

FORESIGHT

Tackling Obesities:
Future Choices – Lifestyle
Change – Evidence Review

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Background

Medical models make clear that obesity is due to an imbalance between calorie intake and output. In recent decades, food has become less expensive, more varied, and more palatable, helping increase calorie intake.¹ At the same time, the effect of technological development has been continually to 'engineer physical effort out of the environment'.² The implication is that environmental and personal factors that increase calorie consumption and reduce physical activity also increase the obesity risk. This leads to the presumption that alterations to the environment and better choices will reduce the likelihood of becoming overweight.

This focus on changing the environmental context of health behaviour and simultaneously promoting individual healthy choices reflects recent policy developments. For example, in 2002, Sir Derek Wanless published a report for the UK Treasury on the resources required to provide high-quality health services.³ The report considered three possible future scenarios. The most optimistic was referred to as the '*fully engaged scenario*' in which, in addition to high rates of technology uptake, the NHS would develop more disease prevention strategies. This scenario requires general confidence in healthcare services and high levels of public engagement in healthcare and maintenance. Wanless predicted that this scenario would result in substantial reductions in both smoking and obesity as well as improvements in general health across the population. It would also release additional funds for healthcare services because of a reduction in sickness costs. For example, in 2002, sick leave cost the UK economy £11.6 billion, an average of £476 per worker.⁴ If this sum was available to the Health Service, it would satisfy the demand for higher-quality treatment and more preventive services. This policy theme was further developed in the most recent public health [White Paper](#),⁴ which emphasised the importance of individual lifestyle choices and the role of behaviour change in achieving public health targets. Is it possible to change environments and individual priorities so that people can make healthy choices? It's not as straightforward as it might seem.

There is a psychological conflict between what people want (e.g. fatty, sweet foods) and their desire to be healthy. Mixed feelings and beliefs about healthy lifestyle choices complicate a public health policy based on individual choice. For instance, people know that rich foods are bad for them and that moderate exercise is beneficial. But people get positive sensations from eating foods that are laden with calories or excess salt, while, on the other hand, finding the time to exercise is very hard. No one escapes this psychological conflict or '*ambivalence*'.⁵ In this context, it's unlikely that public information campaigns telling people to avoid certain foods and exercise more will suffice. Behaviour change programmes that simultaneously inform, shift motivation and provide the necessary skills to maintain behaviour change are required.⁶ In short, 'we need more research into how ordinary people, without professional help, can exert effective control.'¹



What lessons can be learned from previous behaviour change research? Within the health domain, there have been repeated attempts to get people to curb their behaviours around smoking, heavy drinking, unsafe sex, and drug abuse. Elsewhere, large-scale campaigns have been mounted to promote safer driving habits through speed reduction or to increase community and environmental responsibility. All these projects may provide insights into the challenges to behaviour change posed by obesity.

Behaviour change is complex. Consider speed reduction, which at first might seem simple. But if people drive more slowly, they need to allow more time for journeys. This entails more planning, including, for instance, the need to get up earlier. It may also alter other routines, such as the music habitually listened to in the car – less speed might necessitate a more relaxing music choice than usual. Giving up smoking is also far from simple. Effective strategies to cope with cravings include nicotine replacement and stimulus control. The latter involves avoiding cues that have habitually prompted smoking, like going to the pub or seeking the company of smokers. Similarly, tackling obesity involves a variety of short- and longer-term goals, including what may be challenging diet alterations, changes to shopping behaviour, increases in exercise, different choices of transport, reductions in alcohol consumption (including binge-drinking) and so on.

A core feature of behaviours relevant to public health is that their maintenance is essential both for individual and public gain. Although there is considerable research on the psychological antecedents of health behaviour in the immediate or short term (here meaning a few weeks), funding for research into long-term determinants of behaviour has been scarce.⁷ Therefore the role of habit and limited volitional control over behaviours that have a cumulative day-to-day impact on health over many years are not well understood.⁸ Greater focus on behavioural maintenance and the role that habit plays in maintenance is needed.

As the [Choosing Health White Paper](#) suggests,⁴ facilitating good health choices is fundamental to successful public health policy. Such choices are always made within an individual's own particular environment, which has two key policy implications. First, one size doesn't fit all. Generic campaigns for behaviour change may have different effects on individuals from different socioeconomic and cultural backgrounds. Second, there's the importance of identifying 'predatory' environmental influences on individual choices in advance.⁹ For example, promoting cooking with fresh vegetables has the potential to also increase health inequalities if its costs to low-income families are not taken into account. Similarly, without challenging television food advertising, schoolchildren may not be easily persuaded to make healthy 'choices'.

Recent studies have illustrated the difficulties of making healthy choices in an unsupportive environment.¹⁰ In one of these studies, young teenagers were given the opportunity to eat a large quantity of crisps, which they consumed with glee.

The experimenter then gave them a jug of a, supposedly new, bright-red beverage called 'Quench,' along with a written description of its many positive *and* negative attributes. The thirsty participants were told that they could have some of the drink, but it would be better to wait until later because supplies were short. The thirsty participants then sat alone with the drink for ten minutes, while the experimenter unobtrusively videotaped them and gave them an additional questionnaire that asked them to describe the drink. The children tried a range of strategies to avoid drinking the beverage. Some participants moved the tasty-looking juice away from them. Others tried to focus attention on other materials in the lab (e.g. magazines) or tried to highlight the negative (not positive) aspects of the drink in the questionnaire that the experimenter had given to them. Some participants even created negative attributes of the drink that were not mentioned in the description (e.g. that it was 'too sweet'). These behaviours represent considerable psychological effort aimed at combating temptation.^{11,12}

This effort occurred more strongly when the experimenter emphasised that the children were free to choose whether or not to consume the drink. This freedom of choice made it *more difficult* to resist temptation. Other research and theory indicates that stress^{13,14} and habit formation also impede the ability to resist temptation,¹⁵ and this problem is particularly evident for healthy eating behaviour.¹⁶ Yet, choice, stress, and habit are all inescapable aspects of modern life. Cumulatively, they make it very hard to resist unhealthy choices, especially as these are so abundant in the environment.

It is inherent to social psychology research that the person and environment interact to determine behaviour and behaviour change.¹⁷⁻²¹ This emphasis has spawned a long tradition of theory and research that explores the role of these factors in an assortment of social and health-relevant behaviours. Here, we focus on research relevant to understanding healthy lifestyle change.

Our review of research, across hundreds of experiments, reveals useful principles that should be applied in order to complement existing health promotion campaigns and social marketing approaches (such as using market segmentation to target messages) to increase lifestyle change. At times, it may appear that the evidence refutes the utility of social marketing attempts, because we have found that some of these campaigns are inefficient or have backfired. This conclusion would be an overgeneralisation, however, because most of the problems arise primarily in those campaigns that are not informed by the relevant theory and evidence. When armed with the relevant social psychological theory and evidence, public information and social marketing campaigns should be quite successful.

This review comprises three main sections. First, we discuss the concept of habit as it applies to lifestyle change, and then develop the distinction between *upstream* and *downstream* approaches to lifestyle change. We consider evidence from within and outside the health context to illustrate both upstream and



downstream approaches. General theory and evidence about interventions to change a variety of unhealthy behaviours, including smoking, unsafe sex practices and poor diet, and a variety of other behaviours, including unsafe driving, car use, binge-drinking and racism are summarised. In a second section, we reflect on how current research practices limit the application of research insights to public health practice, consider how changes in the documentation of behaviour change interventions (and their evaluations) could facilitate the transfer of knowledge from research to evidence-based practice, and identify some important topics for future study. Finally, we will conclude by highlighting issues that need to be addressed to facilitate the application of knowledge to future lifestyle change campaigns and interventions.

Habit and the distinction between upstream and downstream interventions

Habit may be used as a criterion to find opportunities for change. What constitutes a habit? In everyday language, habit is often used as a synonym for bad behaviour, but most psychologists define habit as frequency of past behaviour. There are reasons to argue, however, that, although repetition of behaviour is a necessary condition for habits to form, frequent behaviour is not necessarily a habit. Verplanken argued that repeated behaviour qualifies as a habit when it has a certain degree of automaticity.^{22,23} A habit is therefore frequent behaviour conducted with little conscious awareness and intention, which, while mentally efficient, may sometimes be difficult to control.²⁴ In addition, a habit is cued by the environment in which the behaviour is conducted.²⁵ These two elements of habit – automaticity and environment cueing – make them particularly hard to change.

Previous research has established a number of factors that make habits formidable obstacles, and two of them merit attention here. First, habit leads to ‘tunnel vision’.^{26,27} When habits have developed, an individual is less motivated to attend to and acquire new information, particularly information that isn’t consistent with the habit, making it resistant to information-based interventions. Second, habitual behaviour seems less guided by attitudes and intentions than behaviour that is conducted in a more deliberative and thoughtful fashion.²⁸ When a particular behaviour is repeated over and over again, the original reasons for the development of that habit may be forgotten.²⁹ The combination of tunnel vision and the attenuated power of attitudes and intentions is bad news for informational campaigns as these are based on the assumption that people will attend to and process the presented information, then form or change their attitudes and intentions.

So how can we hope to change habits? Building on a classic distinction by McKinlay,^{30,31} Verplanken and Wood²³ categorise habit interventions on a continuum from ‘downstream’ to ‘upstream’ approaches. Downstream interventions focus on changing or extinguishing the problematic behaviour of people who already exhibit a significant risk factor. These interventions attempt to solve the problem through the decisions of the individuals who are at risk. In contrast, upstream interventions focus on changing the conditions that produce problematic behaviour in the first place, and on promoting alternatives. These interventions target social norms and environmental supports for desired behaviour. An example of an upstream intervention might be the establishment of standard portion sizes for packaged foods to reduce obesity, while a downstream one might be the provision of information on bus networks to reduce car use among those attending cardiovascular clinics. As we will show, the downstream

and upstream approaches each have their own varieties, strengths and weaknesses.

Downstream approaches

Downstream messages are aimed at those whose behaviours put them at risk or cause other problems. These people might be specific groups, such as gay men in HIV campaigns, or whole populations, as in anti-littering campaigns. A number of points need to be borne in mind when developing such approaches.

Messages designed to arouse fear about health-damaging lifestyles can be effective if they do not prompt defensive reactions (i.e. that lead people to deny the threat)³² as discussed later. However, it is a prerequisite of health behaviour change that people are informed about potential health risks. For example, the first Report of the US Surgeon General on Smoking and Health (1964) started a process that reduced smoking rates in the US from 42.4% in 1965 to 22.8% in 2004, and per capita consumption of cigarettes from a staggering 4,259 cigarettes per year to 2,902. Similarly, the early HIV interventions in the USA in the 1980s resulted in a 60% reduction in sexual risk behaviour among homosexual men in San Francisco (McKusick, Horstman, & Coates, 1985; Winkelstein et al., 1987) and New York (Martin, 1987), both epicentres of the AIDS epidemic in the United States.

In contrast, similar messages delivered ten years later proved much less effective. By then, most people had been informed. The people who continued to engage in their health-impairing behaviours did so in spite of knowing the risks. Providing information is only one element of successful behaviour change. Tackling individual motivation, skills and environmental influences are also crucial. For example, people high in ambivalence towards an issue (such as a risky behaviour) carefully scrutinise any relevant information.^{33,34} They take note of messages that are overly simplistic (e.g. 'just say no') and identify flaws in them. They may then form more *negative* attitudes towards recommended behaviours. A series of studies sponsored by the Economic and Social Research Council has demonstrated this type of backfire when anti-racism messages are presented to people who are highly ambivalent toward ethnic-minority groups.³⁵ This clearly demonstrates the importance of understanding target audiences.

Research in the USA has demonstrated similar backfire effects for anti-littering messages.³⁶ Anti-littering messages were based on an award-winning advertising campaign. Despite being praised by the advertising industry and the public alike, a social psychological analysis of the content of the messages revealed a fundamental problem: in an effort to make the problem seem dramatic, they made it seem like *everyone* was littering, which inadvertently triggered *more* littering (after all, everyone was doing it, so why fight the tide?) Such examples show that the development of messages aimed at behaviour change should not be based on

so-called common sense, but on psychological theory and evidence, combined with pre-testing.

Theoretical perspectives that have been evaluated by social psychological research include:

- **social cognitive theories** such as the Health Belief Model,³⁷ Protection Motivation Theory,³⁸ Social Cognitive Theory,³⁹ and the Theory of Planned Behaviour^{40,41}
- **stage theories of behaviour change** such as the Trans-Theoretical Model of Prochaska and colleagues^{42,43} or the Precaution Adoption Process Model of Weinstein.^{44,45}

Components of a successful health education campaign

Suppose the Department of Health asked us to develop a health education campaign persuading people to have a healthier diet. What would be the first step?

Choosing the target behaviour

Because having a healthier diet is a global goal that can be reached by various behaviours, the first step would be to define the *target behaviour* – the specific behaviour we would like to change. Part of the value of models of the determinants of health behaviours is in isolating targets for interventions designed to change such behaviours.⁷

This is an important point, as things often go wrong at this stage. If we succumb to the temptation of merely trying to raise people’s awareness of the danger of unhealthy eating, although they might be convinced that an unhealthy diet is a bad thing, there is unlikely to be any impact on their behaviour. There would be two reasons for such a failure.

First, people don’t want to feel vulnerable to health risks.^{47,48} So, regardless of the junk food they eat, people will convince themselves that their diet is healthy and that they are not at risk. Research on fear-arousing communications has demonstrated over and over again that health behaviour change is driven by perceived vulnerability to a health risk and not by its perceived severity.^{32,48} People are quite willing to accept that there are all kinds of dangerous lifestyles, but unless they can be convinced that they are at risk themselves, they are unlikely to take any action.⁴⁹ Persuading people that *they* are eating an unhealthy diet has proven a major stumbling block for campaigns in this area.

Second, even if people accept that they are at risk, they require recommendations about specific behaviours. The specific behaviours must be perceived as



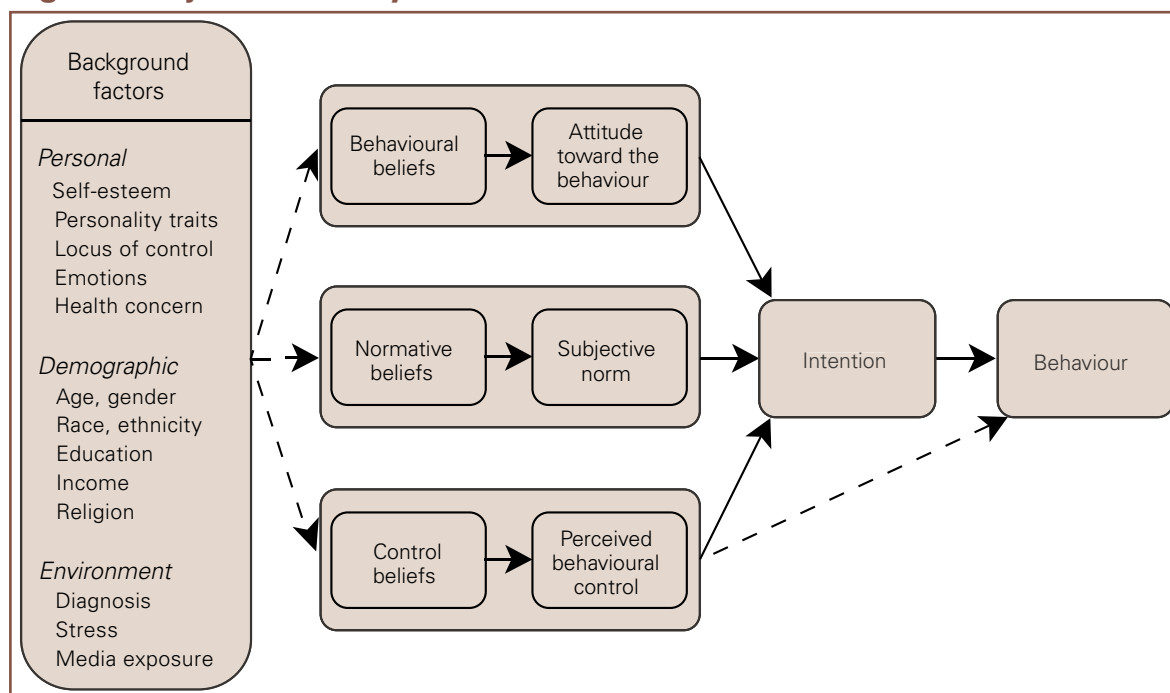
protecting against the health risk.^{37,38} Otherwise, behaviour change will not be achieved. At this point, the intervention becomes increasingly interdisciplinary. In choosing behavioural targets for our campaign, we would need to rely on epidemiological evidence for what constitutes healthy or unhealthy eating habits among the target population, for example, deciding that 'eating five portions of fruit and vegetables per day' should be the target behaviour.

Identify salient beliefs through a belief elicitation study

Having chosen the behaviour to change, we would then have to identify the *salient beliefs that are major determinants of that behaviour*. Expressed more prosaically, we would have to find the reasons why some people eat fruit and vegetables and others do not. The search could be guided by the theory of planned behaviour,⁴⁰ which is supported by an impressive body of empirical evidence.^{50,51} As is illustrated schematically in Figure 1, this theory predicts that human behaviour is guided by three kinds of considerations:

- beliefs about the likely consequences of the behaviour and the evaluations of these consequences (behavioural beliefs)
- beliefs about the expectations of others and the motivation to comply with these expectations (normative beliefs)
- beliefs about factors expected to help or hinder the performance of the behaviour and the perceived importance of these factors (control beliefs).

Figure 1: Ajzen's Theory of Planned Behaviour⁴⁰



All other personal, demographic and environmental factors predominantly influence behaviour through their effects on these three sets of beliefs.

Although people can hold a great many beliefs about a given object, they can attend to only a small number of these beliefs at any one time. It is these *salient* beliefs, which are easily recalled from memory, that are the immediate determinants of people's behavioural intention. To identify the salient beliefs, a belief elicitation study would need to be conducted, using a small sample of individuals from the target population. To elicit their behavioural outcome beliefs, they would be asked to list all the advantages and disadvantages of *eating five portions of fruit and vegetables per day*. To give a reference point, individuals would be asked to list the people who are important to them (i.e. the people on whom they model their own behaviour, so-called 'normative referents') and whether they would approve or disapprove of them engaging in the target behaviour. Finally, control beliefs would be elicited by asking respondents to list the factors or circumstances that might make it easier (or more difficult) for them to eat five portions of fruit and vegetables per day.

Although the belief elicitation study gives insight into the beliefs people associate with a given behaviour, it doesn't indicate whether these beliefs are strong determinants of their intentions to engage in the relevant behaviour. For example, smokers as well as non-smokers will list 'health damage' as one of the disadvantages of smoking. Because both groups have this belief, it's very unlikely to be the reason underlying the *difference* in their behaviour. However, once accessible beliefs have been identified, standard questionnaire methodology supplied by Ajzen and Fishbein⁴¹ to identify the beliefs that are most strongly associated with the target intentions and behaviour can be used. Examining how 'intenders' differ from 'non-intenders' (or how those who engage in some behaviours differ from those who do not) enables the design of better targeted – and therefore more effective – interventions.⁵²

Classify outcome expectancies

It might also be useful to classify outcome expectancies (or beliefs) along a limited number of dimensions.⁷ Although a number of dimensions for classifying outcomes can be identified (such as outcomes for the self versus other, or immediate versus later outcomes), two appear to be vital: positive versus negative outcomes; and instrumental versus emotional outcomes. The first positive versus negative dimension distinguishes between outcomes that are positively valued (e.g. the increased longevity associated with physical exercise) from those that are negatively valued (such as the decreased longevity associated with smoking). Rather than the effect of such positive and negative outcomes being to cancel one another out, recent research suggests that two components may have a distinct effect on behaviour.⁵³ For particular behaviours and individuals, the degree to which a behaviour is perceived to have *more* positive outcomes may be the most



important determinant of performance. For other individuals or behaviours, the degree to which a behaviour is perceived to have *less* negative outcomes may be the most important determinant of performance. Identifying which set of outcomes are more important can help us more appropriately target interventions. For example, Lawton et al. identified negative outcomes as the most important in determining speeding behaviour, but positive outcomes as the most important in determining smoking initiation.⁵⁴ Similarly, Goldberg et al. identified positive outcomes as more important than negative outcomes in relation to drinking alcohol.⁵⁵

The second dimension distinguishes between instrumental outcomes and emotional outcomes. Instrumental outcomes involve material costs and benefits to the self, whereas emotional outcomes are consequences of an action for moods, well-being and emotional states. There is a growing body of evidence to support a distinction between instrumental and emotional beliefs.^{56–60} For risky behaviours in particular, there is increasing evidence for the role of emotion.⁶¹ These behaviours are frequently incongruent with relevant cognitions. People are aware of the risks of certain behaviours, think that these risks are bad, yet do them all the same. In the past, investigators have focused on cognitive explanations, such as invulnerability or optimistic bias⁶² to explaining the cognition–behaviour discrepancy. However, according to the ‘risk as feelings’ hypothesis, emotional reactions to risky situations often diverge from cognitive assessments of the risk. For example, the smoker who acknowledges that they are more at risk of lung cancer may continue to smoke because doing so makes them feel more relaxed or less anxious. Loewenstein et al. argue that emotional reactions drive behaviour when cognition and emotional reactions conflict⁶¹ (see also Lavine et al.⁶³).

To illustrate, Lawton et al. examined the relative contribution of instrumental and emotional outcome expectancies, both positive and negative, to the prediction of two risk behaviours.⁵⁴ In the first study, the significant predictors of speeding among drivers were only the positive and negative emotional beliefs. In the second study, the significant predictors of smoking among adolescents were only the positive and negative emotional beliefs. These findings illustrate the importance of emotional outcomes as determinants of health risk behaviours.

Establish whether the behaviour is under volitional control

Another important analysis would test whether or not individuals consider the behaviour to be largely under volitional control. It makes quite a difference for a campaign strategy if people don’t engage in a given behaviour because they don’t want to (for example, ‘I hate vegetables and my friends would think me a wimp’) or because they feel unable to do so (‘I can’t afford to buy them,’ ‘I don’t have time to cook them,’ ‘I have to eat too many meals in restaurants’). If individuals feel unable to perform a given behaviour, messages targeting behavioural outcome or

normative beliefs will be ineffective. Campaigns need to focus on information that persuades individuals that they can change and provide them with strategies that would help them to change.⁶⁴

This role of perceived control is important partly because there are often large gaps between intentions and actual behaviour. Webb and Sheeran reviewed 47 interventions that generated statistically significant differences in intention scores between treatment versus control participants and subsequent behaviour.²⁸ Findings indicated that the difference in behaviour that accrued from successful intention-change interventions was modest according to standard estimates of effect size.⁶⁵ A review of health behaviours in particular (e.g. exercise, condom use, cancer screening) indicated that people were successful in enacting their goal intentions only 53% of the time.⁶⁶ Therefore the 'gap' between intention and action is substantial.

So, although the motivation to change is a prerequisite to behaviour change, it's not enough in itself. People often find it difficult to translate their 'good' intentions into action – they fail to do the things they say they want to do, or fail to avoid doing things they don't want to do.⁶⁷ Gollwitzer and Sheeran pointed out that 'good' intentions don't guarantee goal attainment because merely committing oneself to the pursuit of a particular goal (i.e. forming a goal intention) is only the starting point en route to goal completion.⁶⁸ The person must still deal effectively with a series of self-regulatory problems in order to attain desired outcomes. These problems need to be addressed by public health campaigns and programmes that aim to change community or national health behaviour trends.

Two specific problems that confront those trying to attain health goals are failures to initiate action (*failing to get started*) and failing to shield an ongoing goal pursuit from unwanted influences (*getting derailed*). People may fail to start trying to attain health goals for at least three reasons. First, they often simply forget to act. Einstein et al. showed that, when people are busy with other tasks, they generally fail to initiate intended behaviours, even when the time interval to performance was only 15 seconds.⁶⁹ Second, even when they remember to act, people may fail to seize opportunities to kickstart goal attainment. For instance, people can miss out on opportune moments to move towards their goal because they don't know what to do at a critical juncture (e.g. they might not know which on the menu are low-fat options), or because they fail to respond by a particular deadline. A third problem in getting started with goal attainment is overcoming an initial reluctance to act. Decisions to undertake health behaviours such as monthly testicular self-examinations are often based on the longer-term benefits (doing it will prevent the development of serious cancer). However, short-term costs (e.g. time, discomfort) that perhaps were not anticipated at the time of decision may loom large at the moment of acting and lead to inaction.

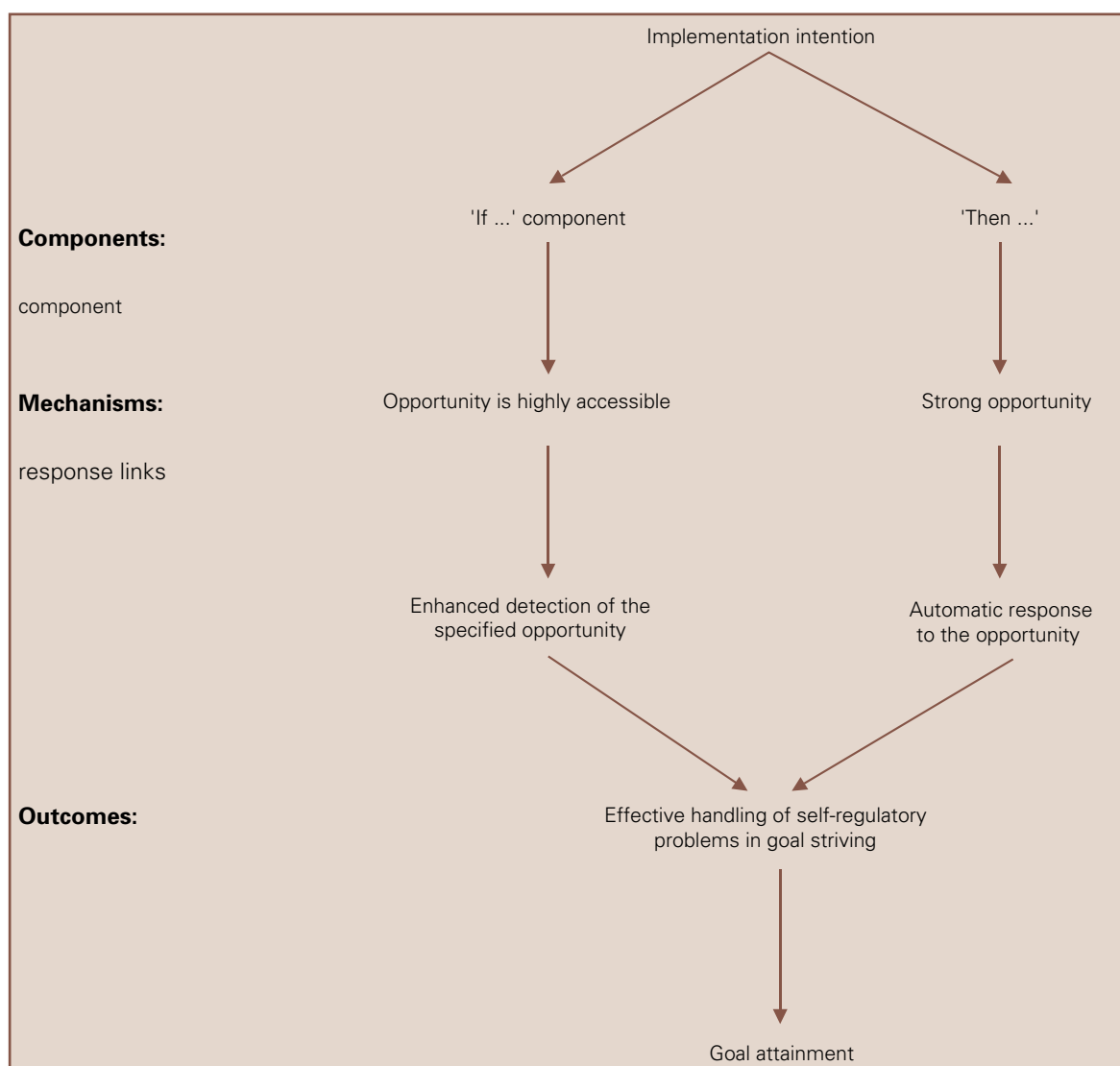
The second major self-regulatory problem – getting derailed – arises because most health behaviours, for example, vigorous exercise or good diet, require repeated and persistent performance if they are to prevent illness and enhance longevity. It's therefore necessary to protect new-found healthy pursuits from being undermined by the many unwanted influences that will be encountered over a prolonged period of time. Both physical environments and social contexts are liable to activate thoughts and feelings that can undermine progress. For instance, spontaneous attention to other attractive activities ('distractions') and the elaboration of desire thoughts (e.g. cravings for chocolate or nicotine) are well known to bring best intentions to a premature halt.⁷⁰ Similarly, when people feel distressed, their main priority is repairing their negative mood. Solace can often be achieved through immediate pleasures, such as high-fat foods. Prioritising the allocation of attention and memory resources to the goal of getting out of the bad mood means that other important goals (e.g. the dieting goal) are suspended.

Implementation intention theory (e.g. Gollwitzer and Schaal⁷¹) helps to address these issues. Implementation intentions are specific 'if ..., then ...' plans of action that specify where, when and how behaviour is to be executed in order to accomplish a particular goal, and have been found relatively effective. Gollwitzer^{68,72,73} proposed that forming *implementation intentions* offers a simple and effective strategy for dealing with self-regulatory problems in goal striving.

Figure 2 describes the components, processes and outcomes of implementation intentions. To form an implementation intention, the person must identify a response that promotes goal attainment (the '*then ...*' component of the plan) and anticipate an opportunity to initiate that response (the '*if ...*' component of the plan). For example, the person might specify the behaviour 'order the salad for lunch' and specify a suitable opportunity as 'when the waiter takes my order at the café tomorrow' in order to achieve their goal of eating more healthily.

Because forming implementation intentions means that people think about and choose a critical future situation for action, the mental representation of this situation becomes highly accessible or easy to retrieve from memory.⁷³ Heightened accessibility of the chosen opportunity implies that a person is 'perceptually ready' to encounter that situation. Consequently, their ability to detect that specified opportunity is enhanced. Evidence indicates that opportunities to act that are specified in implementation intentions don't easily escape people's attention, even when they are busy with other ongoing tasks.⁶⁸

Forming an 'if ..., then ...' plan involves not only choosing a good opportunity to act, but also rehearsing the association between that opportunity and a chosen response. The consequence of these strong links is that the person can respond immediately and efficiently (automatically) at the critical moment. In fact, people who form implementation intentions produce automatic (fast, effortless) responses as soon as they encounter their specified opportunity.⁶⁸ People who

Figure 2: Implementation intentions

have formed implementation intentions are therefore in a very good position to achieve their goals compared to individuals who have merely thought about a goal. However, it's important to bear in mind that this technique is only likely to be effective once motivation to change is established. Therefore prompting someone to formulate implementation intentions as to when and where to begin exercising depends on them intending to increase physical activity.

Two studies concerned with the same behaviour (attendance for an NHS appointment) serve to illustrate how 'if ..., then ...' plan formation can overcome

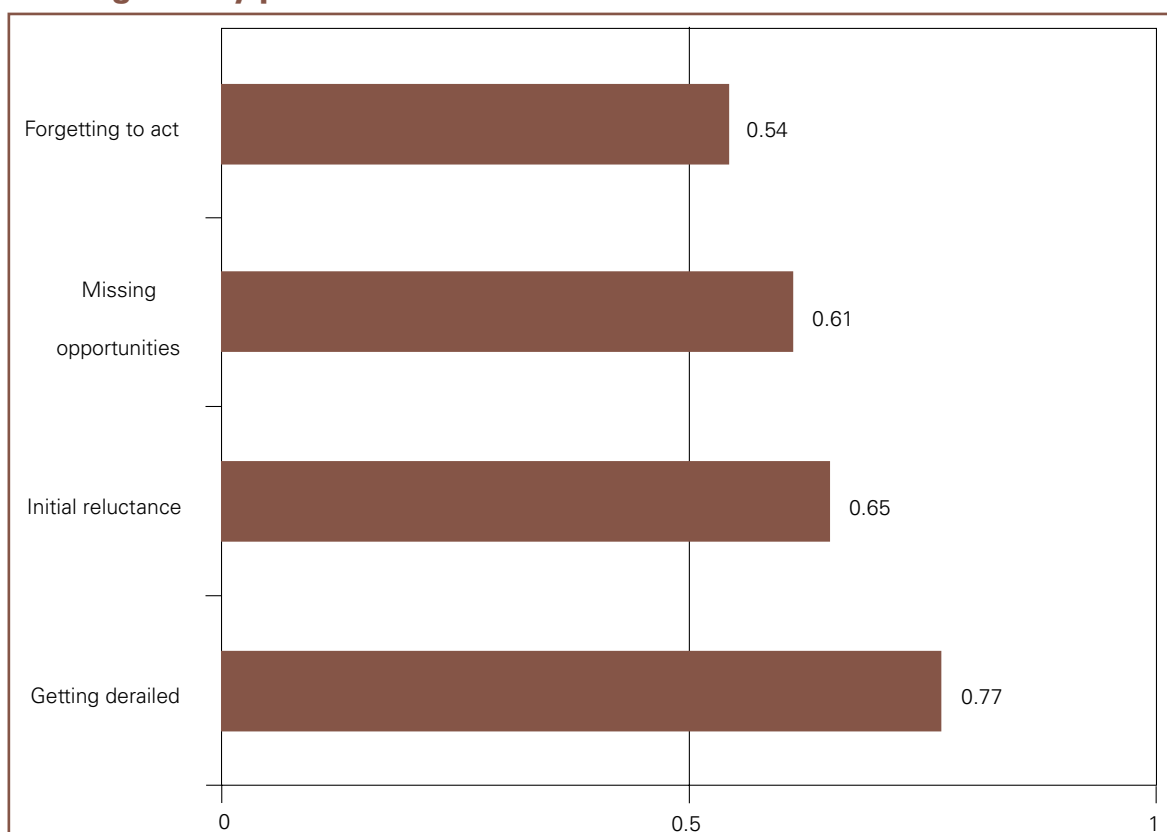
problems in getting started and getting derailed. Sheeran and Orbell tested the impact of implementation intention formation on attendance for cervical cancer screening⁷⁴ – a behaviour where forgetting, missing an opportunity and initial reluctance are acute self-regulatory problems.⁷⁵ Participants recruited from a GP surgery were mailed a questionnaire that assessed their views about screening. One half of the sample were randomly assigned to the 'if ..., then ...' plan condition, and received the following passage at the end of the questionnaire: 'You are more likely to go for a cervical smear if you decide when and where you will go. Please write below when, where and how you will make an appointment.' Participants wrote their answers under each of three headings using the spaces provided. Results indicated that specifying the opportunity and means of achieving the goal in an 'if ..., then ...' plan (i.e. when and how to make an appointment) was highly effective in promoting goal attainment. Medical records indicated that, whereas only 69% of the control group subsequently attended for cancer screening, 92% of participants who formed implementation intentions did so.

The second attendance behaviour concerned appointments for psychotherapy.⁷⁶ Here, the relevant self-regulatory problem had to do with shielding goal striving from unwanted influences during the lengthy interval between seeking help and obtaining treatment. During this period, people are likely to agonise over, feel ashamed, embarrassed, or stigmatised about needing therapy, with the result that 30–60% of people who are offered psychotherapy fail to attend their appointment.⁷⁷ The 'if ..., then ...' plan was therefore geared towards dealing effectively with these negative emotional experiences that might prevent attendance. Participants awaiting a mental health appointment were randomly assigned to receive the following paragraph at the end of a questionnaire concerning perceptions of therapy: 'People can sometimes feel concerned about attending their appointment. To help you manage these concerns, please read the statement below three times and then repeat the statement silently to yourself one more time: *As soon as I feel concerned about attending my appointment, I will ignore that feeling and tell myself this is perfectly understandable!*'

Implementation intention formation again proved effective in promoting attendance behaviour. Whereas only 57% of control participants attended their psychotherapy appointment, 83% of participants who formed an 'if ..., then ...' plan did so. These findings are only illustrative, however. Implementation intention formation has also proved effective in helping people to get started on numerous other activities, including exercise behaviour,^{78–80} eating a low-fat diet^{81,82} and other cancer-relevant behaviours.^{83,84} Similarly, forming implementation intentions prevented the derailment of behaviours by various distractions: safe driving behaviour was protected from activation of the idea of speeding,⁸⁵ dieting behaviour was protected from activation of cravings⁸⁶ and safer sexual intentions was protected from effects of negative mood.⁸⁷

Figure 3 depicts the strength of effects that have been obtained across more than 70 studies.⁶⁸ The effect sizes represent the magnitude of the difference in goal achievement for participants who formed 'if ..., then ...' plans compared to participants who held equivalent goal intentions but did not plan. Implementation intentions had a substantial impact on whether people achieved their goals.

Figure 3: Effects of implementation intention formation on self-regulatory problems



Note: Values are effect sizes (Cohen's *d*). According to Cohen,⁶⁵ $d = 0.20$ is a 'small' effect, $d = 0.50$ is a 'medium' effect, and $d = 0.80$ is a 'large' effect.

Stage models

Identify psychologically distinct groups

Target populations often consist of different groups of individuals. Some think they could, but are not yet willing to, change their behaviour, and others would like to change but feel unable to do so. Stage theories of behaviour change provide a potentially useful approach in identifying psychologically distinct groups. If these groups could be easily identified and messages tailored to their specific control or motivational needs in a cost-effective way, persuasiveness might be enhanced. Stage theories propose that behaviour change involves a sequential progression



from ignorance of a health threat to preventive action. For example, the starting point for the Precaution Adoption Process Model of Weinstein is the individual who is unaware of a given health risk, either out of personal ignorance or because the risk is as yet unknown, such as in the cases of unprotected intercourse and HIV infection before 1980 or the risks involved in smoking before 1964. Of course, when people first learn about a risk, this information doesn't necessarily alter motivation. Further communication from friends or the mass media may, however, convince them that they are personally at risk. Even then a person may feel unable to avoid unprotected sex or stop smoking. Motivation consolidation and high self-efficacy (perhaps based on skills acquisition) are required if newly established motivations are to be translated into behaviour change.

Stage theories suggest that different types of information may be effective at each specific stage. For example, the information that smoking is dangerous is crucial for children who haven't considered the potential dangers but not for an addicted smoker who wants to quit. For the addicted smokers, interventions that increase self-efficacy or perceived behavioural control and/or provide new behavioural skills will be critical to behaviour change.

The potential of stage models has been curtailed by lack of research evidence and problems in application. There is little evidence that people move through sequential stages to achieve behaviour changes.⁸⁸ Readiness to change may fluctuate according to social and environmental contexts and in relation to other goals and demands that impinge on self-regulatory processes. Moreover, in order to tailor communications to specific change stages, it is necessary to categorise each individual's stage of change before intervention delivery. In many public health contexts, this is impractical and prohibitively expensive. Interventions that simultaneously target different psychological needs (e.g. by delivering information about risks, attitude, cultural norms, and prerequisite skills) are less likely to be cost-effective than broad-reach intervention strategies, unless shown to be detrimental to change in some groups. We are not aware of research demonstrating that interventions simultaneously targeting different states of readiness to change are detrimental, relative to stage-matched interventions.

However, for particular groups, tailored interventions may be easier to deliver. For example, given that three in every four US smokers say they want to quit, but fewer than 5% of smokers who quit for at least a day are able to stay tobacco-free for 3–12 months, interventions aimed at increasing information and motivation are likely to have limited effects. Smokers motivated to quit need help to translate their motivation into action (see the earlier discussion of implementation intention formation). Similarly, different interventions may be effective in increasing physical activity among sedentary and already-active individuals.

This discussion highlights a more general point: some people have more difficulty implementing recommended 'actions' than others. Physiological processes and

skills deficits contribute to the grip that certain habitual behaviours, including smoking and eating behaviours, have. It's therefore critical to consider the specific barriers to change that typify any target group. The Information–Motivation–Behavioural Skills Model proposed by Fisher and Fisher⁶ provides a useful framework for thinking about key components of behaviour change interventions and has been successfully applied to many areas of health behaviour change.^{89–91}

Nonetheless, individual message tailoring is feasible in the context of computer-tailored online campaigns. Such interventions programmes can assess individuals' intervention needs and provide interventions matched to individual deficits in information, motivation or skills.⁹² The interactive nature of internet communications has an added advantage. Convincing an individual that they may be vulnerable can be enhanced using diagnostic information provided by them about their lifestyle (e.g. their eating pattern). To give an example, Davidovich et al. recently conducted a randomised controlled trial of a tailored intervention to promote condom use by gay men.⁹³ The results showed that only the intervention that was computer-tailored to address individual deficits in information, motivation and skills yielded increased use of condoms. This online intervention has since been adopted by the Schorer Foundation, the group responsible for offering health education to gay men in the Netherlands.

The potential utility of this approach also raises a question about the applicability of other media channels – television, print ads, radio features, cinema shorts and so on – for promoting behaviour change. There is tremendous variation in the cost of these channels and in the content that can be distributed through them. Although there is a lot of knowledge about how the different channels reach audiences that differ in market characteristics and number, we are not aware of evidence directly testing whether the channels generally differ in their impact on subsequent attitudes and behaviour. There is a need for more evidence examining this issue.⁹⁴

These examples make clear why the development of behaviour change interventions should be guided by social psychological theory and research. After all, the dissemination of messages through mass media is an expensive business. For this reason, even if the design of our messages is based on state-of-the-art knowledge, it is important that their usefulness is examined in small-scale studies that use the best measurement devices available, *before* the messages are used in large-scale campaigns. As described above, there is evidence that large-scale campaigns can elicit the opposite of the intended effects without proper pre-testing, which can make them worse than a mere waste of money.

Mere measurement

The research already outlined on outcome expectancies assumes that changing health behaviours is a function of changing the salient beliefs underlying the

behaviour, whether positive or negative, instrumental or emotional. Traditional persuasive strategies are commonly used to achieve this effect with some success.⁹⁵ However, research has suggested that simply getting people to express cognitions that are supportive of a behaviour can motivate behaviour change. The expression of the cognitions is often achieved through completing a questionnaire measuring the appropriate cognitions. In these cases, it has been termed the '*mere measurement effect*'.⁹⁶

The mere measurement effect has been shown in relation to the measurement of intentions and attitudes. For example, Morwitz et al. showed that completing an intention measure increased subsequent purchase rates for consumer goods.⁹⁶ In the health area, Godin et al. showed that measuring intentions, attitudes and other components of the Theory of Planned Behaviour increased repeat blood donations by 9% during the subsequent six months and by 6% during the subsequent 12 months.⁹⁷

This mere measurement effect appears to be particularly pronounced when the questionnaire assesses emotional outcomes, such as the anticipated feelings of regret from contemplating an action. For example, regret may emerge after imagining how we might feel after having sex with someone new without using a condom, given the threat of unexpected pregnancy, HIV/AIDS and a variety of sexually transmitted diseases.⁹⁸ Mere measurement of regret can be sufficient to change the behaviour associated with the regret, as has been shown in relation to condom use⁹⁸ and exercise.⁹⁹

Indeed, these effects occur over and above those associated with mere measurement of intentions and attitudes. For example, Sandberg and Conner showed that simply measuring intentions, attitudes, norms and perceived behavioural control was sufficient to significantly increase attendance for cervical screening from 21% to 44%,¹⁰⁰ while additionally completing measures of anticipated emotion (e.g. how much regret you might anticipate feeling after not attending for screening) was sufficient to increase attendance by a further 21% (to 65% attendance). Additional analyses indicated that the mere measurement effect for anticipated regret was attributable to increasing attendance among those who intended to attend. So, for groups known to be motivated to change, behaviour opportunities to express views and rehearse cognitions (such as survey completion) may be a simple and cost-effective means to bolster motivation and prompt behaviour change.

Upstream interventions

Upstream interventions aim to elicit changes in the performance environments such that undesired habits are prevented and desired habits can be expected to flourish.²³ In other words, upstream interventions attempt to shape the conditions that promote and sustain desired habits. This emphasis on promoting new habits

is important, because the characteristics that make habits difficult to change are, in fact, desirable for new, healthy or desired behaviours that we want people to adopt. Habituation of desired behaviour, or the promotion of desirable habits, may be explicitly formulated as a goal of behaviour change interventions.

Consistent with operant learning theory,¹⁰¹ suitably timed rewards may facilitate habit development. Economic incentives for desired habits are a good example of an upstream intervention.¹⁰² Such incentives have been used by successive governments and road safety organisations to get people to drive more safely. The use of legislation and enforcement to detect and punish people who fail to use seatbelts or who drive too fast has underscored the need for seatbelts and safe speeds. This example also helps to illustrate the importance of other factors. The legislation on seatbelt use was supported in three ways: by a successful attitude-change campaign, the introduction of standardised easy-to-use inertia-reel belts, and by committed enforcement. Enforcement, in particular, has helped to ensure that material outcomes for people were contingent on their behaviour, which is a point stressed by operant learning theory. By contrast, to date, mobile-phone use legislation has been largely ignored.

Health behaviours, like all behaviours, are influenced by price increases. Governments can increase the costs of smoking, drinking alcohol, or even eating fatty food, by making products more expensive through tax increases or by reducing availability through limiting access. Such price changes implicitly include the contingencies that drive the effects of reinforcement. They make it aversive to perform the unhealthy behaviours and relatively rewarding to perform the healthy behaviours. However, use of economic levers should also be tempered by an understanding of likely psychological and societal effects. For example, taxing cigarettes when most smokers feel unable to quit may widen health inequalities without greatly reducing smoking. Similarly, taxation policies applied to food would need to be sensitively applied, taking account of individuals' ability to alter eating habits in the context of dominant social norms and the commercial availability of particular foods.

Other upstream interventions may involve the transformation of infrastructures or physical environments, such as better street plans and bus routes for promoting public transport usage, or providing healthy school meals such as in Jamie Oliver's school dinner project.¹⁰³ These transformations are often crucial, because the best will in the world can't elicit behaviour change if the environment doesn't provide reasonable opportunities.

Education is another important long-term upstream intervention. The many habits that now are considered as ordinary everyday behaviours, such as seatbelt usage or waste segregation, once started as new behaviour that had to be promoted or implemented. Education alone can't be expected to accomplish great changes. It's important to support upstream interventions and help to turn the new behaviours into normatively accepted and correct behaviours.

Upstream interventions can be difficult to accomplish and often involve substantial resources over longer periods of time, long-term planning *and* political support. To be successful, there must be a combination of legislation, enforcement, education and structural change. Interventions to promote seatbelt use provide a good example. Research reported by Steptoe and colleagues compared self-reported seatbelt use in 13 European countries in 1990 and 2000. Table 1 shows a summary of their key findings. The most marked changes are those in Poland, Portugal and Spain. In all three nations, there was new seatbelt legislation between the two measurement points. These changes in reported behaviour were paralleled by changes in the perceived importance of wearing seatbelts ($r_{men} = 0.93$; $r_{women} = 0.85$). Moreover, the proportion of respondents always using seatbelts increased with strength of belief in the importance of wearing seatbelts.¹⁰⁴

Table 1. The prevalence of always using a seat belt, 1990 and 2000^a

Country (n)	Men			Women		
	1990 % (95% CI)	2000 % (95% CI)	Change %	1990 % (95% CI)	2000 % (95% CI)	Change %
Belgium (1750)	77 (73–80)	69 (64–74)	–8	81 (78–84)	83 (78–88)	+2
England (1560)	88 (83–93)	83 (79–87)	–5	92 (88–96)	89 (85–93)	–3
France (1414)	88 (83–93)	88 (84–92)	0	88 (84–92)	95 (91–99)	+7
Germany (1518)	81 (77–85)	70 (66–75)	–11 ^b	89 (85–93)	83 (79–87)	–6
Greece (1462)	27 (22–32)	55 (51–59)	+28 ^b	28 (23–32)	60 (56–64)	+32 ^b
Hungary (1341)	64 (59–68)	74 (68–79)	+10 ^b	62 (58–67)	72 (68–77)	+10 ^b
Iceland (1476)	73 (69–77)	76 (72–81)	+3	85 (81–89)	92 (88–96)	+7
Ireland (1254)	75 (71–80)	85 (77–93)	+10	75 (72–79)	86 (81–90)	+11 ^b
Italy (2833)	46 (42–50)	53 (51–56)	+7 ^b	45 (41–49)	55 (52–57)	+10 ^b
Netherlands (1433)	83 (78–88)	83 (79–88)	0	92 (88–95)	89 (85–93)	–3
Poland (1554)	25 (20–29)	72 (68–77)	+47 ^b	24 (19–28)	81 (77–85)	+57 ^b
Portugal (1790)	31 (26–35)	92 (89–96)	+61 ^b	30 (26–34)	96 (92–99)	+66 ^b
Spain (1283)	55 (51–59)	81 (75–86)	+26 ^b	57 (53–61)	79 (74–84)	+22 ^b
USA (1672)		72 (68–75)			87 (84–89)	

^aPrevalence levels adjusted to the average age of the total population in the study.

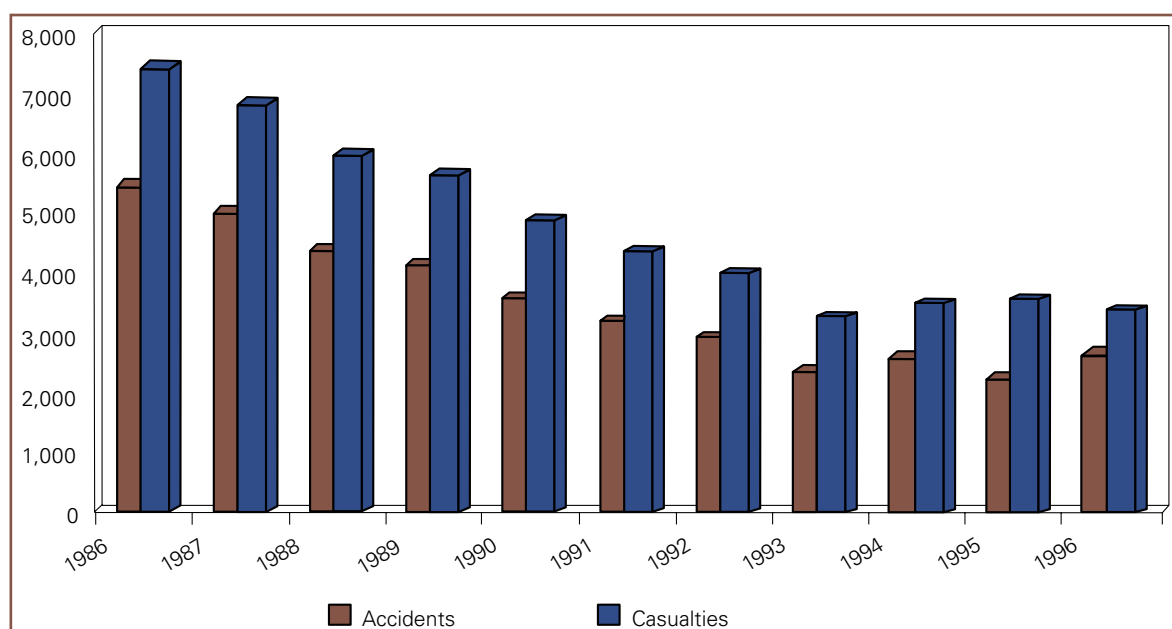
^bNon-overlapping CIs.

CI, confidence interval.

Source: (Steptoe et al., 2002)

Turning to drink driving, Figure 4 shows the declining number of accidents on British roads resulting in death or serious injury in which one or more drivers were found to be above the legal blood-alcohol level. Clearly, some of this reduction is attributable to more effective enforcement of drink–drive legislation. Nevertheless, most people do not anticipate a road alcohol test when they are drinking. Publicity and education must also play a crucial role and, indeed, attitudes to drink–driving are now very negative. Moreover, we know that drink–driving attitudes are predictive of drink–driving intentions.¹⁰⁵

Figure 4: Accidents (victim killed or seriously injured) and casualties with illegal alcohol levels.¹⁰⁶

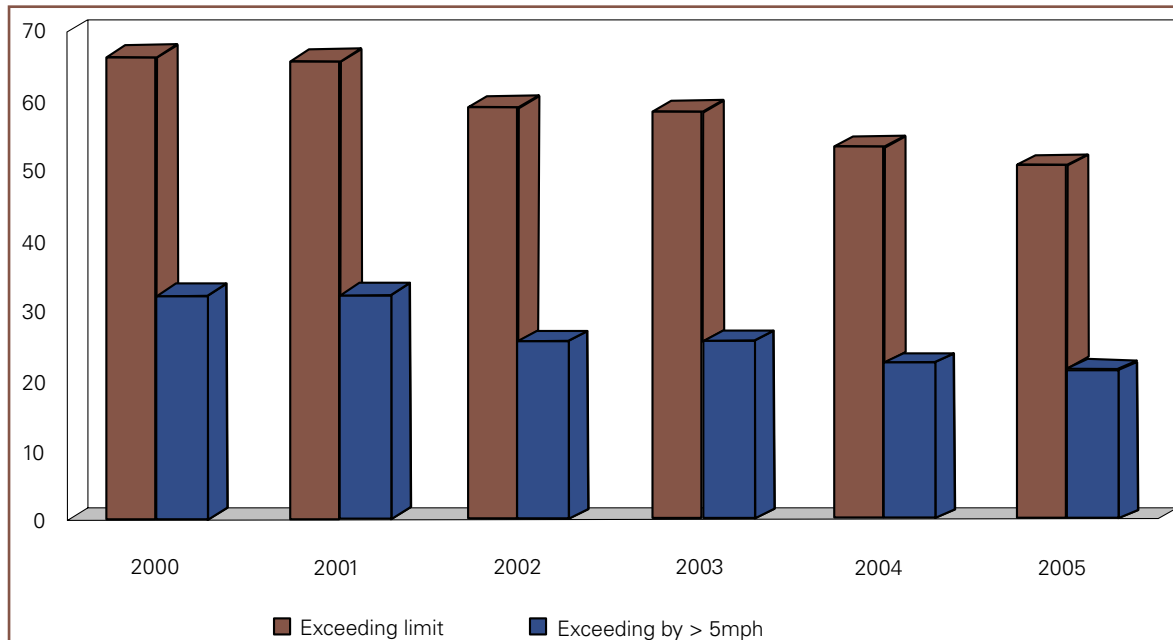


Source: Department for Transport (1998)

Similarly, Figure 5 depicts a small but steady reduction in speeding in built-up areas on British roads in recent years. Again, it is likely that some of this reduction is due to increased enforcement. There is less solid evidence that attitudes to speeding have changed, as compared with evidence of a change in attitudes to seatbelt use and drink–driving. However, the increased enforcement has been coupled with increased advertising against speeding, so it is plausible that attitude change has also occurred. Of course, backfire effects of advertising are possible, but the vehicle speed data indicate that backfire is unlikely in this case.



Figure 5: Percentage of cars speeding on British roads with a 30 mph limit¹⁰⁷



Overall, it's clear that upstream interventions can succeed, even with hard-to-change behaviours. Combinations of legislation, enforcement, education and structural change play a crucial role. The initial costs may seem high, but they must be assessed with their long-term potential in mind. These long-term benefits may make them, relatively speaking, a bargain, justifying large resources and political support. Therefore, the role of upstream interventions as a complement to downstream approaches may be incalculable.

Combinatorial interventions

If habit poses barriers to change, one may search for situations where habits are (temporarily) broken. There are many such situations. They occur when people undergo major changes in their personal or working lives, such as divorce, the birth of a child or a new job, or when the environment changes, such as a major reorganisation or relocation within a workplace. In these situations, existing habits

are broken or are at least vulnerable. Informational, downstream approaches may then have a relatively high prospect of being successful.

Verplanken and Wood referred to interventions aimed at such situations as 'downstream plus context change' approaches.²³ The assumption underlying these interventions is that individuals have to find new ways to behave and solve problems, and may thus be more susceptible to new information that helps them to accomplish this.

There is plenty of scope for such approaches. For example, community 'welcome wagon' programmes in the USA and Canada provide new residents with information about local products and services. The information within these packs often includes information about parks and recreation facilities and public transport options. In some cases, the packs include a free pass to use local buses.²³ Because these packs arrive during a time of habit deconstruction, there is good reason to expect that they are more effective than downstream interventions alone.

Summary

The upstream, downstream and combinatorial approaches each have their own strengths. For instance, even though upstream interventions have been vital for altering driver behaviour, this doesn't imply that mass media campaigns have been unimportant. Such campaigns have been important for changing beliefs and attitudes, and we know that attitudes to speeding predict driving intentions and behaviour.^{108,109} In addition, publicity campaigns designed to change attitudes to speeding do elicit attitude change.¹¹⁰

The complementarity of upstream and downstream interventions reinforces the utility of combinatorial interventions, such as the 'downstream plus context change' intervention. A combinatorial approach may be most promising, and many of the models described provide clues for how to determine which combination of approaches is effective. For example, stage models suggest that the stage of public awareness is important, and social cognitive models indicate that the type of salient belief is vital. These considerations may reveal which upstream changes are necessary and, perhaps, whether it is vital to include psychological aids for habit breakdown (e.g. implementation intention training).

Remaining issues to explore for healthy lifestyle change

Many challenges confront the application of the reviewed evidence to policy. There are limitations in current theory, caveats to inferences that can be made from the extant evidence, and empirical issues that remain to be explored. We are optimistic that these issues can be addressed and, indeed, steps have already been taken to address many of them. We review these issues below, before tackling ramifications for future scenarios in the final section.

Learning from evidence: challenges for implementation posed by scientific documentation of behaviour change evaluations

Development of effective health behaviour change interventions depends on the adoption of change techniques that have been found to be effective (for particular target audiences) in methodologically rigorous trials. Such research can also clarify whether particular approaches are ineffective and should be abandoned. Such transfer of knowledge from research to practice is fundamental to the establishment of evidence-based health promotion practice. Yet most health promotion has tended to develop independently of available research and may be regarded as 'evidence-inspired' rather than evidence-based.¹¹¹

An important barrier to implementation of research findings is the adequacy with which researchers describe the change techniques employed in tested behaviour change interventions. Acceptance of the CONSORT statement (a checklist and flowchart research tool that helps to improve the quality of reports of randomised trials) has helped standardise the reporting of intervention evaluations by insisting that researchers provide 'precise details of the interventions intended for each group and how and when they were actually administered'.¹¹³ However, while this principle has been accepted, description of behaviour change interventions in the scientific literature is not straightforward for two main reasons. First, most health behaviour interventions are combinations of many discrete behaviour change techniques. For example, Abraham and Michie found that healthy eating interventions described in 22 published evaluations (identified by a systematic review of interventions based on self-regulatory principles) included between one and thirteen discrete behaviour change techniques, with an average of six techniques per intervention.¹¹⁴ Second, and more importantly, there is no agreed terminology by which researchers and practitioners can describe and define specific behaviour change techniques. Consequently, different researchers use different terms to describe the same or similar approaches to changing a particular target behaviour while, at the same time, important differences between interventions may not be adequately highlighted.

This lack of a standardised description of change techniques threatens to reduce scientific evaluations to one-off tests of interventions which, while they may be

creatively designed and effective, can't be reliably replicated or accurately translated into practice. Lack of a standardised description of the constituent components of behaviour change interventions limits the conclusions that can be drawn from systematic reviews. For example, Hillsdon et al. conducted an evaluation of systematic reviews of physical activity interventions and noted that some techniques were more frequently found in effective interventions (i.e. exploring beliefs about the costs and benefits of physical activity, bolstering confidence to engage in physical activity, prompting goal setting, encouraging self-monitoring and providing reinforcement of changes in physical activity).¹¹⁵ Here, specific behaviour change techniques were seen to be associated with success in promoting increased physical activity. However, such syntheses are rare because identification of discrete techniques that characterise one intervention but not another can't be read from published evaluation reports in a straightforward manner. Consequently, some systematic reviews are limited to relating intervention effectiveness to the settings in which they are undertaken (e.g. worksite interventions) or the audiences they target, thereby failing to provide detailed guidance to practitioners about what particular combinations of techniques have been found effective when promoting particular health behaviours.

Some researchers have sought to standardise the way intervention components are described. For example, in a review of interventions designed to prevent weight gain, Hardeman et al.¹¹⁶ used 19 separate behaviour change methods to classify intervention contents. More recently, building on work of this kind, Michie and Abraham assessed whether researchers could reliably analyse published intervention descriptions into component techniques (such as prompting goal setting, encouraging self-monitoring and providing contingent reinforcement).¹¹² The researchers used a five-page manual defining 26 discrete behaviour change techniques to characterise interventions described in 195 published intervention evaluations. Two researchers independently decided whether each of the 26 defined behaviour change techniques was, or was not, included in each intervention. This allowed the interventions to be characterised in terms of a common set of contents and also provided assessment of the reliability with which such analyses could be undertaken. Good reliability was observed for 23 of the 26 defined behaviour change techniques, suggesting that published intervention descriptions can be translated into lists of included and excluded behaviour change techniques. These results are encouraging because they demonstrate the feasibility of standardising descriptions of behaviour change interventions in terms of clearly defined, commonly understandable techniques. The research also provides a model for the establishment of a common terminology of behaviour change that can be understood by researchers and practitioners alike. Such standardisation would enable reviewers to link effectiveness data to the use of specified change techniques and facilitate replication fidelity by ensuring that researchers and practitioners use the same terms to describe particular approaches to behaviour change. Further development



of this standardisation work is prerequisite to the establishment of evidence-based promotion of health behaviours.

The role of moral norms

Most of the focus on behaviour change considers the effects of an intervention on individual attitudes, beliefs and behaviours, and this emphasis is apparent in our description of upstream and downstream approaches. However, upstream and downstream interventions have a potential impact above and beyond specific attitudes, beliefs and behaviours. It is also vitally important to consider the moral climate around the target behaviours.

Moral climate is created by shared belief that doing something is inherently 'right' or 'wrong', without regard to the benefits or costs to self. An example of the importance of moral climate is provided by the case of drink-driving, where the combination of education, legislation and enforcement has changed moral norms about it. There is now a prevalent belief that drink-driving is *morally* wrong – a radical change since 1967. This moral climate, in turn, helps to support strong sanctions.

There is other evidence that moral climate merits attention in its own right. First, moral norms are predictive of behavioural intentions over and above attitudes, subjective norms and perceived behavioural control.^{117–119} There is also evidence that – for some behavioural domains – the effects of attitudes on behaviour are determined at least in part by moral considerations.^{120–123} Changing moral norms requires people to accept that a particular behaviour has negative outcomes for others, to take personal responsibility for these outcomes, and to care about others.

It is therefore important to consider the potential impact of upstream and downstream approaches on moral norms. There are two ways of looking at this. On the one hand, relevant research on the 'values as truisms' hypothesis suggests an important behavioural effect.¹²⁴ In general, when people are asked to articulate why specific social values are important to them, they have difficulty describing their reasons. Not only does this observation resonate with recent news stories about confusion over how to define 'health',¹²⁵ but it also fits experimental evidence that a person's values are based more on learned feelings than on reasoned arguments.^{124,126} As a result, people's behaviour often fails to live up to their values in situations that actually make it tempting *not* to fulfil the value. For example, when there is some incentive to favour one's own social group, people will not demonstrate adherence to 'equality' as a guiding principle. However, when people are given an opportunity to develop their own reasons for possessing a value (e.g. equality), they subsequently exhibit much more pro-value behaviour in such situations.¹²⁷ This effect on the ability to resist temptation and behave in a way that is consistent with a value provides provocative evidence that the

provision of interventions that stimulate thinking about health and health-related values may be a useful way to help people deal with the ambivalence engendered by these topics.

On the other hand, the previous discussion of habit has made it clear that much of the basis for non-healthy behaviour may have nothing to do with consciously held intentions. The applicability of the theory of planned behaviour in particular relies on intentional conscious control. An important issue is whether the unhealthy behaviours in question are 'intentional' in nature. People's reactions in situations of temptation suggest that there is a strong sense in which the behaviours are performed counter-intentionally, meaning that they have occurred automatically despite personal ambitions and goals. To the extent that this occurs, interventions aimed at supporting the value of health may be ineffective. Even worse, such interventions may create a stigma against people who are simply reacting to powerful inherited tendencies and situational forces that they have not been able to control.¹²⁸ Indeed, there is now abundant evidence that a form of 'fat-ism' is becoming a pervasive and rampant form of prejudice in society.^{129,130} In the last month alone, the lead author of this report heard of several instances where overweight people, attempting to lose weight, had been heckled by drivers when training or running outdoors. People will not take up exercise only to be ridiculed, and such fat-ism is a powerful disincentive.

The role of automatic attitudes

We require greater awareness of the factors that predict unhealthy behaviours that are counter to people's intention. Despite the current Government's emphasis on 'choosing responsibly', it is clear that many of these behaviours do not arise from conscious choices. There is a need to understand the social factors and internal variables that predict habitual, counter-intentional behaviours. Social psychological research has provided strong evidence for the importance of one variable: automatic attitudes.

These attitudes are measured by so-called 'implicit' measures, which assess evaluations that people are unable or unwilling to retrieve from memory^{131–133} Implicit measures do not ask people to directly report their attitudes. Instead, the measures assess attitudes without respondents' immediate awareness or control.

One approach involves people being shown words or images that describe a particular object, behaviour or person of interest and then being asked to perform a second task.¹³⁴ These initial stimuli, say of sweets or chocolate, can be presented in such a way that the subject is not consciously aware of having seen them.³⁵ Tests show, however, that they have in fact been registered. After each image, participants are asked to quickly indicate whether an adjective – 'awful', 'nice', 'wonderful', 'horrible' – has a 'good' meaning or 'bad' meaning. Participants are quicker to label the positive adjectives (e.g. 'nice') as 'good' after being shown an image they like than after being shown things they dislike. Participants are also



quicker to label the negative adjectives (e.g. 'awful') as 'bad' after being shown an image they dislike than after being shown things they like.

More important, responses on such measures are often discordant with self-reported (explicit) attitudes. For example, a person may explicitly report that they dislike chocolate cake, yet show strong desire for it using an implicit measure (cf. Roefs et al.¹³⁵). This is an important difference because implicit measures are unique in terms of being able to predict behaviour. This ability has been illustrated in several domains of study, including consumer behaviour, health behaviour, clinical disorders, and prejudice.³⁵ In the domain of consumer behaviour, Maison et al. found that women who preferred the taste of low-calorie products over high-calorie products on an implicit measure habitually restricted their high-calorie food intake.¹³⁶ These researchers also found that implicit measures of preference for brands of yoghurt, fast-food restaurants and colas significantly predicted brand choice, product usage, and even brand recognition in a blind taste test. Moreover, although explicit self-report measures of attitude were also powerful predictors of behaviour in these experiments, the implicit measures predicted behaviour even after controlling for the explicit ratings. Therefore implicit measures have a unique relationship with common, food-related behaviours.

There is also evidence that implicit measures predict different types of behaviour in comparison with explicit measures. Research on the use of condoms provides interesting evidence in support of this idea.^{137,138} In this research, explicit self-report measures of condom use tended to better predict hypothetical decisions and behaviours regarding steady dating partners rather than casual dating partners. In contrast, implicit measures of favourability toward condoms tended to predict hypothetical decisions about condom use with casual partners, but not hypothetical decisions about condom use with steady partners. This evidence has been interpreted as support for the notion that explicit measures are better predictors of behaviour that is relatively deliberative and controlled (sex with a steady partner), whereas implicit measures are better predictors of behaviour that is relatively spontaneous and automatic (sex with a casual partner) (see also Dovidio et al.^{139,140}).

Other interesting evidence indicates that these measures can predict behaviours regarding mood-altering substances such as alcohol, nicotine and cannabis. For instance, people who possess more positive implicit associations with alcoholic beverages consume more alcohol, even after statistically accounting for their explicit self-reported alcohol expectancies.¹⁴¹ In addition, smokers exhibit preferences for smoking-related cues on an implicit measure,^{142,143} especially after nicotine deprivation.¹⁴⁴ Similarly, cannabis users exhibit less negative reactions to cannabis-related words on an implicit measure than non-users do.¹⁴⁵

Unfortunately, this is not the only research to yield such a result. Disturbingly, anti-racism messages can elicit more prejudice on implicit measures of attitude.³⁵ In addition, Teachman et al. found that procedures designed to highlight genetic contributions to obesity and instigate empathy for those affected by these

conditions did not reduce prejudice on an implicit measure. In fact, the implicit measure revealed more evidence of anti-fat bias than a comparable explicit measure in which participants largely denied any bias.¹⁴⁶

Ultimately, most applied research is oriented towards yielding successful interventions. Yet there is a lack of evidence evaluating the effects of such interventions using implicit measures of attitude. The results described above highlight the general relevance of implicit measures to applied settings, where the vulnerability of self-report measures to socially desirable responding is most apparent. Because of the unique role of implicit measures of attitude in the prediction of behaviour, it is vital that interventions manage to influence the automatic associations tapped by the implicit measures, and not just the conscious attitudes obtained by self-report measures. This change in the automatic associations may require repeated and creative interventions to change attitudes – even a single, powerful message might not be enough.¹⁴⁷

Insights from brain imaging

We have already noted the important role of psychological ambivalence in making healthy lifestyle choices. There is now evidence that ambivalence has clearly demonstrable neurological properties. This has the potential to provide insights into mechanisms of behaviour change. Using functional magnetic resonance imaging (fMRI) brain-imaging techniques, Cunningham and colleagues have found that regions of the prefrontal cortex (PFC), specifically the ventrolateral PFC, are more active when people make evaluations of objects that elicit ambivalence, over and above the activity associated with emotional valence (i.e. happiness versus sadness) and intensity, in regions such as the amygdala.¹⁴⁸ This pattern indicates that ambivalence has important neuropsychological aspects, which make it easier to understand why it has so great an impact on behaviour.

In fact, such evidence may help to solve an interesting behavioural puzzle about ambivalence. Specifically, ambivalence tends to elicit polarised responses to the objects of the ambivalence (i.e. extremely positive or extremely negative),⁵ despite eliciting enhanced scrutiny of relevant persuasive messages.³³ This means that those who are ambivalent still respond in extreme ways even though they are actively *resisting* direct social influence. It is possible that this combination of polarisation and resistance effects is part of the same psychological process, but they occur over different timescales. The studies showing response polarisation have used very obvious and immediate cues (e.g. mood, good behaviour) that may be important within an early ‘teachable moment’ in which people are still processing their conflicting evaluations. In contrast, persuasive messages require longer periods of attention and deliberation, and they may fail, partly because they are not understood early enough in people’s thoughts about an object, that is, before they have begun to resolve their ambivalence. Neurological scanning can be used to more accurately track the time course of ambivalence using

Event-Related Potential or magnetoencephalogram (MEG). It can also be used to test whether situational cues have a different impact during the activation of brain regions that are associated with ambivalence, after this activation has subsided.

Such evidence may reveal ways that interventions can be shaped to harness the phenomenon of ambivalence. For example, it may be possible to develop signage or messages that, immediately after eliciting feelings of ambivalence about a behaviour, show pictorial cues for healthy behaviour. These approaches may be more successful than approaches that use longer text messages for ambivalent topics. Nonetheless, we still need to determine whether brain activity and intervention data coincide in revealing a unique neurologically based teachable moment in the ambivalence process.

Future scenarios

Wanless concluded that the most effective and cost-effective approach to improving UK health services was to generate a ‘fully engaged scenario’ involving high levels of public engagement in healthcare and health maintenance.³ This focus was further highlighted in a discussion paper published by the Prime Minister’s Strategy Unit on personal responsibility and behaviour change.⁹ The paper noted that:

‘achievement of major policy outcomes requires greater engagement and participation from citizens ... improvements depend on changes in personal behaviour: for example in health, on better diet and more exercise’

and concluded that:

‘behaviourally-based interventions can be significantly more cost-effective than traditional service delivery. There is good evidence across a range of policy areas ... of the cost-effectiveness of behavioural interventions (for example, a change in diet that avoids [sic] a heart attack is better and cheaper than ... heart surgery).’⁹

We have reviewed social psychological theory and evidence that helps to evaluate the potential effects of society-wide interventions to implement such behaviour change. Unfortunately, this theory and evidence makes it clear that it is not as simple as saying that people need to alter some of their bad choices. The endeavour is actually about engineering *lifestyle* change more broadly. Attempts to elicit such change also have to consider psychological ambivalence in the health context and the difficulties trying to redress it.

These issues can be addressed through upstream (e.g. legislation, environmental changes and educational efforts), downstream (e.g. persuasive marketing) and combinatorial approaches (e.g. downstream plus context change). Across these types of large-scale intervention, there are crucial roles for both personal and environmental factors: people can’t attain lifestyle change without the

motivational, cognitive and emotional resources to drive change and an environment that facilitates it.

So, how might interventions be used and what effects may they have over the coming decades? The evidence described in this review furnishes a provocative indication that public campaigns might benefit from an interactional, open-ended style. That is, interventions have attained at least some success by merely measuring attitudes and intentions, asking people to form implementation intentions, and finally encouraging people to rethink relevant values. In all of these methods, a question is posed to the participants and they come up with their own answer. This self-generation of attitudes, implementation intentions and values may be crucial. Indeed, this idea is consistent with classic evidence that self-generated persuasive arguments tend to elicit more attitude and behaviour change than arguments generated by others.^{149,150} So, rather than merely telling people what they should do and how to do it, campaigns should encourage more reflection on the part of individuals.

Such an approach might succeed in promoting healthier values, attitudes and behaviours over the long term, but this approach must also be maintained until there are matching changes in the environment. This assertion is consistent with evidence regarding eating behaviour in particular: 'Attempts to halt the weight increases merely by imploring people to be more prudent in their food consumption or more physically active, without modifying the environment that facilitates positive energy balance behaviours, are likely to have limited impact.'¹ Across behaviour change domains, it is clear that failures to change the environment inevitably result in cues for older, habitual behaviours reasserting themselves. Downstream, informational campaigns work best when people encounter new situations that break up old habits. Given this evidence, it's important to undertake initiatives that change the structure of people's environments. If we must suddenly pay a cash toll to use a road that we often travel, our use of the road immediately becomes less habitual and requires some forethought to ensure the cash is to hand. At the same time, if bright, safe cycle routes suddenly appear beside one's habitual route to work, it should become easier to use this route and become an habitual cyclist. Together, these changes would help to defeat the cues for an old habit and make it easier to build a new one without us having to move job or home. Therefore, the actual timescale of successful campaigns depends heavily on the amount of time required for people to experience the appropriate environmental changes as well.

Some environmental changes are going to occur naturally, through the emergence of new technologies. As noted at the outset of this review, technological changes have engineered radically lower requirements for physical effort in most aspects of daily life.² In the report, [Tackling Obesities: Future Choices – Future trends in Technology and their Impact on Obesity](#), Sharpe et al. indicate that this trend is likely to continue and may even include the increased use of personalised powered transport, which may ironically use some of the same urban paths being designated for pedestrian and cyclist use.² Nonetheless, Sharpe et al. also



describe how other technological advances will facilitate more accurate monitoring and feedback about calorie intake and energy expenditure. The technologies can include clothing that senses energy output and ingestible microchips that detect nutrient consumption. The increased accuracy in information should increase people’s ability to implement required changes, helping them to avoid an extra portion of food and also to do the additional exercise that would be required to burn off the extra calories.²

Such advances in health monitoring are not complete solutions, however. Sharpe et al. also note that they will only help those people who are sufficiently motivated to use them.² Addressing this motivation may be quite a challenge in itself. A personal health monitor might give a tired, single mother clear warnings not to pick up a box of doughnuts from the supermarket, but this may not be enough to overcome a psychological ‘need’ to have them (e.g. to compensate for stress). Our review illustrates how issues like environmental habit cues, moral norms, implementation intentions and automatic attitudes become pivotal in such situations.

To address these psychological issues, we come full circle back to the upstream, downstream and combinatorial interventions that we have described. Our review has described them at a general level, but there are numerous, creative ways that specific applications can be developed. For example, as shown in Table 2, one downstream approach could involve more use of pedestrian and cycle paths by government ministers and executives. This idea is founded on abundant evidence about the importance of leadership behaviour in tackling crises – it’s difficult to

Table 2: Examples of potential lifestyle change approaches

Downstream	
1	Advertisements illustrating the formation of implementation intentions
2	Local publicity for walking and cycling routes
3	Sport celebrity endorsement of exercise (e.g. as a goal for London 2012 Olympics)
4	Government minister participation in walking and cycling for transport
Upstream	
1	Elimination of food advertising to children
2	Early years education for children
3	Education for new parents about child nutrition
4	Higher-quality school meals
5	Design of safer pedestrian and cycle routes
Combinatorial	
1	Food, exercise and transport information packs for new residents and new citizens
2	Workplace health and activity schemes, particularly during periods of corporate restructuring, relocation and merging

compel people to believe that there is a crisis and a need to change when they don't see their leaders change. Abundant theory is available to support other approaches, some of which are listed in Table 2. Nonetheless, there is a lack of evidence evaluating their potential effectiveness at eliciting lifestyle change.

In the development of such approaches, Government should support and insist on the investigation of their *actual* effects on attitudes, motivation and behaviour, using rigorous pre-testing. Our review has noted several instances where popular campaigns have elicited no effects or even the wrong direction of effects on attitudes and behaviour. Often, the critical failing is an over-reliance on survey data or focus groups to develop the interventions. These methods reveal what people *think would work* and not what *actually does work*. For example, a person might not think they would use a new neighbourhood cycle route, but later find that it's more convenient and make heavy use of it. In general, people can hugely neglect or misunderstand important predictors of their own feelings and actual behaviour.^{151,152} There is obviously no point running an expensive campaign that has no impact or even has a negative impact. Therefore support for pre-testing actual effects on attitude and behaviour is essential.

In addition to an emphasis on theory-driven development and pre-testing of interventions, it's critical that rigorous trials of behaviour change interventions discover what works in practice. To do so, we must ensure that researchers clarify what exactly was involved in delivering any successful behaviour change intervention so that it can be precisely replicated in practice before a national roll-out. Similarly, we need to know precisely what differentiates the successful from the unsuccessful behaviour change interventions so that health promoters don't continue to use techniques that have been found to be ineffective in rigorous trials. Doing this would require an agreed terminology to be established with which researchers and practitioners can describe and specify distinct behaviour change techniques. Progress with this project would require changes in the documentation of behaviour change and published descriptions of behaviour change intervention evaluations, extending the initial progress made by the CONSORT agreement.

Furthermore, and echoing suggestions noted earlier, intervention testing would benefit from an interdisciplinary approach. Despite our demonstration that the disciplines of social and health psychology are vital to understanding behaviour change, other disciplines have much to contribute. For example, epidemiologists and medical professionals have learned a lot about the environmental and hereditary factors that predict obesity and have concluded that the dramatic increase in obesity is due to environmental changes affecting vulnerable people (gene–environment interaction).¹⁵³ Kelly Brownell has coined the term 'toxic environment' to describe the situation that afflicts people who are predisposed to obesity.¹⁵⁴ Important factors in this environment are the dramatic increase in the availability of fast food and increased soft-drink consumption.¹⁵⁵ These effects have



been magnified by two marketing strategies: the increase in portion sizes (probably more in the USA) and TV advertising (especially advertising aimed at children).¹⁵³ It's likely that prevention of food advertising during children's TV programmes would be particularly successful, making such interventions particularly powerful upstream initiatives.

We have described information that helps to predict when, why and how such interventions may be successful. An encouraging finding has been that lifestyle change is achievable; but this optimism must be tempered with the recognition that interventions must be adequately informed by the relevant theory and research. It is our hope that we have shown how to facilitate this aim, leading to more powerful interventions and policy initiatives that will support effective health behaviour change.

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