviour being determined chiefly by individuals' internal cognitions and deliberations, feedback-based models present behavioural outcomes as part of an ongoing flow of activity, in which internal and external factors interact to shape how we behave. The driving force behind this behaviour is not a series of value-based decisions, but an ongoing monitoring of one's own behaviour and its impacts, as a result of which adjustments are made to subsequent behaviour. Feedback-based models of behaviour can be found in both psychology and sociology.

The interplay of internal and external forces is at its most intertwined in **Structuration Theory** (Giddens 1984). Reflexiveness is the driving force of the theory, a looped process which builds recursiveness into the model as agency and structure interact and reshape one another. Reflexiveness is described as actors' "*continuous monitoring...of the flow of day to day life in the context of social activity*". The key purpose of reflexiveness is "*to reproduce existing social systems*", routinising our social practice, and stabilising our sense of self in relation to it (providing "*ontological security*"). Structuration has already been discussed in the context of habit (see 1.7 above); reflexiveness gives social behaviour 'resistance', not as reluctance to change, but as a byproduct of the process of constant adaptation. Behaviour for Giddens is inherently conservative.

Giddens comments on the "*systemness*" of reflexiveness and concedes that this element of his Theory can be regarded in the same way as the homeostatic (negative feedback) loop in systems thinking. Systems thinking is discussed as a wider theory of change in Section 3.3 below; the negative feedback (or homeostatic) loop, which is the mainstay of systems thinking, must be introduced here first. In mechanics it most simply describes the working of a thermostat, in which there is a looped relationship between the temperature of the environment (as 'reference value') and the temperature set by the switch operating the system (as 'input value' or 'standard'); the interaction ('feedback') between the two values determines whether the heating comes on. The loop is negative as it is designed to regulate, rather than reinforce the variable in question (in this case, the temperature).

While systems thinking was developed to explain the 'behaviour' of mechanical systems in engineering or computing, it provided useful parallels for social psychologists theorising behaviours. It is from systems thinking that social psychology derived models of behaviour which do not follow the assumptions of EV Theory. Carver and Scheier used the negative feedback loop as the fundamental process in their behavioural model of **Control Theory** (Carver and Scheier 1982 – Figure 2.17).

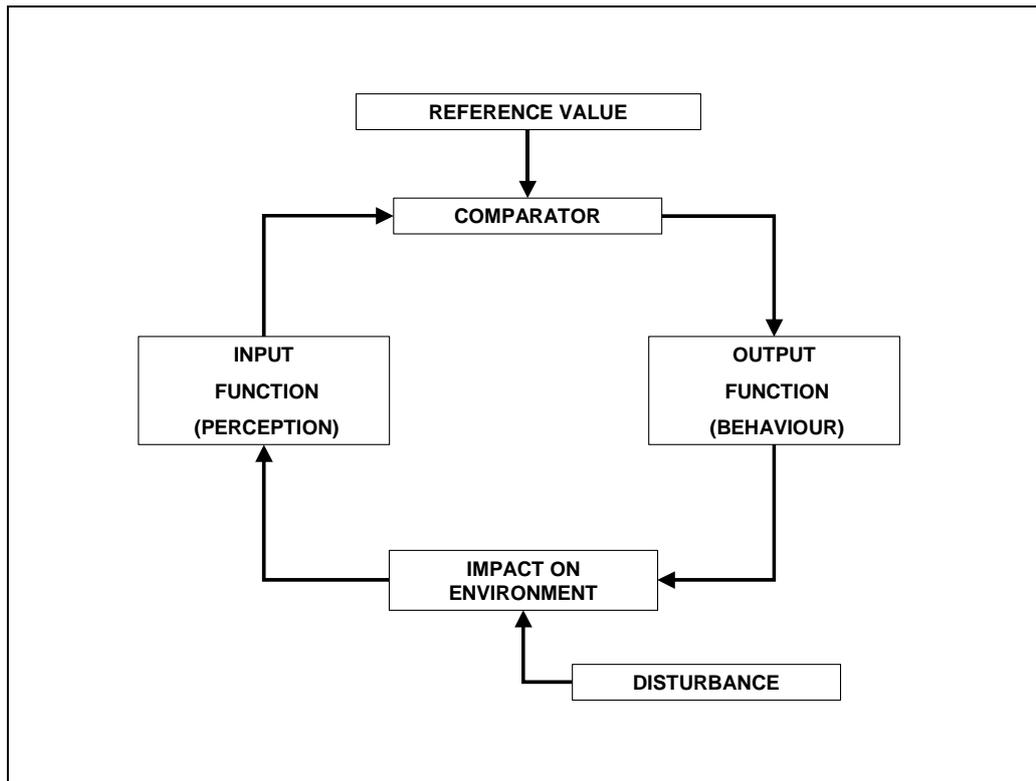


Figure 2.17: The Negative Feedback Loop [adapted from Carver and Scheier 1982]

Control Theory conceptualises behaviour as “*an automatic process of self-regulation*”. Carver and Scheier give the behavioural example of car driving, in which the driver keeps the car on the road by continually monitoring its position in relation to the roadside, and adjusting the steering accordingly. The authors also go further by splitting each cognitive and muscular process in the chain of action apart, then showing how the behaviour of car driving results from feedback between all the constituent actions in sequence. The emphasis on this process as automatic is key, and parallels Giddens’ description of reflexiveness as taking place in the practical consciousness.

Control Theory also includes an ‘expectancy assessment’ construct, which explains why an action may be abandoned if the discrepancy between the desired standard and the current (reference) level is too great. This construct essentially builds agency into the model; it is very similar to Bandura’s self efficacy construct (with its ‘central processor’, see 2.6 above). The self efficacy construct sits within the framework of Bandura’s **Social Cognitive Theory of Self Regulation** (1991, but dating back to 1977 and his work on self efficacy – see Figure 2.18). Carver and Scheier described Bandura’s Theory as “*nearly identical*” to their own (Carver and Scheier 1982), although a glance at Bandura’s model will show that it is more complex than the simple negative feedback loop.

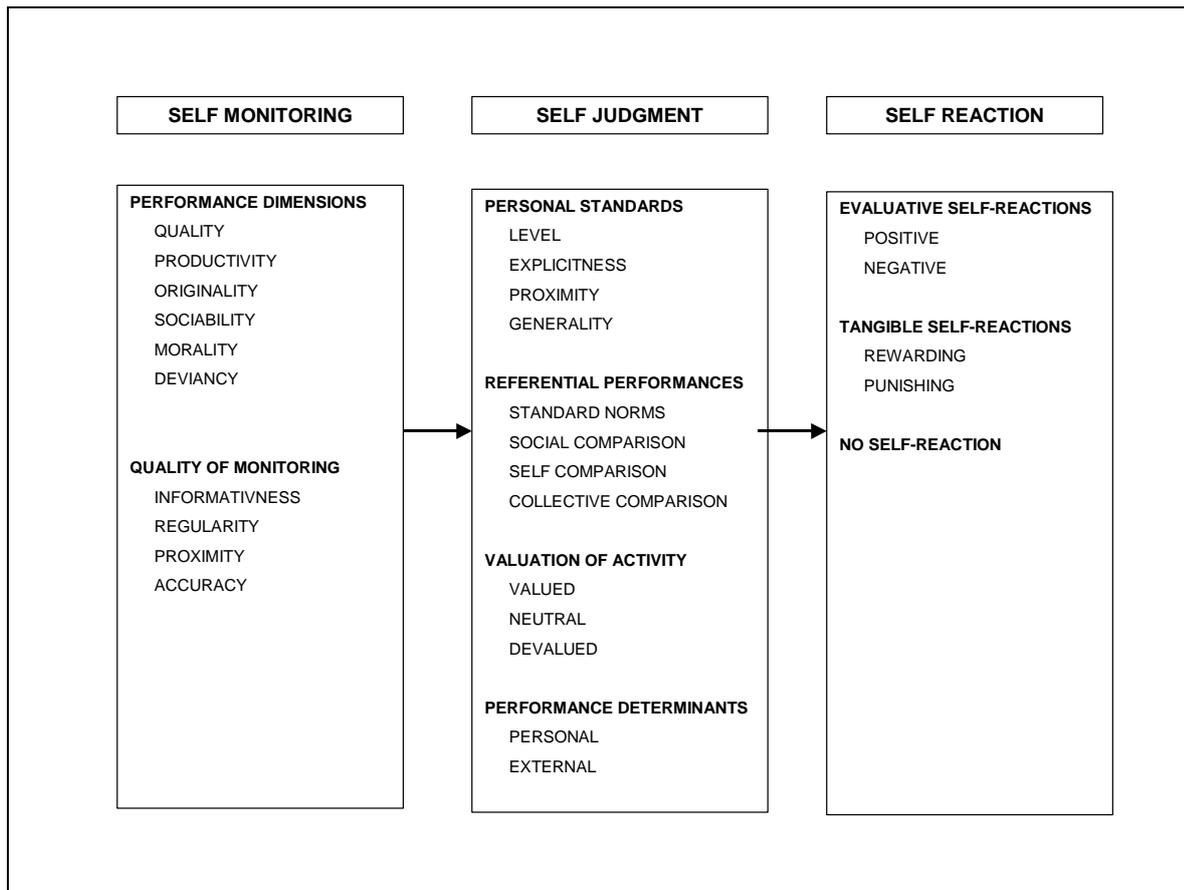


Figure 2.18: Bandura’s Social Cognitive Theory of Self Regulation (1991)

Self regulation in the Social Cognitive Theory has two elements: self monitoring and self judgement. Self monitoring provides the contextual information (or ‘reference value’) while self judgement sets the target level (as ‘input value’ or ‘standard’). Standards thus have psychological meaning in this version of a self-regulating system; they are self-set by individuals, based on the observation on others. In this way Bandura’s Theory builds on his work in Social Learning, in which behaviour is learnt through observing and ‘modelling’ the behaviour of others (1977, in eg. Jackson 2005). Unlike Control Theory, which is concerned with the ongoing flow of behaviour, Social Cognitive Theory is explicitly about behaviour change: Bandura states that altering our standards and goal setting is essential for “*self-directed change*” (Bandura 1991).

Bandura’s Theory also includes a rewards element as the purpose for the goal-setting process; these tend not to be tangible rewards, but loose psychological ones based on a sense of achievement. In his work on self efficacy, Bandura comments that a sense of personal mastery can be acquired through achieving a succession of small tasks, not just a few big ones (Bandura 1977). Self efficacy is given as the key example of the self-regulating system in action. The effort to be expended on a behaviour is based on an assessment of the gap between current and desired levels. Goal setting is the key means of driving action: increasing the standard to be achieved continually motivates action. Self efficacy comes from achieving the standards, but is also recursive as efficacy is derived from experiences of achievement. Failure to achieve goals does not deter those with high self efficacy from acting; however, for those with low self efficacy, failure will quickly result in apathy.

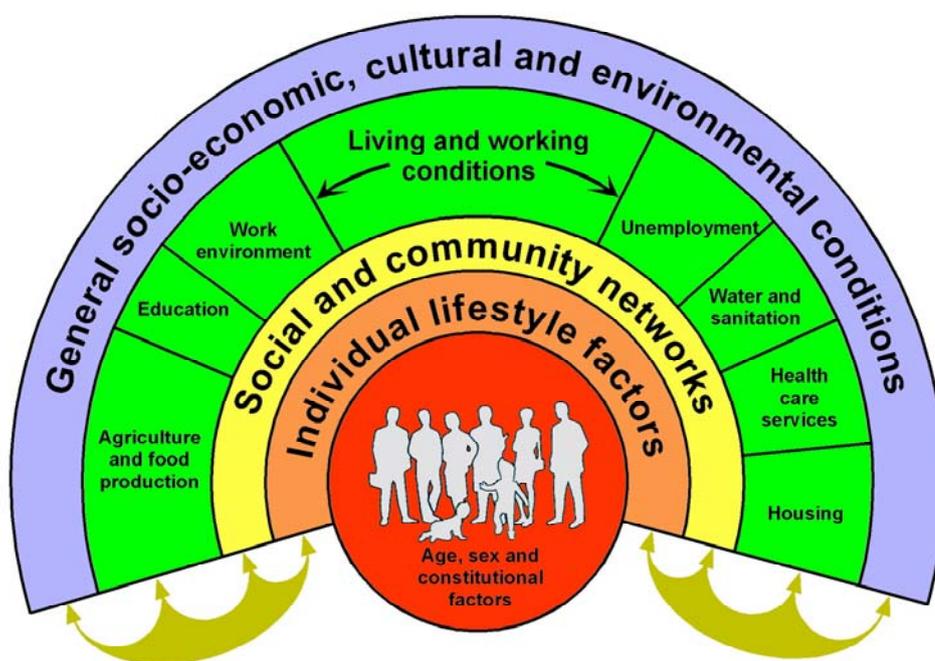
2.11 Societal factors

It has been noted (at 2.9 above) that most social-psychological models only display the factors influencing behaviour from within an individual's own psyche. Some of the featured variables – notably those relating to agency and control – incorporate external and contextual factors, but in most cases these do not appear explicitly on the models. Models of this type bring an inherent risk for those designing behaviour change interventions, namely that they may overlook or underestimate the importance of addressing factors beyond the individual's control. This potential drawback can be counteracted through reference to another class of model, which reverses the relative emphasis on internal and external factors. These models focus on the factors influencing individuals' behaviours from higher levels of scale; they include individual-level behavioural processes as one corner of a chart designed to demonstrate macro-level societal impacts on behaviour. While all the models of societal change reviewed feature factors working on multiple levels, some also include feedback loops, showing behaviour formation to be a recursive process between the individual and society.

Charles Vlek and colleagues' **NOA (Needs Opportunities and Abilities)** model offers the clearest example of a societal model, spanning the different levels of behavioural influence (1997, in Gatersleben and Vlek 1998 – Figure 2.15). A social-psychological model of individual consumer behaviour sits at the centre of the NOA model. This is the NOA construct itself, an intention-based model of behaviour, with intentions formed from two paths: one being motivation (a combination of Needs and Opportunities) and the other agency (based on Opportunities and Abilities). In this regard the construct resembles a deliberative means-end chain model, although the end goal is not behaviour but the dual outcomes of personal wellbeing, and environmental quality. However, the model is also nested, with the NOA construct influenced by five macro-level societal factors (expressed in the TEDIC formulation used elsewhere in environmental psychology: Technology, Economy, Demography, Institutions, Culture). The five factors shape consumption by influencing the balance of the NOA components. In turn, the model shows consumer behaviour influencing the societal factors, by means of a large feedback loop running from the bottom of the model to the top. While not as nuanced as systems of provision models or Structuration Theory, NOA emphatically shows the interaction between individual and society, and demonstrates the need for interventions to work on multiple levels of scale.

A comparable model from the health context is the **Main Determinants of Health** model (Dahlgren and Whitehead 1991 – Figure 2.19). Rainbow-like tiers of social, economic and behavioural factors surround individuals whose biological variables (eg, age, sex and genetics) are fixed at the centre of the model. The model illustrates four tiers, and describes intervention types for each one, as follows. The top tier is the macro-level 'structural environment' (similar to NOA's TEDIC; this is subject to legislation, taxation etc). The next tier is 'material living conditions', including housing, education and the workplace (subject to legislation/regulation and the provision of public services). Moving closer to the individual, the third tier is 'material support networks' including family and friends (subject to strengthening networks and building community capacity). The closest tier is 'lifestyle/behavioural factors' (subject to influencing interventions, including the provision of information).

The Main Determinants of Health



Source: Dahlgren and Whitehead, 1993

Figure 2.19: Dahlgren and Whitehead's Main Determinants of Health Model (1991) [reproduced from Dahlgren and Whitehead 2007]

The model was presented within a strategic framework for tackling health inequalities (which has recently been updated for WHO - Dahlgren and Whitehead 2007), based on the dual behavioural approach of improving health opportunities while tackling health hazards. While the model does not demonstrate how the influencing factors in the tiers combine to determine health outcomes in the way that NOA shows the way factors influence behaviour, its nested basis is clear. The accompanying framework describes reinforcing feedback loops at work between the tiers, in the context of diverse areas of health inequality (eg. in the role of poverty, or in the uptake of smoking). The framework also sketches out the elements of policy interventions to tackle health inequalities (eg. in drinking behaviours, or obesity). In each case, the authors apply the Main Determinants of Health model, demonstrating that interventions must simultaneously address factors within each of the tiers if lasting change is to be brought about at the individual level.

3. Using Behavioural Models

The social-psychological models and theories gathered in this review have revealed the fundamental underpinnings of human behaviour. However, there are inherent limits to what models can tell us, which in turn dictate how models are best used in designing interventions (see also Section 7 below, and the accompanying Practical Guide).

- **Models are concepts, not representations of behaviour**
The fundamental point to understand about models is one expressed by Triandis in presenting the TIB (Triandis 1977). He writes that models do not describe the processes which take place in the heads of people prior to them acting; rather they should be seen as “*a quick and imprecise way of organising a lot of information in order to make more theoretical statements possible*”. In short, models are concepts which can help us understand behaviour, but they do not demonstrate what makes people behave how they do.
- **There is a limit to how far models will stretch**
Models are derived from a specific behavioural context (ie. research data, usually quantitative), and they tend to work best in that context. For instance, Norm Activation Theory is good for predicting altruistic behaviours, the Health Belief Model preventative health behaviours, and so on. Some models have wider applicability (eg. the TPB and the TIB), but they nonetheless are better at predicting behaviours in some areas than others (see eg. Ajzen 1991, Armitage and Conner 2001). Interventions should be careful to use models which have been shown to be applicable to the specific behaviour they are targeting. (Tables 1 and 2 are supplied in the Practical Guide to show reported matches between specific models and types of behaviour – these are reproduced in Appendix i) below.)
- **Models don't tend to differentiate between people**
Most behavioural models are either presented without data (showing the relationships between the factors conceptually) or they are filled with data which aggregates the behaviour of all people in the given study. Such empirical models can be regarded as ‘everyman’ models, as they only show the factors driving a behaviour for all respondents. While it is common practice in marketing (and axiomatic in social marketing) to segment the public into like groups, behavioural models only rarely do so. An exceptional example is found in Stewart Barr and colleagues’ analysis of types of pro-environmental behaviour as undertaken by four different clusters of the public (Barr et al 2005). The four resulting **path diagrams for recycling behaviour** show clearly that different factors influence the same behaviour for people in different segments (two of the four diagrams are reproduced below - Figure 3.20a and b). The implication is that policy makers using a single model should be sure not to develop a rigid ‘one size fits all’ intervention.

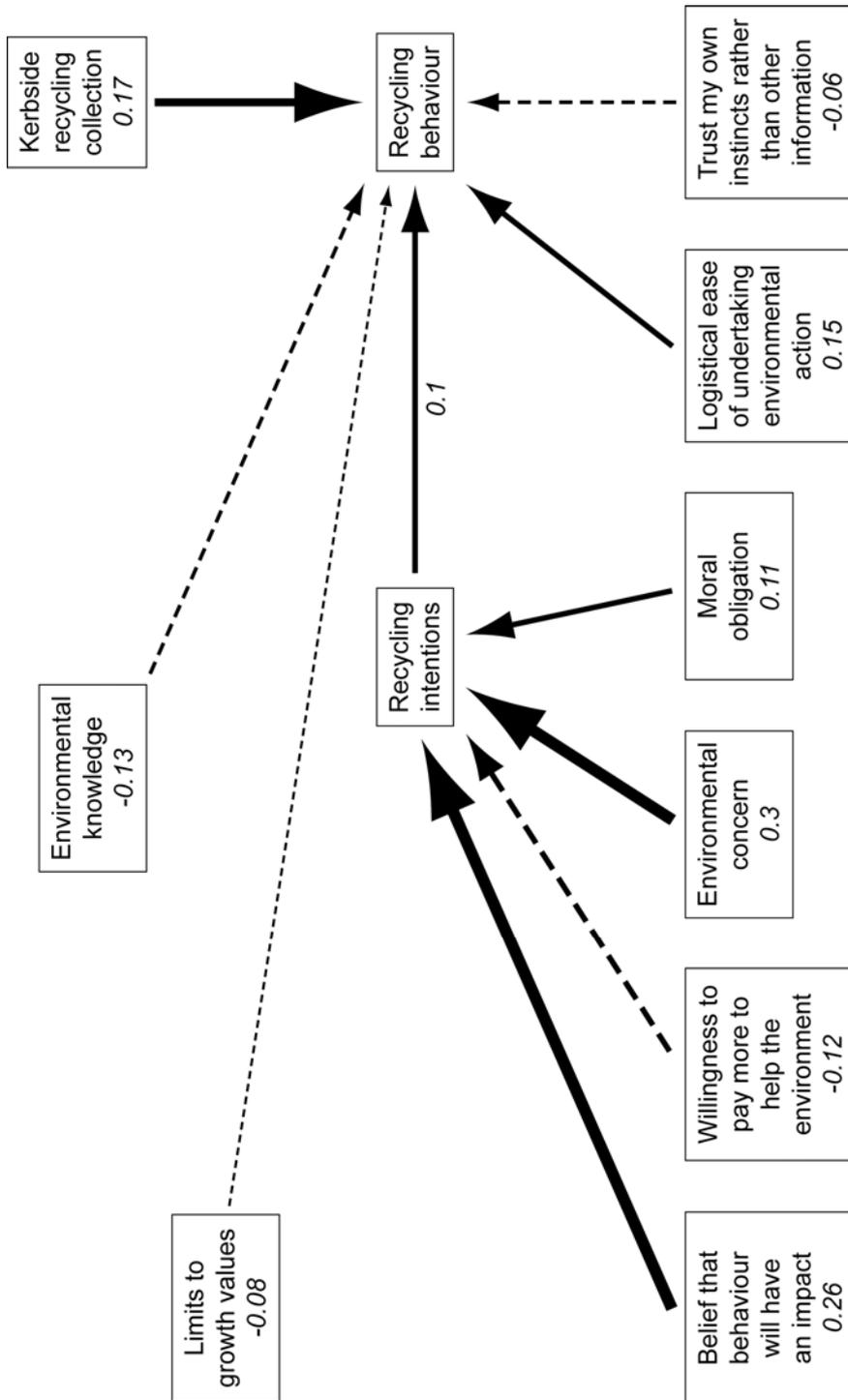


Figure 3.20a: Barr et al's path diagram for recycling behaviour - Cluster 1 [reproduced from Barr et al 2005]

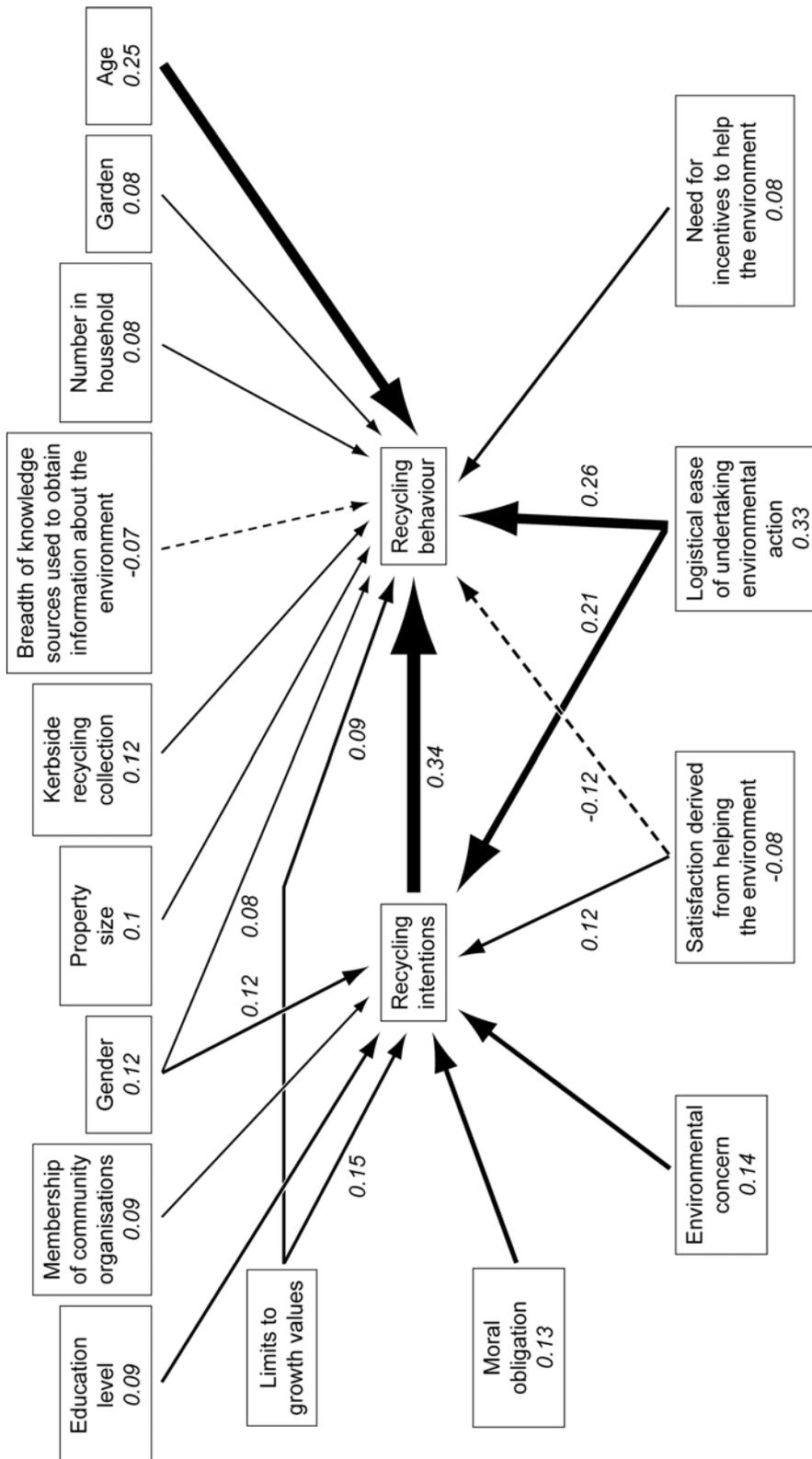


Figure 3.20c: Barr et al's path diagram for recycling behaviour - Cluster 3 [reproduced from Barr et al 2005]

- Behaviour is complex, but models are deliberately simple
Most models are simplified to make them comprehensible, and workable when used in subsequent studies. There is a tension in behavioural models between completeness and simplicity (or “*parsimony*”, according to eg. Ajzen 1991). Gains in the accuracy of a model through increasing its completeness come at the expense of its comprehensibility. The two extremes of this tension could be illustrated by the TRA at the parsimonious end, and Bagozzi and colleagues’ **Comprehensive Model** of consumer behaviour at the other (Bagozzi et al 2002 – Figure 3.21). The latter model is so complete as to be effectively inoperable (Jackson 2005). Theorists commonly leave factors out of their models in order to make them more comprehensible and operable. For instance, in theory the TPB does have a feedback loop from the outcome behaviour back to the antecedent beliefs, but Ajzen chose not to diagram it (Ajzen 1991). Again it should be noted that models are aids to understanding; those basing interventions on models should be mindful that they do not account for all the complexities of behaviour.

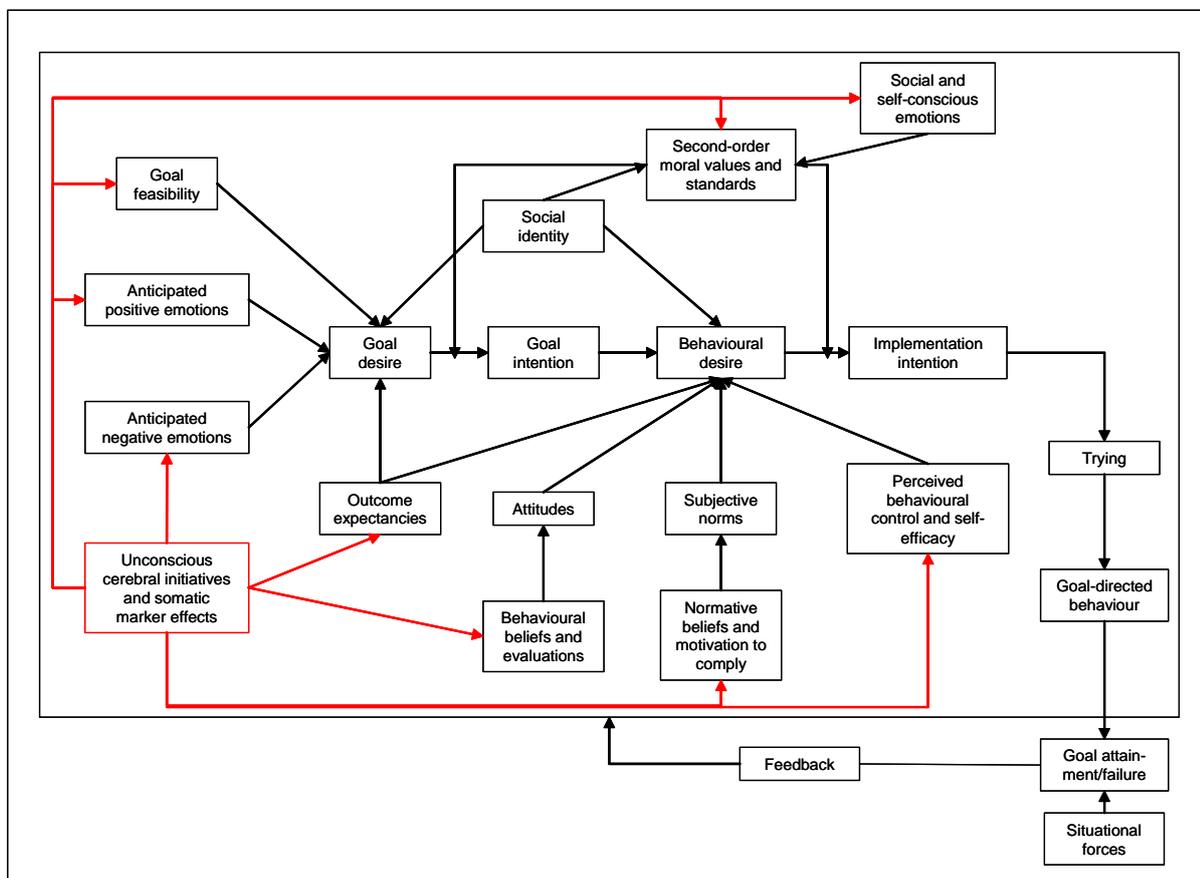


Figure 3.21: Bagozzi et al's Comprehensive Model (2002)
[reproduced from Jackson 2005]

- Factors don't always precede behaviour
Most behavioural models present social-psychological factors as preceding behaviour (hence they are 'antecedent' variables). Such models are 'consequentialist', and read from left to right, implying that changing the factors is necessary to produce behaviour change. However there are instances where people are compelled to change their behaviour first, which then leads to change in the social-psychological variables (eg. attitudes and norms) afterwards. A leading example is the London congestion charge (see Darnton et al 2006, Knott et al 2007). Public opinion was opposed to the charge before it was introduced, but those attitudes changed once the charge was brought in.

A theoretical explanation for this pattern can be found in Festinger's **Theory of Cognitive Dissonance** which holds that we realign our values, beliefs and attitudes to achieve cognitive consistency (*"If a person knows various things that are inconsistent, he will try in a variety of ways to make them consistent"* - Festinger 1957, in Kurani and Turrentine 2002). This case illustrates that interventions do not always have to work through social-psychological factors, although they do need them to be in line for behaviour change to be sustained.

- Factors are not barriers
Behavioural models can appear to present factors as buttons to be pressed, in the expectation that the behavioural outcome shown will result. Such an approach would be misguided, as it does not take account of Triandis' point above about models as concepts, and also does not account for the evidence on theories of change (to be discussed below). Those designing interventions would be wise to recall Kersty Hobson's description of barriers as opportunities for *"rich moral conversations"* (Hobson 2001). Instead of simply attempting to remove barriers from afar, interventions should engage individuals as actors, and together work to negotiate the factors influencing behaviour.

4. Understanding Change

Having discussed behavioural models and theories, this report will now consider theories of change. While there is emerging consensus over what models and theories of behaviour are relevant to the behaviour change agenda, there is less consensus around the literature presenting theories of change. Many reviews of behaviour change theory concentrate only on behavioural models, and overlook theories of change.

Some theories of change are based on social psychological understandings of behaviour, and there is a clear overlap between these two bodies of evidence. However thinking on change can also be found in other theoretical disciplines, as well as arising from diverse areas of practice. Indeed central to many conceptions of change is the merging of theory and practice. Treating theories of change as distinct from behavioural models emphasises the different uses of the two types of evidence when planning behaviour change interventions.

The theories of change outlined here are drawn from diverse fields, but can be brought together into a loosely-bound body of evidence. They include social-psychological models which feature a temporal process (showing behaviour, and change, over time), whether this is staged or based on feedback loops. These latter models also feature in systems thinking, itself a hybrid of disciplines (chiefly cybernetics and engineering), but developed distinctly from psychology. The literature also includes learning theory (sometimes drawing on formal educational theory), showing how people learn and change (both perceptually and behaviourally). When conducted in a group setting, learning can be directed primarily at achieving behaviour change, for instance in breaking habits, or pursuing organisational change. Diverse processes for achieving social change are also identified, based on social networks (for instance, theories of diffusion and social capital).

4.1 Changing habits

In the social-psychological literature, behaviour can inherently be defined in terms of its lack of change; for instance, Kurt Lewin describes habit as “*resistance to change*” (Lewin 1951). Unlike the conception of habit as a force in itself (automaticised behaviour, as put forward by Triandis or Cialdini), Lewin identifies habit only in relation to its reaction to external stimuli. Thus for Lewin habit is not measured by the consistency of behaviour over time but in terms of the consistency of behaviour in the face of changing circumstances. When measuring habit, Lewin is not counting the frequency of behaviour (as Triandis does) but its resistance to change. This resistance is not willfulness, but a sign of the resilience of a group or social organisation, which will adapt to keep its behaviour constant.

Lewin’s work is fundamental to the discipline of social psychology; he is also described as the father of action research. For learning theorists Argyris and Schon, Lewin is “*the prototypical action researcher...who remarked that nothing is so practical as good theory*” (Argyris and Schon 1996). The quotation is in itself an accurate expression of Field Theory, a method of enquiry (more than a theory) based on learning through doing which Lewin first developed, and which has become central to social psychology. Lewin’s ideas (not least from his 1947 paper on ‘Group Dynamics’, in Lewin 1951) can be discerned in many of the theories of change which are brought together in this review. For instance, Peter Senge, one of the leading exponents of systems thinking in relation to organisational change, identifies ‘policy resistance’ as one of the underpinning principles of systems thinking (Senge 1992). This view of behaviour, derived from Lewin, has fundamental implications for those involved in work on behaviour change.

For Lewin resistance as a social dynamic is based in the smaller unit of the group. In writing which clears the way for the concepts of norms and identity theory, Lewin describes how group standards represent the source of individual resistance. Through adherence to group standards, the sense of a coherent group is maintained; individuals either adhere or get ousted. Lewin stresses that group standards must be altered if lasting individual change is to result. The process of change he describes has come to be called Lewin's **Change Theory** (although much of what he writes is essential to theories of change). Change Theory refers to Lewin's description of an unfreezing/refreezing process in changing behaviour, whereby habitual behaviour is exposed to scrutiny by the group before being allowed to fall back into position in day to day life, but based on altered group standards. Lewin's metaphor of behaviour is that of the flow of a river.

The notion of a constant flow of behaviour is central to Giddens' Structuration Theory (as well as models of behaviour based on self-regulation – see 1.10 above). Giddens' duality of practical and discursive consciousness is particularly useful for expressing the unfreezing/refreezing process. Borrowing his terminology, 'less directly motivated' behaviours are lifted from practical to discursive consciousness, before being reconfigured and left to fall back into the routines of social activity. The dynamic of lifting and dropping is present in Lewin's account, with change being observed as a change in levels: of attitude, conduct or output.

Lewin's Change Theory is inextricably situated in group processes. In her work on GAP's Action at Home programme (see 2.9 above), Kersty Hobson observed the unfreezing/refreezing process at work as householders changed their everyday behaviours (Hobson 2001). She concluded that the main reason for people to take part in the scheme was not to reduce their environmental impacts per se, but to measure their behaviour and debate it with others. The programme is thus described as "*a learning process*" not an intervention in which people's behaviour is changed through the acquisition of instrumental knowledge (see also 4.4 below). Group decision making is the fundamental change tool for Lewin. He gives an account of an experiment designed to encourage mothers to drink more fresh milk; as a result of the research he concludes that "*group decision*" is better than "*a good lecture*" (Lewin 1951). The group context can also supply the "*emotional stir-up*" necessary to "*break out of the shell of complacency*" and alter customary habits (see 2.8 above). This injection of emotional force (eg. shock) can be thought of as shifting the habit into the realm of discursive consciousness.

Lewin notes that achieving this shift in levels of conduct won't in itself bring about lasting change. Elements of maintenance will continue to be required (for instance, how frequently the mothers' groups meets will impact on their ongoing milk drinking). In this respect Change Theory has a temporal dimension. It also has a contextual aspect, as Lewin notes that the external conditions need to be right (for instance, having fresh milk delivered to the door). In some instances, he says, such external factors will be more influential than the group decision itself. For a newly changed behaviour to become refrozen into a habit, the "*whole social field*" will need to be adjusted. In Lewin's analogy of behaviour as a river flowing, this means changing the river bed, the boulders that lie on it, the breadth of the riverbanks, and so forth.

External context is not only of practical importance in the refreezing of behaviours, but it can also supply situational cues. Away from Lewin's theory, other social-psychological approaches to changing habitual behaviours stress the importance of situational factors. Bandura's **Mastery Modelling** (1977, in Burgess and Nye 2006) is a technique derived from theory which involves the practising of behavioural cues, such that when certain situations are encountered 'reflex' responses become habitual. The rehearsed reflexes are in line with (new) intentions, thus circumventing habitual behaviours. The techniques

of Mastery Modelling also include reducing a big behaviour change into smaller steps, for each of which cues can be successfully constructed and practised. This is consistent with Bandura's Social Cognitive Theory, in which goal setting is described as essential for "*self-directed change*" (Bandura 1991 – see 2.10 above). A cue-based approach is also found in Gollwitzer's **Implementation Intentions**, which sets out a conditioning process, involving the rehearsal of 'if...then...' scenarios (1993, in eg. Bamberg and Schmidt 2003). In cognitive terms, rehearsal makes the intended response more accessible; well rehearsed individuals are described as "*perceptually ready*" to respond based on intentions not habits (Maio et al 2007).

4.2 Change in stages

The theories cited in the section above all show behaviour as a flow over time. This is in contrast to most social-psychological models of behaviour which omit a temporal dimension, and can be read as suggesting that behaviour is a one-off and deliberative action. Lewin's Change Theory, and behavioural models based on self-regulation, demonstrate that changing behaviour requires interventions which are sustained over time, and which treat change as a process, not an event.

While all theories of change necessarily include a temporal element, the most obvious example is Prochaska and Di Clemente's **Transtheoretical Model** of Health Behaviour Change, also known as the '**Stages of Change**' model (1983 – see Prochaska and Velicer 1997, summarised in Figure 4.22a).

1. **Pre-Contemplation:**
in which people are not intending to change or take action; to be established across a six month period.
2. **Contemplation:**
people are intending to take action within the next six months, but are not ready to take action; doubts about the effectiveness of action and of uneven costs and benefits may stall people at this stage for some time (in a state of "*chronic contemplation*").
3. **Preparation:**
people are intending to take action in the next month; they are very aware of the costs and benefits of change and some behaviour change may already have taken place, including having a plan of action.
4. **Action:**
people have made or are making specific overt modifications to their behaviour, usually begun within the last six months.
5. **Maintenance:**
people are actively working to prevent a relapse to the previous behaviour, having made the change at least six months previously.
6. **Termination:**
the changed behaviour has become normative; there is no chance of relapse.

Figure 4.22a: Prochaska and Di Clemente's Transtheoretical Model of Health Behaviour Change ('Stages of Change' Model) (1983)

The Model has been widely used, particularly in health interventions, although it has received ever increasing criticism from practitioners. The model is basically a segmentation, which arranges the public on a continuum according to the level of behaviour they demonstrate (ie. the stage of change they are at). Segmenting by

behaviour in this manner is a mainstay of social marketing (see Section 5 below), and given the discipline's avowed purpose is behaviour change it is unsurprising that the Stages of Change model has been much adopted by social marketers.

The Model identifies 6 segments or stages of change, from 'pre-contemplation' to 'maintenance'; it also can be expressed as a cycle (Figure 22b).

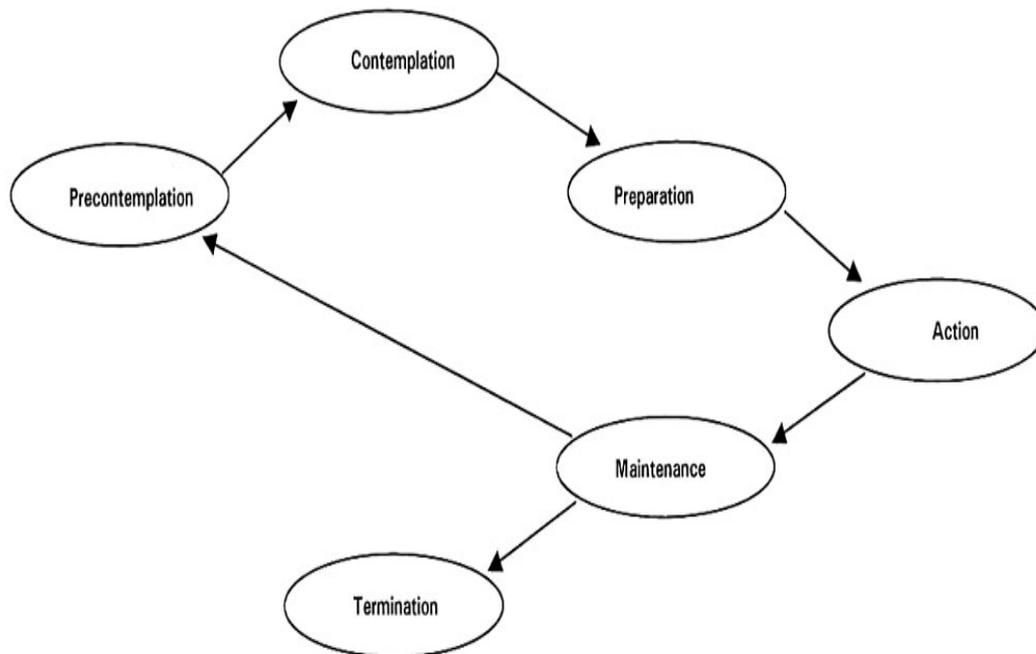


Figure 4.22b: Prochaska and Di Clemente's Transtheoretical Model of Health Behaviour Change ('Stages of Change' Model) (1983) [reproduced from Conner 2007]

The cyclical diagram demonstrates how the Model allows for a relapse back to the beginning of the process. The sixth stage, 'termination', is nominal, as most of those who achieve health-related change remain in a state of continuing maintenance. The borders between the stages are also defined in terms of the length of time an individual has remained in that state for; for instance the 'action' stage lasts approximately six months before an individual is deemed to be in 'maintenance'. The model was originally devised based on a meta-analysis of data on smoking cessation (including both self-changers and those following programmes). Over time it has come to be applied to other behaviours, usually in the realm of health. However, the Model's main value lies in its segmenting of individuals, and this strategic approach has relevance across wider policy areas.

Along with the six stages, the Transtheoretical Model also identifies 10 'processes of change', which describe the elements of interventions which appear to be effective at advancing change. The elements were observed in interventions developed using a range of theories, hence the name given to the Model overall. The Model entitles these 'stage-matched interventions', and argues that the effectiveness of these intervention methods depends on their being correctly stage-matched; this argument in turn supports the need for segmenting the public into stages. However, the case that the interventions are only effective if stage-matched is unproven, according to numerous commentators (eg. Shepherd 2006). For instance, interventions based on the 'contingency management' principles of contracts, rewards and recognition are likely to have some positive effect at several points in the process of change.

The Model adopts Bandura's concept of self efficacy as the measure of individuals' progress along the scale of change. Thus termination is defined as "*having the confidence to cope with high risk situations without reverting to unhealthy behaviour*" (Prochaska and Velicer op.cit.). As well as in the self efficacy construct, the model observes deliberative processes throughout; staying engaged in the process (rather than relapsing) is determined by 'decisional balance', a calculation of the pros and cons of trying to change (both to the self and others). The pros of involvement outweigh the cons from the 'contemplation' stage; from the 'action' stage onwards, the perceived cons also successively diminish.

Ironically, Bandura has been one of the strongest critics of the model (1997, in Shepherd 2006). He described it as "*over-differentiated*", arguing that the first three stages (preceding action) only varied in terms of intention, while the next two stages (before termination) could only be measured by their duration). In his analysis Shepherd notes that the model is difficult for researchers to operationalise, given that it is hard to write questions which allocate individuals to the different stages. Shepherd, writing from the perspective of dietary health behaviours, raises doubts about whether the model is adaptable to non-addictive behaviours. For instance, if a person were trying to consume fewer calories, how many fewer would they need to consume to be considered in the active post-contemplation stages, and how would they reach termination? In many behaviours, a change in level, rather than complete cessation, is a more appropriate definition of successful change.

Criticism of the model can also be found from those working in the same area of addictive behaviours as that in which the 'Stages of Change' was developed. Robert West, a health psychologist who recently developed the PRIME model of behaviour, has questioned the validity of the staged-matched approach, and has called for the abandonment of the Model in smoking cessation programmes. West argues that interventions of value can be effective at any point in the process of change, and that a small input at the right point can trigger lasting change. Furthermore, interventions should apply the maximum level of pressure tolerable by the individual, regardless of the stage of behaviour they are in (West 2006a).

Models of addiction naturally include a temporal dimension as, like theories of habitual behaviour, they address change in behaviour over time. While the Transtheoretical Model sets out a process for giving up habitual behaviours, Gibbons and Gerrard's **Prototype/Willingness Model** analyses the early stages of habit formation (Gibbons et al 2003 – Figure 2.13). As discussed (in 2.7 above), the Model sets out a dual process by which adolescents undertake risky behaviour; when they are new to the behaviour they follow the 'social reaction pathway' based on behavioural willingness (defined as "*openness to opportunity if the context is right*"), but as they develop experience in the behaviour they increasingly move onto the intentional pathway of behavioural expectations. The model is particularly helpful for explaining drug trying and early using among young people, and it has been adopted by the FRANK campaign (see Darnton 2005). Recognising that there were limits to what an information-based campaign could do to reduce young people's drug use, the campaign strategy focused tightly on addressing young people's 'risk images' (their perceptions of what a typical person undertaking the drug behaviour in question was like), in order to influence their progress along the willingness pathway.

Beyond drug use, Gibbons and Gerrard state that the model is applicable to diverse behaviours which are 'less appropriate' for people at all ages, which are based on willingness rather than intentions (drink driving and adultery are two of the examples given). The Model offers useful lessons for those working on behaviour change, including that many 'less appropriate' behaviours, and those where individuals have little previous

experience to refer to, are not best understood using intention-based models (such as the TPB). Ultimately the Prototype/Willingness model can be regarded as a staged model, as well a dual process one, which shows that behaviours are influenced by different factors according to experience.

4.3 Change via social networks

Social-psychological models show the importance of social factors in determining outcomes; it is indicative that the 'subjective norm' was the first factor added by Ajzen and Fishbein when they extended expectancy value theory into the TRA (see eg. Jackson 2005). Related disciplines provide models of how a changed behaviour might spread through society.

The most famous model of this kind is Everett Rogers' **Diffusion of Innovations** (see Rogers 1995). The theory essentially explains the process of adoption of innovations by society; Rogers defines diffusion as "*the communication of an innovation over time through certain channels among a social system*". The theory charts the uptake of an innovation due to the interactions within social networks. The theory was originally published in 1962, and it has since undergone constant revision. It was first developed by Rogers as a student, through research on the different rates of adoption by farmers of new agricultural technologies. He quickly extended the theory into other areas (eg. the adoption of antibiotics among prescribing doctors), but it is notable that it is still predominantly applied to products and technologies – not behaviours.

The theory comprises a number of related elements; the core dynamic is demonstrated by the S-curve, showing the rate of adoption of innovations by a society or network. The curve suddenly takes off at around the 10-20% level of adoption; this is explained by interpersonal networks taking effect, and driving the rate of adoption to continue steeply through their own momentum (until it levels off again at around 80-90% adoption). The S-curve demonstrates the concept of 'critical mass', with the point at which critical mass is achieved known as the 'tipping point' (popularised by Malcolm Gladwell – see Rogers 1995).

Like the Stages of Change model, the Diffusion of Innovations theory results in a segmentation of the public. Rogers divides people into five 'adopter categories', based on their propensity to adopt innovations. The categories have been taken up and referred to in marketing and wider public life; they comprise 'innovators', 'early adopters', 'early majority', 'late majority' and 'laggards'. A sixth segment sits outside the model: 'change agents' who encourage the take up of the innovation (but – ominously perhaps – are not part of society). Adoption is represented as following a cascading dynamic down the categories, which can effectively be overlaid as vertical bands across the S-curve of adoption.

The rate of adoption of an innovation in a society is determined by a combination of the nature of the network, and the attributes of the innovation. Again these attributes have been widely cited in marketing practice; they are broken down into five aspects, being: 'relative advantage' and 'compatibility' (together the main factors in the attribute calculation), plus 'complexity', 'trialability' and 'observability'. Given the inherent newness of innovations, the theory must allow for uncertainty in the adoption decision; this uncertainty can be addressed through the innovation itself (eg. through trialability), but Rogers also confers importance on information as the force which enables adoption. This information should be differentiated according to the adopter category it is designed for; this allows for the categories' different levels of acceptable uncertainty (early adopters accept the most uncertainty). A further element of the theory is the 'Innovation-Decision

Process', through which individuals decide whether to adopt. Again, this is presented as a five step process, comprising 'knowledge of the idea', 'persuasion', 'decision', 'information' and 'confirmation'.

These elements of the Diffusion of Innovations theory reveal the underlying assumptions of the model. First it is highly deliberative; while social interaction spreads awareness of the innovation, the adoption behaviour is highly rational, close indeed to Expected Utility theory. The closeness to standard economic models of behaviour is further underlined by the sequential linearity of the Innovation-Decision Process, which is reminiscent of the AIDA marketing model (see 2.3 above). The theory also includes striking similarities to Prochaska and Di Clemente's Stages of Change model, including its segmenting of the public, and the recommended application of 'stage-matched' information. Indeed, Rogers claims that Prochaska developed his model in the light of Rogers' early work in agricultural innovations. Rogers in turn explicitly endorses the stage-matched approach.

As well as being fundamentally at odds with social-psychological theories of behaviour, Diffusion of Innovations takes a different view of change from those researchers who have worked on habitual behaviours since Lewin. In Rogers, a better technology simply replaces a previous one; the idea of resistance is not addressed in the theory. Finally, it has been noted that the theory can be read as a model of social learning; Rogers himself cites Hamblin (1979) who wrote that "*Diffusion models portray society as a huge learning system...*". However, the discussion of learning theory to follow below will suggest that Rogers' conception of learning is rather meagre, being highly instrumental, based on the passing of stable (and indisputable) information through a network, much in the way the innovation itself is seen to be adopted.

The fundamental point to note about the theory, which Rogers acknowledges, is that it was developed to explain the adoption of new products and technologies by society. There is little evidence that it is appropriate for understanding how behaviours spread through a society. Rogers also notes that the theory is inherently biased towards the innovation, which is presumed to be a good thing, of utility to all (somewhat sheepishly he remarks that much of the research conducted for the early development of the model was paid for by commercial sponsors, including Pfizer). In turn, this means that those who do not adopt the innovation are stigmatised, both by implication, and explicitly (as 'laggards'). Negative equity effects necessarily result from the model; by illustration, we might think of the current 'digital divide', increasing levels of exclusion among non-adopting groups.

Despite Rogers' mechanistic view of social systems, the emphasis the theory places on social networks in spreading behaviour is instructive. Much subsequent work on human behaviour has focused on the nature of networks, and in particular on the role of key individuals within them: 'network nodes' in the language of network theory. Gladwell's 'Tipping Point' (2000, in Rogers 1995, Dawney and Shah 2005) describes three types of individual who play key roles in driving adoption: **Mavens** (who acquire expert knowledge and freely share it), **Connectors** (who interact with large numbers of others in the network) and **Salesmen** (who are the most persuasive in encouraging adoption). While Gladwell identifies these types as key to driving social change, the context from which they emerge again relates to new products and services. Gladwell's Mavens are derived from the original concept of Market Mavens (Feick and Price 1987), which describes individuals who have greater or earlier information about products, and who initiate discussions with others about those products, or respond to their queries. The direct suggestion is that targeting these individuals can increase the effectiveness of marketing campaigns. The concept has rarely been tested as a means of spreading new behaviours rather than products; however, Defra are currently exploring the notion of mavens in the context of pro-environmental behaviour change.

Network theory is concerned with the nature of nodes and of the connections between them. This area of theory describes network connections as based on three types of relationship: propinquity (physical closeness), homophily (closeness of identity, for instance as status, values or norms), and multiplexity (based on closeness in multiple dimensions, eg. being a neighbour and a co-worker) (see Burgess and Nye 2006). Network theory also highlights the 'strength of weak ties' in building a network's common resources; for instance, weak ties are better at speeding adoption, as they tend to cover more nodes (see Rogers 1995).

Distinctions between different kinds of tie are also central to thinking on social capital. **Social capital** can be defined as "*the social resources available through networks, social norms and trust and reciprocity*" (Mc Michael 2007). It is thus inherently concerned with social change, as the accumulation of social capital through building network connections. Robert Putnam, who worked on social change from a policy perspective in Italy and then the USA (see 'Bowling Alone', Putnam 2000), describes social capital in terms of the network ties which it operates through. He identifies three kinds of connection: 'bonding capital' (in-group links), 'bridging capital' (inter-group links) and 'linking capital' (vertical links between strata of society). While bonding capital is best for getting by, bridging capital is best for getting on.

The premise of social capital is that societies which have it function more efficiently than those which do not; in small examples based on reciprocity between individuals this is clearly the case. However social capital is a difficult concept to measure; Putnam's book works through a welter of proxy measures for social capital, although there is no one (indexed) calculation available, or model to express the concept. David Halpern has applied thinking from social capital in an analysis of crime statistics from different countries (Halpern 2001). Halpern's analysis found that societies with higher levels of social capital (based on a few proxy measures) did indeed report lower levels of crime; he accounts for this through the greater levels of trust, self esteem and 'collective efficiency' in those societies. However, when the different measures of social capital were isolated from one another and tested through multivariate analysis, more contradictory effects were observed. This analysis found that a social trust variable actually correlated with higher levels of crime; Halpern explains this by saying that high trust societies provide criminals with "*a ready supply of trusting victims who leave their property unprotected*". He concludes that crime reduction interventions may be better directed at reducing 'criminogenic' factors such as self-interest than trying to enhance the factors that contribute to social capital.

From a social-psychological perspective, social capital can be regarded as an enabling resource which individuals can draw on when planning courses of behaviour. Social capital does not appear to drive behaviour per se. In this sense it resembles agency (see 2.6 above); indeed, 'collective efficacy' can be used as a related term (often in the context of crime – in eg. Knott et al 2008). It also appears that building social capital is in itself very difficult. Putnam recommends 'upstream' interventions which work to create more supportive contexts for building ties (Putnam 2000). These include better town planning, different approaches to formal education, and more opportunities to get involved in the democratic process. However, it is people themselves who forge the connections which create social capital; furthermore, this process itself is recursive, involving the building of reciprocal relationships and trust. Putnam concludes that the project to increase social capital necessitates overturning the distinction between "*top down and bottom up*" solutions; both are required.

4.4 Change as learning

Both behavioural models and theories of change reveal learning to be fundamental to the process of change. Models of behaviour which include feedback imply a learning process at work: we require evidence of impacts in order to evaluate and change our performance. Even in models which don't explicitly show feedback, learning is at work determining outcomes, as our learnings from past behaviour shape our expectations of future outcomes, our emotional reactions, our habits and our sense of agency. Beyond behavioural models, theories which explicitly address learning underline the importance of learning processes in bringing about lasting change.

The section has already introduced learning as a change tool through the example of rehearsing prospective behaviours (eg. Gollwitzer's Implementation Intentions –in eg. Maio et al 2007). The idea of change interventions based on learning new behaviour patterns is also expressed in the **Information–Motivation–Behaviour Skills (IMB)** model, commonly applied to preventative health behaviours (eg. Fisher et al 2002, where it is applied to HIV prevention). The IMB model is based on social-psychological principles (including the role of social norms and peer modelling) but it is predominantly an intervention method (similar to the Stages of Change model). The premise of the IMB model is that those with high levels of information, motivation and behavioural skills will undertake preventative health behaviour. Interventions should begin by assessing the audience in each of these dimensions, and provide the appropriate blend of each factor through the intervention method. Thus IMB interventions target knowledge, attitudes, and both generic self efficacy and instrumental behavioural skills. The IMB model is explicitly about learning. Fisher et al's HIV intervention is undertaken in a formal educational setting (US High Schools); the only area of debate is who should administer the intervention (teachers, peers or a combination of both).

Similarly to Rogers' Diffusion of Innovations theory, the IMB model does not stop to ask whether the behaviour to be adopted is desirable or not. This question is relatively unproblematic in the context of HIV prevention, but is more so in the context of climate change; a school-based intervention which required students to eat less meat would likely be more contested. Environmental education has addressed these concerns, and theorists have spent the last 30 years responding to the explicit call for behaviour change which the Tbilisi Intergovernmental Conference in 1977 included in its definition of environmental education's core purposes ("*To create new patterns of behaviour of individuals, groups, and society as a whole...*", in Darnton 2006). How best to achieve that goal is still an issue for debate, and one in which questions of principle and practice elide. Martha Monroe has identified oppositional yet complementary purposes in her **Framework for Environmental Education** (Monroe et al 2006 – Figure 4.23). At one end of the spectrum is skills practising (like IMB's behavioural skills element, or Gollwitzer), at the other end is problem solving. The key difference is whether specific behaviours are to be prescribed, and this in turn varies the extent to which education is explicitly used as a tool for behaviour change.

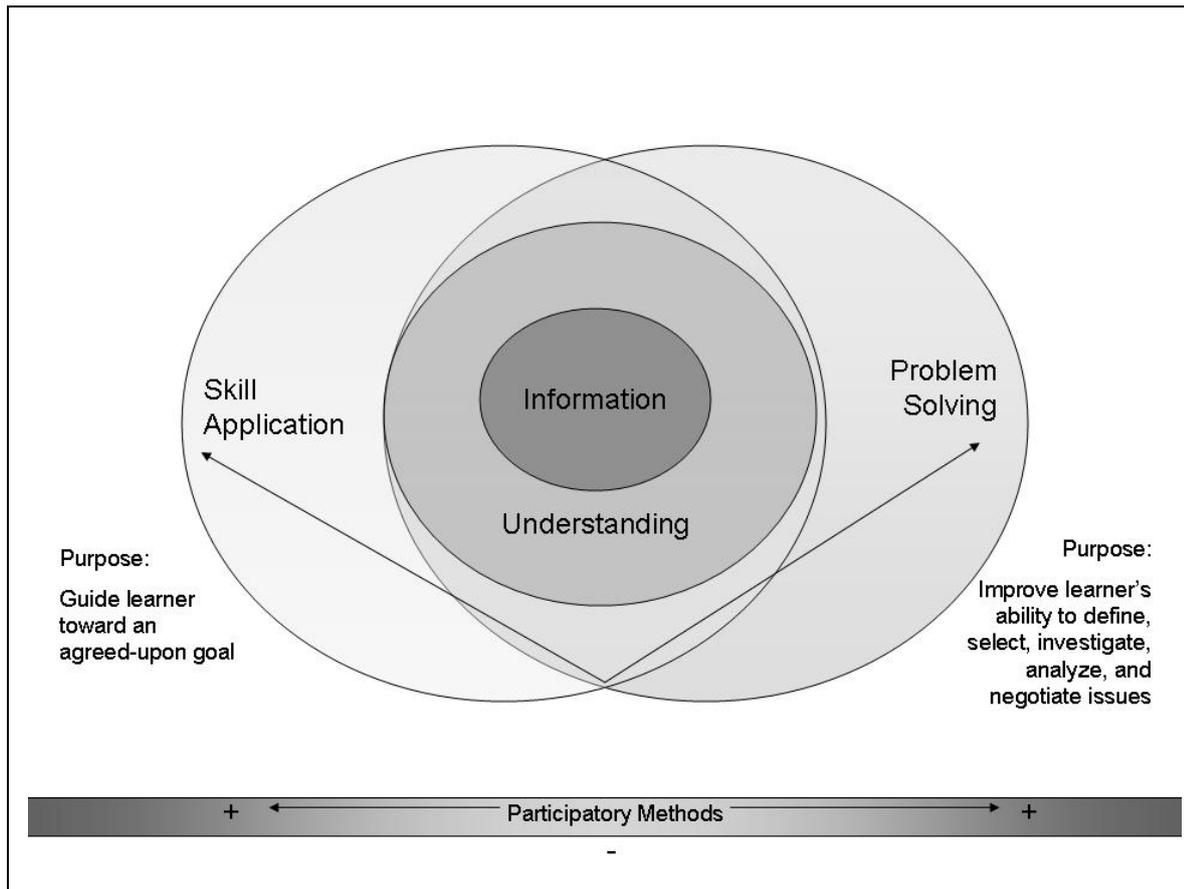


Figure 4.23: Monroe et al's Framework for Environmental Education Strategies (2006)
[reproduced from Monroe et al 2006]

In the context of Education for Sustainable Development (ESD), Paul Vare and Bill Scott have recently developed the theory of **ESD1/ESD2**. The theory represents two complementary purposes for ESD (Vare and Scott 2007), which can be summarised as follows:

ESD1: Promoting Behaviour Change

Relates to the teaching of pre-determined skills and behaviours, which are to be adopted as taught. The impact of ESD1 can be measured in terms of wider environmental impacts. The downside of ESD1 is that it does not build our capacity to act as autonomous individuals, in the short or long term.

ESD2: Exploring Sustainable Living

Relates to building learners' capacity to think critically about the behaviours identified as delivering sustainability. There are no pre-determined behaviours, hence the impact of ESD2 cannot be measured against pre-determined environmental impacts. The downside of ESD2 is that it may not lead to effective sustainable behaviour (ie. we "*sit around all day just talking*", says Vare).

ESD1 and ESD 2 are not either/or approaches; instead they are explained using the yin/yang symbol, with each moving around the other, and the seed of each being present in the other. The authors do however advocate ESD2 approaches over ESD1, partly as a corrective to current educational practice, but chiefly because environmental change will throw up future challenges which we cannot predict, so teaching a prescribed set of skills alone will be insufficient. ESD2 also requires participative approaches to learning through doing, on the basis that this is non-prescriptive, that it is the most impactful means of

acquiring knowledge, and that at the same time as learning about a problem it builds the learner's sense that they can influence it (ie. they acquire agency).

The difference between ESD1 and ESD2 is also explicitly defined as the difference between single and double loop learning. **Double loop learning**, as proposed by Chris Argyris and Donald Schon is a key concept in learning theory, but is also fundamental to theories of change (1978, in Argyris and Schon 1996). In developing the 'learning to learn' principles of learning theory put forward by Gregory Bateson, Argyris and Schon drew a distinction between 'first-order' and 'second-order' (also called 'higher order') thinking. The theory is presented in diagrammatic form, where first order learning is 'single loop' and second order 'double loop' (Figure 4.24).

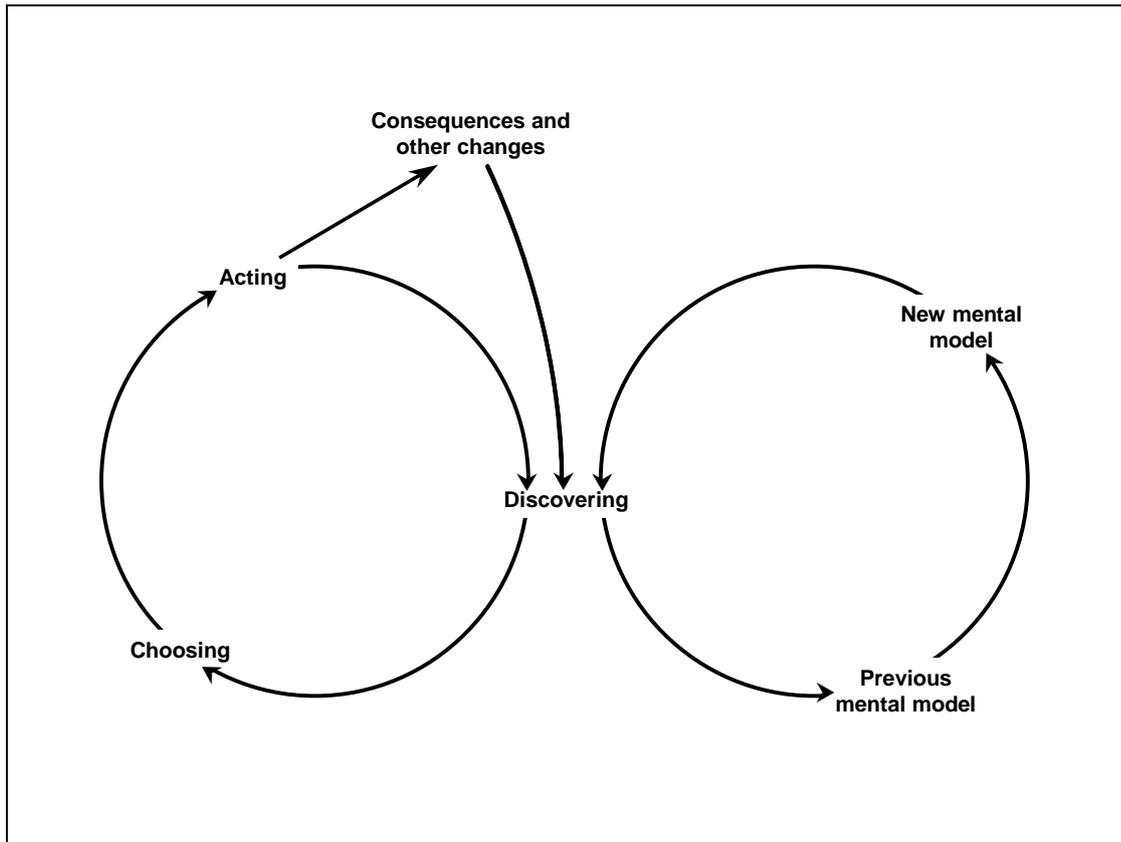


Figure 4.24: Argyris and Schon's Double Loop Learning (1978)

Double loop learning requires a questioning of existing assumptions as part of the process of learning. In the first (left-hand) loop, 'instrumental learning' occurs, in which understanding is acquired through scrutinising the impacts of action taken. In the second (right-hand) loop, 'process learning' occurs, in which inquiry is performed into the assumptions informing the acquiring of knowledge ('instrumental learning') in the first loop. Change in behaviour results as a by-product of learning; it is produced out of the first loop. Argyris and Schon state that they modelled their diagram on the homeostatic feedback loops of early systems thinker Ross Ashby. Their model is thus consistent with non-linear conceptualisations of behaviour, based on feedback. It can be remarked in passing that Donald Schon worked at MIT, where much of the leading systems thinking work was developed.

The double loop model explicitly accounts for processes of learning and change. When process learning occurs in the second loop, we learn how to do different things which enable us to perform more effectively; thus ESD2 is likened to second loop learning. Argyris and Schon describe learning in the first loop as "*paradigm constrained*", while

second loop learning is “*paradigm breaking*”. While single loop learning is sufficient to detect and correct errors in the way we operate, double loop learning is necessary if we are to change the fundamental basis on which we operate. The unspoken ‘theories in use’ which inform the instrumental learning processes are necessarily overthrown in ‘double loop’ learning, requiring as it does “*the restructuring of norms*”.

While appearing radical, this approach to learning as change can be traced back to thinking from the start of the twentieth century by John Dewey. Dewey’s early work in the psychology of human behaviour showed action to be the result of intermediate processing; instead of a stimulus-response dynamic, Dewey proposed a stimulus-interpretation-response model (1896 – see Rogers 1995). In his later work on education, Dewey described learning as a process of adapting to surprises which we experience on confronting a problematic situation. The surprise blocks our flow of spontaneous activity, giving rise to thought, then adapted action to re-establish the flow. For Argyris and Schon, new group norms are also required in order to re-establish the flow; in addition to the focus on John Dewey, they make explicit references to Kurt Lewin in their writing.

The learning practices which Argyris and Schon advocate are similarly ESD2, but again go back to Dewey, who defined enquiry as “*exercising intelligence in the world, the intertwining of thought and action by which we move from doubt to doubt*” (1938, in Argyris and Schon 1996). This formulation also brings to mind Kurt Lewin’s overarching ‘field theory’ approach, more a method than a theory, which develops concepts out of procedural enquiry (Lewin 1951). Argyris and Schon see themselves as action researchers, in the tradition which they trace back to Lewin as the “*father*”. Donald Schon developed his own definition of the action researcher as “*reflective practitioner*” (Schon 1983, in Argyris and Schon op. cit.), an identity which encapsulates the procedure followed by someone engaged in double loop learning.

Argyris and Schon developed the theory of double loop learning in the context of organisational change, a discipline of which they were themselves founding fathers when first publishing ‘Organisational Learning’ in 1978. Argyris and Schon hold that the fundamental learning unit is the individual, although like Lewin, they situate those individuals in groups (here, organisations) for the learning process to take effect. The ‘group standards’ that guide organisations are ‘theories in use’, unspoken understandings shaping organisational behaviour (‘theories in action’ are their explicit, post-rationalised, equivalents). The only way to identify theories in use is through observation; the only way to change theories in use is through double loop learning. The dynamic for changing ‘theories in use’ is similar to Lewin’s method of unfreezing/refreezing, and it is accompanied by similar emotional conflicts (or ‘stir-ups’), here on an interpersonal level.

Argyris and Schon’s methods have been highly influential in subsequent work on organisational learning. For instance, MIT psychologist Ed Schein’s seminal work ‘Organisational Culture and Leadership’ (first published in 1985, see Schein 2004) identifies three levels of **organisational culture**, and explains these in relation to Argyris and Schon’s theory. The surface level of organisational culture is ‘artefacts’ (including business plans and strategies); the level below is ‘espoused beliefs and values’ (described as ‘theories in action’), and the foundation level is ‘underlying assumptions’ (as ‘theories in use’). Only double loop learning or ‘frame breaking’ will allow the reshaping of underlying assumptions; without undertaking this change process periodically, the culture will come to dominate the organisation and its leader, making adaptive change (or conventional leadership) impossible. The process of exposing and changing underlying assumptions is again configured as something uncomfortable; Schein explicitly references Lewin’s phrase of “*creating disequilibrium*” (often through the use of “*disconfirming data*”). Schein writes of the “*inevitable pain of learning and change*”, revealing the two purposes to be intertwined.

He also notably concludes “*Learning and change cannot be imposed on people...cultural understanding and cultural learning starts with self-insight.*” (Schein 2004).

4.5 Change in systems

Theorists, practitioners and action researchers (being both in one) have long equated learning with change, especially in the context of organisations and in the wake of Argyris and Schon. Their common argument runs that, since change is the only constant in the modern world (what Donald Schon called “*the loss of a stable state*” – see Argyris and Schon 1996), organisations must be constantly adapting in order to thrive. Peter Senge, building on Argyris and Schon’s work (and also a colleague of Schon’s at MIT) turned their organisational learning theory into the concept of the ‘learning organisation’, capable of refashioning itself constantly. In ‘The Fifth Discipline’ (Senge 1990), Senge foregrounded the links between double loop learning and systems thinking in advocating new methods of organisational change.

Systems thinking is a theoretical approach to change (a field theory perhaps) derived from the network-based disciplines of cybernetics and ‘servo-mechanism’ engineering. The central premise is that systems have “*emergent properties*” (Checkland 1997, in Chapman 2004); the components of systems interact to create effects (often unforeseen) which the components could not have generated singly. Thus systems are more than the sum of their parts. Of the five disciplines which Senge sees as necessary for a learning organisation, systems thinking is the fifth discipline. He defines this in the Greek ‘metanoia’, meaning “*an upward shift of the mind*” (Senge 1990); thus systems thinking is “*a discipline for seeing wholes*”. The traditional Western analytical procedure is reductive, disassembling complex wholes into their parts to understand them. This method can be seen in scientific enquiry; a similar purpose is apparent in standard economic analysis in which the assumption of rationality is applied in order to simplify, and so model, complex behaviours (see 2.1 above). Systems thinking offers a distinctive approach, standing back to see the patterns at play across the whole. Jake Chapman, who works on organisational learning in the context of the UK government, describes systems thinking as “*moving up a level of abstraction*” (Chapman 2004). Senge makes the distinction between ‘detail complexity’, which traditional analysis can deal with by disassembly, and ‘dynamic complexity’ which involves systemic interactions over time, and generates emergent properties.

As has been discussed in the context of models of behaviour as self-regulation (see 2.10 above), the **feedback loop** is the central construct in systems thinking. Behaviour in systems thinking develops in continuous loops (as in Control Theory – see Carver and Scheier 1982), similar to the ongoing cycles of action and reflection in Donald Schon’s reflective practice (see Argyris and Schon 1996). Senge’s ‘Fifth Discipline’ is filled with looped diagrams showing progress via feedback, as each action reinforces or counterbalances another. As with looped learning, this is clearly at odds with multilinear, left to right models of behaviour. Senge comments that “*reality is made up of circles, but we see straight lines*” (Senge 1990).

To illustrate behaviour as feedback, Senge presents a simple single loop demonstrating how filling a glass of water from a tap is a looped not a linear action, based on monitoring and feedback between our eye and our hand as the water reaches the desired level in the glass (Figure 4.25).

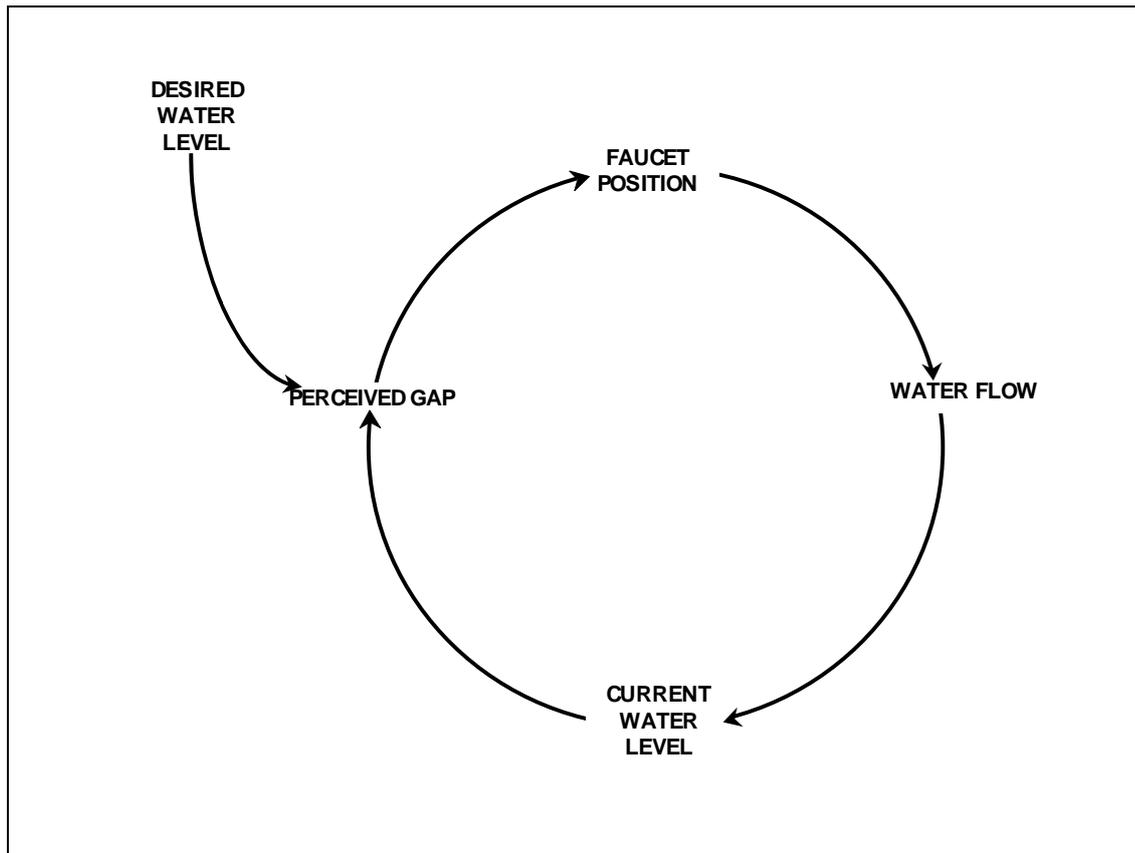


Figure 4.25: Senge's Diagram of Filling a Glass of Water as Feedback (1990)

The negative feedback loop of the homeostatic system (eg. a thermostatic heating system) is a variation on this figure, while positive feedback is diagrammed as two loops each reinforcing the behaviour of the other. The Cold War arms race is given as an example of positive feedback, with escalation in the number of warheads resulting in the unintended consequence of increased levels of fear, when the original aim of each superpower was to keep their population safe.

Senge demonstrates how diagrams are central to systems thinking; they offer an alternative to the linear analytical approaches of models and language. The act of drawing up the looped diagrams ('modelling') is essentially the discipline of systems thinking in practice. In calling for learning, Senge requires organisations to practice the discipline of systems thinking: "...*practising a discipline is different from emulating a model; emulation is just piecemeal copying and playing catch-up.*" Thus systems thinking delivers a direct challenge to traditional analytical approaches, effectively calling for reflective practice and Deweyan inquiry – not the implementing of models. This is also a clear challenge to traditional (policy) approaches to behaviour change, which use theory to identify what works in an intervention so it can be replicated elsewhere. Moreover, systems thinking makes the distinction between transformational and incremental change ("*playing catch-up*" in Senge's phrase). Transformational change requires the kind of deep insight advocated by Schein, that can expose and reshape underlying assumptions, whereas incremental change works within the existing structure. In the language of Argyris and Schon, incremental change would be single loop learning, sufficient to detect and correct errors.

The notion that thought is sparked by encountering problems is fundamental to systems thinking, and can be traced back to Dewey's definition of learning based on reacting to surprises. Systems thinking distinguishes between problems in two kinds, thus allowing

for the production of transformational as well as incremental change. In 'System Failure' (in part, the failure of government to become a learning organisation), Chapman cites Roger Ackoff defining problems of two kinds (Ackoff 1974, in Chapman 2004):

- **'difficulties'**
in which there is agreement about the problem and what constitutes a solution, and which are bounded by time and resources;
- **'messes'**
characterised by uncertainty: about what the problem is, how it might be deemed fixed, and how long that might take.

Both types of problem can respond to systems approaches, although messes most require such approaches. Intervening in one mess tends to impact on other messes, so that addressing the issues is usually unbounded in scope, time, resources and people. In a policy context, reducing crime or raising school standards could be described as 'messes'; complex organisations can also be 'messes', and Chapman is not alone in saying the NHS is one.

Faced with such problems, systems thinking advocates two methods: **hard systems** approaches and **soft systems** approaches. Both methods are holistic (involving "*seeing wholes*"), but soft systems is also pluralistic, allowing for divergence in opinion on the nature of the system of interest (eg. where its boundaries lie). Soft systems methods are particularly good for approaching messes, and in problems where diverse stakeholders are involved. Soft systems methodology was developed for analysing human activity systems, whereas hard systems derived from engineering problems, in which the components of a system are fixed and known. Soft systems modelling (producing looped diagrams and 'rich pictures') is best undertaken by groups of stakeholders following cycles of action and reflection; at some point in the process a shift to a higher level of abstraction is required (see Chapman 2004 and 2007).

Soft systems approaches and the related concept of messes are particularly valuable in the context of policy problems which do not respond to 'piecemeal' interventions addressing one part of the system. Notably, a soft systems approach has recently been applied by the Foresight programme to the near-epidemic 'mess' of obesity (Foresight 2007a). In order to understand the diverse factors contributing to obesity, Foresight assembled a team of experts to take part in a systems mapping exercise. This resulted in the exceedingly complex '**Obesity System Map**' (Figure 4.26), which is described as the "*most comprehensive*" model of obesity available. Its comprehensiveness recalls Bagozzi's own Comprehensive Model (see Section 2 above), but the relations between the factors in the Map are more complex, being looped throughout. The Map is characterised by feedback, and at its centre is the 'energy balance' model of weight gain, based on a simple negative (regulating) feedback loop, balancing energy taken in (through eating) against energy expended (through exercise). However, Foresight note that tackling obesity is not just a question of getting people to eat less and exercise more; the interventions between the myriad other factors shown must also be addressed.

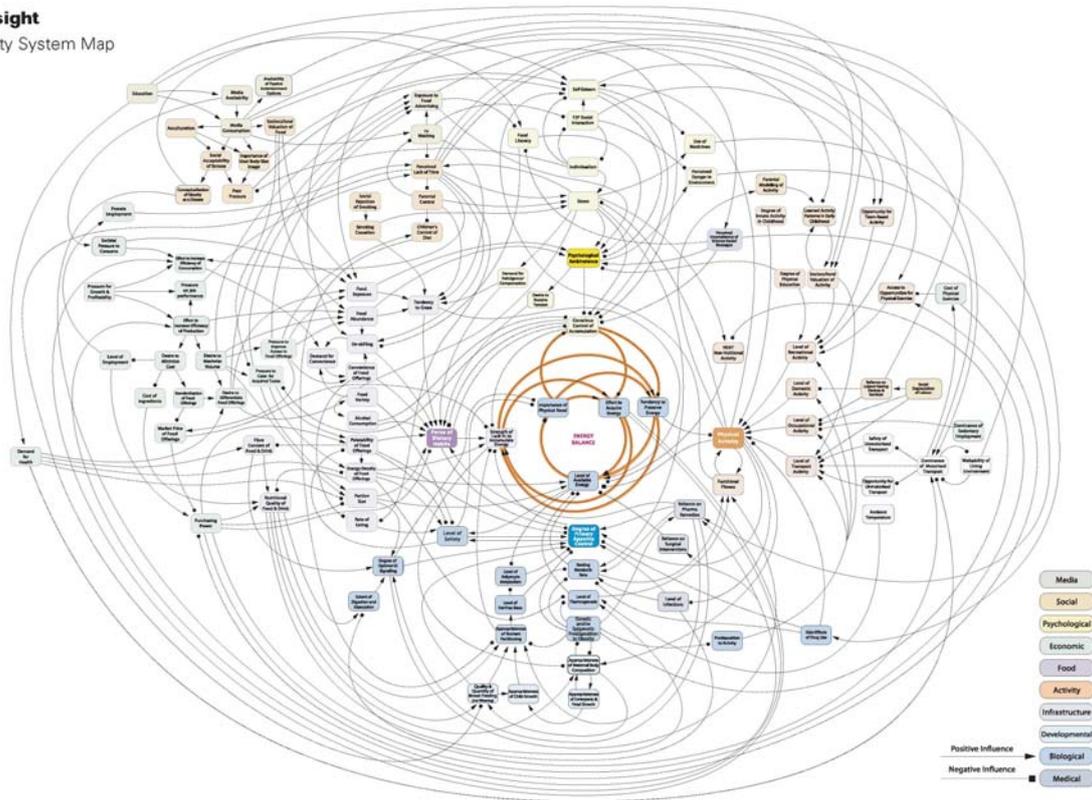


Figure 4.26: Foresight’s Obesity System Map (2007) [reproduced from Foresight 2007a]

It is because of their emergent properties that systems are inherently resistant to change. For Senge ‘policy resistance’ is one of the underpinning principles of systems thinking (Senge 1990). For Chapman, resistance to change is not “*bloodymindedness*”, but a measure of a system’s resilience (Chapman 2004). This definition recalls Lewin’s, although for him the binding factor was group standards, whereas in systems thinking it is feedback. Despite differences in conceptualisation, Lewin’s understanding of change can be seen to resonate with soft systems approaches.

A good example from practice is provided by Robin Youngson, a senior manager in the New Zealand health service (Youngson 2006). He describes a positive (self-reinforcing) feedback loop in a hospital, between doctors, midwives, managers and patients (Figure 4.27a and b). In its ‘unsafe state’ this loop is characterised by fear, blame and defensiveness – the indicators being a lack of disclosure of errors and failures, and a high rate of births by caesarian section. Following a traumatic event at the hospital – a fire in an operating theatre – the stakeholders were forced to come together to work through the problem, and reveal their underlying assumptions (including through techniques like psychodrama). As a result of this ‘emotional stir-up’ and group decision, the system “*flipped*” into a ‘safe’ self-reinforcing loop – where better disclosure led to increased trust, and greatly reduced c-section rates. The fundamental elements of Lewin’s theory of change are clearly present, in parallel with a systems approach. Once the uncomfortable process of change had been accomplished, the flow of day to day hospital life returned as the positive feedback loop was re-established.

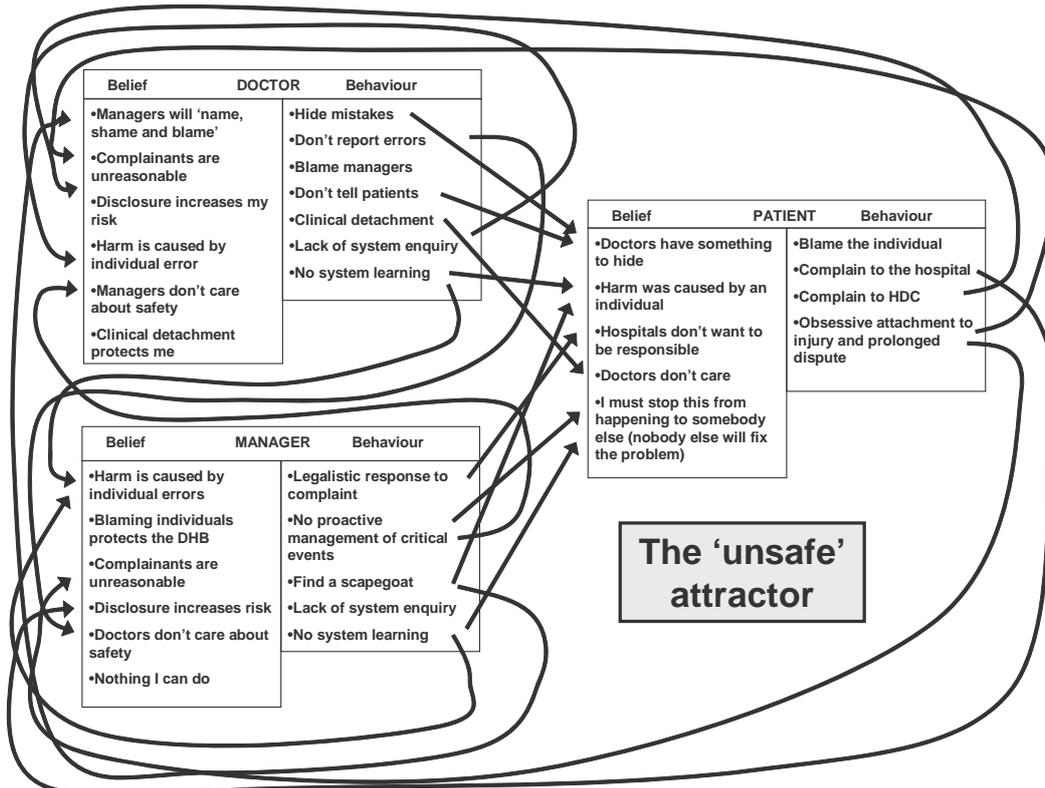


Figure 4.27a: Youngson's Unsafe Hospital State as Positive Feedback (2006) [reproduced from Youngson 2006]

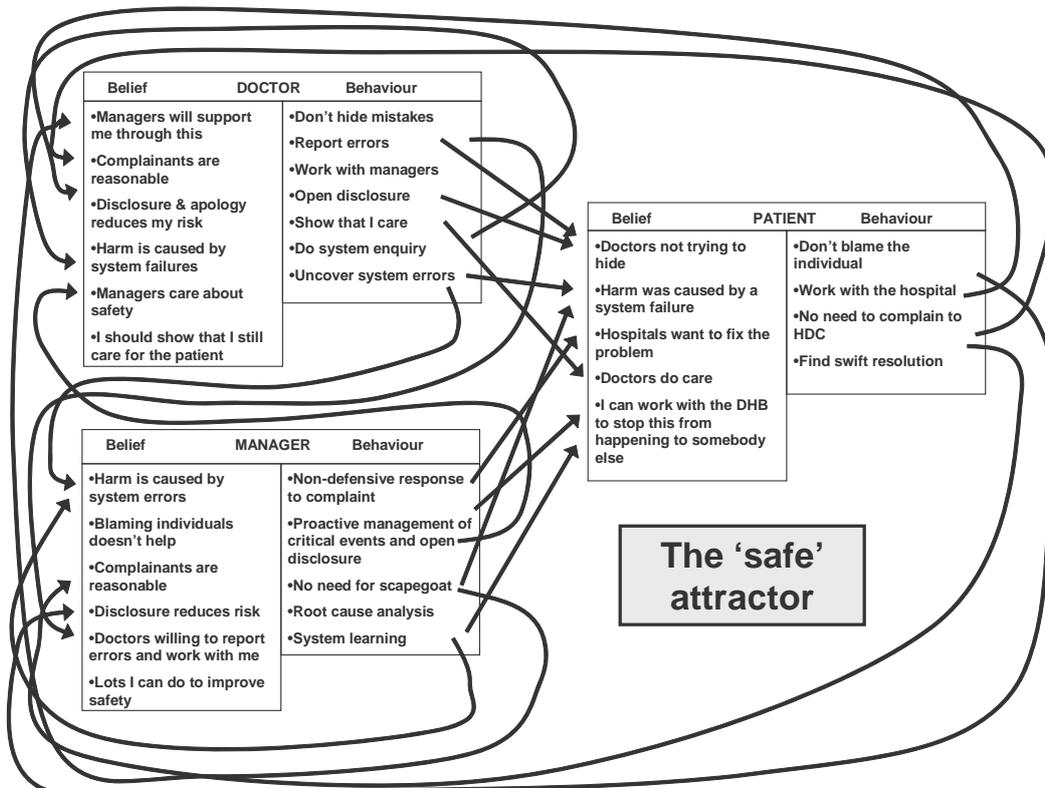


Figure 4.27b: Youngson's Safe Hospital State as Positive Feedback (2006) [reproduced from Youngson 2006]

As in Lewin’s theory, the role of groups in bringing about change is vital in systems approaches. For Senge, team learning is one of the five disciplines he advocates, because teams are the “*fundamental learning unit*” in organisations (notably not individuals, who are the basic building blocks of organisations for Argyris and Schon). Senge has recently collaborated with another MIT colleague Otto Scharmer to evolve a new change discipline, **Theory U** (Scharmer 2007). The Theory has roots in the work of Argyris and Schon, and explicitly builds on Schein’s work; Scharmer also quotes Lewin: “*you cannot understand a system unless you change it*” (Lewin 1951). Theory U effectively represents an alternative to soft systems approaches, tackling uncertainty in complex systems through a process called ‘presencing’, defined as “*seeing the future as it emerges*” (Scharmer 2007). Again this requires action and reflection, and at the heart of the process is a shift up a level of abstraction, as in soft systems modelling. However this shift is also explicitly spiritual, expressed as connecting to a higher presence. It should be noted that Senge says that his term of ‘metanoia’ has historically been used by Christians to mean seeing God; however, presencing is also deliberately not aligned with any one religion.

Theory U blends existing change theories as it describes change as a U-shaped process (Figure 4.28). Down the left-hand side of the U, participants reveal and ‘let go’ their assumptions (recall Ed Schein peeling back the layers of organisational culture). At the foot of the U participants acquire deep self-insight through presencing (as metanoia). Up the right-hand side of the U, participants ‘let come’ new prototypes based on their new assumptions (which they test through action and reflection). Theory U is in its infancy, but it has already proved suitable for systemic problems where transformational change is required, especially through the involvement of stakeholder organisations. For instance, it has recently been applied to the problem of building sustainability into US food markets.

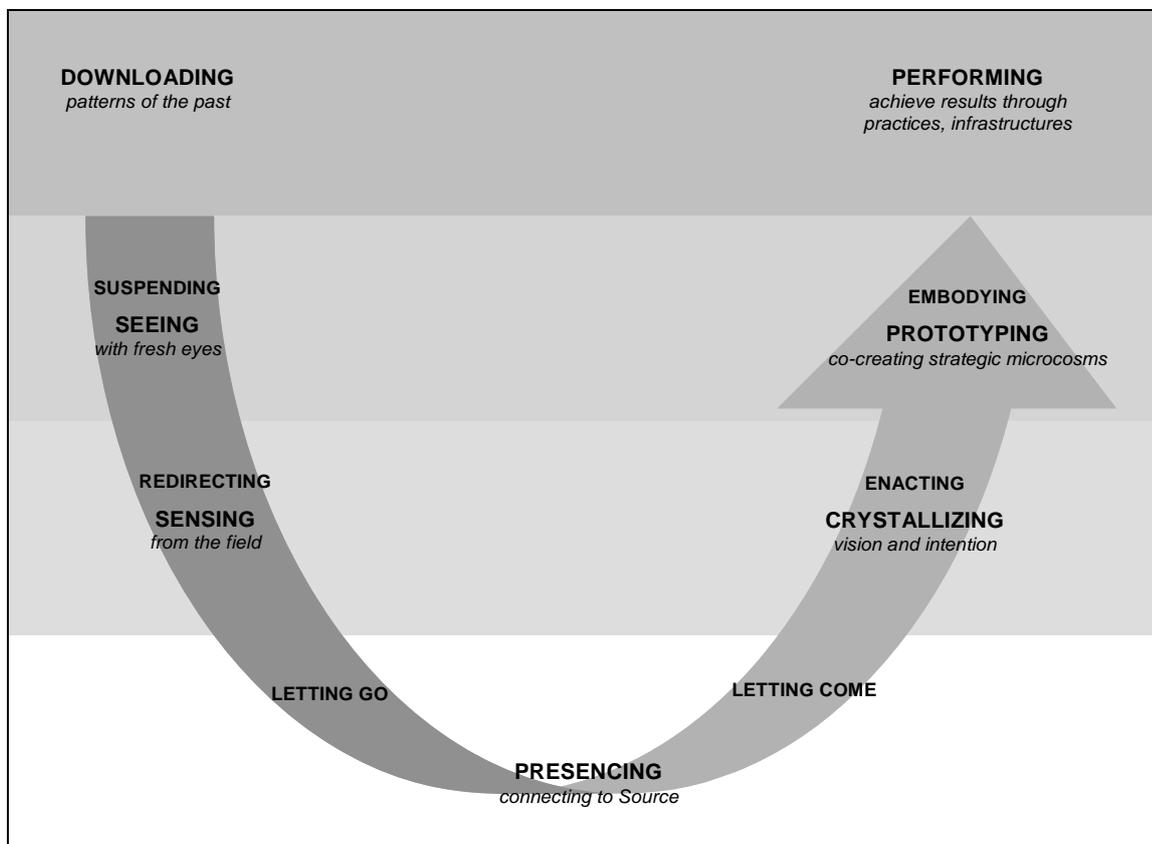


Figure 4.28: Scharmer’s Theory U (2007) [adapted from Scharmer 2007]

5. Applied Approaches to Change

The UK government has recognised the need for behaviour change in order to deliver its policy goals, and to achieve greater efficiency in service delivery. The Wanless Report (2002) provides a prime example of the latter rationale for behaviour change in the context of health: citizens need to be ‘fully engaged’ in positive health behaviours in order to keep down the costs of health service provision (see Halpern et al 2003, Knott et al 2008). Meanwhile, in relation to tackling environmental degradation, Defra are leading on the Government’s Sustainable Development Strategy (2005), which explicitly calls for behaviour change given that individuals are responsible for many of the most significant environmental impacts (see Darnton et al 2006). Most recently, the Foresight programme called for behaviour change to tackle obesity – not just at the level of individuals, but “*within families, communities, organisations and economic markets*” (Foresight 2007a). Government has also adopted process-based models and frameworks to support effective policy making for behaviour change.

Social marketing is often used by government for engaging the public in behaviour change initiatives. In 2005 the Department of Health, together with the National Consumer Council, set up the National Social Marketing Centre (NSMC), which provides guidance across government, and collects best practice. The NSMC Pocket Guide defines social marketing as “*the systematic application of marketing concepts and techniques to achieve specific behavioural goals relevant to a social good*” (French and Blair Stevens 2005). Social marketing is multidisciplinary, and explicitly transtheoretical, drawing on much of the behaviour change theory summarised here. The NSMC guidance puts the emphasis in the social marketing process on the initial ‘scoping’ phase, and in so doing follows the practice of Doug McKenzie-Mohr, who stresses the importance of initial “*barrier research*” (McKenzie-Mohr 2000). The chief proponent of **community-based social marketing** (CBSM), McKenzie-Mohr describes social marketing as a four step process, as follows:

- Step 1: Uncover the barriers to behaviours, then, based on this information, select which behaviours to promote.
- Step 2: Design a program to overcome the barriers to the selected behaviours.
- Step 3: Pilot the program.
- Step 4: Evaluate the program once implemented.

Andreasen had earlier described the social marketing process similarly, although he accounted for 6 stages (1995, in Kurani and Turrentine 2002). Three of **Andreasen’s six stages** involve research: ‘listening’ (including barrier research), ‘pretesting’, and once the programme is implemented, ‘monitoring’. Notably, Andreasen presents the six stages as a looped diagram (Figure 5.29), and explicitly describes social marketing as a recursive process, with the intervention adapted in the light of ongoing monitoring.

Andreasen defines social marketing as a process “*...designed to influence the voluntary behaviour of the target audience to improve their welfare, and society’s*”. This conclusion is apparently similar to Schein’s that learning and change cannot be imposed, although the two approaches pursue different aims. Social marketing starts from where people are at, and moves in increments towards a predetermined goal, whereas approaches based on double loop learning and systems thinking tackle the underlying assumptions of social groups in order to unleash transformational change.

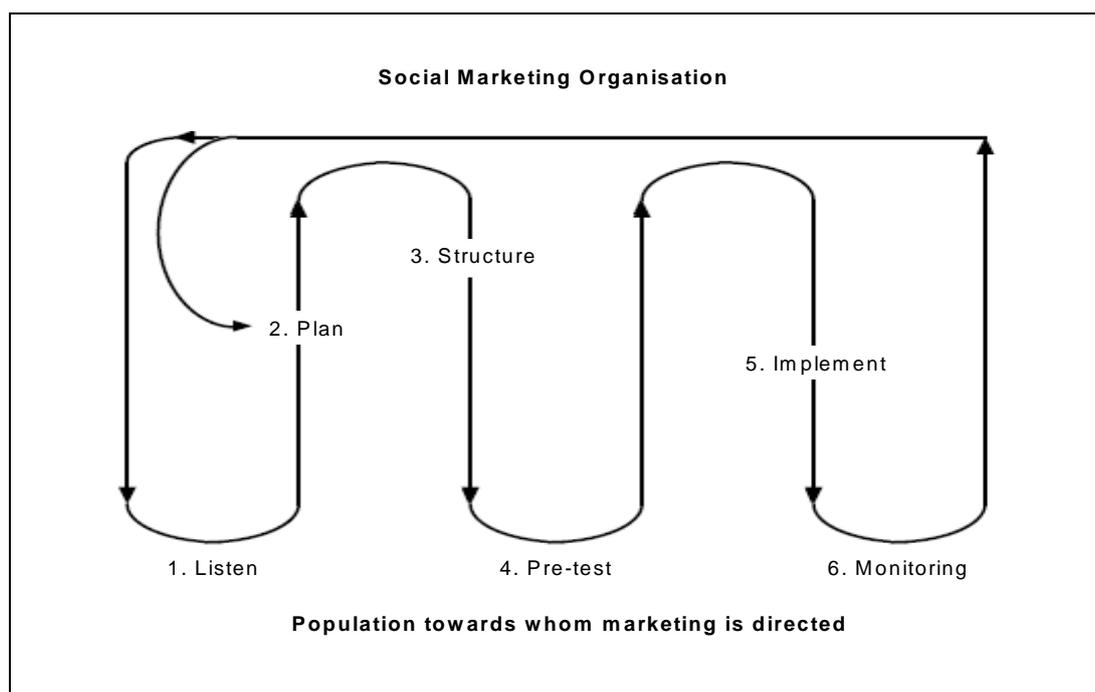


Fig 5.29: Andreasen's Six Stage Model of Social Marketing (1995) [adapted from Kurani and Turrentine 2002]

By taking commercial marketing practice and applying it to changing behaviours, social marketing represents a framework for developing policy interventions. Close parallels are apparent between the four or six stages advocated in social marketing, and the eight or so points set out by Gardner and Stern in their '**Principles for Intervening to Change Environmentally Destructive Behaviour**' (1996, in Stern 2000 – Figure 2.10). Several of these have already been mentioned, including those concerning engaging the audience as actors in the process (see 2.6 above), and addressing "*conditions beyond the individual which constrain choice*" (see 2.9 above). The Principles arise from social psychology, but are explicitly provided for policy makers addressing behaviour change in the context of the environment. A number of frameworks for designing interventions have also been developed in the health sphere, of which Kay Bartholomew and colleagues' **Intervention Mapping (IM)** is the leading example (Bartholomew et al 1998 – Figure 5.30).

Intervention Mapping sets out a five-stage process for intervention development, running from setting objectives through to generating evaluation plans. The five steps are preceded by a 'Needs Assessment' stage which, in keeping with Gardner and Stern's Principles, calls for the precise specifying of the target behaviour which is to be changed. However, in a key difference from those other frameworks, the Needs Assessment stage of IM explicitly requires the selection and adoption of relevant models from behavioural theory. IM sets behavioural models at the centre of the policy planning process; the intervention strategy followed through all the subsequent steps is shaped by the particular model selected at the beginning. Finally, as in Andreasen's model of social marketing, learnings gathered at the end of the process are fed back in to the Needs Assessment stage of subsequent programmes.

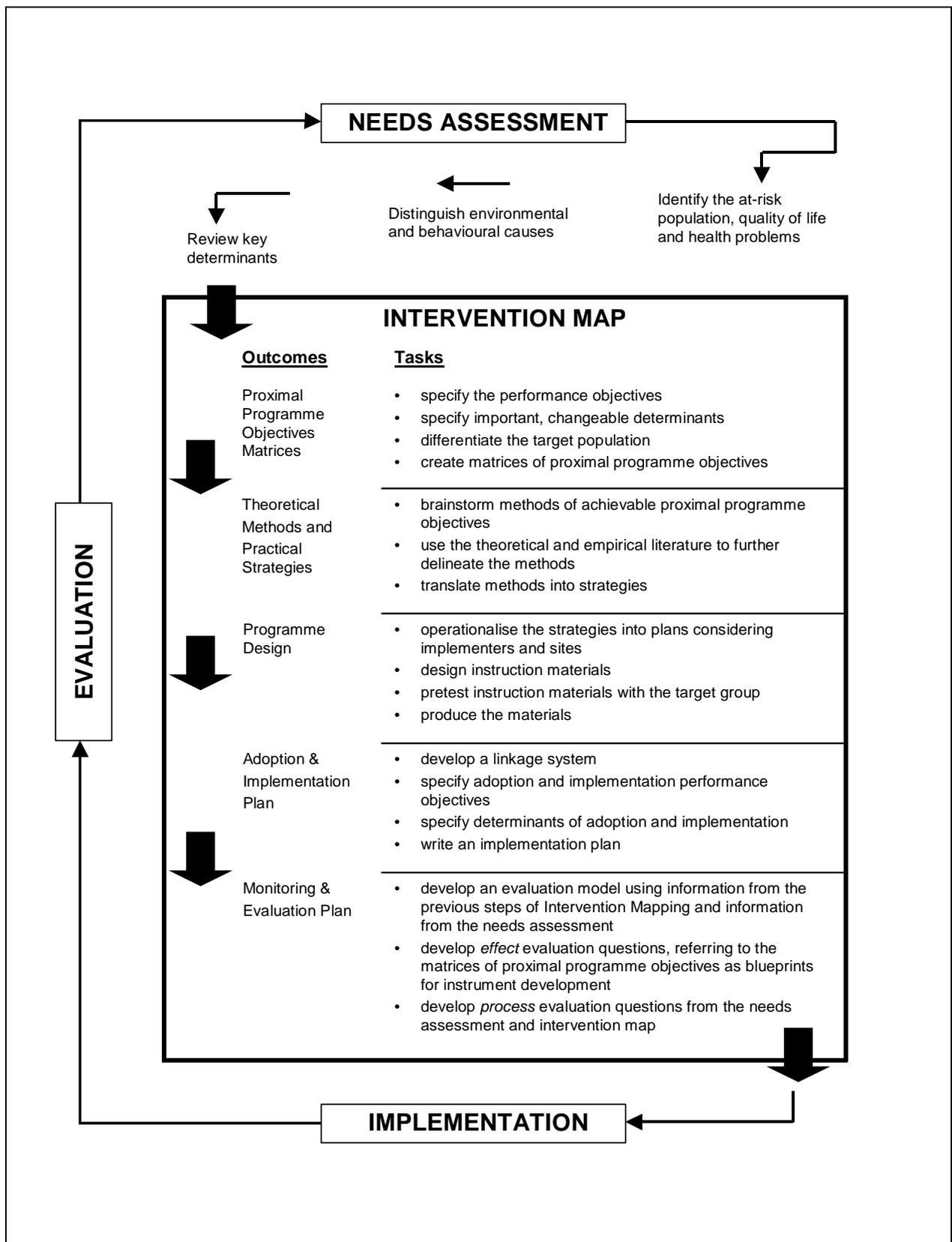


Figure 5.30: Bartholomew et al's Intervention Mapping (IM) (1998) [adapted from Bartholomew et al 1998]

Unlike the context-specific policy frameworks of Gardner and Stern and Intervention Mapping, social marketing sets out requirements for the intervention methods to be used. Social marketing explicitly recommends combining multiple types of tool in an ‘intervention mix’ (French and Blair Stevens 2005). Indeed, one common interpretation of social marketing is that it simply means including ‘below the line’ marketing methods (this is certainly the emphasis of community-based social marketing). The idea of the ‘intervention mix’ is central to a current process model for policy makers, Defra’s **4Es model** (‘the Defra Diamond’ 2005, in Defra 2008 – Figure 5.31).

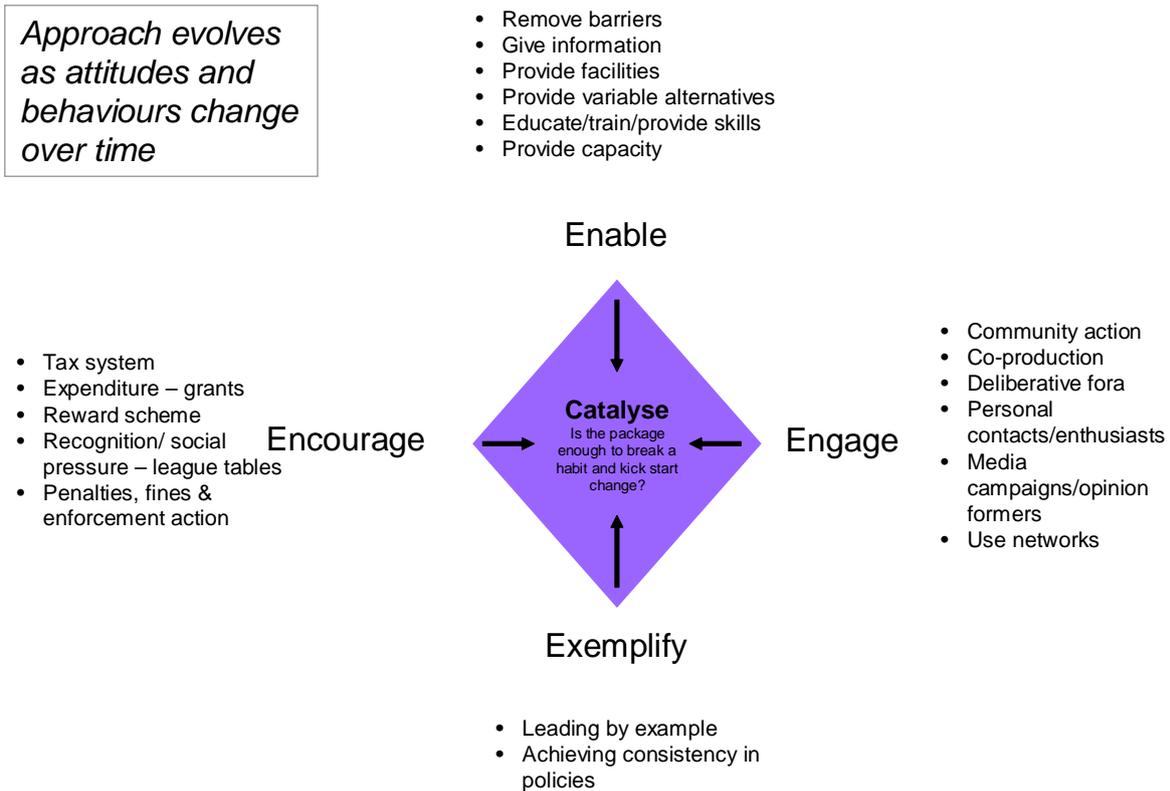


Figure 5.31: Defra’s 4 Es Model (2005)

Though developed for pro-environmental behaviours, the 4Es model has been applied more broadly (often being customised, see eg. French and Blair Stevens 2005, Lewis 2007). Designed in accordance with social marketing principles, the model goes with the grain of consumer behaviour, as is apparent in the non-coercive tone of the Es themselves: Enable, Encourage, Engage and Exemplify. Like the four tiers in the Main Determinants of Health Model (Dahlgren and Whitehead 1991, 2007), also designed for policy development, each of the Es is mapped against intervention types. Thus Enable relates to core infrastructure, Encourage to fiscal, legislative and regulatory measures, Engage to communications, and Exemplify to government demonstrating its commitment to the behaviour in question (Defra 2008).

Together the 4Es form a “*package of measures*”; the question explicitly asked at the centre of the model is is the package “*strong enough to catalyse the behaviour change?*”. The purpose of the behaviour change intervention is thus not presented as forcing the public to comply, but supplying a little extra energy sufficient to kick-start the process of change. However, within this non-coercive package there is still the potential for forcing change, as Encourage does include regulatory instruments, which provide compulsory levers. In the ipp’s adapted version of the model (in Lewis 2007), it is notable that Encourage appears

as 'Encourage and Enforce', thus emphasising government's need to compel behaviour change in some circumstances.

The 4Es model provides a valuable framework for policy makers developing interventions, functioning as a visual checklist to help ensure balanced policies result. However, being a tool for policy development rather than a behavioural model, it does not help predict how individuals will react in response to the policy which is designed. Off the model lie many other factors, including societal influences on behaviour such as market forces, and the (often contradictory) influence of other government policies. Most obviously, social-psychological factors are also omitted; it would be necessary to use the 4Es model alongside relevant behavioural models to determine which policy instruments were most likely to achieve an effective balance.

Recent work by the Prime Minister's Strategy Unit has expanded the boundaries of the 4Es model by setting it in the wider context of culture change (Knott et al 2008). The result is the **Cultural Capital Framework**, a nested model in which policymaking for individual behaviour change sits within wider policy making for culture change (Figure 5.32).

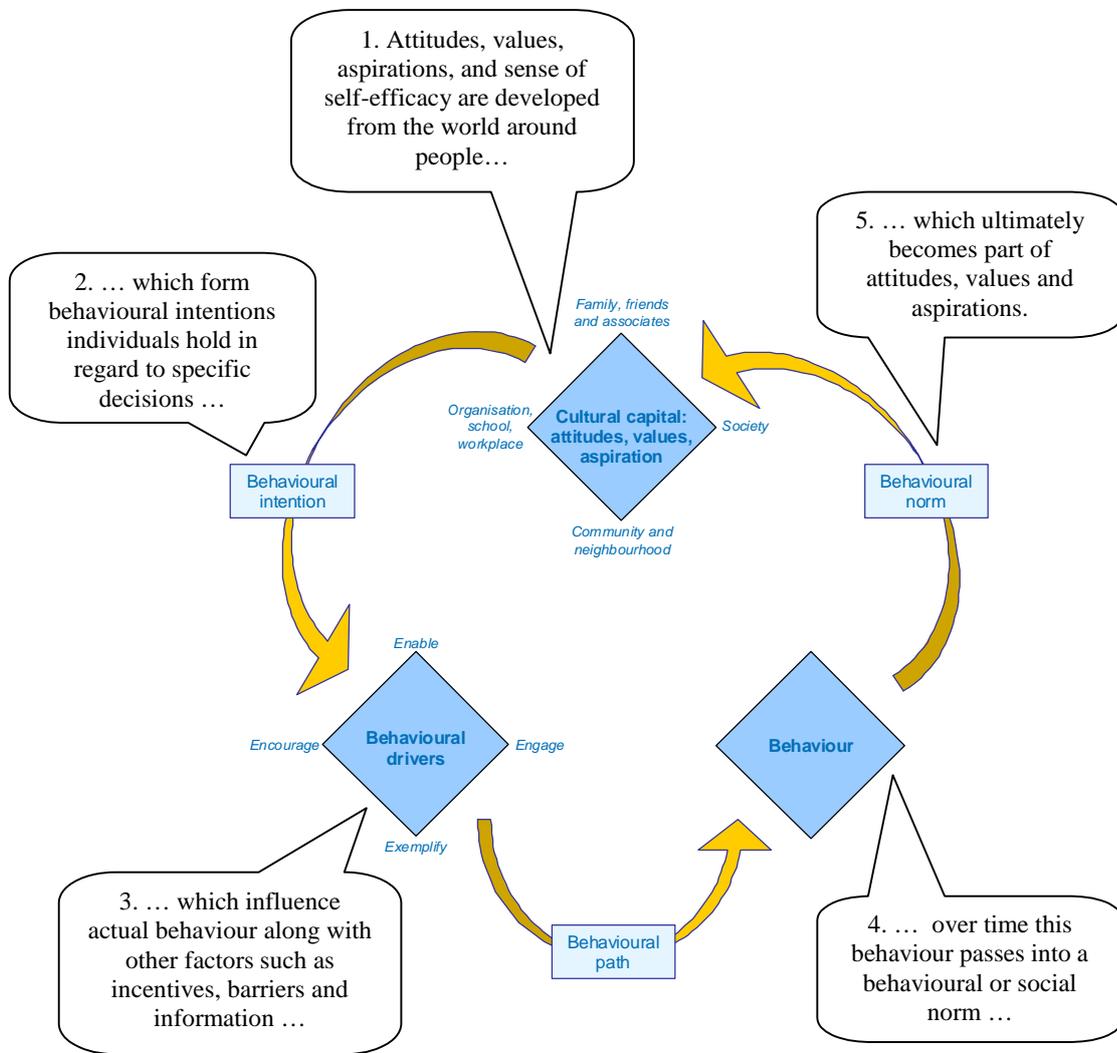


Figure 5.32: Knott et al's Cultural Capital Framework (2008) [reproduced from Knott et al 2008]

David Knott's argument is that social context prevents individuals from changing their behaviour, so interventions must also address social and cultural norms to enable

'catalysis' of behaviour to occur. This implication is in keeping with social-psychological theory; the culture change model thus resembles societal models of change such as NOA. Indeed the culture change model is similarly looped, identifying the recursive process between individual behaviour and cultural norms. Cultural capital, defined by Bourdieu as the capital individuals hold which impacts on their educational attainment (ie. their knowledge and skills), is embodied in the socialised self. Cultural capital thus offers an aggregate measure of individuals' assets, and in this way it mirrors social capital. Building cultural capital is a similarly top down and bottom up process to building social capital; while individual-level behaviour change interventions are required, so are upstream interventions directly designed to change the societal context for behaviour. Culture change can thus be driven both by individuals (notably by 'thought leaders', eg. Gandhi, or Jesus) as well as by government and institutions. Consistent with changing social norms, culture change is presented as a longterm process.

A comparable goal of societal change is apparent in the Department for Communities and Local Government's **Model of Community Empowerment** (CLG 2008 – Figure 5.33).

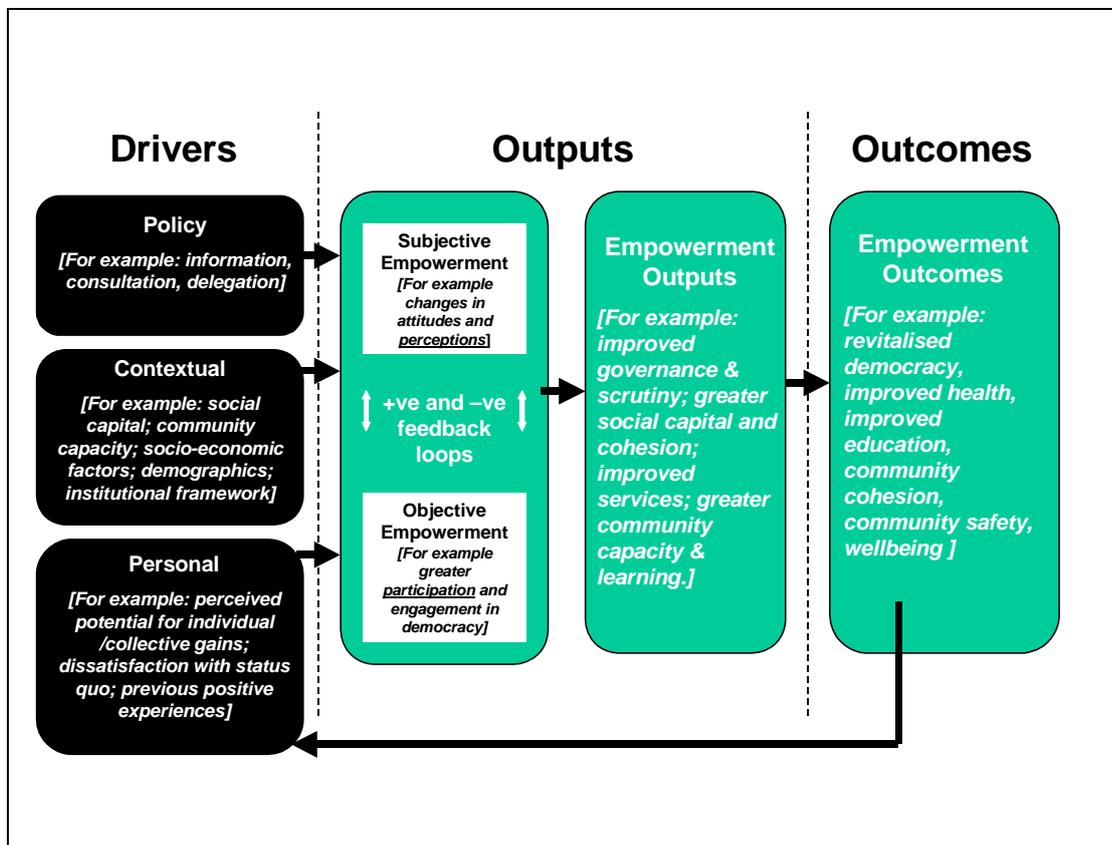


Figure 5.33: Department for Communities and Local Government's Community Empowerment Framework (2008) [reproduced from CLG 2008]

The Model is still in development (and subject to ongoing revision), but it serves both as a policy framework, and as a model of change. The Model shows the recursive relationship between policy intervention and individual behaviour in generating community empowerment; we may recall the discussion of social capital (in 1.11 above). In the Model, policy, contextual and personal drivers generate 'subjective and objective' outputs (measured as changes in public behaviour and attitudes: more civic and democratic participation, a greater sense of collective agency, and more positive public perceptions). As in the NOA model, these outputs are not the end in themselves, but generate further outcomes, including revitalised democracy, community cohesion, better health and education outcomes, and (like NOA) personal wellbeing. A feedback loop is included

running from the outcomes of the process back to the drivers, demonstrating the 'virtuous circle' of community empowerment. While the Model serves to identify the factors driving community empowerment, it also demonstrates the role of policy in bringing about societal change.

Finally, an alternative process-based approach to policy making for behaviour change which applies the systems thinking approach, is offered by Jake Chapman. Chapman's work has been undertaken not from within but alongside government; he is an academic and systems thinker, who has consulted for government departments, and been a trainer on the government's Top Management Programme (see Chapman 2007). **Chapman's 'System Failure'** (2004), written for Demos, lays out a systems view of why so much policy fails (in large part due to the feedback in human activity systems, or their 'policy resistance', in the words of Peter Senge). Systems thinking represents a challenge to the traditional 'mechanistic' model of policy making, based on 'command and control' assumptions. Chapman explains the difference between the two approaches through reference to the work of Paul Plsek, himself a consultant employing systems approaches, including to improvement within the NHS. Plsek describes how 'mechanistic' policy approaches imagine a problem as a stone, which can be thrown in a particular direction, allowing the thrower to make a fair prediction as to where it will land. However, systems approaches treat complex problems more like a bird, whose flight cannot be predicted, once thrown. The two solutions Plsek puts forward are to tie the stone to the bird (thereby effacing the bird's essential qualities), or to lure the bird to a particular landing site with the use of some agreeable food.

In keeping with the non-prescriptive approach to change (based on action and reflection) which Chapman advocates, he does not lay out an ideal policy process to be adopted. Again, Senge's line on adopting models as "*just piecemeal copying*" can be recalled. Instead, Chapman's overarching recommendation is "*to create a system of government that can learn for itself*", a public sector equivalent of Senge's learning organisation. Chapman explicitly refuses to lay out steps or principles, as these would appear to provide a solution, when what is required is the capacity to learn (a thoroughly ESD2 approach). However it is possible to identify a few key implications for policy from his analysis, as follows:

- Don't prescribe solutions from the centre, gather them up from local contexts.
- Abandon command and control assumptions about policy-making; adopt participative ways of working throughout the process.
- Don't set targets from the centre; instead, stipulate the direction of change, and provide the necessary resources.
- Innovate, implement and review policy continuously; it could take a year to see what has worked (at the end of which, abandon what has not).
- Greet failure as an opportunity to build understanding: "*While failure is unacceptable, learning is not possible – with the paradoxical result that failures will continue.*"

6. Issues around intervening

As well as grounding interventions in a thorough understanding of behaviour and change, research analysts and policy makers also need to consider the consequences and wider contextual issues of intervening, whether intended or unintended. Wider contextual issues to be accounted for when considering undertaking behaviour change interventions include the ethics around intervening, and the wider effects of doing so, both in terms of equity effects and unintended consequences.

To an extent these issues stand apart from the theoretical evidence on behaviour change, and the two bodies of literature are not currently well integrated. However, some of the sources included in this review address both behaviour change theory and ethical and other issues around intervening – most notably ippr’s recent ‘States of Reason’ review (Lewis 2007).

There is little evidence that any of these equity and related issues arise from using models and theory to design interventions. No one model of behaviour is inherently fairer than another; whether negative effects result depends on what factors within a model are selected for an intervention to work upon, and then the manner in which those factors are operationalised. For instance, an approach to tackling obesity based on promoting negative risk images of obese people would stigmatise the obese (contributing to ‘fatism’ – see Maio et al 2007), but that would not mean the Prototype/Willingness Model was unfair per se (see Gibbons et al 2003). Negative impacts on equity caused by behaviour change interventions appear to arise more from how a behavioural model is operationalised than which model is chosen.

By contrast, the evidence shows that the process of policy development has a role in determining whether it is perceived as fair by the public. Engaging the public in the policy development process is as common a recommendation in the public policy literature as in the behaviour change literature, and it is often linked to increasing equity, as well as acceptability (see eg. Pearce 2007 and Knott et al 2008). Given that negative effects can arise from policy processes, theories of change are more likely than behavioural models to be linked to negative impacts on equity, as they describe processes of change. The distinction between behavioural models and theories of change is again helpful here. It is notable that the one case where it is suggested that a model carries the inherent risk of increasing inequality features a theory of change, Rogers’ Diffusion of Innovations (Knott et al 2008).

6.1 Ethical issues

The top-level objection to behaviour change interventions is that it is not the role of government in a liberal society to be intervening in individual behaviour. This philosophical argument (or point of principle) is most clearly expressed in the ippr’s recent review (Lewis 2007). That review advocates a progressive relationship between government and citizen based on an open market plus strong public services to support those in need. The underlying philosophy of such a policy approach is **libertarian paternalism**, in which individuals are informed and empowered to exercise genuine choice; this philosophy is clearly in line with standard economic theories of behaviour. However, in the recent PMSU review on culture change (Knott et al 2008), paternalism is associated with more pejorative uses, which can be equated to public notions of ‘the nanny state’. The concept of **personal responsibility**, as presented in an earlier PMSU review (Halpern et al 2003) presents one solution to the ethical problem of government intervention. Personal responsibility’s focus on “*helping people help themselves*” can be seen as an attempt to

bridge the tension inherent in behaviour change policy which entails encouraging people to take responsibility without telling them what to do (Lewis 2007).

However, encouraging personal responsibility in a given direction is difficult when individuals are pursuing divergent courses. In an example from the Foresight project on tackling obesity, the government could be seen to have little right to prevent people from making unhealthy food choices, but conversely they also have little right to make others meet the increased healthcare costs of those who are obese (JP Morgan in Foresight 2007b). Similarly it is hard to help people to help themselves if they do not appreciate the appropriateness of the behaviour change being encouraged. In educational theory, the ESD1/ESD2 concept addresses concerns over behaviour selection; ESD2 is preferred by the developers of the theory precisely because it does not prescribe which behaviours people are to change in order to meet the challenge of sustainability (Vare and Scott 2007 – see 4.4 above). This approach again emphasises intervention processes based on public engagement and empowerment as the key to effectiveness (and to minimising negative effects).

It is clearly easier to go with the grain of public opinion than against it, in order to achieve acceptability and avoid ethical objections. Process-based theories of change support this view, for instance Andreasen defines social marketing in terms of achieving “*voluntary*” change (1995, in Kurani and Turrentine 2002), while Schein spells out that change based on learning cannot be imposed on people (Schein 2004). However the government is not always in the position of being able to go with the grain of public opinion, and must sometimes compel behaviour change. This need may go some way to explaining the traditional preference for using economic instruments, based on rational models of behaviour.

6.2 Equity issues

The HM Treasury Green Book (HMT 2003) provides a two-fold rationale for government intervention: to enhance economic efficiency, and to achieve a social good “*such as promoting equity*” (2003, in Knott et al 2008). The ippr review regards achieving **equity** as the central aim of behaviour change interventions; the review features an adapted version of Defra’s 4Es model of policy development, which features ‘Evaluate Equity’ at the centre of the diamond (Lewis 2008).

Achieving equity can be seen to incorporate two objectives: minimising harm, and maximising choice or opportunity. Tackling negative externalities (ie. impacts on others) is a standard purpose of interventions (eg. Ledbury et al 2006, Knott et al 2008); the ban on smoking in public places can be used as an example, where intervention was justified in order to limit the impacts on others (from passive smoking). The ippr review breaks down minimising harm to others to include harm to general others (eg. through littering) and harm to future others (eg. through wider environmental impacts) (Lewis 2007).

Choice can also be equated with equity, with those suffering from social exclusion facing structural barriers, or lacking the resources, to enable them to take advantage of the offers of choice-based policies. From the perspective of social capital, such groups can be seen to lack the appropriate social networks to enable them to exert choice (or self efficacy). They may also lack the economic capital, or cultural capital (such as information and skills) to enable them to do so. Policies based on choice, for instance in education or healthcare provision, are thus seen to require the targeted provision of information and advice in order to enable all social groups to benefit from them (eg. Knott et al 2008).

Achieving **social justice** can be an end goal of policy, but conversely it is recognised that interventions may also increase social inequality through negative side-effects. Some

intervention types inherently run greater risks of triggering negative effects than others. The pros and cons of different policy instruments are reviewed in the policy research literature (eg. Ledbury et al 2006, Brooks et al 2006). While behavioural models do not inherently bring equity concerns, intervention types do, with economic instruments being particularly associated with negative effects on equity. The example of carbon taxes is given in the ippr review, based on the work of Dresner who calculates that poorer groups would be 20% worse off if such universal taxes were imposed (2006, in Lewis 2007). In earlier work on green taxes, Ekins and Dresner note the “*inevitability of losers*” resulting from such universal interventions, and stress that such instruments must be accompanied by targeted measures to compensate the worst affected groups (Ekins and Dresner 2004).

Social justice goes further than ensuring equal choice or opportunity in that it is based on achieving equality of outcomes or ‘**distributional equity**’. Policies for social justice are thus under an onus to assess current inequalities, then design interventions to address them, effectively prioritising the needs of disadvantaged groups to bring them up to meet average population levels in the dimension in question. The indicators set for policies for social justice should be distinct from the dimensions in which the negative impacts on equity resulting from universal interventions are assessed. In both cases however, social equity is commonly measured in terms of outcomes, as distributional equity.

A distinction is made between this and ‘**procedural equity**’, which concerns the fairness of the process through which the outcome was reached. In a recent paper, the director of ippr argues that procedural fairness is wrongly overlooked in policy design, while outcomes are the sole specified measures (Pearce 2007). Procedural equity can be summed up as ‘fair rules, fairly implemented’. The key principle of procedural equity is that people will accept negative outcomes for themselves, if they feel that the process through which they were arrived at was fair (legal verdicts provide the most obvious example). The important implication for policy is that once people perceive procedural fairness, they are more likely to co-operate, to be satisfied, and in the long term to trust the institution concerned. This in turn boosts the likely effectiveness of behaviour change interventions.

Leventhal identified 6 key criteria for procedural fairness, or ‘fair rules’ (in Pearce 2007). These include consistency (across people and time), and ethicality (an underlying ethical code – one example of how equity and ethical issues overlap). Most notably for this Review, a further criterion is representativeness: ensuring that citizens’ views are included in the decision making process. As noted, this principle is consistent with calls for the engagement of the public as active partners in the process of change (see eg. Bartholomew et al 1998, Stern 2000). Procedural equity offers further parallels to behavioural theory, as in emphasising processes over outcomes, it can help explain why people accept more autonomy at work over a pay rise, or why people are so willing to pay their taxes – behaviours which cannot easily be explained using standard economic theory based on cost-benefit calculations. Pearce even suggests that people use a ‘procedural heuristic’ as a shortcut to determine whether a decision-making process was fair.

The policy research evidence also argues for an approach to intervention development based on public engagement. In addition, the prototype assessment phase should not merely be regarded as a means of equity-proofing prospective interventions, but an opportunity for building public views into the intervention strategy. More fundamentally, interventions which are regarded as unfair are likely to be ineffective, as the public will be disinclined to comply with them (the Fuel Duty Escalator offers an extreme example – see eg. Knott et al 2008). Even where an intervention has been developed in accordance with relevant theoretical and empirical research evidence, it may still be rendered ineffective if it is perceived by the public as unfair.

6.3 Side effects

Negative impacts on equity are a prominent example of how interventions can bring about '**perverse**' **side effects** which run counter to their principal purpose. Ledbury et al (2006) advise that evaluations of prospective policies include analysis of possible side effects. Many side effects are however harder to foresee; one of the potential applications of systems thinking is as a way of modelling such effects across a wide system of interest (Chapman 2004). Systems thinking is especially attuned to explaining side effects, due to its emphasis on feedback loops. Chapman gives the example of tackling drugs as a means of tackling crime; the unintended consequence of seizing drugs is seen as an increase in the cost of drugs on the street, which in turn increases the need for users to commit crime to buy the drugs. A similar looped example can be found in the context of education, in which misbehaving pupils are excluded from school, which then further damages their levels of educational attainment (Ledbury et al 2006).

However, **unintended consequences** do not always remain confined within one policy, but spread between different areas of policy as behavioural feedback results in a **spill-over** effect. An example from the literature is the impact of raising taxes on cigarettes; while this supports health objectives, it can lead to an increase in crime as more cigarettes are smuggled and illegally sold (Ledbury et al 2006). Such effects can be lessened by the inclusion of a **policy consistency** criterion in the assessment of prospective policies. Inconsistency is to be avoided as when policies in one place work in an opposite direction to policy in another, negative or at least neutralising effects can result (see eg. Knott et al 2008). At the same time, the public can lose trust in the validity of the case for intervention in one or other of the areas (Lewis 2007). More intervention inherently increases the risks that policies will clash; for this reason, the 'do nothing' scenario is sometimes regarded as a preferable default (see eg. Ledbury et al 2006, Knott et al 2008).

The evidence presented in this section suggests that the wider impacts of interventions should be considered during the planning stage. From a practical perspective, the policy literature complements that on behavioural models and theories of change, such that theory-based guidance on developing behaviour change interventions should incorporate steps to equity-proof prospective policies. Such recommendations are already present in the research literature (eg. Ledbury et al 2006, Brooks et al 2006). They suggest that policy development processes use standard assessment tools (such as Impact Assessments), on top of which additional criteria can be addressed (such as social or environmental justice). The guidance resulting from this review follows that lead – see the Practical Guide for further information.

7. Using Behavioural Models with Theories of Change

A Nine Principle framework for selecting models and developing interventions is provided in the accompanying Practical Guide for research analysts and policy makers, but it is important to conclude this report with the key implications for behaviour change policy arising from theory.

The review of behavioural models and theories reveals human behaviour as complex, arising from diverse psychological factors, and from social, societal and contextual influences. Building on standard economic assumptions, social-psychological theory shows people's motivations to be wider than self interest, and to be varying over time, and in different contexts. Most importantly, theory reveals behaviour to be both more and less rational, sometimes strongly influenced by emotions, or habits and routines. The diversity of factors at play in social-psychological models explains why changing behaviours has proven so challenging for policy makers. Interventions must address a number of factors at once, and be flexible to different audiences and contexts.

Behavioural models can help in the task of identifying which factors are the most significant in determining behaviours. However, behavioural models do not specify how to bring about behaviour change; as well as understanding behaviour, we need to understand change. The review of theories of change suggests some intervention techniques which may prove effective for particular behaviours, but more fundamentally, it shows how best to approach the task of behaviour change.

Diffusion models and staged models are shown to have serious limitations as intervention methods, but both models importantly demonstrate that change is a process, not an event. This implication can counteract the (simplistic) impression from linear models of behaviour, which lack a temporal dimension. These models of change suggest that interventions should be sustained over time, and be differentiated across audience groups.

Both Lewin's Change Theory and systems thinking approaches focus on resistance to change, and suggest that lasting change requires a process of engagement, in which audience groups are included as partners in the process (in the language of agency, as 'actors'). The principles of action research, and reflective practice, suggest that this process of engagement should involve learning through doing. This review recommends that this is the most effective way for audiences to undertake change, but also that such an approach is the most effective way for policy makers to develop and deliver interventions that help to bring about lasting change.

The two bodies of theory should be seen as working together, with behavioural models embedded within intervention processes shaped by theories of change. As frameworks such as social marketing show, underpinning the intervention process should be a thorough understanding of the target behaviour, and the variation in that behaviour among the audience groups in question. Behavioural models are essential to developing this understanding; however, both bodies of theory agree that these models should not be adopted and imposed uncritically through interventions. Behavioural models work best when applied in the context in which they were developed; even the most flexible models work better for some behaviours than others. Models should not be regarded as solutions to policy problems, but as tools to be used in the process of developing interventions with the audience groups in question.

Harry Triandis was mindful of these limits when presenting his own model, the Theory of Interpersonal Behaviour (TIB, Triandis 1977). He quotes Cronbach (1975) saying models

are “...*concepts that will help people use their heads*”. Models are best used critically, in devising the strategy for behaviour change interventions. The interventions themselves should then be developed based on past experience of what works, and be worked out on the ground, through research and piloting with the audience groups in question. The theories included in this review ultimately suggest that behaviour change is best pursued as a craft not a science.

Appendices

i) Tables: Matching behaviours to models

The following pair of tables are reproduced from the Practical Guide, where they form an element in the Nine Principles process for developing behaviour change interventions based on behavioural models. The tables summarise all references made in the sources under review in which a behaviour (or type of behaviour) is linked to a behavioural model (or factor). The tables are shown here to provide further references on the specific models cited in this report; for instructions on how best to use the Tables, see the Practical Guide.

Table A1: Behaviours matched to models (plus factors), by behaviour domain

[Behaviour]	[Model (or Factor)]	[References]
Community Participation		
Blood Donation	(habit / past behaviour)	Lewis 2007
Community Participation	CLG's Model of Community Empowerment	CLG 2008
Community Participation	(social/cultural norms)	Knott et al 2008
Community Participation	(social capital)	Putnam 2000
Voter Choice	Theory of Reasoned Action	Ajzen 1991
Voter Choice	Clarke et al's Valence Politics Model	Clarke et al 2004
Voter Choice	(habit / past behaviour)	Lewis 2007
Voter Turnout	Theory of Planned Behaviour	Ajzen 1991
Voter Turnout	Whiteley and Seyd's General Incentives Model	Clarke et al 2004
Consumption		
Buying Domestic Appliances	(convenience)	Shove 2003
Consumption	NOA	Gatersleben and Vlek 1998
Consumption	Spaargaren and Van Vliet's Consumption as Social Practices	Jackson 2005; Burgess and Nye 2006
Consumption	(self/social identity)	Shove 2003
Purchasing Choices	(attitudes: automatic)	Maio et al 2007
Shopping	Bagozzi and Warshaw's Theory of Trying	Bagozzi et al 2002
Environment		
Climate Change	(social/cultural norms)	Knott et al 2008
Composting	Taylor and Todd's Theory of Composting as Altruism	Darnton et al 2006
Energy Consumption	(socio-technical regimes)	Shove 2003
Energy Efficiency Behaviours	(contextual factors: information, costs, incentives)	Wilson and Dowlatabadi 2007
Food Choice	Bedford's Environmental Considerations for Food Purchasing	Bedford 2002
Home Energy Use	(information eg. better billing, smartmeters)	Lewis 2007; Wilson and Dowlatabadi 2007
Home Energy Use (Heating)	(comfort)	Shove 2003
Home Energy Use (Heating)	(quality of life)	Gatersleben and Vlek 1998

Environment (cont...)		
Pro-Environmental Behaviour	(values: altruism)	Thogersen and Olander 2006; Berglund and Matti 2006
Pro-Environmental Behaviour	(personal norms)	Thogersen 2007
Recycling	Barr's Path Analysis Models of Recycling Behaviour	Barr et al 2005
Recycling	Stern's ABC Model	Stern 2000; Jackson 2005
Recycling	(social norms; personal norms inc neutralisation)	Burgess and Nye 2006
Recycling	(contextual factors: infrastructure)	Burgess and Nye 2006
Solar Microgeneration	(social norms: descriptive)	Wilson and Dowlatabadi 2007
Waste Reduction	Barr's Path Analysis Models of Reducing Behaviour	Barr et al 2005
Health		
Addiction (eg. Smoking)	PRIME	West 2006
Alcohol / Drug Use (Giving Up)	Prochaska and Di Clemente's Transtheoretical Model ('Stages of Change')	Prochaska and Velicer 1997
Alcohol Consumption	(contextual factors: cost)	Lewis 2007
Alcohol Consumption	Dahlgren and Whitehead's Main Determinants of Health Model	Dahlgren and Whitehead 2006
Alcohol Consumption (esp. Young People)	(social norms)	Rimal et al 2005
Binge Drinking	Gibbons and Gerrard's Prototype/Willingness Model	Gibbons et al 2003
Binge Drinking	(social norms)	Schultz et al 2007
Bottle-feeding Babies	Theory of Reasoned Action	Ajzen 1991
Condom Use	Theory of Planned Behaviour	Ajzen 1991
Condom Use	(self efficacy)	Armitage and Conner 2001
Dental Flossing	Theory of Planned Behaviour	Gibbons et al 2003
Drug Use (esp. Young People)	Gibbons and Gerrard's Prototype/Willingness Model	Gibbons et al 2003
Eating Vegetables	Theory of Planned Behaviour	Gibbons et al 2003; Baker et al 2007
Food Choice	Rosenstock's Health Belief Model	Becker et al 1977
Food Choice	(information eg. labelling)	Lewis 2007
Food Choice	(affect: preference/pleasure)	Conner 2007
Food Choice	(contextual factors: cost)	Maio et al 2007
Food Choice	Theory of Planned Behaviour	Maio et al 2007
Obesity	Foresight's Obesity System Map	Foresight 2007
Obesity	Dahlgren and Whitehead's Main Determinants of Health Model	Dahlgren and Whitehead 2006
Obesity	(social/cultural norms)	Knott et al 2008
Positive Health Behaviours	(personal norms)	Maio et al 2007
Preventative Health Behaviours	Rosenstock's Health Belief Model	Becker et al 1977

Health (cont...)		
Public Health Scares (Boycotts)	Loewenstein et al's Risk as Feelings Model	Loewenstein et al 2001
Safe Sex	(affect: anticipatory)	Bagozzi et al 2002
Smoking	Dahlgren and Whitehead's Main Determinants of Health Model	Dahlgren and Whitehead 2006
Smoking	(contextual factors: cost)	Knott et al 2008
Smoking (Giving Up)	Prochaska and Di Clemente's Transtheoretical Model ('Stages of Change')	Prochaska and Velicer 1997
Smoking (Giving Up)	Protection Motivation Theory	Rogers 1975
Smoking (Giving Up)	(self efficacy)	Prochaska and Velicer 1997
Smoking (in Public)	Social Learning Theory (social proof)	Dawnay and Shah 2005
Smoking (in Public)	(social norms: descriptive)	Halpern et al 2003
Taking Exercise	Theory of Planned Behaviour	Ajzen 1991
Tooth Brushing	Protection Motivation Theory	Rogers 1975
Using Contraception	Prochaska and Di Clemente's Transtheoretical Model ('Stages of Change')	Prochaska and Velicer 1997
Using Sunscreen	Prochaska and Di Clemente's 'Stages of Change': decisional balance	Shepherd 2006
Using Sunscreen	(social identity: in-group norms)	Terry et al 2000
Transport		
Car Buying Choice	Lane and Potter's Car Buying Model	Anable et al 2006
Car Use	Theory of Interpersonal Behaviour	Anable et al 2006
Car Use	Bamberg and Schmidt's Model of Car Use	Bamberg and Schmidt 2003
Car Use	(affect)	Anable et al 2006
Car Use	(self identity: symbolic)	Anable et al 2006
Car Use	(habit / convenience)	Lewis 2007
Congestion Charging (Paying)	Festinger's Cognitive Dissonance	Darnton et al 2006; Knott et al 2007
Crossing the Street	Protection Motivation Theory	Rogers 1975
Drink Driving	Gibbons and Gerrard's Prototype/Willingness Model	Gibbons et al 2003
Drink Driving	(affect: anticipatory)	Bagozzi et al 2002
Public Transport Use	(personal norms / values)	Anable et al 2006
Public Transport Use	(contextual factors: infrastructure)	Lewis 2007
Seatbelt Use	Theory of Planned Behaviour	Gibbons et al 2003
Seatbelt Use	(social norms)	Demos/Green Alliance 2003; Dawnay and Shah 2005
Seatbelt Use	(past behaviour / habit)	Lewis 2007
Speeding	Gibbons and Gerrard's Prototype/Willingness Model	Gibbons et al 2003
Speeding	(social norms: descriptive, injunctive)	Jackson 2005

Work & Savings		
Incapacity Benefit (Reducing Claims)	Rosenstock's Health Belief Model	Talbot et al 2007
Pensions / Investments	(inertia)	Talbot et al 2007
Other		
Adultery	Gibbons and Gerrard's Prototype/Willingness Model	Gibbons et al 2003
Crime	Halpern's Tripartite Model of Crime	Halpern 2001
Crime	(collective efficacy)	Pearce 2007
Education Retention	(contextual factors: incentives eg. EMAs)	Knott et al 2008
Education Retention	(social/cultural norms)	Knott et al 2008
Littering	Cialdini's Focus Theory of Norms	Cialdini et al 1990
Playing the Lottery (Gambling)	(affect: anticipatory)	Bagozzi et al 2002
Tax Evasion	Gibbons and Gerrard's Prototype/Willingness Model	Gibbons et al 2003

Table A2: Types of behaviour matched to models

[Type of Behaviour]	[Model]	[Reference]
Addictive (Early Stages)	Gibbons and Gerrard's Prototype/Willingness Model	Gibbons et al 2003
Addictive (Established)	West's PRIME Theory	West 2006
Altruistic / Helping	Schwartz's Norm Activation Theory	Schwartz 1977; Jackson 2005
Coping (involving Risk)	Rogers' Protection Motivation Theory	Rogers 1975
Delinquent (Inaction)	Sykes and Maza's Norm Neutralization Theory	Burgess and Nye 2006
General - Frequent / Habitual / Low Consciousness	Triandis' Theory of Interpersonal Behaviour	Triandis 1977; Jackson 2005
General – Under Total Volitional Control	Fishbein and Ajzen's Theory of Reasoned Action	Ajzen 1991; Jackson 2005
General – Under Less Total Volitional Control	Ajzen's Theory of Planned Behaviour	Ajzen 1991
Less Appropriate	Gibbons and Gerrard's Prototype/Willingness Model	Gibbons et al 2003
Preventative (inc. Health)	Rosenstock's Health Belief Model	Becker et al 1977
Risky / Emotional	Loewenstein's Risk as Feelings Theory	Loewenstein et al 2001
Visible / Public	Cialdini's Focus Theory of Norms	Cialdini et al 1990

ii) Methodology

Background

In late 2007, the Government Social Research Unit (GSRU) launched a series of cross-government reviews to capture and disseminate research knowledge in particular areas. The first of these reviews concerned the broad area of influencing behaviour change. Following a competitive tender process, Andrew Darnton (an independent researcher) and Karen Lucas (director of the Centre for Sustainable Development at the University of Westminster) were commissioned to undertake the review.

Objectives

The specific objectives agreed for the project were to:

- Provide a taxonomy within which to arrange the behaviour change models, suitable for use by research analysts and policy-related audiences;
- Summarise the key features of selected behaviour change models within each category of the taxonomy (including their strengths and weaknesses, and terminology employed)³;
- Identify the limits to behavioural models, both practical and theoretical;
- Provide guidance on how to select and apply the models in policy-related practice, including ethical issues arising.

The overall aim of the project was to make sense of models of behaviour change for specific audience groups. The two key audience groups for the outputs from the project were:

- i) Research analysts
- ii) Policy makers

It was understood that levels of familiarity with behavioural theory would be variable within the audience of research analysts across government. Thus, while based on desk research, the study also included a series of phone interviews which were undertaken during the initial data gathering stage to allow audience needs to be assessed.

Methodology

A three-stage approach was adopted to the study, comprising data gathering and audience needs analysis, the identification of relevant content, and reporting. Having been commissioned in December 2007, the study began in January 2008; draft reports were completed by early April 2008. Final outputs were completed in June 2008.

Data Gathering and Needs Analysis

The initial stage of the project involved the gathering of data; in addition, the qualitative research was undertaken with research analysts at this point, to establish audience needs

³ At the Interim Debrief stage, in view of the findings from the needs analysis exercise, and based on the reading of the sources, it was agreed that what analysts needed was not a way discretely to categorise behavioural models, but a way to match theoretical models to the behaviours on which they and their policy colleagues would be working. Accordingly it was proposed to provide guidance on the process of model selection, within which tables would summarise the links identified in the literature between models and behaviours (both by specific behaviour, and type of behaviour).

A systematic study of the traditional academic sort (based on database searches of research papers) was not deemed appropriate for this project for a number of reasons, including that the range of behaviours would be too boundless to search on effectively, and that much of the relevant literature would be 'grey' (ie. unpublished in academic journals, including that which is held within government departments). The proposed method for data gathering included contacting key individuals (both within and beyond government) in order to ask for their contributions in terms of research sources and likely lines of further enquiry.

Relevant sources were gathered by three routes:

- i) By the project team and the GSR Advisory Group based on their knowledge of the literature
- ii) From external experts. To ensure the most pertinent evidence was included in the study, whilst also covering a wider range of behavioural models, 18 selected experts were invited to contribute to the study. The list of experts was agreed with the GSRU Advisory Group; it included well-respected individuals in their fields, nearly all of whom responded to the call for information. A full list of the individuals and organisations contacted is given in Appendix ii) below.
- iii) From departmental contacts. The 'needs analysis' exercise was undertaken with research analysts during the data gathering phase. The qualitative exercise involved semi-structured telephone interviews, lasting between 20 and 60 minutes. The list of analysts was agreed with the GSR Advisory Group; 12 analysts were interviewed in total (again, they are listed in Appendix ii) below). The questions covered in the interviews included the analysts' current use of models, the behavioural areas on which their work focused, and finally their needs from the GSRU project. Additionally, the interviews provided an opportunity to invite analysts to submit relevant sources for inclusion in the study.

Identifying Content

As a result of the data gathering, 137 relevant sources were identified. Given the tight timescale set for the project it was agreed only 90 would be read in depth. In the event, 109 sources were selected as being the most relevant to the project objectives and were scoped out in full.

The relevant content in each of the 109 sources was noted out onto a grid, under four summary headings, as follows:

- Background and Methodology
- Behavioural Models
- Limits of Models
- Models of Change and Policy Principles / Processes

Reporting

The final phase of the desk research study involved reporting; as discussed above, it was agreed that the findings would be written up as three reports.

This report provides a guide to theory; while in length it is the main findings report, it serves as a reference to the Practical Guide, which provides practical guidance on how to use models and theories in designing interventions. Both reports were peer reviewed by two academic experts, and circulated among key staff in diverse government departments. The reports were revised in the light of their comments.

A further Policy Briefing summarises the findings from the review. This is supplemented by the electronic bibliography, and a charted presentation.

ii) Organisations and individuals contacted

Individuals consulted during the research study are identified below. Academics and other experts consulted during the data gathering are listed first; 18 were contacted, of whom 15 responded. The second table lists the research analysts who took part in qualitative phone interviews during the data gathering phase; 12 analysts were interviewed.

The project team's sincere thanks go to all those who took part in the study, who were generous with their time and expertise. Without them, there would be little data to review.

Datagathering

Organisation	Key Individuals
Centre for Research in Health and Medicine, University of Surrey	Charles Abraham
Centre for Transport Policy, Robert Gordon University, Aberdeen	Jillian Anable
Resolve, University of Surrey	Tracey Bedford
School of Geography, Politics and Sociology, University of Newcastle	Derek Bell
Centre for Investigative Psychology, University of Liverpool	David Canter
Demos	Jake Chapman
Department of Politics, Keele University	Andy Dobson
Prime Minister's Strategy Unit	David Halpern
Centre for Environmental Strategy, University of Surrey	Tim Jackson
ippr	Miranda Lewis
National Social Marketing Centre	Dominic McVey
School of Psychology, Cardiff University	Greg Maio
Department of Psychology (Health), University of Surrey	Jane Ogden
'DirectedCreativity' / NHS Institute for Innovation and Improvement	Paul Plsek
Centre for the Analysis of Social Exclusion, London School of Economics	Anne Power
Food, Consumer Behaviour and Health Research Centre, University of Surrey	Richard Shepherd
National Research Council (US)	Paul Stern
Department of Government, University of Essex	Paul Whiteley

Needs Analysis

Organisation	Key Individuals
Communities and Local Government	Richard Tonkin, Arianna Haberis
Department of Health	Susan Lonsdale
Department for Transport	Helen Bullock, Kaite Emmerson (road safety)
Department of Work and Pensions	Clare Talbot
Food Standards Agency	Louis Levy Vivien Lund
Home Office	Sara Skodbo
Ministry of Justice	Tina Golton
Scottish Government	David Gordon, Karen McNee

iii) Electronic bibliography

In order to provide a further way into the literature in this area the sources used in the review have been captured in the Excel spreadsheet below which contains a description of each source, models and theories featured and a hyperlink to the source material where available.



"Electronic
Bibliography .xls"

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