

Social Psychological Factors in Lifestyle Change and Their Relevance to Policy

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Crises in obesity and changes in the environment illustrate the need to change problematic behaviors and lifestyles in large segments of the population. This article uses social psychological theory and research to understand methods for facilitating lifestyle change. A basic assumption in the social psychological

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perspective is that the environment and the person interact to determine behavior. Both factors are important for understanding “upstream” and “downstream” approaches to lifestyle change (McKinlay, 1993; Verplanken & Wood, 2006) and consideration of one factor without the other may be disastrous. We review evidence from within and outside of the health context to illustrate the upstream and downstream approaches and then describe implications for public policy and intervention. The evidence and recommendations encompass a wide range of behaviors, ranging from speeding and intoxicated driving to eating an unhealthy diet and energy conservation. When armed with the relevant social psychological theory and evidence, lifestyle change campaigns are likely to be successful.

A variety of social, health, and environmental problems arise because of the behaviors performed by large numbers of people. Social inequality is perpetuated by discrimination against people from other groups; sexually transmitted diseases spread because people have unprotected sex with a variety of partners; road accidents increase with greater rates of speeding and driving after drinking. For these and other problems, there is a need to change people's behaviors. Of importance, changing the behaviors entails changing the context of the behavior *and* the individual's role in producing the behavior.

This strategy can be illustrated by considering recent approaches to tackling the rapidly growing rate of obesity, which has led the World Health Organization (2000) to declare it a “global epidemic.” Medical models make clear that obesity is due to an imbalance between calorie intake and output and, in recent decades, food has become less expensive, more varied, and more palatable, helping to increase caloric intake (Stroebe, in press; Wardle, 2006). At the same time, technological developments continually “engineer physical effort out of the environment” (Sharpe, Parry, Dubhthaigh, & Barter, 2006, p. 3). The implication is that environmental and personal factors that increase caloric consumption and reduce physical activity increase the risk of obesity. Presumably, then, we need to both alter our environment and make better choices in order to reduce the chances of becoming overweight. Indeed, this view is consistent with recent policy developments in the United Kingdom. In 2002, Sir Derek Wanless's report for the UK Treasury recommended that the UK's National Health Service (NHS) help to develop more public confidence in healthcare services and high levels of public engagement in healthcare and maintenance. Wanless predicted that this scenario would result in a substantial reduction in smoking and obesity as well as improvement in the general health across the population. This policy theme was developed in the most recent public health UK government White Paper (Department of Health, 2004), which emphasizes the importance of individual lifestyle choices and the role of behavior change in achieving public health targets.

As the White Paper suggests, facilitation of healthy choices is fundamental to successful public health policy, but individual choices are always made within

particular environments. The two key policy implications here are that generic behavior change campaigns may have different effects on individuals from different socioeconomic and cultural backgrounds and that it may be important to identify “predatory” environmental influences on individual choices (Halpern et al., 2004). For example, without consideration of price differences, promotion of cooking with low fat and fresh foods has the potential to increase health inequalities by promoting health only in middle- and upper-income households. Similarly, without challenging television food advertising, school children may not be easily persuaded to make healthy “choices.”

So how can we change both the environment and individual priorities so that people can make healthy choices? In January of 2005, the Foresight division of the UK’s Department of Trade and Industry posed this question to the authors of this article. The Department was seeking a review of relevant evidence on attitude and behavior in order to address key questions in their “Tackling Obesity” project. This project is one among many wherein the Foresight division is charged with the task of examining long-term trajectories (i.e., 50 years) and alternative scenarios for pressing national problems (<http://www.foresight.gov.uk/index.html>). The aim is to form scientific initiatives and partnerships to address the issues, rather than simply make recommendations to government. The Foresight project’s orientation is toward “use-inspired research” and the integration of basic and applied themes, thereby addressing a need that has not been met by the longstanding tendency to view basic and applied research in opposition (Stokes, 1997). In the Foresight initiative, there is a potential for research to inform practice and vice versa, which may be particularly important for the translation of work from the social sciences (Price & Behrens, 2003).

This opportunity for research to inform practice was exciting, but it did not appear easy to address this aim. In general, a variety of environmental, biological, and social psychological processes at the individual level may mediate policy effectiveness. In the case of obesity (e.g., Wardle, 2006), examples of environmental challenges include the abundance of calorific foods, and low activity jobs and transport options; examples of biological factors include pre- and post-natal nutrition, and innate differences in body type, metabolism, and fat deposits; and examples of social psychological factors include the effects of conscious and unconscious attitudes, as well as gap between intentions and behavior. These environmental, biological, and social psychological factors may also interact in complex ways. In particular, the environmental and biological processes may shape attitudes and intentions, while attitudes and intentions can also have an impact on the environment and biological processes.

Nevertheless, the individual-level social psychological variables can be regarded as the most proximal determinants of individual behavior, and, therefore, we chose to focus our answer to Foresight’s question on research that has attempted to affect these variables in diverse ways (e.g., through environmental and

informational influence). Even this restriction of focus did not make our task easy. The literature on attitude and behavior change is enormous, and it covers a variety of attitudes and behaviors outside of the obesity contexts. Yet, all of the domains are relevant. As in other areas with an intersection of public policy and science, this breadth of relevance makes it difficult to provide a definitive answer to the question posed (Bocking, 2004). Nonetheless, we can aim to provide lessons from past research that may at least lead to better informed judgments about policy and intervention.

What lessons can be learned from previous research? Within the health domain, there have been repeated attempts to get people to refrain from smoking, heavy drinking, unsafe sex, and drug abuse. For these activities, there is often psychological conflict between what people desire (e.g., fatty, sweet foods) and the need to stay healthy. People's mixed feelings and beliefs make any public health policy based on individual choice more complex. People experience positive sensations from eating foods that provide excessive caloric and salt content and find it difficult to find the time to exercise. People know that rich foods are bad for them and that moderate exercise is beneficial, but no one escapes the psychological conflict, or "*ambivalence*" that ensues. In this context, it is unlikely that public information campaigns reminding people to avoid certain foods and exercise will suffice. Behavior change programs that simultaneously inform, shift motivation, and provide the necessary skills to maintain behavior change are required (Fisher & Fisher 1992). In short, "we need more research into how ordinary people, without professional help, can exert effective control" (Wardle, 2006, p. 4).

Elsewhere, large-scale campaigns have been mounted to promote safer driving habits (e.g., speed reductions) and greater community and environmental responsibility. These projects may all provide insights into current behavior change challenges such as those posed by obesity. Behavior change is complex. Consider attempts to reduce the incidence of driving under the influence of alcohol. For people to avoid driving while under the influence, they have to take this into consideration whenever they travel to any event at which alcohol is served. They have either to resolve in advance that a designated driver is not going to drink alcohol, or to arrange for an alternative means of returning home, such as a taxi or public transport. This entails more planning, changes to travel routines, and possibly changes to drinking habits. Giving up smoking is also far from simple. Effective strategies to cope with cravings include nicotine replacement and stimulus control, which involves avoiding cues that have habitually prompted smoking (such as alcohol consumption and the company of smokers). Similarly, tackling obesity involves a variety of short-term and long-term goals, including challenging diet alterations, changes to shopping behavior, increases in exercise, different choices of transport, reductions in alcohol consumption (including binge drinking) and so on.

A core feature of behaviors relevant to public health is that *maintenance* of healthy behavior is essential to individual and public gain. Eating the occasional fatty meal is unproblematic, but eating them on a regular basis is a problem. Unfortunately, while there is considerable research on the psychological antecedents of immediate or short-term health behavior (e.g., behavior over a few weeks), funding for research on long-term behavior has been scarce (Conner & Norman, 2005). Thus, the role of habit and limited volitional control over behaviors that have a cumulative day-to-day impact over many years has been poorly articulated (Verplanken, 2006). Greater focus on the maintenance of safe, healthy behavior is warranted.

Another issue is that healthy choices are often made in environments that require psychological effort to combat temptation (Baumeister & Newman, 1994; Metcalfe & Mischel, 1999). Freedom of choice makes it *more difficult* to resist temptation (Doria, 2006), and diversity of choice may have a similar effect (B. Schwartz, 2004). Other research and theory indicates that stress (Kruglanski & Webster, 1996; Muraven & Baumeister, 2000) and habit formation also impede the ability to resist temptation (Wood, Quinn, & Kashy, 2002), and this impediment is also evident for healthy eating behavior in particular (Wardle & Gibson, 2002). Yet, choice, stress, and habit are all inescapable aspects of modern life. Cumulatively, they make it onerous to resist unhealthy choices when they are abundant in the environment.

So these are some of the salient problems in attempting to address the challenge posed by the Foresight project, and it quickly became clear that a review of the enormous literature on attitude and behavior change was impossible, because of the tremendous variety of theory and methods in this research. Instead, the group's efforts would need to draw on their experience to highlight high-impact theory that is relevant to the problem and describe research that illustrates the core ideas.

This article summarizes ideas and evidence that were generated by this group, who were all experts in social or health psychology or both. As social or health psychologists, our emphasis is on the idea that the person and environment interact to determine behavior and behavior change (Allport, 1935; Heider, 1944, 1946; Lewin, 1938, 1951). Consistent with this emphasis, our review focuses on a distinction between "downstream" and "upstream" approaches to lifestyle change (McKinlay, 1993; Verplanken & Wood, 2006), which focus on individuals or the environment, respectively. To foreshadow, the review reveals useful principles that could be used to complement existing health promotion campaigns and social marketing approaches (e.g., 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 find that such campaigns may be inefficient or even backfire. This conclusion would be an overgeneralization, however, because most of the problems arise primarily in the campaigns that

are not at all informed by the relevant theory and evidence (Aronson, 1991). When armed with the relevant theory and evidence, public information and social marketing campaigns aimed at lifestyle change should be quite successful.

Framework and Description of Relevant Theory and Research

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 behavior. Most psychologists define habit as frequency of past behavior, regardless of whether it is “good” or “bad.” In this perspective, repetition of behavior is a necessary condition for habits to form, but not all frequent behavior is habitual. Verplanken argued that repeated behavior qualifies as a habit when it also has a degree of automaticity (Verplanken & Aarts, 1999; Verplanken & Wood, 2006). That is, a habit is frequent behavior that is conducted with little conscious awareness and intention, is mentally efficient, and may sometimes be difficult to control (Wood, Tam, & Wit, 2005). In addition, a habit is cued by the environment in which the behavior is conducted. These two elements of habit—automaticity and being environment-cued—make habits particularly difficult to change. Although the behaviors we are interested in are often complex and may contain moments of deliberate thinking, the critical habitual aspect is often the moment a decision is made to instigate the behavior, such as the decision to take either a fatty snack or a piece of fruit (Brug, de Vet, Wind, de Nooijer, & Verplanken, 2006; Verplanken, 2006), or whether or not to work out or exercise (Verplanken & Melkevik, in press).

Previous research has established a number of factors that make habits formidable obstacles, and two of these obstacles merit attention here. First, habit leads to “tunnel vision” (Betsch, Haberstroh, Glöckner, Haar, & Fiedler, 2001; Verplanken, Aarts, & van Knippenberg, 1997). When habits have developed, an individual is less motivated to attend to and acquire new information, particularly information that is not consistent with the habit. In other words, habits tend to resist information-based interventions. Second, habitual behavior seems less guided by attitudes and intentions than behavior that is conducted in a more deliberative and thoughtful fashion (Webb & Sheeran, 2006a). When a particular behavior is repeated over and over again, the original reasons and arguments why that behavior was adopted in the first place may vanish over time (Cialdini, 2001). The tunnel vision and the attenuated power of attitudes and intentions are bad news for informational campaigns. These campaigns are based on the assumption that the target group attends to and processes the presented information, forms or changes attitudes and intentions accordingly, and thus adopts the propagated behavior.

So how can we hope to change habits? Building on a classic distinction by McKinlay (1975; 1993), Verplanken and Wood (2006) categorize habit interventions on a continuum from “downstream” to “upstream” approaches.

“Downstream” interventions focus on changing or extinguishing the problematic behavior 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 *environment* in which the problematic behavior occurs and on promoting alternatives. These interventions target social norms and environmental supports for desired behavior. According to Verplanken and Wood, examples of these interventions include the establishment of standard portion sizes for packaged foods to reduce obesity and the improvement of bus networks to reduce car use—their focus is more on the situation than on the individual. As we will illustrate, the downstream and upstream approaches each contain their own varieties, strengths, and weaknesses.

Downstream Interventions

A common downstream approach is to exhort behavior change through information campaigns. Messages designed to arouse fear about health-damaging lifestyles can be effective if they do not prompt defensive reactions, that is, lead people to deny the threat (see below; De Hoog, Stroebe, & de Wit, in press; Rutter, Abraham, & Kok, 2001). However, it is necessary to inform people of potential health risks as a precondition for healthy behavior change. For example, the first Report of the U.S. Surgeon General on Smoking and Health (USDHEW, 1964) gave vigor to antismoking campaigns that used advertisements to deglamorize smoking, cite negative effects on health, and emphasize personal and social responsibility (<http://profiles.nlm.nih.gov/VC/Views/Exhibit/narrative/antismoking.html>). Since the report, smoking rates in the United States dropped from 42.4% in 1965 to 22.8% in 2004, and per capita consumption of cigarettes from a staggering 4,259 to 2,092 cigarettes per year (Stroebe, 2000). Similarly, the early HIV interventions in the United States in the 1980s resulted in a 60% reduction in sexual risk behavior among homosexual men in San Francisco (McKusick, Horstman, & Coates, 1985; Winkelstein et al., 1987) and New York (Martin, 1987), both epicenters of the AIDS epidemic.

In contrast, similar messages delivered 10 years later proved much less effective (Stroebe, 2000). There could be several reasons for this difference in impact, because the impact of interventions varied widely even early in the emergence of HIV (Weinhardt, Carey, Johnson, & Bickham, 1999). One factor may be that most people had learned about HIV before the later messages were tested. The people who continued to engage in their health-impairing behaviors may have done so despite the known risks. Providing information is only one element of successful behavior change. It is also crucial to tackle individual motivation, skills, and environmental influences (Fisher, Fisher, Amico, & Harman, 2006; Fisher, Fisher, Bryan, & Misovich, 2002).

Another factor is the emergence of ambivalence (i.e., feelings of conflict) toward the recommended behavior. For instance, people may know that use of a condom will cut the risk of sexually transmitted disease, but at the same time fear a sense of hassle and awkwardness. People high in ambivalence toward an issue (such as a risky behavior) carefully scrutinize any relevant information (Bell, Esses, & Maio, 1996; Jonas, Diehl, & Bromer, 1997), identify flaws in any messages that are overly simplistic (e.g., “just say no”; see Aronson, 1991), and may form more *negative* attitudes toward recommended behaviors. For instance, in the United Kingdom, a series of studies have demonstrated this type of backfire when antiracism messages were presented to people who were highly ambivalent toward ethnic minority groups (Maio, Haddock, Watt, & Hewstone, in press). The antiracism messages that elicited message backfire were very brief and simple posters. For example, one series of posters highlighted counter-stereotypic individuals from ethnic minority groups.

Research in the United States has demonstrated similar backfire effects for antilittering messages (Cialdini, 2003). Antilittering messages were based on an award-winning ad campaign, praised by the advertising industry and public alike. The most well-known ad in the campaign was a video depicting an indigenous American traveling in time down a river that grows steadily more polluted by litter. A social psychological analysis of the content of the messages revealed a fundamental problem: the ad made it seem as though everyone was littering, inadvertently *reinforcing* the norm to litter. Such examples reinforce a long-standing argument that it is very important to understand the attitudes and interpretations of target audiences prior to the design of well-meaning message interventions (Fishbein & Ajzen, 1981). The development of messages aimed at behavior change should not be based on so-called common sense, but on social psychological theory and evidence, combined with pretesting (Aronson, 1991). Several theories and research findings can help address this issue, as we describe below.

Theory of Planned Behavior

The Theory of Planned Behavior (Ajzen, 1991; Ajzen & Fishbein, 1980) is supported by an impressive body of empirical evidence (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Armitage & Conner, 2001) and has proven particularly useful in guiding the development of effective health messages. As is illustrated in Figure 1, this theory predicts that human behavior is guided by three kinds of considerations: (a) beliefs about the likely consequences of the behavior and the evaluations of these consequences (behavioral beliefs), (b) beliefs about the expectations of others and the motivation to comply with these expectations (normative beliefs) and (c) beliefs about factors expected to help or hinder the performance of the behavior and the perceived importance of these factors (control beliefs). All other personal, demographic, and environmental

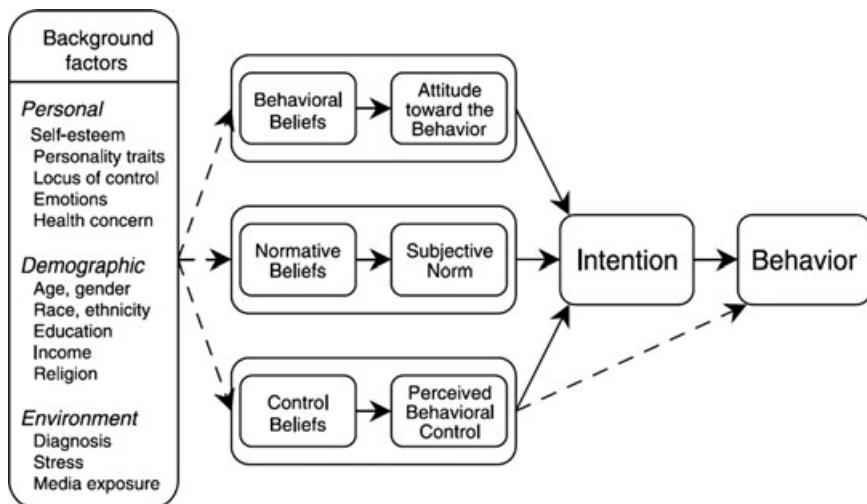


Fig. 1. Ajzen's (1991) Theory of planned behavior.

factors predominantly influence behavior through their effects on these three sets of beliefs. Moreover, evidence suggests that successful interventions have their effects on behavior *because of* their impact on these theory-specified cognitions. That is, these cognitive changes mediate the effects of interventions on behavior (Albarraacín et al., 2005; Hill, Abraham, & Wright, in press).

How would we use this theory to develop a health education campaign persuading people to eat a healthier diet? Because eating a healthier diet is a global goal that can be reached by various behaviors, our first step could be to define the *target behavior*—the specific behavior we would like to change. This is an important point, where things often go wrong. If we succumb to the temptation of merely trying to raise people's awareness of the dangers of unhealthy eating, we might convince them that an unhealthy diet is a bad thing, but have little impact on their behavior.

There would be two reasons for such a failure. First, people are reluctant to feel vulnerable to health risks (Ditto & Lopez, 1992; Ditto, Munro, Apanovitch, Scepanisky, & Lockhart, 2003). Thus, regardless of the junk food they eat, people will be convinced 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 behavior change is driven by perceived vulnerability to a health risk and not by its perceived severity (Das, DeWit, & Stroebe, 2003; De Hoog et al., in press; De Hoog, Stroebe, & DeWit, 2005). People are quite willing to accept that there are all kinds of dangerous lifestyles, but unless we can convince them that they are at risk themselves, they are unlikely to take any action (De Hoog et al., 2005). 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 behaviors. The specific behaviors must be perceived as protecting against the health risk (Janz & Becker, 1984; Maddux & Rogers, 1983). Otherwise, we will not achieve behavior change. At this point, the intervention becomes increasingly interdisciplinary. In choosing behavioral targets for our campaign, we would rely on epidemiological evidence for what constitutes healthy or unhealthy eating habits among our target population. For example, on the basis of this evidence, we may decide on “*eating five portions of fruits and vegetables per day*” as our target behavior (<http://www.5aday.nhs.uk>).

Having chosen the behavior that we want to change, we have to identify the *salient beliefs that are major determinants of that behavior*. (It would also be useful to identify nonconscious beliefs and attitudes that are determinants of behavior, but we will return to this point later in the review.) Expressed more prosaically, we have to find the reasons why some people eat fruit and vegetables and others do not. Although people can hold a great many beliefs about a given object, they can attend to only a small number at any given time. It is these *salient* beliefs, which are easy to recall from memory, that are the fundamental determinants of people’s attitudes and behavioral intention. To identify the salient beliefs, we would conduct a belief elicitation study, with a small sample of individuals from the target population. To elicit their behavioral outcome beliefs, we would ask them to list all the advantages and disadvantages of *eating five portions of fruits and vegetables per day*. For normative referents, individuals would be asked to list the people who are important to them and whether they would approve or disapprove of them engaging in the target behavior. 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 fruits and vegetables per day*.

Although a belief elicitation study provides insight into the beliefs people associate with a given behavior, it does not tell us whether these beliefs are strong determinants of their intentions to engage in the relevant behavior. For example, smokers as well as nonsmokers will list “health damage” as one of the disadvantages of smoking. Because both groups possess this belief, it can hardly be the reason underlying the *difference* in their behavior. However, once accessible beliefs have been identified, we can use the standard questionnaire methodology supplied by Ajzen and Fishbein to identify those beliefs that are most strongly associated with the target intentions and behavior. Examining how “intenders” differ from “nonintenders” (or how those who do some behaviors differ from those who do not) with respect to these beliefs and values enables better targeted—and therefore more effective—interventions (Ajzen & Manstead, 2007).

It may also be useful to classify outcome expectancies (or beliefs) along a limited number of dimensions (Conner & Norman, 2005). Although a number of dimensions for classifying outcomes can be identified (such as outcomes for the self versus other; immediate versus distal outcomes), two appear to be vital: positive versus negative outcomes and instrumental versus emotional outcomes. The first dimension distinguishes between outcomes that are positively valued (e.g., increased longevity associated with physical exercise) from those that are negatively valued (e.g., decreased longevity associated with smoking). Rather than such positive and negative outcomes canceling one another out, recent research on attitudinal ambivalence would suggest that the two components may have distinct effects on behavior (Conner & Sparks, 2002). For particular behaviors and individuals, the degree to which a behavior is perceived to have *more* positive outcomes may be the most important determinant of performance; for other individuals or behaviors, the degree to which a behavior 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, Conner, and Parker (2007) identified negative outcomes as most important in determining speeding behavior, but positive outcomes as most important in determining smoking initiation. Similarly, Goldberg, Halpern-Felsher, and Millstein (2002) identified positive outcomes as more important than negative outcomes in relation to drinking alcohol.

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. For example, instrumental outcomes for speeding would include fines, driving license penalties, and jail time; emotional costs would include feelings of shame, guilt, embarrassment, and anger. There is a growing body of evidence to support a distinction between instrumental and emotional beliefs (e.g., Abelson, Kinder, Peters, & Fiske, 1982; Crites, Fabrigar, & Petty, 1994; Trafimow & Sheeran, 1998; Van der Pligt, Zeelenberg, van Dijk, de Vries, & Richard, 1998; Zanna & Rempel, 1988). For risky behaviors in particular, there is increasing evidence for the role of emotion (Loewenstein, Weber, Hsee, & Welch, 2001). These behaviors are frequently incongruent with relevant cognitions. People are aware of the risks of the behaviors, think the risks are bad, but still perform the behaviors. In the past, investigators have focused on cognitive explanations, such as invulnerability or optimistic bias (e.g., Weinstein, 1983) to explaining the cognition-behavior discrepancy. However, according to the "risk as feelings" hypothesis (Loewenstein et al., 2001), emotional reactions to risky situations often diverge from cognitive assessments of the risk. For example, the smoker who acknowledges that she is more at risk of lung cancer may continue to smoke because doing so makes her feel more relaxed or less anxious. Loewenstein et al. (2001) argue that emotional reactions drive behavior when cognitive and

emotional reactions conflict (see also Lavine, Thomsen, Zanna, & Borgida, 1998).

Research by Lawton et al. (2007) illustrates the importance of emotional outcomes as determinants of health risk behaviors. These researchers examined the relative contribution of instrumental and emotional outcome expectancies, both positive and negative, to the prediction of two risk behaviors. In Study 1, only positive and negative emotional beliefs were significant predictors of speeding among drivers. In Study 2, the significant predictors of smoking among adolescents were positive and negative emotional beliefs. Thus, emotional outcomes were the more powerful determinants of different unhealthy behaviors in two distinct samples.

Another important analysis would discover whether or not individuals consider the behavior to be under volitional control. It makes quite a difference for our campaign strategy whether people do not engage in a given behavior because they do not want to (I hate vegetables and my friends would think me a wimp) or whether they do not do it because they feel unable to do so (I have no time to slice, dice, and cook vegetables). If individuals feel unable to perform a given behavior, then messages targeting behavioral outcome or normative beliefs will be ineffective. Campaigns should focus on information that persuades individuals that they *can* change and provides them with strategies that would help them to change (see Luszczynska & Schwarzer, 2005).

Gaps Between Intentions and Behaviors

This role of perceived control is important partly because there are often gaps between intentions and actual behavior. Webb and Sheeran (2006a) reviewed 47 interventions that generated statistically significant differences in intention scores between treatment versus control participants and assessed subsequent behavior. Findings indicated that the difference in behavior that accrued from successful intention-change interventions was modest according to standard estimates of effect size (Cohen, 1992). A review of health behaviors in particular (e.g., exercise, condom use, cancer screening) indicated that people were successful in enacting their intentions only 53% of the time (Sheeran, 2002). Thus, the gap between intention and action is substantial.

In other words, although the motivation to change is a prerequisite to behavior change, it is far from sufficient. People often find it difficult to translate their “good” intentions into action. That is, people often fail to do the things that they say they want to do or fail to avoid doing things that they do not want to do (Orbell & Sheeran, 1998). Gollwitzer and Sheeran (2006) pointed out that “good” intentions do not 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. The person still must 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 programs that aim to change community or national behavior trends.

Two specific problems that confront strivings for behavior goals are failures to initiate action (*failing to get started*) or to shield an ongoing goal pursuit from unwanted influences (*getting derailed*). People may fail to get started for at least three reasons. First, people often simply forget to act. Einstein et al. (2003) showed that, when people are busy with other tasks, they generally fail to initiate intended behaviors, even when the time interval to performance was only 15 seconds. Second, even when they remember to act, people may fail to seize good opportunities to initiate goal striving. For instance, people can miss out on opportune moments to move toward their goal because they do not know how to act at the critical juncture (e.g., which options on the menu are low fat) or because they fail to respond by a deadline. A third problem in getting started is overcoming initial reluctance to act. Decisions to perform health behaviors such as monthly testicular self-examinations often are based on the longer-term benefits of the action (e.g., the exam will prevent the development of serious cancer). However, short-term emotional costs (e.g., discomfort) that perhaps were not anticipated at the time of decision may loom large at the moment of acting and lead to nonperformance of the behavior.

The second major self-regulatory problem, getting derailed, arises when behaviors require repeated and persistent performance (e.g., frequent walking to work, good diet). It is therefore necessary to shield ongoing pursuits from numerous unwanted influences over extended periods. However, physical environments and social contexts are liable to activate thoughts and feelings that can undermine progress toward one's goals. For instance, spontaneous attention to attractive alternative activities ("distractions") and the elaboration of desire thoughts ("cravings") can bring focal goal strivings to a premature halt (Kavanagh, Andrade, & May, 2005). Similarly, when people feel distressed, their greatest priority is likely to be repairing their negative mood. Solace can often be achieved through immediate pleasures that derail the goal. For instance, stress may cause consumption of high-fat foods, derailing the goal of a good diet. Prioritizing 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) get suspended.

Gollwitzer (1993, 1999; Gollwitzer & Sheeran, 2006) proposed that forming *implementation intentions* offers a simple and effective strategy for dealing with self-regulatory problems in goal striving. Implementation intentions are specific, "if-then" plans of action that specify where, when, and how behavior is to be executed in order to accomplish a particular goal. 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

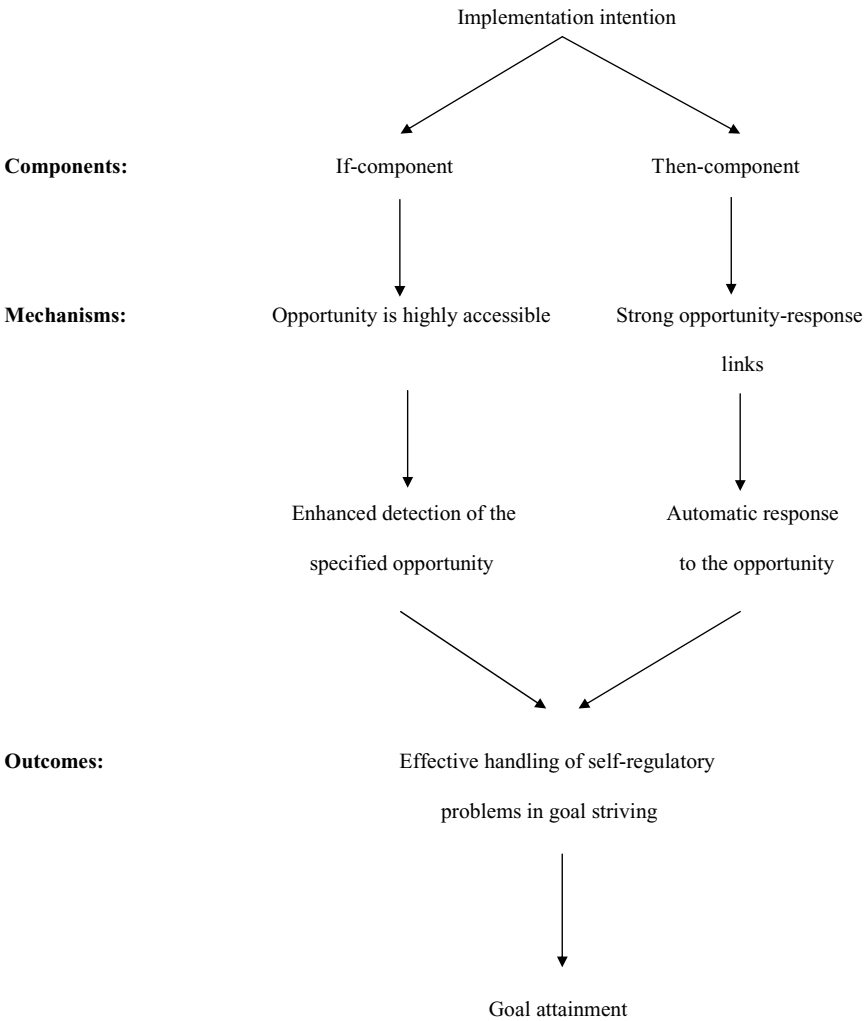


Fig. 2. Implementation intentions.

response (the *if*-component of the plan). For example, the person might specify the behavior “order the salad for lunch” and specify a suitable opportunity as “when the waiter takes my order at the café tomorrow” in order to enact the goal of eating 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 (Gollwitzer, 1999). Heightened accessibility

of the chosen opportunity implies that one is “perceptually ready” to encounter that situation; consequently, one’s ability to detect that specified opportunity is enhanced. Evidence indicates that opportunities to act that are specified in implementation intentions do not easily escape people’s attention, even when people are busy with other ongoing tasks (Gollwitzer & Sheeran, 2006).

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 (Gollwitzer & Sheeran, 2006). People who have formed implementation intentions are therefore in a very good position to achieve their goals compared to individuals who have merely formed a goal.

Two studies concerned with the same behavior (attendance for a health service appointment) serve to illustrate how if-then plan formation can overcome problems in failing to get started and getting derailed. Sheeran and Orbell (2000) tested the impact of implementation intentions on attendance for cervical cancer screening—a behavior where forgetting, missing one’s opportunity, and initial reluctance are acute self-regulatory problems (Orbell & Sheeran, 1993). Participants recruited from a General Practitioner surgery (medical doctor’s office) were mailed a questionnaire that assessed their views about screening. Half of the sample was 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 in 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 behavior concerned appointments for psychotherapy (Sheeran, Aubrey, & Kellett, *in press*). 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 ruminate, or feel ashamed, embarrassed, or stigmatized about needing therapy, with the result that 30–60% of people who are offered psychotherapy fail to attend their appointment (Hughes, 1995). The if-then plan was therefore geared at dealing effectively with these negative emotional experiences that could 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

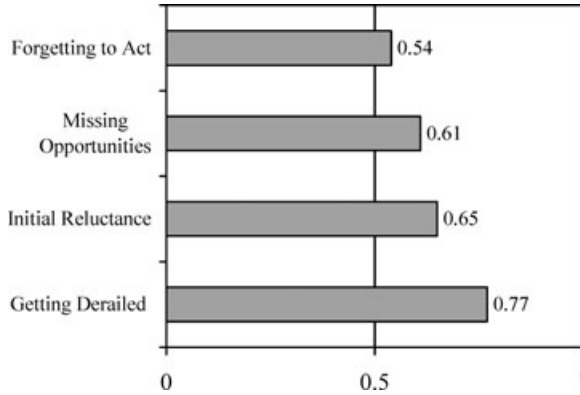


Fig. 3. Effects of implementation intention formation on self-regulatory problems. Values are effect sizes (Cohen's d). According to Cohen (Cohen), $d = .20$ is a "small" effect, $d = .50$ is a "medium" effect, and $d = .80$ is a "large" effect.

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 behavior. 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 also has proved effective in helping people to get started on numerous other activities including exercise behavior (Milne, Orbell, & Sheeran, 2002; Prestwich, Lawton, & Conner, 2003; Sniehotta, Scholtz, & Schwarzer, 2002), eating a low-fat diet (Armitage, 2004; Verplanken & Faes, 1999), and cancer-relevant behaviors (Orbell, Hodgkins, & Sheeran, 1997; Sheeran, Milne, Webb, & Gollwitzer, 2005). Similarly, forming implementation intentions prevented the derailment of behaviors by various distractions: safe driving behavior was protected from activation of the idea of speeding (Gollwitzer, Sheeran, Trötschel, & Webb, 2006), dieting behavior was protected from activation of cravings (Achtziger, Gollwitzer, & Sheeran, 2006), and safer sexual intentions was protected from effects of negative mood (Webb & Sheeran, 2006b).

Figure 3 depicts the strength of effects that have been obtained across more than 70 studies (Gollwitzer & Sheeran, 2006). 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. The effect sizes were medium to large in magnitude (Cohen, 1992). Thus, implementation intentions had a substantial impact on whether people achieved their goals.

In addition, the accumulated evidence helps to identify the reasons for these effects and eliminate alternative explanations. Webb and Sheeran (2007a; 2007b) found that the effects of implementation intentions are due to the heightened accessibility (i.e., ease of retrieval from memory) of the specified opportunities in the implementation intentions and strong opportunity-response links. Meta-analysis showed that the effects were not due to an increased sense of self-efficacy or a greater sense of commitment (Webb & Sheeran, 2007b).

Automatic Attitudes

Behavior change may also be influenced by automatic attitudes. These attitudes are measured by so-called implicit measures, which assess evaluations that people are unable or unwilling to retrieve from memory (Greenwald, McGhee, & Schwartz, 1998; Schuette & Fazio, 1995; Wittenbrink, Judd, & Park, 1997). Implicit measures do not ask people to report their attitudes; instead, the measures assess attitudes without respondents' immediate awareness or control. Thus, we label these attitudes as "automatic" because they arise quickly and spontaneously without thought or deliberation.

In one approach, people are shown words or images that describe a particular object, behavior, or person of interest and then asked to perform a second task (Fazio, Jackson, Dunton, & Williams, 1995). These initial stimuli can be shown outside of conscious awareness (e.g., Maio et al., in press). For instance, images of candy could be presented so quickly that participants do not consciously register their appearance. (Nonetheless, tests show that the objects have been perceived.) After each image, participants are asked to quickly indicate whether an adjective (e.g., awful, nice, wonderful, horrible) has a "good" meaning or a "bad" meaning. It turns out that people are faster to label the "good" adjectives after being shown things that they like than after being shown things that they do not like.

More important, responses on such measures are often discordant with self-reported (explicit) attitudes. For example, a person may explicitly report that she dislikes chocolate cake, but exhibit strong desire for this cake on an implicit measure (cf. Roefs et al., 2005). This difference is important because the implicit measures can predict variance in behavior that is not explained by self-report measures of attitude. This ability has been illustrated in several domains of study, including consumer behavior, health behavior, clinical disorders, and prejudice (Maio et al., in press).

In the domain of healthy eating, Maison, Greenwald, and Bruin (2001) 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. These researchers also found that implicit measures of preference for brands of yoghurt (Danone versus Bakoma), fast-food restaurants (McDonald's versus Milk Bar), and colas (Coca-Cola versus Pepsi) 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 these variables, the implicit measures predicted the variables even after controlling for the explicit ratings. Thus, implicit measures have a unique relationship with common, food-related behaviors. Of interest, this unique relationship may be particularly strong when the behaviors are relatively spontaneous and automatic, rather than thoughtful and deliberative (see also Dovidio, Kawakami, & Gaertner, 2002; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997).

Despite these important aspects of automatic attitudes, there is a lack of evidence using implicit measures of attitude to evaluate the effects of interventions. Because of the unique role of automatic associations and habit in the prediction of behavior, 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 (Wilson, Lindsey, & Schooler, 2000).

More disturbing, there is evidence indicating that interventions can have a negative impact on automatic attitudes. For example, antiracism messages can elicit more prejudice on implicit measures of attitude among people who are initially ambivalent toward other ethnic groups (Maio et al., in press). In addition, Teachman, Gapinski, Brownell, Rawlins, and Jeyaram (2003) found that procedures designed to instigate empathy for obese individuals did not reduce prejudice against them on an implicit measure. In fact, the implicit measure revealed more evidence of antifat bias than a comparable explicit measure, on which participants largely denied any bias. Such evidence poignantly illustrates the importance of utilizing implicit measures in the evaluation of interventions purporting to change attitudes and behavior.

Tailored Interventions

For particular groups, tailored interventions may be easy to deliver. For example, given that 3 out of 4 U.S. 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 to 12 months (see Stroebe, 2000), it is clear that interventions aimed at increasing information and motivation may have limited effects. Instead, smokers need help to translate their motivation into action, as evident in the above discussion of implementation intentions.

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 of certain habitual behaviors, including smoking and eating behaviors. Thus, it is critical to consider the specific barriers to change that typify any target group. The Information-Motivation-Behavioral

Skills model proposed by Fisher and Fisher (1992) provides a useful framework for thinking about key components of behavior change interventions, and it has been successfully applied to many areas of health behavior change (e.g., Fisher et al., 2006; Fisher et al., 2002; Misovich, Martinez, Fisher, Bryan, & Catapano, 2003).

Interventions programs can assess individuals' deficits in information, motivation, and skills and provide interventions that are tailored (i.e., matched) to the individual. The interactive nature of Internet communications has the added advantage that we can also use diagnostic information provided by the targets of our communication about their lifestyle (e.g., their eating pattern) to convince them that they are vulnerable. To give an example, Davidovich, de Wit, and Stroebe (submitted) recently conducted a randomized controlled trial of a tailored intervention to promote condom use by gay men. The results showed that only the tailored condition increased condom use. 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 methods for promoting behavior change. When should interventions use television, print ads, radio features, cinema shorts, telephone surveys, person-to-person chats, social networks, etc.? There is tremendous variation in the cost of these methods and in the content that can be distributed through them. Although there is a great deal of knowledge about how the different methods reach audiences that differ in market characteristics and number, there is a need for evidence directly testing whether the methods generally differ in impact on subsequent attitudes and behavior (Eagly & Chaiken, 1993). In fact, some evidence indicates that the most effective (yet costly) method remains person-to-person, perhaps because it allows for quick tailoring of communication to a target person's needs and information during a discussion (Aronson, 1991).

Summary

Our discussion of downstream interventions has illustrated how social psychological theory and research can inform the design of these interventions. The theory and research indicate that interventions should focus on salient beliefs, implementation intentions, while assessing emotional outcomes and impact on automatic attitudes. Interventions may also be tailored to individual deficits in information motivation, and skills.

Overall, the development of downstream interventions should be guided by relevant theory and research. After all, the dissemination of messages through mass media is an expensive business. For this reason, even if the design of messages is based on state of the art knowledge, it is imperative that their effectiveness be 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 pretesting, which can make them even more dangerous than a mere waste of money.

Upstream Interventions

“Upstream” interventions aim to elicit changes in the performance environments, such that undesired habits are prevented and desired habits can flourish (Verplanken & Wood, 2006). 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 behaviors that we want people to adopt. Thus, the habituation of desired behavior may be explicitly formulated as a goal of behavioral change interventions.

Consistent with operant learning theory (Skinner, 1963), suitably timed rewards may facilitate habit development. Economic incentives for desired habits are a good example of an upstream approach to changing habits (Stroebe, 2000). Such incentives have been used by successive governments and road safety organizations to elicit safer driving. Legislation has promoted the detection and punishment of people who fail to use seat belts or drive too quickly (e.g., using safety cameras). The legislation on seat belt use was supported by attitude change campaigns, standardized easy-to-use in-car seat belts, and committed enforcement. Similarly, the legislation on speeding has been supported by attitude change campaigns, speed or “safety” cameras, and committed enforcement. Enforcement, in particular, helped to ensure that material outcomes for people were contingent on their behavior, as stressed by operant learning theory.

Operant learning theory is also consistent with the notion that most consumer behaviors, including those relevant to lifestyle, 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 sales. Such price changes implicitly include the contingencies that drive effects of reinforcement: they make it aversive to perform the unhealthy behaviors and relatively rewarding to perform the healthy behaviors.

However, use of economic levers should also be tempered by an understanding of a variety of other societal factors. 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 transformation of infrastructures or physical environments, such as better street plans and bus routes for promoting

public transport usage or providing healthy school food, such as in Jamie Oliver's school dinner project (e.g., Oliver, 2005). These transformations are often crucial, because all of the best will in the world cannot elicit behavioral change if the environment does not provide reasonable opportunities.

Education is another important long-term upstream intervention. The many habits that now are considered as ordinary everyday behaviors, such as seat belt usage or waste segregation, once started as new behaviors that had to be promoted or implemented. Education of young people who have not yet built a habit for the target behavior can be influenced before the behavior is set in place (e.g., by introducing safe habits while learning to drive). Of course, education alone cannot be expected to solve all problems. It is important to support other upstream interventions and ensure that the new behaviors are normatively accepted and easy to sustain.

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 seat belt use provide a good example. Research reported by Steptoe and colleagues (2002) compared self-reported seat belt use in 13 European countries in 1990 and 2000. These researchers found that the most marked changes were those in Poland, Portugal, and Spain. In all three nations, there was new legislation concerning the wearing of seat belts between the two measurement points. These changes in reported behavior were paralleled by changes in the perceived importance of wearing seat belts ($r_{men} = .93$; $r_{women} = .85$). Moreover, the proportion of respondents always using seat belt increased with strength of belief in importance of wearing seat belts.

Turning to drinking-and-driving, Figure 4 shows the declining number of accidents on British roads resulting in death or serious injury in which one or more drivers was above the legal blood alcohol level. Clearly, some of this reduction is attributable to more effective enforcement of drink-and-drive legislation. Nevertheless, most people do not expect a road alcohol test while drinking. Publicity and education must also play a crucial role and, indeed, attitudes to drinking-and-driving are now very negative. Moreover, we know that drinking-and-driving attitudes are predictive of drinking-and-driving intentions (Parker, Manstead, Stradling, & Reason, 1992).

Similarly, Figure 5 depicts a small but steady reduction in speeding within 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 (cf. Elliot, Armitage, & Baughan, 2007; Lawton et al., 2007; Lawton, Parker, Stradling, & Manstead, 1997), as compared with evidence of change in attitudes to seat belt use and drinking-and-driving. However, the increased enforcement has been coupled with increased advertising

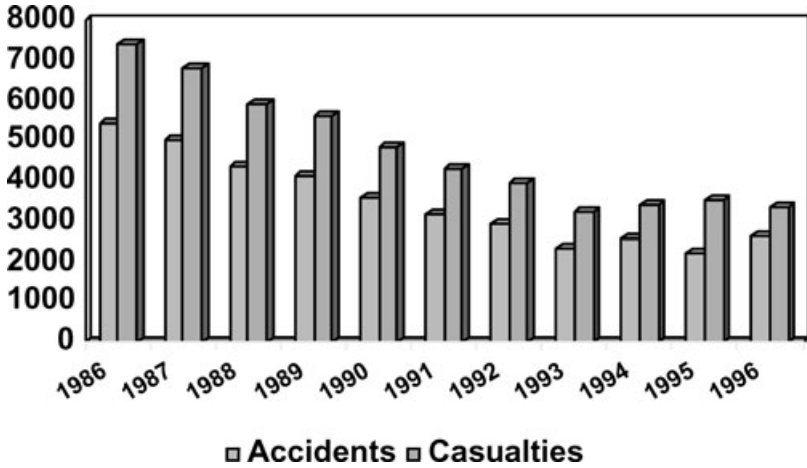


Fig. 4. Estimated number of accidents and number of casualties involving death or serious injury in which there was evidence of illegal blood alcohol levels, adjusted for underreporting: 1986–1996. Based on data reported by the UK Department for Transport in DfT Consultation Paper, Combating drink-driving: Next steps, published in 1998 and available at <http://www.dft.gov.uk/consultations/archive/1998/comdd/combatingdrinkdrivingnextsteps>

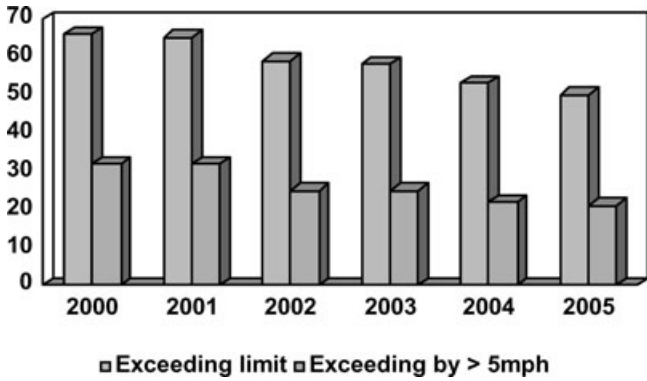


Fig. 5. The percentage of cars speeding on British roads with a 30 mph limit. Based on data reported by the UK Department for Transport in Vehicle Speeds in Great Britain: 2005, published in 2006 and available at <http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/vehiclespeedsgb/vehiclespeedinggreatbritain2005a>

against speeding, so it is plausible that attitude change has also occurred. The aforementioned backfire effects of advertising are possible, but the vehicle speed data indicate that backfire is unlikely in this case.

Overall, it is clear that upstream interventions can succeed, even with hard-to-change behaviors. 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. These long-term benefits may make such interventions a relative bargain and justify large investments and political support. Thus, the role of upstream interventions as a complement to downstream approaches may be invaluable.

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 changes, such as major life changes and moving to another job, or when the environment changes, such as major reorganization in a workplace. In these situations, existing habits are broken or vulnerable. Informational, downstream interventions may then have a relatively high prospect of being successful.

Verplanken and Wood (2006) used the term “downstream-plus-context-change” to label these interventions. The assumption underlying them is that individuals are in a position that requires finding new ways to behave. Consequently, they are more susceptible to new information that helps to guide their new behaviors.

There is plenty of scope for such interventions. For example, community “welcome wagon” programs in the United States and Canada provide new residents with information about local products and services. The information within these packets often includes details about parks and recreation facilities and public transport. In some cases, the packs have been supplemented with a free pass to use local buses (Verplanken & Wood, 2006). 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.

It is possible to take a similar approach during other periods of habit deconstruction, including transitions to parenthood or to new jobs. For example, employers could be encouraged to provide new employees with information that addresses healthy lifestyle behaviors, including transportation to work, local exercise facilities, and good local eating options. Indeed, corporate emphasis on the importance of good health could also establish powerful social norms to help maintain new lifestyle habits. It would also be interesting to examine the effects of such packages on job satisfaction and commitment. Another interesting issue is whether frequent relocation makes people more resistant to these interventions or more amenable to them.

Summary of Interventions

The upstream, downstream, and combinatorial approaches each have their own strengths. For instance, even though upstream interventions have been vital for altering driver behavior, this does not imply that mass media campaigns have been unimportant. Such campaigns have been important for changing beliefs and

attitudes, and we do know that attitudes to speeding predict driving intentions and behavior (Conner et al., 2007; cf. Elliott, Armitage, & Baughan, 2003; 2007). In addition, publicity campaigns designed to change attitudes to speeding do elicit attitude change (Stead, Tagg, MacKintosh, & Eadie, 2005). The complementarity of upstream and downstream interventions reinforces the utility of combinatorial interventions, such as the downstream-plus-context-change intervention.

Of interest, most of these interventions involve a common element that can facilitate behavior change: they often involve the measurement of responses supportive of a behavior. The mere measurement of such responses can motivate behavior change, also known as the *mere measurement effect* (Morwitz, Johnson, & Schmittlein, 1993). For example, Morwitz et al. (1993) showed that answering questions about purchase intentions increased subsequent purchase rates for consumer goods. In the health area, Godin, Sheeran, Conner, and Germain (in press) showed that measuring intentions, attitudes, and other components of the Theory of Planned Behavior increased repeat blood donations by 9% during the subsequent 6 months, and by 6% during the subsequent 12 months. In theory, these effects occur because the responses to the questions elicit a sense of psychological commitment to the behavior—any actions that increase commitment have a strong effect on behavior (Arbuthnot, Tedeschi, Waner, Turner, & Kressel, 1976–1977; Freedman & Fraser, 1966). Consistent with this explanation, the 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 (Abraham & Sheeran, 2004; Richard, van der Pligt, & de Vries, 1996; Sandberg & Conner, 2006). Thus, all interventions that provide opportunities to express personal views (such as survey completion) may help to bolster motivation and prompt behavior change.

In addition, the complementarity of the upstream and downstream approaches is important because it may powerfully introduce a new moral climate around the target behaviors. 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 drinking-and-driving, where the combination of education, legislation, and enforcement has changed moral norms concerning the behavior. There is now a prevalent belief that drinking-and-driving is *morally* wrong—a radical change since 1967.

Moral norms are important partly because they may predict behavioral intentions over and above attitudes, subjective norms, and perceived behavioral control (Conner et al., 2007; Maio & Olson, 1995; Manstead, 2000). There is also evidence that effects of attitudes on behavior are determined at least in part by moral considerations, though it is not yet clear whether this conclusion is better supported for some types of behavior (e.g., interpersonal behaviors) than for others (Godin, Conner, & Sheeran, 2005; Maio & Olson, 2000; Maio, Olson, Bernard, & Luke, 2003; Sparks & Manstead, 2006). It is therefore important to consider

the potential impact of upstream, downstream, and combinatorial approaches on moral norms, while considering the relevance of the moral norms to the particular behavior being examined.

With this potential impact in mind, it is worth noting that moral norms may also be targeted directly, through relevant social values. People tend to consider abstract values, such as equality, freedom, pleasure, and family, to be very important, while having difficulty describing reasons for *why* they are important (Maio & Olson, 1998). People's values are based more on learned feelings than on reasoned arguments (Maio, Haddock, Bernard, & Huskinson, 2004; Maio & Olson, 1998). As a result, people's behavior often fails to live up to their values in situations that make it tempting *not* to fulfill the value (Maio, Olson, Allen, & Bernard, 2001). For example, even people who are made mindful of the importance of helping others may fail to provide help for another person when the situation makes this difficult (Darley & Batson, 1973; Maio et al., 2001). However, when people are given an opportunity to develop their own reasons for possessing a value (e.g., helpfulness), they subsequently exhibit much more provalue behavior in such situations (Karremans, 2006; Maio et al., 2001).

In the context of healthy lifestyle change, this evidence is interesting because the news media have recently noted a lack of understanding of what it means to be healthy (e.g., Stuttaford, 2006). If the value of health lacks cognitive support for most people in the same way as other basic values, then people's ability to resist temptation and perform healthy behaviors may be improved by the provision of interventions that stimulate thinking about health and health-related values. The increased moral commitment at this abstract level may be a broad and powerful way to help people enact behavior change. Indeed, the power of a strong commitment to values is revealed in various notorious acts, such as when animal rights activists destroy research laboratories or prolife advocates bomb abortion clinics (cf. Kristiansen & Hotte, 1997; Murray, Haddock, & Zanna, 1996). We expect that people can harness their values to promote more mundane, albeit challenging, lifestyle change (e.g., as when people concerned about animal welfare drop meat products from their diet).

Social Issues and Policy Implications

In this section, we reflect on how changes in the documentation of behavior change interventions (and their evaluations) could facilitate the transfer of knowledge from research to evidence-based practice. We then identify some potential policy implications for future study.

Challenges From Research Practice

There are challenges for implementation posed by scientific documentation of behavior change evaluations. Development of effective health behavior change

interventions depends upon adoption of change techniques that have been found to be effective (for particular target audiences) in methodologically rigorous trials. Such research can also clarify that particular approaches are ineffective and should be abandoned. This transfer of knowledge from research to practice is foundational to the establishment of evidence-based health promotion practice. It is therefore critical that tested interventions can be accurately replicated. Yet, health promotion has tended to develop independently of available research and may be regarded as “evidence-inspired,” rather than evidence-based (Michie & Abraham, 2004).

An important barrier to implementation of research findings is the adequacy with which researchers describe the change techniques employed in tested behavior change interventions. This issue has been addressed by the CONSORT statement, which is a checklist and flowchart research tool specifying details that should be included in intervention evaluation reports (Moher, Schultz, Altman, & CONSORT-Group, 2001). Acceptance of this statement has helped standardize 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” (Moher et al., 2001, p. 1192). However, although this principle has been accepted, description of behavior change interventions in the scientific literature is not straightforward for two main reasons. First, most health behavior interventions are combinations of many discrete behavior change techniques. For example, Abraham and Michie (in press) found that healthy eating interventions described in 22 published evaluations (identified by a systematic review of interventions based on self-regulatory principles) included between 1 and 13 discrete behavior change techniques, with an average of 6 techniques per intervention. Second, and more importantly, there is no agreed terminology by which researchers and practitioners can describe and define specific behavior change techniques. Consequently, different researchers use different terms to describe the same or similar approaches to changing a particular target behavior while, at the same time, important differences between interventions may not be adequately highlighted. This lack of standardized description of change techniques threatens to reduce scientific evaluations to one-off tests of interventions, which, even though they may be creatively designed and effective, cannot be reliably replicated or accurately translated into practice. A lack of standardized description of the constituent components of behavior change interventions limits the conclusions that can be drawn from systematic reviews.

For example, Hillsdon, Foster, Cavill, Crombie, and Naidoo (2005) conducted a systematic review 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). Here, specific behavior change techniques are seen to be associated with success in promoting increased

physical activity. However, such syntheses are rare because identification of discrete techniques that characterize one intervention but not another cannot 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 behaviors.

Some researchers have sought to standardize the way in which intervention components are described. For example, in a review of interventions designed to prevent weight gain, Hardeman, Griffin, Johnston, Kinmonth and Wareham (2000) used 19 separate behavior change methods to classify intervention contents. More recently, Abraham and Michie (in press) assessed whether researchers could reliably analyze published intervention descriptions into component techniques (such as prompting goal setting, encouraging self-monitoring, and providing contingent reinforcement). The researchers used a five-page manual defining 26 discrete behavior change techniques to characterize interventions described in 195 published intervention evaluations. Two researchers independently decided whether each of the 26 defined behavior change techniques was or was not included in each intervention. This allowed the interventions to be characterized 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 behavior change techniques suggesting that published intervention descriptions can be translated into lists of included and excluded behavior change techniques. These results are encouraging because they demonstrate the feasibility of standardizing descriptions of behavior change interventions in terms of clearly defined, commonly understood techniques.

The research also provides a model for the establishment of a common terminology of behavior change, which could be understood by researchers and practitioners alike. Such standardization would enable reviewers to link effectiveness data to use of specified change techniques and facilitate replication fidelity by ensuring that researchers and practitioners used the same terms to describe particular approaches to behavior change. Further development of this standardization work is a precondition for the establishment of evidence-based promotion of health behaviors.

Applications

We have reviewed social psychological theory and evidence that helps to evaluate the potential effects of society-wide interventions to implement such behavior change, and we have considered obstacles to inferences from behavior change research. This theory and evidence makes clear that it is not as simple

as saying that people need to alter a few bad choices that they make and that researchers may differ in the precise components that they identify for intervention. Nonetheless, it is also clear that the broader theories that we have described retain a high level of empirical support, and consideration of them provides useful clues for how to effect lifestyle change through upstream (e.g., legislation, environmental changes, and educational efforts), downstream (e.g., persuasive marketing), and combinatorial approaches (e.g., downstream-plus–context-change).

So how exactly might interventions be used and what effects may they have over the coming decades? The evidence described in this review furnishes a basis for thinking that public campaigns might benefit from an interactive, open-ended style. That is, interventions have attained at least some success by (1) merely measuring attitudes and intentions, (2) asking people to form implementation intentions, and (3) 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 behavior change than arguments generated by others (Greenwald, 1969; Janis & King, 1954). Thus, 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 behaviors 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 behavior 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 behaviors, are likely to have limited impact” (Wardle, 2006, p. 4). Across behavior change domains, it is clear that failures to change the environment cause cues to older, habitual behavior to reassert themselves over time. As a result, behavior reverts to past tendencies.

Downstream informational campaigns work best when people encounter new situations that break up old habits. Given this evidence, it is important to carry out initiatives that change the structure of people’s environment. If people suddenly must pay a cash toll to use a road that is often traveled, the use of the road will immediately become less habitual and will require some forethought to ensure that the cash is at 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 defeat the cues to an old habit and make it easier to build a new one. (That is, the environment is changed without forcing people to move job or home.) Thus, the actual time scale 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 article, technological changes have engineered radically lower requirements for physical effort in most aspects of daily life (Sharpe et al., 2006). In their report for the “Tackling Obesities” project, Sharpe et al. indicate that this trend is likely to continue, and may include even the increased use of personalized powered transport, which may ironically use some of the same urban paths being designed for pedestrian use and for cyclists. Nonetheless, Sharpe et al. also describe how other technological advances will facilitate more accurate monitoring and feedback about caloric 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 the ability to implement required changes, by avoiding the extra portion that people do not need or expending the extra calories that must be used.

Not even such advances in health monitoring are complete solutions, however. Sharpe et al. (2006) also note that these advances will help only those people who are sufficiently motivated to use them and that addressing this motivation may be quite a challenge in itself. A personal health monitor might give a tired, single mom clear warnings not to pick up a box of cakes from the supermarket, but this may not be enough to overcome a psychological “need” to have them (e.g., to compensate for stress). 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 to the upstream, downstream, and combinatorial interventions that we have described. We have described them at a general level, but there are numerous, creative ways in which specific applications can be developed. For example, as shown in Table 1, one downstream approach could involve more use of pedestrian and cycle paths by government ministers and executives. This idea is founded on evidence about the importance of leadership behavior in tackling crises—it is difficult to compel people to believe that there is a crisis and a need to change when they do not see their leaders change. For the purpose of illustration, the table suggests many other examples of each type of intervention.

In the development of such approaches, government should support and insist upon the investigation of their *actual* effects on attitudes, motivation, and behavior, using rigorous pretesting. Our review has noted several instances where popular campaigns have elicited no effects or even the wrong direction of effects on attitudes and behavior. Often, the critical failing is an overreliance 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 that he or she would use a new neighborhood cycle route, but later find that it is more convenient and make heavy use of it. (This use would help to engineer physical effort back into the environment.) In general, people can hugely

Table 1. 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 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. Health and activity schemes, particularly during transitions to parenthood, periods of corporate restructuring, relocation, and merging.

neglect or misunderstand important predictors of their own feelings and actual behavior (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 2002; Wilson, 2002). There is obviously no point running a campaign that costs money and has no impact or even a negative impact. Thus, support for pretesting of actual effects on attitude and behavior is essential.

Furthermore, and echoing suggestions noted earlier in this article, intervention testing would benefit from an interdisciplinary approach. Despite our demonstration that the disciplines of social and health psychology are vital to understanding behavior change, other disciplines have much to contribute. For example, it is clear that biological factors can have a significant role in many of the issues that we have covered. This role is particularly evident in tackling obesity. Abundant evidence has indicated that there are genetic and biological factors in the emergence of obesity (Bernstein, Schuppenies, Wong, & Licinio, 2006; G. J. Schwartz, 2004; Stunkard, 1991). 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 (i.e., gene environment interaction) (e.g., Wadden, Brownell, & Foster, 2002).

Kelly Brownell (1994) has coined the term, “toxic environment” to describe the situation that afflicts people who are predisposed to obesity. Important factors in this environment are the dramatic increase in the availability of fast food and the increased consumption of soft drinks (French, Story, & Jeffery, 2001). These effects have been magnified by two marketing strategies (French et al., 2001; Stroebe, in press): the increase in portion sizes and TV advertising. It is likely that prevention of food ads during children TV hours and children TV programs

would already be quite effective, making such interventions particularly powerful “upstream” initiatives (Christakis, 2006; Wiecha et al., 2006).

Policymakers’ and individuals’ understanding of the role of biology may shape their thoughts on the degree of control and “culpability,” people have in various circumstances. In addition, the role of biology could be incorporated into interventions that encourage behavior change. For example, interventions could highlight the biological process of addictive behaviors or the difficulty in metabolizing certain classes of food by some individuals. This approach would remind people of their biological susceptibilities, thereby helping to augment perceived vulnerability. As noted above, perceived vulnerability is a major factor that drives health behavior change. Emphasizing the biological contribution may help to minimize people’s defensiveness and reduce the psychological conflict that people experience with their decisions.

Conclusion

Most of the focus on behavior change considers the effects of an intervention on individual attitudes, beliefs, and behaviors, and this emphasis is apparent in our description of downstream, upstream, and combinatorial approaches. A great portion of the theory and evidence that we have considered makes clear that unhealthy behaviors may not always be driven by consciously held intentions. Habit, automatic attitudes, and situational limitations are just some examples of the factors that may compete with volitional control. Consequently, despite our recommendation that attention is paid to the role of moral norms, policymakers must be careful about creating a moral stigma against people who fail to live healthily—people who may be simply reacting to powerful inherited tendencies and situational forces that they have not been able to control (Stunkard, 1991). Indeed, as noted in our earlier discussion of obesity, technological developments have made it difficult to maintain healthy weight, because these developments “engineer physical effort out of the environment” (Sharpe et al., 2006, p. 3).

Yet, there is now abundant evidence that a form of “fat-ism” is becoming a pervasive and rampant form of prejudice in Western society (Crandall et al., 2001; Hebl & Mannix, 2003; Penny & Haddock, 2007). Even more disturbing, overweight people may be ridiculed by others while trying to become more fit. Fat-ism may be both an unfair stigma and an impediment to change, and this prejudice may be exacerbated by policymakers’ tendency toward inaction through an overemphasis on people’s behavioral responsibility.

Such issues make it important that there is ongoing dialogue between the scientists examining these issues and policymakers who are attempting to address them. Our review shows that there is a useful contribution to be made from research that simultaneously makes basic and applied contributions. Even very basic research outside of an applied context may make a contribution. Our experience

with this project and others has made salient that the most important determinant of the level of contribution is the amount of dialogue that occurs between the people carrying out the research and the people who might use or benefit from it. It is, of course, vital that the research is sound and relevant, but a lack of dialogue will cause sound and relevant research to make absolutely no contribution.

In sum, our review has described information that helps to predict when, why, and how such interventions may be successful. An encouraging finding has been that lifestyle change is quite achievable; but this optimism must be tempered with the recognition that interventions must be adequately informed by the relevant theory, research, and communication between researchers and practitioners. It is our hope that this article facilitates this aim.

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