Prediction and Change of Health Behavior

Applying the Reasoned Action Approach

EDITED BY

Icek Ajzen
University of Massachusetts, Amherst

Dolores Albarracín
University of Florida

Robert Hornik
University of Pennsylvania

LEA LAWRENCE ERLBAUM ASSOCIATES, PUBLISHERS
2007 Mahwah, New Jersey London

CHAPTER 1

Predicting and Changing Behavior: A Reasoned Action Approach

Icek Ajzen
University of Massachusetts

Dolores Albarracín
University of Florida

If you were told of a miraculous potion that could prevent all manner of illness—from cancer to cardiovascular disease, AIDS to malaria, diabetes to Alzheimer's—you would be justifiably skeptical. And if, after reviewing the evidence, you found that the medicine had no more curative effects than a placebo, you would reject the claim and return to a more realistic search for the diverse causes and cures of these illnesses. Psychological research, by comparison, seems at times to obey a different set of rules. Our attempts to predict and explain human behavior tend to rely on broad dispositional constructs: locus of control, sensation seeking, trust in doctors, self-consciousness, liberalism–conservatism, dominance, hedonism, prejudice, self-esteem, authoritarianism, altruism, achievement motivation, and so on ad infinitum. The oft documented failure of such constructs to predict behavior has done little to undermine confidence in their utility.

Self-esteem is a good case in point. Low self-esteem is often considered a major cause of problem behavior. In 1994, Robyn Dawes (1994) wrote a scathing critique of a report (Mecca, Smelser, & Vasconcellos, 1989) by a task force on self-esteem and social responsibility established by the California State Assembly. In their report, the task force reviewed the voluminous literature on self-esteem and found virtually no evidence for any effects of self-esteem on child maltreatment, academic achievement, unwanted teenage pregnancy, crime and violence, chronic welfare dependency, or alcoholism and drug use. Nevertheless, the contributors clung to their preconceived ideas regarding the importance of

self-esteem and suggested that interventions to increase self-esteem be encouraged. A more recent review of the literature (Baumeister, Campbell, Krueger, & Vohs, 2003) again documented the lack of evidence for a relation between self-esteem and problem behavior among adolescents: "Most studies on self-esteem and smoking have failed to find any significant relationship, even with very large samples and the correspondingly high statistical power... Large, longitudinal investigations have tended to yield no relationship between self-esteem and either drinking in general or heavy, problem drinking in particular... Self-esteem does not appear to prevent early sexual activity or teen pregnancy" (p. 35). We do not wish to claim, of course, that self-esteem is a useless construct. All else equal, we might well prefer that people feel good about themselves, but it is important to recognize that this construct does little to advance our understanding of the determinants of human social behavior.

Other instances of injudicious reliance on dispositional constructs abound. For example, not much more encouraging than the findings regarding self-esteem are the results of research on racial prejudice and discriminatory behavior. In two recent meta-analyses (Schütz & Six, 1996; Talaska, Fiske, & Chaiken, 2004) of the relevant literature, the average correlations between measures of prejudice and discrimination were .29 (based on 46 data sets) and .26 (based on 136 data sets), respectively. Correlations of comparable magnitude were reported in recent research that, instead of measuring attitudes explicitly, obtained implicit measures by means of the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998) or evaluative priming (Fazio, Jackson, Dunton, & Williams, 1995). Like explicit measures of prejudice, implicit measures tend to have relatively low correlations even with nonverbal behaviors that are not consciously monitored (for reviews, see Ajzen & Fishbein, 2005; Fazio & Olson, 2003). Nevertheless, there is no readily apparent diminution in work on this construct. Again, we do not wish to give the impression that racial, ethnic, and gender prejudices are unimportant, but we have to realize that prejudice does not account for a great deal of variance in any particular behavior.

THE REASONED ACTION APPROACH

Evidence of this kind led Fishbein (1967a; Fishbein & Ajzen, 1972, 1975) more than 30 years ago to question reliance on global dispositions. Instead of studying the role of self-esteem, prejudice, internal-external locus of control, or some other global disposition, he suggested that we direct our attention to the particular behavior of interest and try to identify its determinants. Much prior theory and research had focused on one or another global disposition that might serve as an overarching causal agent and then tried to rely on this disposition to account for many different types of behavior in the disposition's domain of application. By contrast, Fishbein and Ajzen proposed that we identify a particular behavior and then look for antecedents that can help to predict and explain the behavior of interest, and thus potentially provide a basis for interventions designed to modify it.

Of course, this quest would be quite unrealistic if we had to assume that each behavior is determined by a unique set of antecedents. The reasoned action model that emerged in response to the challenge, now known as the theory of planned behavior, actually identified a small set of causal factors that should permit explanation and prediction of most human social behaviors. Briefly, according to the theory, a central determinant of behavior is the individual's *intention* to perform the behavior in question. As they formulate their intentions, people are assumed to take into account three conceptually independent types of considerations. The first are readily accessible or salient beliefs about the likely consequences of a contemplated course of action, beliefs which, in their aggregate, result in a favorable or unfavorable *attitude toward the behavior*. A second type of consideration has to do with the perceived normative expectations of relevant referent groups or individuals. Such salient normative beliefs lead to the formation of a *subjective norm*—the perceived social pressure to perform or not to perform the behavior. Finally, people are assumed to take into account factors that may further or hinder their ability to perform the behavior, and these salient control beliefs lead to the formation of *perceived behavioral control*, which refers to the perceived capability of performing the behavior. As a general rule, the more favorable the attitude and subjective norm with respect to a behavior, and the greater the perceived behavioral control, the stronger should be an individual's intention to perform the behavior under consideration. Finally, given a sufficient degree of *actual* control over the behavior, people are expected to carry out their intentions when the opportunity arises. Intention is thus assumed to be the immediate antecedent of behavior. However, because many behaviors pose difficulties of execution that may limit volitional control, it is useful to consider perceived behavioral control in addition to intention. To the extent that perceived behavioral control is veridical, it can serve as a proxy for actual control and contribute to the prediction of the behavior in question. A schematic representation of the theory is shown in Figure 1–1.

Expectancy-Value Model

The three major determinants in the theory of planned behavior—attitudes toward the behavior, subjective norms, and perceptions of behavioral control—are traced to corresponding sets of behavior-related beliefs. The relation between beliefs and overall evaluative attitude is embodied in the most popular model of attitude formation and structure, the expectancy-value model (see Feather, 1959, 1982). One of the first and most complete statements of the model can be found in Fishbein's (1963; 1967b) summation theory of attitude. In this theory, people's evaluations of, or attitudes toward, an object are determined by their salient or readily accessible beliefs about the object, where a belief is defined as the subjective probability that the object has a certain attribute (Fishbein & Ajzen, 1975). The terms *object* and *attribute* are used in the generic sense and they refer to any discriminable aspect of an individual's world. When applied to attitudes toward a behavior, the object of interest is a particular action and the attributes are the action's anticipated outcomes. For example, a person may believe that physical exercise (the attitude object) reduces the risk of heart disease (the attribute).

Each belief thus associates a behavior with a certain outcome. According to the expectancy-value model, a person's overall attitude toward performing a behavior is determined by the subjective values or evaluations of the outcomes

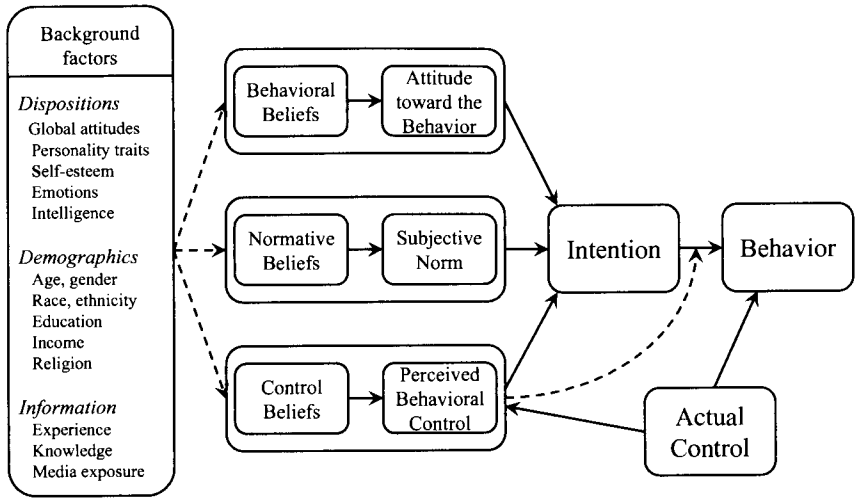

FIGURE 1–1. The theory of planned behavior.

associated with the behavior and by the strength of these associations. Specifically, the evaluation of each outcome contributes to the attitude in direct proportion to the person's subjective probability that the behavior will lead to the outcome in question. The basic structure of the model is shown in the equation below, where A_B is the attitude toward the behavior, b_i is the strength of the belief that the behavior will lead to outcome i, e_i is the evaluation of outcome i, and the sum is over all salient outcomes (see Fishbein & Ajzen, 1975).

$$A_B \propto \sum b_i e_i \qquad 1$$

A similar logic applies to the relation between normative beliefs and subjective norm, and the relation between control beliefs and perceived behavioral control. Normative beliefs refer to the perceived behavioral expectations of important referent individuals or groups such as the person's family, friends, coworkers, and health professionals. These normative beliefs—in combination with the motivation to comply with the different referents—determine the prevailing subjective norm regarding the behavior. Finally, control beliefs have to do with the perceived presence of factors that can facilitate or impede performance of a behavior. It is assumed that the perceived power of each control factor to impede or facilitate performing the behavior contributes to perceived control in direct proportion to the person's subjective probability that the control factor is present.

Basically, then, the theory assumes that human social behavior follows reasonably from the information or beliefs people possess about the behavior under consideration. These beliefs originate in a variety of sources: personal experiences, formal education, radio, newspapers, TV, the Internet and other media, interactions with family and friends, and so forth. No matter how beliefs were acquired, they are assumed to produce attitudes, subjective norms, and perceptions of control with regard to the behavior, and thus guide the formation of behavioral intentions and actual performance of the behavior.

To summarize briefly, Fishbein and Ajzen's response to the failure of global dispositions, and in particular of global attitudes, to predict behavior was twofold. First, they suggested that we shift focus from global dispositions, such as attitudes toward broad objects, groups, institutions, or policies to behavior-specific dispositions, such as intentions to perform the behavior, attitudes toward the behavior, subjective norms regarding the behavior, and perceptions of control over performing the behavior. This shift constituted a revolution in the theorizing of social scientists who for decades had relied almost exclusively on global dispositions in their attempts to explain social behavior. In fact, Fishbein and Ajzen's insight has yet to reach many investigators as is evidenced by the continuing reliance on global dispositions in diverse areas of research. Second, Fishbein and Ajzen proposed that we apply the well-established expectancy-value model of general attitudes to the study of attitudes toward a behavior and that we extend its logic to the other antecedents of intentions as well. This approach is reminiscent of behavioral decision theory and its dominant theoretical framework, the subjective expected utility model (see Edwards, 1954). Both models focus on specific behavioral options and assume that an option's perceived attributes determine a person's decision. However, the expectancy-value model makes fewer psychometric assumptions, is more descriptive of the decision-making process, and is consistent with work on the psychological limitations of human judgments and decisions (see Ajzen, 1996). We return to this last point in the following discussion of misconceptions about the reasoned action approach.

Background Factors

Though focusing on determinants closely linked to a behavior of interest, the theory of planned behavior does not deny the importance of global dispositions, demographic factors, or other kinds of variables often considered in social psychology and related disciplines. In fact, the reasoned action approach recognizes the potential importance of such factors but, as can be seen in Figure 1–1, they are considered background variables that can influence behavior indirectly by affecting behavioral, normative, and control beliefs. However, whether a particular background factor does indeed have an impact on beliefs is an empirical question. Furthermore, given the large number of potentially relevant background factors, it is difficult to know which should be considered without a content-specific theory to guide selection in the behavioral domain of interest. Content theories of this kind are not part of the reasoned action model but can complement it by identifying relevant background factors and thereby extending our understanding of a behavior's determinants (see Petraitis, Flay, & Miller, 1995). With the aid of the theory of planned behavior we can not only examine whether a given background factor is related to the behavior of interest but also explain such an effect by trac-

ing it to differences in behavior-relevant beliefs, attitudes, subjective norms, perceptions of behavioral control, and intentions.

The proposition that behavior follows from information or beliefs about the behavior is not unique to the reasoned action model developed by Fishbein and Ajzen (see Fishbein et al., 2001). Among other theories consistent with this proposition are the health belief model (Rosenstock, Strecher, & Becker, 1994; Strecher, Champion, & Rosenstock, 1997), social cognitive theory (Bandura, 1986, 1997), the theory of subjective culture and interpersonal relations (Triandis, 1972, 1977), the information-motivation-behavioral skills model (Fisher & Fisher, 1992), and the theory of trying (Bagozzi & Warshaw, 1990). For example, Bandura's well-known social cognitive theory relies on outcome expectancies or behavioral beliefs and, more importantly, on the construct of self-efficacy to explain behavior. It deals with the same kinds of variables as the theory of planned behavior, but subdivides them into a greater number (see, e.g., Bandura, 1998). Thus, instead of a single intention, it distinguishes between proximal and distal goals; instead of beliefs about behavioral consequences and social norms, it refers to physical, social, and self-evaluative outcome expectations; and instead of a single factor referring to perceived behavioral control, it draws a distinction between beliefs about self-efficacy on one hand and beliefs about personal and situational versus system impediments on the other. Similarly, in his theory of subjective culture and interpersonal relations Triandis considers intentions, facilitating factors, perceived consequences of performing a behavior, and perceived social influences to be important determinants of behavior, but he also includes habit and emotion as additional factors.

Misconceptions

Though widely accepted and applied, some aspects of the theory of planned behavior—and of the reasoned action approach in general—are frequently misconstrued.

Reasoned versus rational action. Foremost among misconceptions is the supposition that in a reasoned action approach people are assumed to behave rationally, basing their decision on a dispassionate weighing of all relevant information. In actuality, all the theory assumes is that behavioral intentions follow reasonably from beliefs about performing the behavior. People may hold few or many beliefs. Some beliefs persist over time, some are forgotten, and new beliefs are formed. However, there is no assumption in reasoned action models that these beliefs are veridical. On the contrary, the theory recognizes that beliefs, although often quite accurate, can be biased by a variety of cognitive and motivational processes, that they may derive from invalid or selective information, be self-serving, or otherwise fail to correspond to reality. However, once a set of beliefs is formed it provides the cognitive foundation from which attitudes, perceived social norms, and perceptions of control—and ultimately intentions—are assumed to follow in a reasonable and consistent fashion.

Deliberative versus automatic processes. The theory of planned behavior is also often misinterpreted as implying that people form a conscious intention prior to carrying out each and every behavior. In reality, the theory assumes that, after repeated opportunities for performance of a given behavior, deliberation is no longer required because the intention to perform (or not perform) the behavior is activated spontaneously in a behavior-relevant situation (see Ajzen & Fishbein, 2000). In other words, the behavior has become so routine that it is initiated with minimal conscious effort or attention. Many behaviors in everyday life are of this kind: We brush our teeth, leave the house for work, put on a seat belt, walk up stairs, and so forth without prior conscious deliberation. There is no need to assume that such behaviors are activated automatically or unconsciously, without prior intentions—only that the intentions are activated spontaneously without much conscious effort.

A related issue has sometimes been raised with respect to the formal structure of the expectancy-value model of attitudes. The equation used to compute an attitude estimate on the basis of accessible beliefs may seem to imply that people go through a complex mental calculus, involving multiplication of belief strength by outcome evaluation and summation of the resulting product terms. In actuality, although the investigator does perform these computations, people are *not* assumed to do so. It is merely proposed that attitude formation can be *modeled* in this fashion. The psychological processes involved in arriving at an attitude are assumed to take account of belief strength as well as outcome evaluation, roughly in the form described by the formal model: The more strongly a belief is held, and the more positive or negative the outcome evaluation, the greater is the belief's expected contribution to the overall attitude. The same is true of the models describing the relations between normative beliefs and subjective norms, and the relations between control beliefs and perceived behavioral control.

Indeed, the processes described in the expectancy-value model are assumed to occur automatically and often below conscious awareness. Fishbein's (1963; 1967b) original summation model described attitude formation as the automatic conditioning of evaluative reactions to the attitude object. Similarly, although couched in more cognitive, information-processing terminology, the expectancy-value model of attitudes in the theory of planned behavior does *not* assume deliberate and conscious attitude construction. Instead, our attitudes toward a behavior are assumed to be formed automatically and inevitably as we acquire new information about the behavior's outcomes, and as the subjective values of these outcomes become linked to the behavior. These attitudes are immediately available when we are confronted with the behavior. The same logic applies to the formation and automatic activation of subjective norms and of perceived behavioral control.

Empirical Support

A large number of studies have applied the theory of planned behavior to examine the psychological antecedents of actions in various domains, and more recently, attempts have also been made to use the theory as a framework for

behavioral interventions. In this chapter, we focus on health-related behaviors, but our conclusions hold equally well for behavior in other domains. It is beyond the scope of this chapter to review the large body of research that has applied the theory of planned behavior in the health domain (for summaries, see Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997). Suffice it to note that, generally speaking, the theory has been well supported. Thus, with regard to the prediction of behavior, many studies have substantiated the predictive validity of behavioral intentions. A few sample applications in the health domain are shown in Table 1–1. It can be seen that intentions can be highly predictive of various health-related behaviors. Indeed, meta-analyses of studies dealing with specific health behaviors, such as condom use and exercise, have revealed a strong link between intentions and behavior, with mean correlations ranging from .44 to .56 (Albarracín et al., 2001; Godin & Kok, 1996; Hausenblas et al., 1997; Sheeran & Orbell, 1998). Also, it has been found that the addition of perceived behavioral control can improve prediction of behavior considerably, especially when performance of the behavior is difficult. For example, in a general sample of smokers, a measure of perceived behavioral control accounted for an additional 12% of the variance in smoking behavior over and above intentions; and among postnatal women, the increase in explained behavioral variance due to perceived behavioral control was 34% (Godin, Valois, Lepage, & Desharnais, 1992).

Regarding the antecedents of intentions, Table 1–2 summarizes the results of a few recent studies that attempted to predict behavioral intentions in the health domain. It can be seen that the theory of planned behavior accounted for appreciable variance in people's intentions to perform a diverse set of behaviors: physical exercise, using illicit drugs, eating a low-fat diet, consuming dietary products, and performing breast self-examinations. And here, too, meta-analyses of the empirical literature have provided strong evidence to show that intentions to perform health-related behaviors can be predicted with considerable accuracy from measures of attitudes toward the behavior, subjective norms, and perceived behavioral control or self-efficacy, with mean correlations ranging from .63 to .71 (Albarracín et al., 2001; Godin & Kok, 1996; Hagger, Chatzisarantis, & Biddle, 2002; Sheeran & Taylor, 1999).

Overall, then, the theory of planned behavior has done quite well across a variety of behavioral domains. Still, one may wonder about the relatively large amount of variance that often remains unaccounted for. Some of the unexplained variance may be due to random measurement error. This suggestion is supported by structural equation modeling which usually results in a good fit between model and data and a high proportion of explained variance once measurement unreliability is taken into account (see, e.g., Bamberg & Schmidt, 1994; Blue, Wilbur, & Marston-Scott, 2001; Davis, Ajzen, Saunders, & Williams, 2002; Levin, 1999). In some studies, low predictive validity is due to lack of variance in the behavioral criterion, or inappropriate operationalization of the predictor or criterion measures. Even with these limitations, meta-analyses provide strong support for the reasoned action approach, particularly when one considers that prior to the introduction of the theories of reasoned action and planned behavior, most studies accounted for no more than 10% of the variance in behavior (see Wicker, 1969).

TABLE 1–1
Correlations Between Health-Related Intentions and Behaviors

Behavior	*Intention-behavior correlation*
Using birth control pills (see Ajzen & Fishbein, 1980, ch. 11)	.85
Breast vs. bottle feeding (Manstead, Proffitt, & Smart, 1983)	.82
Using ecstasy drugs (Orbell, Blair, Sherlock, & Conner, 2001)	.75
Having an abortion (Smetana & Adler, 1980)	.96
Donating blood (Giles & Cairns, 1995)	.75
Using homeopathic medicine (Furnham & Lovett, 2001)	.75

Note: All correlations are significant ($p < .01$).

TABLE 1–2
Prediction of Intentions from Attitude Toward the Behavior (AB), Subjective Norm (SN), and Perceived Behavioral Control (PBC)

	Correlation coefficients			*Regression coefficients*			
Intention	A_B	*SN*	*PBC*	A_B	*SN*	*PBC*	*R*
Physical exercise (Courneya, 1995)	.51	.47	.48	.22	.17	.18	.62
Using cannabis (Conner & McMillan, 1999)	.70	.55	.69	.42	.11	.43	.81
Eating a low-fat diet (Armitage & Conner, 1999)	.68	.43	.59	.36	.16	.33	.78
Consuming dairy products (Kim, Reicks, & Sjoberg, 2003)	.42	.33	.48	.38	.11*	.30	.65
Breast self-examination (Norman & Hoyle, 2004)	.56	.52	.80	.26	.03*	.70	.85

*Not significant; all other coefficients $p < .05$.

The Cognitive Foundation of Intentions and Behavior

Substantive information about the considerations that guide decisions to perform a given behavior is obtained by examining the behavioral, normative, and control beliefs that provide the basis for attitudes, subjective norms, and perceptions of

behavioral control. A recent review of research on physical exercise (Downs & Hausenblas, 2005) provides summary information for this particular domain and can serve as an illustration. The authors surveyed 47 investigations that had conducted elicitation studies to identify salient behavioral, normative, and control beliefs about exercising. Salient behavioral beliefs associated exercising with such advantages as improved physical and psychological health, control of body weight, improved daily functioning, increased energy, stress relief, and relaxation. Salient negative outcomes of exercising had to do with pain and injury, fatigue, and time expenditure. The most frequently mentioned salient normative referents were family members, friends, and health-care professionals. Finally, the most frequently listed control factors that could interfere with exercising were health-related problems (injury, pain), inconvenience, lack of energy, lack of time, and lack of social support. Salient facilitating factors included convenience, pleasure derived from exercise, and social support.

This analysis of exercise beliefs also showed that, in the context of expectancy-value formulations, behavioral beliefs accounted for over 54% of the variance in direct measures of attitude toward exercising, normative beliefs for almost 56% of the variance in direct measures of subjective norms, and control beliefs for about 34% of the variance in direct measures of perceived behavioral control. Examination of differences in behavioral, normative, and control beliefs between individuals who exercise and those who do not can provide useful information about the kinds of considerations that are the most influential determinants of this behavior and that may be targeted most effectively in behavioral interventions.

BEHAVIORAL INTERVENTIONS AND PERSUASIVE COMMUNICATIONS

According to the reasoned action approach, changes in behavior can be brought about by changing people's intentions to perform the behavior in question. A recent meta-analysis (Webb & Sheeran, 2006) provides strong support for this expectation. This meta-analysis examined 47 studies in which an intervention program was found to significantly strengthen intentions to perform a behavior of interest. The analysis showed conclusively that these changes also led to subsequent changes in behavior. An important question, therefore, has to do with strategies that can be used to effectively change the antecedents of behavioral intentions and thus modify behavior. The remainder of this chapter discusses research that has examined possible strategies in the health domain.

Changing the Psychological Antecedents of Intentions

The reasoned action approach has guided many interventions designed to prevent disease and promote health. In these interventions, attempts are made to induce favorable attitudes, norms, and/or perceived control with respect to a health-related behavior. For example, in the domain of condom use to prevent HIV/AIDS, Albarracín McNatt, Klein (2003) and Albarracín, Gillette, (2005)

identified several intervention strategies relevant for a reasoned action approach. One strategy entails attempts to modify attitudes by means of *attitudinal arguments*. These programs usually consist of assertions that condom use has personally beneficial consequences for one's physical health or psychological comfort. Another strategy comprises arguments to increase favorable norms with respect to condom use (*normative arguments*). These arguments are often designed to convince an audience that its social network supports condom use. In addition, interventions can also contain behavioral scripts about strategies that yield successful performance of the behavior. These scripts can be transmitted verbally, within persuasive arguments, or as part of a behavioral skills training based on Kelly et al.'s (1991) approach. For example, a persuasive message may describe how successful condom use depends on preparatory actions such as carrying condoms around all the time or discussing condom use with potential partners (*behavioral skills arguments*). Similarly, a widely accepted strategy is to ask participants to role-play condom application or negotiation (*behavioral skills training*). Presumably, the behavioral practice and the instructional feedback facilitate acquisition of necessary behavioral skills. As a result of teaching behavioral skills, interventions of this type presumably increase perceived behavioral control.

Albarracín and her colleagues (2005) conducted a comprehensive meta-analysis of the outcomes of HIV-prevention interventions to increase condom use published between 1986 and 2004. As part of this project, over 350 interventions and around 100 control groups were selected, comprising a large number of countries and U.S. states. For each of these groups or conditions, the researchers calculated amount of change in behavior (e.g., increases in condom use frequency) and change in various psychological variables. Of interest to this chapter, they calculated change in *actual condom use*, *attitudes* with regard to condom use (whether one thinks that condom use is good and desirable), *norms* about the use of condoms (beliefs that others support one's use of condoms), *perceptions of control* over the behavior (perceiving that one can do it if one wants to), and *intentions* to use condoms.

Changing behavior by changing attitudes and perceived behavioral control. Albarracín et al. (2005) distinguished between what they termed *active* and *passive* interventions. Overall, interventions with strategies that required *activities* by the recipients (behavioral skills training, HIV counseling and testing, or client-tailored counseling, termed *active interventions*) were more effective than interventions that relied exclusively on presented material without the recipients engaging in specific activities (termed *passive interventions*). Within passive interventions, the most effective strategies were attitudinal arguments discussing the beneficial outcomes of using condoms and behavioral-skills arguments explaining how to best implement condom use. The distribution of condoms to participants was also effective when the intervention was passive. Within active interventions (those including behavioral skills training, HIV counseling and testing, and/or client-tailored counseling), effective strategies included presenting

attitudinal and control/behavioral skills arguments (two passive strategies often included in active interventions) and training people in the management of their moods and situations in which drugs and alcohol are involved (one of the strategies that characterized active interventions).

Of course, the finding that an intervention with attitudinal and behavioral-control contents is effective at changing behavior does not necessarily validate the reasoned action approach. Like any treatment, behavioral interventions may work for any number of reasons. For example, an intervention to improve condom use attitudes may increase condom use because it is accompanied by the provision of condoms or arguments to increase HIV threat. Thus, one must verify that the behavioral change produced by the attitudinal or control arguments was mediated by changes in attitudes and perceived behavioral control (while controlling for other strategies).

Figure 1–2 summarizes the findings from path analyses fit to test mediational models for the effects of attitudinal arguments and self-management training (Albarracín et al., 2005). Sobel (1982) tests were calculated and are presented along with the path coefficients; a significant test indicates significant mediation. The figure shows that the effects of attitudinal and behavioral-skills arguments on behavior were positive and significant across passive and active interventions. However, the positive effects of attitudinal arguments on behavior change were mediated by changes in attitudes. Similarly, the analyses in the bottom half of the

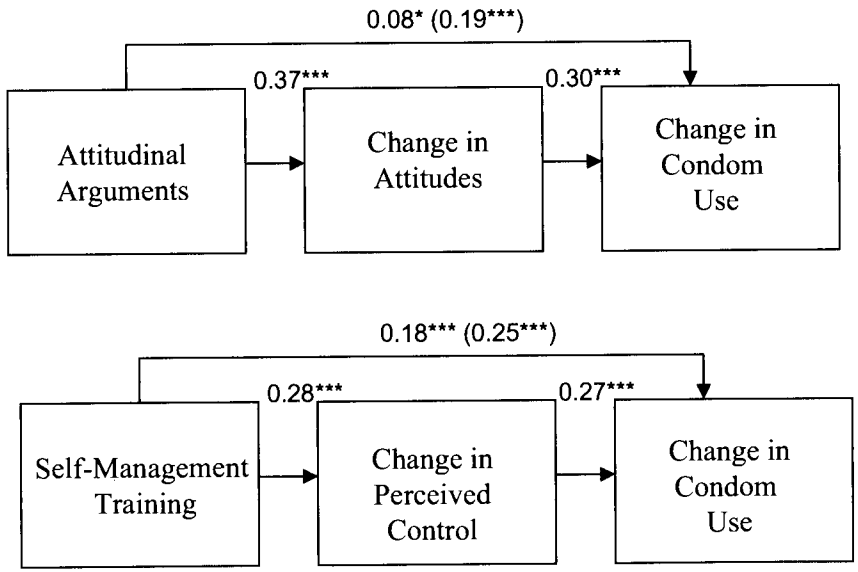

FIGURE 1–2. Path analyses to determine the mediating effects of change in specific psychological variables on changes in condom use. Panel A: Effects of attitudinal arguments. Panel B: Effects of self-management training. Both models also included all the strategies that were coded in the meta-analysis. However, the other paths are not presented for simplicity. Path coefficients are standardized. The direct path when the mediator was not included appears between parentheses. Sobel tests were significant unless indicated as ns. Adapted from Albarracín et al. (2005).

figure indicate that the positive influence of behavioral-skills arguments on condom use change was mediated by control perceptions. The analyses are simplified for display purposes; they controlled for other possible influences such as condom provision and threat-inducing arguments.

Changing behaviors by changing norms. The outcomes of HIV-prevention interventions also illustrate how changing norms can produce changes in behaviors. Durantini et al. (2006) used the same meta-analytic procedures as Albarracín et al. (2005) to investigate the impact of source characteristics and demographic similarity between the source and the recipient on actual behavioral changes after the interventions. Some researchers have argued that persuasive communications (and therefore behavioral interventions) should use experts as sources (Hovland, Janis, & Kelley, 1953). However, there is also extensive work and policy favoring the use of laypersons selected from the target community (Freire, 1972; Putnam, 1911; in the domain of HIV prevention, see Kelly et al., 1997). Although there are some deeply held beliefs about these issues, there have been no direct comparisons. Researchers have compared control groups with peer-led interventions, or control groups with expert led interventions. The key comparison between expert and peer sources, however, was absent prior to this meta-analysis of source effects.

By dividing interventions into ones presented by experts (e.g., public health educators, physicians, nurses, research staff) and ones presented by lay community members (e.g., community leaders, artists, religious ministers), the meta-analysis by Durantini and her colleagues (2006) could establish what type of source is more effective. Findings indicated that, overall, expert sources were more effective than lay community members. Moreover, as shown in the top part of Figure 1–3, these effects were mediated by norms (in addition to other factors) in various samples that differed in race (Black and White) as well as gender. This meta-analysis also showed that communicators similar to the audience produced greater changes in behavior than dissimilar communicators, and that the effect of source similarity was again mediated by changes in subjective norms. We return to this issue in the following section.

The Role of Background Factors in Interventions

In the reasoned action approach, background factors such as gender, ethnicity, and past behavior can influence intentions and behavior in two ways. First, the relative influence of attitudes, norms, and perceived control on intentions and behavior may vary as a function of a given background factor. Second, background factors can influence intentions and behavior by their effects on the proximal determinants, that is, beliefs, attitudes, subjective norms, and perceived behavioral control.

Background factors as moderators. Whether an intervention that targets norms, or attitudes, or perceived control will be influential appears to depend on the target population. The results from Durantini et al.'s (2006) review revealed that even when experts were generally effective, they were most effective for

FIGURE 1–3. Path analyses for the effects of expertise and demographic similarity. Models were fit using pair-wise deletion procedures to maintain the number of groups included in the main analyses reported in this paper. The first number next to each path is a standardized path coefficient. The parenthetical numbers correspond to the univariate correlations between expertise and each potential mediator. Sobel tests were significant whenever the source variable had a direct effect on behavior change. Adapted from Albarracín et al. (2005).

populations that typically have restricted power in society. That is, the beneficial impact of having an expert source was stronger for ethnic minorities and women than for ethnic majorities and men (see top part of Figure 1–3).

Notwithstanding the finding that experts are more effective than peers in unempowered populations, it also seems to be beneficial if the expert shares some of the characteristics of the audience. Thus, women and ethnic minorities were found to be sensitive to sources who share whatever characteristic makes that audience different from the mainstream (see bottom part of Figure 1–3). First women changed more in response to other women, and members of ethnic minorities changed more in response to other members of their ethnic group. Also, most populations whose behavior places them at risk for HIV (injection drug users, multiple partner heterosexuals, low condom users) benefited from having both an expert and somebody from their own group as intervention facilitators. In all of these cases, changes in norms mediated changes in behavior. For instance, the effect of demographic similarity among women and people of African backgrounds was mediated by norms (see bottom left diagram in Figure 1–3).

Whether normative arguments are effective is also contingent on the nature of the audience. For teens, receiving an HIV-prevention message that contains normative arguments was found to be better than not receiving these arguments. However, for adults, receiving these arguments was worse than not receiving them at all (see Albarracín et al., 2005).

Mediated effects of background factors. The reasoned action approach assumes that attitudes and norms are formed spontaneously when specific beliefs develop. For instance, people may form a favorable attitude toward a behavior if they previously formed beliefs that the behavior has desirable outcomes. However, as noted earlier in this chapter, the fact that beliefs are implicated does not imply that the process is rational. To the contrary, beliefs have many sources. For example, Albarracín and Wyer (2000) led college students to believe that outside of awareness they had either supported or opposed the institution of comprehensive examinations at their university. Because the feedback was experimentally manipulated, the researchers were able to examine the causal influence of participants' perceived past behavior on both their later behavior decisions and the cognitive processes that mediated these decisions. This influence was studied under a variety of experimental conditions designed to influence the participant's ability to process information. It was found that at least in some of these conditions the influence of the past behavior induction was belief-mediated. Likewise, interventions that induce actual trial of a new behavior may have similar belief-mediated effects on later behavior (for limiting conditions, see Albarracín, Cohen, & Kumkale, 2003; Albarracín & McNatt, 2005).

CONCLUSION

The reasoned action approach, as embodied in the theory of planned behavior, has proven useful both as a conceptual framework for understanding the determinants of specific behaviors, notably in the health domain, and as a basis for designing

effective behavioral interventions. A considerable amount of variance in behavior can be explained by considering intentions to engage in a behavior of interest as well as perceptions of control over the behavior. Intentions, in turn, are found to be well predicted from attitudes toward the behavior, subjective norms, and perceptions of behavioral control. Finally, salient beliefs about the behavior's outcomes, about the normative expectations of salient referents, and about facilitating and inhibiting factors can be examined to obtain a more detailed understanding of the cognitive foundation that underlies behavioral decisions. Consistent with this conceptual framework, behavior can be influenced by changing its theoretical antecedents. Thus, as expected, interventions directed at behavioral beliefs are found to influence attitudes, and by changing attitudes influence intentions and actions. Similar conclusions apply to interventions designed to change subjective norms or perceptions of behavioral control. Finally, also consistent with the theory, background factors such as personality, race, gender, and past actions have been found to influence behavior indirectly, by their effects on salient beliefs about the behavior.

REFERENCES

Ajzen, I. (1996). The social psychology of decision making. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 297–325). New York: Guilford Press.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice Hall.

Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 11, pp. 1–33). Chichester, England: Wiley.

Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracín, B. T. Johnson & M. P. Zanna (Eds.), *Handbook of attitudes and attitude change: Basic principles* (pp. 173–221). Mahwah, NJ: Lawrence Erlbaum Associates.

Albarracín, D., Cohen, J. B., & Kumkale, G. T. (2003). When persuasive communications collide with behavior: Effects of post-message actions on beliefs and intentions. *Personality and Social Psychology Bulletin, 29,* 834–845.

Albarracín, D., Gillette, J., Earl, A., Glasman, L.R., Durantini, M.R., & Ho., M.H. (2005). A test of major assumptions about behavior change: A comprehensive look at HIV prevention interventions since the beginning of the epidemic. *Psychological Bulletin, 131,* 856–897.

Albarracín, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. A. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin, 127,* 142–161.

Albarracín, D., & McNatt, P. S. (2005). Maintenance and decay of past behavior influences: Anchoring attitudes on beliefs following inconsistent actions. *Personality and Social Psychology Bulletin, 31,* 719–733.

Albarracín, D., McNatt, P. S., Klein, C., Ho, R., Mitchell, A., & Kumkale, G. T. (2003). Persuasive communications to change actions: An analysis of behavioral and cognitive impact in HIV prevention. *Health Psychology, 22,* 166–17.

Albarracín, D., & Wyer, R. S., Jr. (2000). The cognitive impact of past behavior: Influences on beliefs, attitudes, and future behavioral decisions. *Journal of Personality and Social Psychology, 79,* 5–22.

Armitage, C. J., & Conner, M. (1999). Distinguishing perceptions of control from self-efficacy: Predicting consumption of a low-fat diet using the theory of planned behavior. *Journal of Applied Social Psychology, 29,* 72–90.

Bagozzi, R. P., & Warshaw, P. R. (1990). Trying to consume. *Journal of Consumer Research, 17,* 127–140.

Bamberg, S., & Schmidt, P. (1994). Automobile or Bicycle? Empirical test of a Utility-Theory Approach. *Koelner Zeitschrift Fuer Soziologie und Sozialpsychologie, 46,* 80–102.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health, 13,* 623–649.

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest, 4,* 1–44.

Blue, C. L., Wilbur, J., & Marston-Scott, M. V. (2001). Exercise among blue-collar workers: Application of the theory of planned behavior. *Research in Nursing and Health, 24,* 481–493.

Conner, M., & McMillan, B. (1999). Interaction effects in the theory of planned behavior: Studying cannabis use. *British Journal of Social Psychology, 38,* 195–222.

Courneya, K. S. (1995). Understanding readiness for regular physical activity in older individuals: An application of the theory of planned behavior. *Health Psychology, 14,* 80–87. (There is no citation.)

Davis, L. E., Ajzen, I., Saunders, J., & Williams, T. (2002). The decision of African American students to complete high school: An application of the theory of planned behavior. *Journal of Educational Psychology, 94,* 810–819.

Dawes, R. M. (1994). *House of cards: Psychology and psychotherapy built on myth.* New York: The Free Press.

Downs, D. S., & Hausenblas, H. A. (2005). Elicitation studies and the theory of planned behavior: A systematic review of exercise beliefs. *Psychology of Sport and Exercise, 6,* 1–31.

Durantini, M. R., Albarracín, D., Earl, A., & Mitchell, A.L. (2006). Conceptualizing the influence of social agents of change: A meta-analysis of HIV prevention interventions for different groups. *Psychological Bulletin, 132,* 212–248.

Edwards, W. (1954). The theory of decision making. *Psychological Bulletin, 51,* 380–417.

Fazio, R. H., Jackson, J. R., Dunton, B. C., & Williams, C. J. (1995). Variability in automatic activation as an unobtrusive measure of racial attitudes: A bona fide pipeline? *Journal of Personality and Social Psychology, 69,* 1013–1027.

Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and uses. *Annual Review of Psychology, 54,* 297–327.

Feather, N. T. (1959). Subjective probability and decision under uncertainty. *Psychological Review, 66,* 150–164.

Feather, N. T. (Ed.). (1982). *Expectations and actions: Expectancy—value models in psychology.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Fishbein, M. (1963). An investigation of the relationships between beliefs about an object and the attitude toward that object. *Human Relations, 16,* 233–240.

Fishbein, M. (1967a). Attitude and the prediction of behavior. In M. Fishbein (Ed.), *Readings in attitude theory and measurement* (pp. 477–492). New York: Wiley.

Fishbein, M. (1967b). A consideration of beliefs and their role in attitude measurement. In M. Fishbein (Ed.), *Readings in attitude theory and measurement* (pp. 257–266). New York: Wiley.

Fishbein, M., & Ajzen, I. (1972). Attitudes and opinions. *Annual Review of Psychology,* 487–544.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Fishbein, M., Triandis, H. C., Kanfer, F. H., Becker, M., Middlestadt, S. E., & Eichler, A. (2001). Factors influencing behavior and behavior change. In A. Baum & T. A. Revenson (Eds.), *Handbook of health psychology.* Mahwah, NJ: Lawrence Erlbaum Associates.

Fisher, J. D., & Fisher, W. A. (1992). Changing AIDS-risk behavior. *Psychological Bulletin, 111,* 455–474.

Freire, P. (1972). *Pedagogy of the oppressed.* Harmondsworth, UK: Penguin.

Furnham, A., & Lovett, J. (2001). Predicting the use of complementary medicine: A test of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology, 31,* 2588–2620.

Giles, M., & Cairns, E. (1995). Blood donation and Ajzen's theory of planned behaviour: An examination of perceived behavioural control. *British Journal of Social Psychology, 34,* 173–188.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion, 11,* 87–98.

Godin, G., Valois, P., Lepage, L., & Desharnais, R. (1992). Predictors of smoking behaviour: An application of Ajzen's theory of planned behaviour. *British Journal of Addiction, 87,* 1335–1343.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74,* 1464–1480.

Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology, 24,* 3–32.

Hausenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport and Exercise Psychology, 19,* 36–51.

Hovland, C. I., Janis, I. L., & Kelley, H. H. (1953). *Communication and persuasion: Psychological studies of opinion change.* New Haven, CT: Yale University Press.

Kelly, J. A., Murphy, D. A., Sikkema, K. J., McAuliffe, T. L., Roffman, R. A., Solomon, L. J., Winett, R. A., Kalichman, S. C., & the Community HIV Prevention Research Collaborative (1997). Randomised, controlled, community-level HIV-prevention Intervention for sexual-risk behavior among homosexual men in US cities. *The Lancet, 350,* 1500–1505.

Kelly, J. A., St. Lawrence, J. S., Diaz, Y. E., Stevenson, L. Y., Hauth, A. C., Brasfield, T. L., Kalichman, S. C., Smith, J. E., & Andrew, M. E. (1991). HIV risk behavior reduction following intervention with key opinion leaders of population: An experimental analysis. *American Journal of Public Health, 81,* 168–171.

Kim, K., Reicks, M., & Sjoberg, S. (2003). Applying the theory of planned behavior to predict dairy product consumption by older adults. *Journal of Nutrition Education and Behavior, 35,* 294–301. (There is no citation)

Levin, P. F. (1999). Test of the Fishbein and Ajzen models as predictors of health care worker's glove use. *Research in Nursing & Health, 22,* 295–307.

Manstead, A. S. R., Proffitt, C., & Smart, J. (1983). Predicting and understanding mothers' infant-feeding intentions and behavior: Testing the theory of reasoned action. *Journal of Personality and Social Psychology, 44,* 657–671.

Mecca, A. M., Smelser, N. J., & Vasconcellos, J. (Eds.). (1989). *The social importance of self-esteem.* Berkeley, CA: University of California Press.

Norman, P., & Hoyle, S. (2004). The theory of planned behavior and breast self-examination: Distinguishing between perceived control and self-efficacy. *Journal of Applied Social Psychology, 34,* 694–708.

Orbell, S., Blair, C., Sherlock, K., & Conner, M. (2001). The theory of planned behavior and ecstasy use: Roles for habit and perceived control over taking versus obtaining substances. *Journal of Applied Social Psychology, 31,* 31–47.

Petraitis, J., Flay, B. R., & Miller, T. Q. (1995). Reviewing theories of adolescent substance use: Organizing pieces in the puzzle. *Psychological Bulletin, 117,* 67–86.

Putnam, R.D. (1911). *Making democracy work.* Princeton, NJ: Princeton University Press.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1994). The health belief model and HIV risk behavior change. In R. J. DiClemente & J. L. Peterson (Eds.), *Preventing AIDS: Theories and methods of behavioral interventions. AIDS prevention and mental health* (pp. 5–24). New York, NY: Plenum Press.

Schütz, H., & Six, B. (1996). How strong is the relationship between prejudice and discrimination? A meta-analytic answer. *International Journal of Intercultural Relations, 20,* 441–462.

Sheeran, P., & Orbell, S. (1998). Do intentions predict condom use? Meta-analysis and examination of six moderator variables. *British Journal of Social Psychology, 37,* 231–250.

Sheeran, P., & Taylor, S. (1999). Predicting intentions to use condoms: A meta-analysis and comparison of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology, 29,* 1624–1675.

Smetana, J. G., & Adler, N. E. (1980). Fishbein's Value x Expectancy model: An examination of some assumptions. *Personality and Social Psychology Bulletin, 6,* 89–96. (There is no cite)

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp. 290–312). Washington, DC: American Sociological Association.

Strecher, V. J., Champion, V. L., & Rosenstock, I. M. (1997). The health belief model and health behavior. In D. S. Gochman (Ed.), *Handbook of health behavior research 1: Personal and social determinants* (pp. 71–91). New York: Plenum Press.

Talaska, C. A., Fiske, S. T., & Chaiken, S. (2004). *Predicting discrimination: A meta-analysis of the racial attitude-behavior literature.* Unpublished manuscript.

Triandis, H. C. (1972). *The analysis of subjective culture.* New York: Wiley.

Triandis, H. C. (1977). *Interpersonal behavior.* Monterey, CA: Brooks/Cole.

Webb, T. L., & Sheeran, P. (2006). Does Changing Behavioral Intentions Engender Behavior Change? A Meta-Analysis of the Experimental Evidence. *Psychological Bulletin, 132,* 249–268.

Wicker, A. W. (1969). Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. *Journal of Social Issues, 25,* 41–78.