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Using Theory to Design Effective Health Behavior Interventions

This article demonstrates the usefulness of two theories for the development of effective health communication campaigns. The integrative model of behavioral prediction focuses on changing beliefs about consequences, normative issues, and efficacy with respect to a particular behavior. Media priming theory focuses on strengthening the association between a belief and its outcomes, such as attitude and intention toward performing the behavior. Both the integrative model of behavioral prediction and media priming theory provide guidance with respect to the selection of beliefs to target in an intervention. The article describes the theories, shows how they can be applied to the selection of target beliefs, and, for each theory, defines the criteria for belief selection. The two theories as well as their appropriate analytic strategies are complementary rather than conflicting.

Those who design interventions that aim to increase health behavior are faced with a number of decisions when developing the intervention. For example, decisions need to be made concerning the primary goal of the intervention, its target population, and the selection of messages for the intervention. As we will try to demonstrate, two theoretical approaches provide powerful tools for identifying the specific beliefs that need to be addressed if one wishes to change or maintain a given behavior. The two theories exemplify two ways to change a variable, for example, a person's intention to perform a health-protective behavior. First, the integrative model of behavioral prediction represents the more conventional view that changing beliefs underlying the intention to perform a behavior ultimately results in changes in intention. Second, media priming theory represents a more recent account of change. It focuses on the association between beliefs and intention and predicts that a strengthened association between beliefs and intention ultimately results in a change in intention. In this article, we will describe the integrative model of behavioral prediction and media priming theory and demonstrate how these theories make complementary rather than conflicting contributions to the development of effective health communication campaigns.

Behavioral Prediction

Although many theories have been applied to health-related behavioral research and to the development of behavioral interventions, some contend that there are only a limited number of variables that need to be considered in predicting and understanding any given behavior (see, e.g., Fishbein et al., 2002; Fisher & Fisher, 1992; Petraitis, Flay, & Miller, 1995; Slater, 1999; Witte, 1995). These variables are contained in three theories that have been widely used in health behavior research and interventions.

Health Belief Model. The health belief model (Janz & Becker, 1984; Rosenstock, 1974) proposes that in order for someone to perform a recommended health behavior, the person must first believe that he or she is at risk for acquiring a serious and severe negative health outcome (e.g., coronary heart disease, HIV/AIDS). At the same time, the person must believe that the benefits of performing the recommended protective behavior outweigh the costs of performing that behavior. Note that the costs and benefits of performing one behavior (e.g., using condoms with main partners) may be very different from costs and benefits of another behavior (e.g., using condoms with nonmain partners). For example, although a person might believe that using condoms with main partners could "suggest that I do not trust my partner," he or she may not hold this belief with respect to using condoms with nonmain partners.

Social Cognitive Theory. According to social cognitive theory (Bandura, 1977, 1986, 1997), there are also two primary factors that determine the likelihood that someone will adopt a health-protective behavior. First, the person must believe that the positive outcomes (benefits) of performing the behavior outweigh the negative outcomes (costs). Second, the person must have a sense of personal agency or self-efficacy with respect to performing the behavior. That is, the person must believe that she or he can perform the recommended behavior, even in the face of various circumstances or barriers that make it difficult to perform that behavior.

Theory of Reasoned Action. According to the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), performance of a given behavior is primarily determined by the strength of a person's intention to perform that behavior. The intention to perform a given behavior is, in turn, viewed as a function of two factors, namely the person's attitude toward performing the behavior (i.e., one's overall positive or negative feeling about personally performing the behavior) and/or the person's subjective norm concerning the behavior (i.e., the person's perception that his or her important others think that he or she should or should not perform the behavior). Attitudes are a function of behavioral beliefs (i.e., beliefs that performing the behavior will lead to certain

outcomes) and their evaluative aspects (i.e., the evaluation of those outcomes); subjective norms are viewed as a function of normative beliefs (i.e., beliefs that a specific individual or group has regarding whether one should or should not perform the behavior in question) and motivations to comply (i.e., the degree to which, in general, one wants to do what the referent thinks one should do).

Taken together, these three theories identify a limited number of variables that serve as determinants of any given behavior. Although there is considerable empirical evidence for the role of attitude, perceived norms, and self-efficacy as proximal determinants of intention and behavior (e.g., Sheeran, Abraham, & Orbell, 1999; Sheppard, Hartwick, & Warshaw, 1988), the support for the role of perceived risk is inconsistent. Whereas methodological and conceptual flaws in perceived risk research may account for part of this inconsistency (Poppen & Reisen, 1997; Weinstein & Nicolich, 1993), available evidence suggests that perceived risk is best viewed as a "distal" rather than as a "proximal" predictor of intention and behavior (e.g., Gerrard, Gibbons, & Bushman, 1996). Thus, most behavioral theories suggest three critical determinants of a person's intentions and behaviors: (a) the person's attitude toward performing the behavior, which is based upon one's beliefs about the positive and negative consequences (i.e., costs and benefits) of performing that behavior; (b) perceived norms, which include the perception that those with whom the individual interacts most closely support the person's adoption of the behavior and that others in the community are performing the behavior; and (c) self-efficacy, which involves the person's perception that she or he can perform the behavior under a variety of challenging circumstances. These variables have recently been incorporated in an integrative model of behavioral prediction (Fishbein, 2000; Fishbein et al., 2002).

An Integrated Theoretical Model

According to the model, any given behavior is most likely to occur if one has a strong intention to perform the behavior, if a person has the necessary skills and abilities required to perform the behavior, and if there are no environmental constraints preventing behavioral performance (see Figure 1). Indeed, if a person has formed a strong intention to perform a given behavior and has the necessary skills and abilities to perform the behavior, and if there are no environmental constraints to prevent the performance of that behavior, there is a high probability that the behavior will be performed (Fishbein, 2000; Fishbein et al., 2002).

One immediate implication of this model is that very different types of interventions will be necessary for people who have formed an intention but are unable to act upon it, than for people who have little or no intention to perform the recommended behavior. In some populations

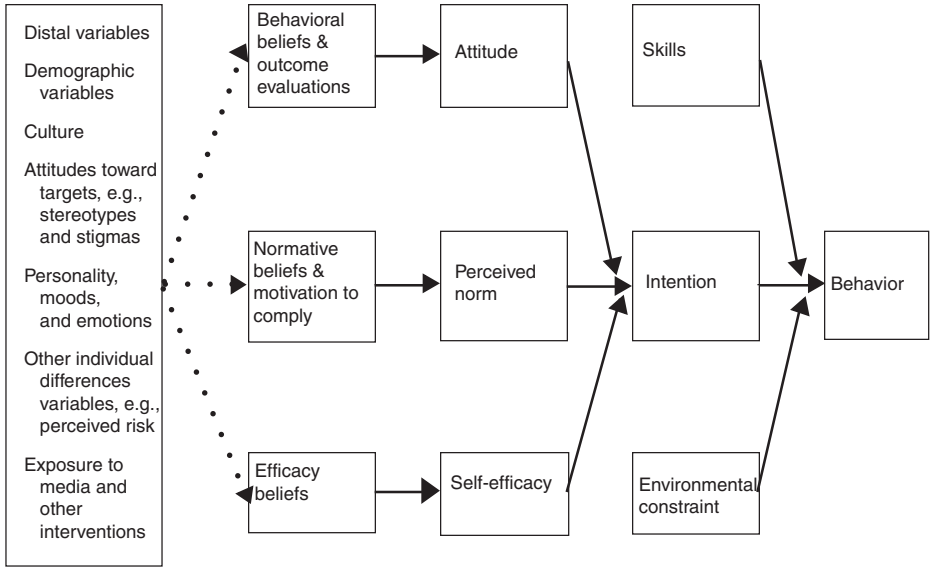

Figure 1. An Integrative Model of Behavioral Prediction

or cultures, the behavior may not be performed because people have not yet formed intentions to perform the behavior, whereas in others, the problem may be a lack of skills or the presence of environmental constraints. Clearly, if people have formed the desired intention but are not acting on it, a successful intervention will be directed either at skills building or at removing (or helping people to overcome) environmental constraints.

On the other hand, if strong intentions to perform the behavior in question have not been formed, the model suggests that there are three primary determinants of intention: the attitude toward performing the behavior, perceived norms concerning performing the behavior, and one's self-efficacy with respect to performing the behavior. It is important to recognize that the relative importance of these three psychosocial variables as determinants of intention will depend upon both the behavior and the population being considered. Thus, for example, one behavior may be primarily determined by attitudinal considerations while another may be primarily influenced by feelings of self-efficacy. Similarly, a behavior that is attitudinally driven in one population or culture may be normatively driven in another. Thus, before developing communications to change intentions, it is important to first determine the degree to which that intention is under attitudinal, normative, or self-efficacy control in the population in question.

The model in Figure 1 also recognizes that attitudes, perceived norms, and self-efficacy are all, themselves, functions of underlying beliefs about

the outcomes of performing the behavior in question, the normative proscriptions of specific referents, and specific barriers to (or facilitators of) behavioral performance. For example, the more one believes that performing the behavior in question will lead to "good" outcomes and prevent "bad" outcomes, the more favorable one's attitude should be toward performing the behavior. Similarly, the more a person believes that specific others think he or she should or should not perform the behavior in question, and the more motivated a person is to comply with those specific others, the stronger will be the subjective norm to perform or not perform the behavior. Finally, the more a person perceives that he or she can (i.e., has the necessary skills and abilities to) perform the behavior, even in the face of specific barriers or obstacles, the stronger will be the person's self-efficacy with respect to performing the behavior.

At this level the substantive uniqueness of each behavior comes into play. For example, the barriers to getting a mammogram or the outcomes (or consequences) of getting a mammogram may be very different from those associated with taking a PSA test (Protein Specific Antigen for prostate cancer) or getting genetic screening. Yet these specific beliefs must be addressed in a communication if one wishes to change intentions and behavior. Although investigators can sit in their offices and develop measures of attitudes, perceived norms, and self-efficacy, they cannot tell what a particular population (or a given person) believes about performing a given behavior. The investigator must go to members of that population to identify salient outcome, normative, and efficacy beliefs. That is, one must understand the behavior from the perspective of the population under consideration.

Finally, Figure 1 also shows the role played by more traditional demographic, personality, attitudinal, and other individual difference variables (such as perceived risk or sensation seeking). According to the model, these types of variables play primarily an indirect role in influencing behavior. These distal variables such as cultural and personality differences should be reflected in the underlying belief structure.

Applying the Model

The first implication in using the integrated model is identifying the behavior that is the target for change or reinforcement. Unfortunately, this is not nearly as simple or straightforward as is often assumed. First, it is important to distinguish between behaviors, behavioral categories, and goals. One of the lessons we have learned is that the most effective interventions will be those directed at changing specific behaviors (e.g., walk for 20 minutes three times a week) rather than behavioral categories (e.g., exercise) or goals (e.g., lose weight; see, e.g., Fishbein, 1995, 2000).

The definition of a behavior involves several elements: the action (getting/using/buying), the target (a mammogram/a condom), and the con-

text (at the women's clinic/for vaginal sex with my spouse). Clearly, a change in any one of the elements changes the behavior under consideration. Thus, for example, getting a mammogram is a different behavior than getting a PSA test (a change in target). Similarly, getting a mammogram at the woman's clinic is a different behavior than getting a mammogram at the university hospital (a change in context). Moreover, it is also important to include an additional element of time. Getting a mammogram in the next 3 months is a different behavior than getting a mammogram in the next 2 years.

Once one or more behaviors have been identified, the model can be utilized to help explain why some members of a target population are performing the behavior and others are not. That is, by obtaining measures of beliefs, attitudes, norms, self-efficacy, intention, and behavior, an investigator can determine whether people are not performing a specific behavior, such as getting a colonoscopy, because they have not formed an intention to get a colonoscopy or because they are unable to act on their intention. Similarly, an investigator can (a) determine whether intention is influenced primarily by attitudes, norms, or self-efficacy in the population under consideration, and (b) identify the specific beliefs that discriminate between those who do or do not intend to perform the behavior. It is these discriminating beliefs that need to be addressed in a theory-based communication. That is, although the ultimate goal of health communication should be to reinforce or change a given health-related behavior, it should be recognized that communication, at best, creates or changes specific beliefs. When the beliefs are appropriately selected, these changes should, in turn, influence attitudes, perceived norms, or self-efficacy—the proximal determinants of the intention to engage in the behavior.

Identifying Intervention Goals and Target Populations

The model suggests that a given behavior may not be performed either because a person has formed an intention to perform the recommended behavior but is unable to act upon it, or because the person has little or no intention to perform the recommended behavior. The importance of this classification is that very different types of interventions will be necessary if one has formed an intention and acts accordingly, if one has formed an intention but is unable to act upon it, or if one has little or no intention to perform the behavior.

Let us illustrate the point. Project RESPECT is a randomized trial designed to increase condom use with both regular and occasional partners among clients attending inner-city STD clinics (Kamb et al., 1996; Kamb et al., 1998). Table 1 shows that in the RESPECT data set, most people (72%) intended to always use condoms for vaginal sex with their

Table1. Intention–Behavior Configuration: Condom Use

		Consistent condom use		
		No	Yes	Total
Intention to always use condoms	No	383 (25%)	41 (3%)	424 (28%)
	Yes	567 (37%)	536 (35%)	1103 (72%)
	Total	950 (62%)	577 (38%)	1527 (100%)

Note. Intention measured immediately after the intervention. Condom use measured 3 months after the intervention.

main partners, but that only half of these people acted upon their intention and used condoms consistently. In contrast, of the 424 people who did not intend to always use condoms, 90% acted in keeping with their intention, that is, they did not use condoms consistently.

It should be clear that the four cells have different implications for the development of interventions. These implications can be derived directly from the integrative model. Table 2 shows that if people have not formed the desired intention, an intervention should be directed at changing attitudes, norms, or self-efficacy. On the other hand, if people have formed the desired intention but are not acting on it, the intervention should be directed either at skills building or at removing (or helping people to overcome) environmental constraints. However, if people have formed a strong intention to perform the recommended behavior and act accordingly, one may not need to intervene, or the intervention's focus should be on helping people maintain their positive intention.

Table 1 reveals that 424 people, or 28% of the total sample, had not formed intentions to use condoms, whereas 567 people, or 37% of the sample, intended to use condoms but did not end up consistently using them 3 months later. This information raises important questions for the health educator. First, should the intervention be designed to change intentions or to help people with positive intentions act on those intentions? If the latter, the health educator needs to know whether these people were unable to act upon their intentions because they lacked the skills to perform the behavior, because environmental factors hindered performing the behavior, or because they changed their intention in the 3 months between intervention and follow-up.

The health educator needs to decide how important it is to target these different groups. How many people who intend to perform a recommended behavior but do not act upon it are needed to justify focusing on this group? In the example above, it would appear that more benefit would be obtained if one focused on helping people act on their intentions (37%) rather than trying to get those who did not intend to

Table 2. Intention–Behavior Configuration: Implications for Interventions.

		Performance of the recommend behavior	
		No	Yes
Intention to perform the recommended behavior	No	Change outcome, normative, and/or self-efficacy beliefs	Change outcome, normative, and/or self-efficacy beliefs
	Yes	• Improve skills • Reduce/help overcome environmental barriers	No intervention necessary or maintain positive intention

use condoms to intend to do so (28%). However, given the large proportion of the population in each of these groups, both types of intervention may be necessary. In a similar vein, the health educator needs to have some estimate of the expected effectiveness of both strategies. For example, it may prove more difficult for a communication campaign to change skills and/or environmental constraints than to change the determinants underlying people's intentions to perform a behavior. Thus, although the RESPECT example suggests that a communication that focuses on skills and/or environmental constraints would help more people than one that tries to change intentions, the net result in terms of those who ultimately perform the recommended behavior may be highest when a communication aims at changing intentions.

In many cases, however, longitudinal data on the intention-behavior relationship are not available. For example, consider the data in Table 3, which comes from a mall-based survey of 600 adolescents (ages 11 to 19) conducted by Opinion One, a market research firm, for researchers at the University of Pennsylvania's Annenberg School for Communication. Table 3 shows the percentage of adolescents who have and have not used marijuana in the past 12 months and who do or do not intend to use marijuana in the next 12 months. It can be seen that, in this sample, about 25% have used marijuana in the past year. Among those who have never used marijuana, over 75% (338 persons, or 57% of the total sample) say they definitely will not use marijuana in the coming year. In contrast, among those who have used marijuana in the past year, only 12% (17 persons, or 3% of the total sample) say they definitely will not use marijuana in the coming year. The health educator is faced with a dilemma once again. Should the intervention try to (a) increase the number of people who say they will definitely not use marijuana in the next year (i.e., change 40% of the total sample) or (b) help those who say they definitely will not use marijuana act on those intentions (60%)? Equally important, should the intervention try to help nonusers who say they will definitely not use marijuana (57% of the total sample) act on their intentions, or should the intervention try to change

Table 3. Intention–Past Behavior Configuration: Marijuana Use

	Used marijuana in past 12 months		
Intention	No	Yes	Total
Definitely won't use	338 (57%)	17 (3%)	355 (60%)
Other than definitely won't	110 (18%)	129 (22%)	239 (40%)
Total	448 (75%)	146 (25%)	594 (100%)

the intentions of nonusers (18% of the total sample) or of current users (22% of the total sample) who may intend to use marijuana in the next 12 months? Although the first impression might be to direct an intervention at helping the never-users act on their negative intentions (57% of the total sample), it is quite likely that most of these adolescents will act in accord with their intentions whether one intervenes or not. Indeed, the greatest benefit may be obtained if one could convince nonusers who are somewhat uncertain about future use (19% of the total population) to form intentions to definitely not use marijuana in the future. Although it would also be beneficial to change the intentions of current users (22% of the total population), this would probably be much more difficult than changing the intentions of current nonusers. Moreover, because nonusers and current users represent two different populations, changing the intentions of current users may require a very different intervention than changing the intentions of current nonusers. For example, although nonusers' intentions may be largely attitudinally controlled, current users' intentions may be primarily influenced by normative considerations or feelings of self-efficacy. The above examples show that the position of the target population in the intention-behavior configuration determines the type of intervention that is needed. The examples also show that the same intervention may not be equally effective in all populations.

The Selection of Beliefs to Target in a Communication

As indicated above, proper use of theory should help the researcher identify whether, in any given population, a particular behavior is determined primarily by attitudinal, normative, or efficacy considerations, or some combination thereof. It should further lead to the identification of a number of behavioral, normative, or control beliefs that clearly discriminate between people who do or do not engage in the behavior in question, that is, beliefs that are highly correlated with the intention or behavior. The question is which of these beliefs a communication should address.

Hornik and Woolf (1999) examined the characteristics of candidate

Table 4. Behavioral Beliefs About Positive Outcomes of Condom Use

Belief	% saying extremely likely	% saying quite likely	% saying either
Makes you relaxed	27.0	20.9	47.9
Makes partner relaxed	28.4	25.1	53.5
Feels cleaner	26.1	11.8	37.9
Less messy	21.8	19.0	40.8
Responsible thing to do	51.7	27.5	79.2
Show partner you care	27.5	28.0	55.5
Prolong sex	11.4	16.6	28.0
Make insertion easier	5.2	7.6	12.8

Note. Adapted from Fishbein, von Haeften, and Appleyard (2001).

beliefs for interventions that are grounded in behavioral theory, which attempt to ultimately affect intention and behavior. According to these authors, there are three things to consider in identifying beliefs to target in an intervention. First, Hornik and Woolf suggest that, in the population under consideration, the belief should be strongly related to the intention or behavior one wishes to change. Second, there should be enough people who do not already hold the targeted belief (e.g., who do not believe that consistent condom use will lead to a positive consequence or who believe that consistent condom use will lead to a negative consequence) to warrant trying to change it. Thus one must consider whether an intervention designed to change a given belief has the potential of moving enough people to make the intervention worthwhile. Finally, one must consider whether it is in fact possible to change the belief: Can one support the belief with a plausible argument based on strong evidence?

Correlation With Intention and Behavior. Clearly, with respect to the first criterion, it is relatively easy to use theory-based survey data to identify beliefs that discriminate between intenders and nonintenders or that are highly correlated with the intention or behavior one wishes to change.

How Many People Already Hold the Targeted Belief? Even though a belief may be significantly correlated with the intention and behavior one wishes to change, little will be accomplished if most people already strongly hold the belief in question. However, this does not necessarily mean that moving people from being "somewhat positive" to "very positive" will yield negligible effects. To illustrate this point, Table 4 presents data from Project SAFER, a longitudinal study of condom use behaviors in a number of "at-risk" populations (Fishbein, von Haeften,

Table 5. Percentage of People With Strong Intentions to Always Use Condoms as a Function of the Strength of Their Behavioral Beliefs About Positive Outcomes

	% having very strong intentions among those who believe the outcome is	
Belief	Extremely likely	Quite likely
Makes you relaxed	66.7%	27.3%
Makes partner relaxed	61.7	24.2
Feels cleaner	56.4	16.0
Less messy	39.1	22.5
Responsible thing to do	45.9	8.6
Show partner you care	56.9	22.0
Prolong sex	54.2	31.4
Make insertion easier	81.8	37.5

Note. Adapted from Fishbein, von Haeften, and Appleyard (2001).

& Appleyard, 2001; Kasprzyk, Montano, & Fishbein, 2001).

Table 4 shows the percentage of people who said it was "quite likely" or "extremely likely" that consistent condom use for vaginal sex with their main partner would lead to a number of positive outcomes. It can be seen that even the belief that is held most strongly by this population (i.e., the belief that consistent condom use is the responsible thing to do) is only fully accepted (i.e., rated "extremely likely") by 51.7% of the population. Because another 28.5% say that this positive outcome is quite likely, one could argue that almost 80% strongly hold this belief. Thus, it becomes important to determine whether moving people from "quite likely" to "extremely likely" could make a difference.

For each of the behavioral beliefs in Table 4, Table 5 shows the potential impact on intention of moving people from "quite likely" to "extremely likely." More specifically, it shows the percentage of people from among those who said a given belief was either "quite likely" or "extremely likely" who also hold very strong intentions (i.e., have a score of +3 on a -3 to +3 scale) to always use condoms for vaginal sex with their regular partners. For example, of those who think it is "extremely likely" that condom use "is the responsible thing to do," 45.9% hold very strong intentions to always use condoms, but of those who think it is "quite likely" that condom use "is the responsible thing to do," only 8.6% hold equally strong intentions. Similarly, of the people who believe it is "extremely likely" that consistent condom use "would make them feel more relaxed," 66.7% hold very strong intentions to always use condoms, but of those who think it is "quite likely," only 27.3% hold such strong intentions. These data make it clear that the criterion of "enough people to move" does not simply imply that when most people already hold a

belief, this belief cannot be a candidate to target in an intervention. On the contrary, a message that moves people from believing that a given consequence of condom use is "quite likely" to believing that the consequence is "extremely likely" can have significant impacts on the formation of very strong intentions to always use condoms. Thus, when selecting a belief to change in an intervention, we should not only know how many people already hold that belief, but also examine the impact that moving people to fully accept the belief has on their intention to adopt the recommended behavior. The example presented here illustrates that very substantial effects on intended health behavior may occur when a message produces relatively little belief change.

Can the Belief Be Changed? In stark contrast to the first two criteria, which are empirically based, the third criterion suggested by Hornik and Woolf (1999) is largely a subjective judgment. Clearly, not all beliefs are equally amenable to change, and relatively little will be accomplished by attacking a belief that is very difficult, if not impossible, to change. For example, if a man has used a condom and, as a result, strongly believes that "using a condom decreases my sexual sensation," it may not be possible to change this belief with a communication. Common sense suggests that beliefs based on one's own direct experience will be more difficult to change than those based on information provided by others.

Media Priming

Corresponding to the integrated model of behavioral prediction, most research involving interventions typically starts from the premise that the interventions (should) change beliefs and related variables. Media priming theory refocuses the researchers' attention in a second direction. Whereas the integrated model of behavioral prediction postulates that an intervention can produce an effect by changing the mean value of a variable, priming theory proposes that such effects can also occur by changing the association between a predictor and its outcome, even while the means for the predictor remains the same. The process that yields this effect has come to be known as media priming (e.g., Domke, Shah, & Wackman, 1998; Iyengar & Kinder, 1987; Mendelsohn, 1996). To illustrate the process of media priming, recall that attitudes toward marijuana use are determined by beliefs about negative and positive consequences of marijuana use. Suppose that one message tells about negative outcomes of marijuana use, while a second message tells about positive outcomes of marijuana use. Media priming predicts that, in comparison to nonexposure, exposure to the first message alone strengthens the correlation between beliefs about negative outcomes and attitude

and that exposure to the second message strengthens the correlation between beliefs about positive outcomes and attitude. Such priming effects presumably occur because exposure to a message increases the accessibility of information that is presented in the message and, the more accessible the information, the more it influences attitude, norms, and self-efficacy (Iyengar & Kinder, 1987).

The integrated model of behavioral prediction and media priming theory are not mutually exclusive. That is, an intervention can simultaneously yield changes in mean values and changes in the association between a predictor variable and its outcome. At the same time, however, it is clear that priming theory offers a different account of message effects on beliefs and intentions than the integrated model of behavioral prediction. To illustrate the differences between these approaches, we present a hypothetical example. The example assumes that an intervention targets the attitude toward trying marijuana in the next 12 months. A further assumption is that two beliefs are relevant, namely that trying marijuana damages the brain (belief A) and that it leads to acceptance by your friends (belief B). Table 6 describes four hypothetical conditions: (a) baseline, preintervention, (b) an intervention primes belief A, (c) an intervention changes the mean of belief A, and (d) an intervention primes and changes belief A.

At baseline, the relative importance (or regression weight) of belief A as a predictor of attitude is –.3. The negative sign denotes that the belief that marijuana trial damages one's brains negatively affects one's attitude toward trying marijuana. The mean of belief A is 1 on a –2 (the outcome of marijuana trial is very unlikely) to +2 (the outcome of marijuana trial is very likely) scale, denoting that on average people find it somewhat likely that marijuana trial will do damage to the brain. For belief B, the weight is .5 and the mean value is –1, suggesting that on average people think that it is somewhat unlikely that friends will accept them if they try marijuana. Thus, given the regression equation of predicted attitude as attitude = [(weight of belief A) x (mean of belief A)] + [(weight of belief B) x (mean of belief B)], attitude at baseline is slightly negative (–0.8).

The assumption underlying the remaining three conditions is that an intervention focuses on belief A only. Condition 2 represents pure priming: There is no effect on the mean of belief A, but its weight, that is, the association between belief A and attitude, is stronger compared to baseline. As a result of priming the belief that marijuana trial damages your brain, the attitude toward trying marijuana now is more negative, –1.0 compared to –0.8. In Condition 3 the weight of belief A is unaffected, but its mean value has changed from 1 to 2. Correspondingly, attitude is more negative, –1.1 compared to –0.8. Finally, when belief A

Table 6. Comparison of Media Priming Theory and Theory of Behavioral Prediction: A Hypothetical Example of Effects on Attitude

Condition	Predicted attitude	Wt. of belief A	Mean of belief A	Wt. of belief B	Mean of belief B
Baseline	-0.8	-.3	1	.5	-1
Intervention primes belief A	-1.0	-.5	1	.5	-1
Intervention changes mean of belief A	-1.1	-.3	2	.5	-1
Intervention primes and changes belief A	-1.5	-.5	2	.5	-1

Note. Beliefs measured on -2 (*very unlikely*) to +2 (*very likely*) scale. Belief A: Marijuana trial damages your brains; belief B: marijuana trial yields acceptance by friends. Predicted attitude = [(regression weight of belief A) x (mean of belief A)] + [(regression weight of belief B) x (mean of belief B)]. Example adapted from Cappella et al. (2000).

is both primed and changed (Condition 4), attitude toward marijuana trial changes from slightly negative (–0.8) to negative (–1.5). Thus, the example shows that an intervention can change attitude toward a particular behavior by persuading someone to believe differently about the behavior and by augmenting the association between the belief and attitude. In addition, the example shows that belief change and priming can have complementary effects on attitude change.

Analyzing Intervention Effects

Table 6 suggests that the integrated model of behavioral prediction and priming theory point to different analytic approaches to investigating intervention effects. The integrated model can be used to examine changes in means by comparing means in an intervention condition to those in a baseline or a control condition. Priming theory will lead one to look for changes in the association between the primed variable and its outcomes. For example, change in attitude toward using marijuana, says priming theory, can be found in changes in the correlation with key beliefs that predict attitude. Because a correlation between a belief and attitude is the ratio of the covariance between the belief and attitude to the variance of the belief times the variance in attitude, differences in correlation can be traced to differences in variance, covariance, or both.[1] Yzer, Cappella, Fishbein, Hornik, and Ahern (2003) used this technique in a study on the effects of an antimarijuana intervention that targeted beliefs about negative outcomes of regular marijuana use. Unexpectedly, they found lower correlations between these beliefs and attitude in the intervention condition than in the control condition. By applying the covariance-variance technique, the authors found that the variance in attitude did not differ between the control and the intervention condition. The results also suggested that the difference in covariance between the control and intervention condition was very small. However, the variance in the beliefs was significantly lower in the control condition

than in the intervention condition. It thus appears that the attenuated correlations with attitude in the intervention condition were due to increased variability of belief scores in the intervention condition rather than to a weakened association. A further exploration of the results, using the same covariance-variance technique, showed that the attenuated correlation between beliefs and attitude was primarily the result of increasing separation between adolescents at low and at high risk in beliefs about negative outcomes of regular marijuana use. At-risk adolescents in the intervention condition moved toward disbelieving that regular marijuana use has negative outcomes. This is a subtle and important effect, given that no differences in means were found. Thus, the covariance-variance technique helps us understand priming effects by showing whether a difference in correlation is due to movements in covariance (association), variance, or both.

Media Priming as an Alternative Approach to Selecting Beliefs

Given that priming theory proposes a different route to attitude and behavior change than the integrated model of behavioral prediction, what would priming theory recommend for selecting beliefs for a communication campaign? In essence, priming theory does not require a belief to meet any one of the three considerations outlined by Hornik and Woolf (1999). Priming theory assumes only that exposure to the targeted belief activates the belief and, hence, increases its association with attitude or intention. Therefore, a strong correlation between a belief and its outcome is not required, nor is it necessary that strong arguments are used in the message. We already discussed that a belief may even be a target candidate when most members of a population already hold the belief, because minor changes in already positive beliefs can produce strong intention effects. Priming theory suggests a second reason for sometimes recommending the targeting of beliefs that are already held by the majority of the population. To illustrate this, Table 7 presents data from a research study on the effects of antimarijuana messages on adolescents (see Yzer et al., 2003). The data were taken from a sample of adolescents who are at increased risk for using marijuana and pertain to 10 beliefs about the outcomes of using marijuana regularly.

The beliefs are rank-ordered in terms of extremity, that is, the list runs from outcomes that are believed to be either *very unlikely* or *very likely* (scores near –2 or +2) to outcomes that are believed to be neither *unlikely* nor *likely* (a score near 0). The at-risk adolescents believe that outcomes 1–4 are most likely. The mean values of these beliefs are in the "right" direction, that is, they do not support marijuana use. The means of outcomes 5–10 are closer to the midpoint of the scale, that is, they are believed to be *somewhat unlikely* or *somewhat likely.* More importantly,

Table 7. Beliefs About Outcomes of Regularly Using Marijuana

	M	Correlation with Attitude	Correlation with Intention
If I used marijuana regularly, I would . . .			
Damage my lungs	1.10	-.17	-.22
Upset my parents	1.06	-.28	-.25
Be a bad role model	.97	-.31	-.27
Damage my brain	.83	-.32	-.26
Lose my friends	-.61	-.49	-.41
Lose my friends' respect	-.40	-.46	-.38
Have a good time with my friends	.37	.39	.39
Feel lonely	-.32	-.36	-.37
Be like other teens my age	.32	-.02	-.02
Not be able to get a job	-.21	-.41	-.43

Note: All beliefs measured on a -2 (*very unlikely*) to +2 (*very likely*) scale.

however, they are in the "wrong" direction, that is, they are supportive of marijuana use. For example, at-risk adolescents believe that marijuana use does not result in their losing their friends or in feeling lonely. They further believe that marijuana use will result in having a good time with their friends and being like other teens their own age. It is reasonable to assume that the mean values of these beliefs are the result of directly experiencing the consequences of marijuana use. Thus, for example, it will be very hard if not impossible to persuade at-risk adolescents that marijuana use will make them feel lonely if they know from experience that it will not.

Priming theory proposes that the best strategy here is to focus on outcomes 1–4. Note that this strategy is at odds with Hornik and Woolf's (1999) consideration that there is too little room to move these beliefs. Priming theory does not require that beliefs can be moved; its only consideration is that exposure to a message about the belief can increase the association of the belief with attitude and intention. The rationale for priming outcomes 1–4 is that activating these outcomes increases the likelihood that a person's attitude and intention toward using marijuana are based on the primed beliefs, that is, beliefs that do not support marijuana use. As a result, attitude and intention would also be unfavorable toward marijuana use. A focus on outcomes 5–10 could have adverse effects. These beliefs meet two of Hornik and Woolf's (1999) criteria: There is room to move these beliefs, and all are correlated with attitude and intention. However, it may prove to be difficult to mount strong

arguments to change these beliefs. If the intervention fails to change these beliefs, it may still have primed them, thereby increasing the importance of beliefs that support marijuana use. This would be an undesirable result.

In sum, in terms of priming theory, an effective communication campaign increases the association between beliefs that are consonant with the recommended behavior and the more proximal determinants of that behavior (i.e., attitudes, norms, self-efficacy, and intention). That is, the campaign's message strategy would be to identify and target attitudinal, normative, or self-efficacy beliefs that are consonant with the behavior. The example presented in Table 7 shows that in some situations the best target candidates are beliefs that are already held by the majority of a population.

Conclusions

In this article we have tried to show that theory is a powerful tool in helping make informed decisions when developing a communication campaign. For the purpose of illustration we focused on health communication and behavior, but most of our recommendations can also be applied to other behavioral domains, such as consumer and political behavior.

On the basis of an integrative model of behavioral prediction we presented an intention–behavior configuration that provides a useful matrix for classifying one's target population in terms of whether or not they intended to perform a behavior, and whether or not they acted upon their intention. Importantly, each of the cells in the intention–behavior configuration implies different interventions. For example, to help people who do not act upon their positive intentions overcome environmental barriers calls for a fundamentally different intervention than to induce people to form positive intentions. It is recognized that the integrative model of behavioral prediction is particularly useful for interventions that aim to develop and strengthen intentions to perform a recommended behavior. For such interventions, appropriate application of the integrative model can identify the critical determinants of a given intention (or behavior) as well as the critical beliefs underlying these determinants.

In addition to the integrative model of behavioral prediction, priming theory also provides guidance with respect to the selection of beliefs to target in an intervention. The integrative model of behavioral prediction, which focuses on changing beliefs, holds that a belief is a target candidate if it is not accepted by all, if it is associated with attitude or intention, and if credible arguments can be mounted. Priming theory, which focuses on strengthening the association between a belief and its

outcomes, holds that a belief is a target candidate if it is consonant with the recommended behavior, and—especially when dissonant beliefs are important in a population—if most people already hold the consonant belief. The two theories and their appropriate analytic strategies are complementary. A health educator can therefore design an intervention to both change beliefs and strengthen the association between the belief and attitude and/or intention.

Although theory can help select target beliefs for an intervention, it does not tell one how to best change these beliefs or whether these beliefs are amenable to change. Consistent with this, Hornik and Woolf (1999) have distinguished between message strategy and the message per se. According to these authors, message strategy refers "to the essential belief(s) that a message will be designed to impart" whereas the message per se is "the product of a creative process that will turn the strategy into a specific realization." Unfortunately, there are no general theories of message creation to guide one in turning a given strategy into a specific realization. There are, however, a number of theoretical approaches to messages and persuasion, such as exemplification theory (Zillmann, 1999), fear appeals (Witte, 1992), and the activation model of information exposure (Donohew, Lorch, & Palmgreen, 1991, 1998). These theories provide insight into possible effects of certain message characteristics, but they do not clearly define the circumstances under which they can be applied. More importantly, these theories do not consider which beliefs to target in an intervention. It is at this point where the usefulness of the integrative model of behavioral prediction and priming theory become apparent.

It is clear that theory is an important tool for the development of effective communication campaigns that aim to change people's intentions to engage in a health behavior. This article shows that in such campaigns, theory helps identify the beliefs that need to be targeted in order to change people's intention. Campaigns that target people who have formed a positive intention but do not act upon it may need to focus on other variables than beliefs. The integrative model of behavioral prediction suggests that people do not act upon their intentions because they lack the skills to perform the behavior, because there are environmental barriers that hinder performance of the behavior, or both. Therefore, an intervention should aim to improve people's skills or help people overcome barriers to performing the behavior, or both. It may be that communication campaigns are not the most effective means to bring about changes in these factors. Rather, it may prove necessary to train people to develop skills to perform the behavior and overcome barriers.

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Note

[1] Many if not most current structural equation software packages can handle such a covariance-variance technique nicely.

References

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

Bandura, A. (1977). Self-efficacy theory: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191–215.

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.

Cappella, J. N., Fishbein, M., Hornik, R., Ahern, R. K., & Sayeed, S. (2000). Using theory to select messages in antidrug media campaigns: Reasoned action and media priming. In R. Rice & C. K. Atkins (Eds.), *Public communication campaigns* (pp. 214–230). Thousand Oaks, CA: Sage.

Domke, D., Shah, D. V., & Wackman, D. B. (1998). Media priming effects: Accessibility, association, and activation. *International Journal of Public Opinion Research, 10*, 51–74.

Donohew, L., Lorch, E., & Palmgreen, P. (1991). Sensation seeking and targeting of televised antidrug PSAs. In L. Donohew, H. E. Sypher, & W. J. Bukoski (Eds.), *Persuasive communication and drug abuse prevention* (pp. 209–226). Hillsdale, NJ: Erlbaum.

Donohew, L., Lorch, E. & Palmgreen, P. (1998). Applications of a theoretic model of information exposure to health interventions. *Health Communication Research, 24*, 454–468.

Fishbein, M. (1995). Developing effective behavior change interventions: Some lessons learned from behavioral research. In T. E. Backer, S. L. David, & G. Soucy (Eds.), *Reviewing the behavioral sciences knowledge base on technology transfer* (NIDA Research Monograph No. 155, NIH Pub. No. 95–4035, pp. 246–261). Rockville, MD: National Institute on Drug Abuse.

Fishbein, M. (2000). The role of theory in HIV prevention. *AIDS Care*, *12*, 273–278.

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

Fishbein, M., Cappella, J. N., Hornik, R., Sayeed, S., Yzer, M. C., & Ahern, R. K. (2002). The role of theory in developing effective anti-drug public service announcements. In W. D. Crano & M. Burgoon (Eds.), *Mass media and drug prevention: Classic and contemporary theories and research* (pp. 89–117). Mahwah, NJ: Erlbaum.

Fishbein, M., von Haeften, I., & Appleyard, J. (2001). The role of theory in developing effective interventions: Implications from Project SAFER. *Psychology, Health & Medicine*, *6*, 223–238.

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

Gerrard, M., Gibbons, F. X., & Bushman, B. J. (1996). Relation between perceived vulnerability to HIV and precautionary sexual behavior. *Psychological Bulletin*, *119*, 390–409.

Hornik, R., & Woolf, K. D. (1999). Using cross-sectional surveys to plan message strategies. *Social Marketing Quarterly, 5*, 34–41.

Iyengar, S., & Kinder, D. (1987). *News that matters: Television and American opinion.* Chicago: University of Chicago Press.

Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly, 11*, 1–47.

Kamb, M. L., Dillon, B. A., Fishbein, M., & Willis, K. L. (1996). Quality assurance of HIV prevention counseling in a multi-center randomized controlled trial. *Public Health Reports, 111*, 99–107.

Kamb, M. L., Fishbein, M., Douglas, J., Rhodes, F., Rogers, J., Bolan, G., Zenilman, J., Hoxworth, T., Malotte, K., Iatesta, M., Kent, C., Lentz, A., Graziano, S., Byers, R., & Peterman, T. (1998). Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases. *Journal of the American Medical Association, 280*, 1161–1167.

Kasprzyk, D., Montano, D. E., & Fishbein, M. (2001). Application of an integrated behavioral model to predict condom use: A prospective study among high HIV risk groups. *Journal of Applied Social Psychology, 28*, 1557–1583.

Mendelsohn, M. (1996). The media and interpersonal communications: The priming of issues, leaders, and party identification. *Journal of Politics, 58*, 112–125.

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.

Poppen, P. J., & Reisen, C. A. (1997). Perception of risk and sexual self-protective behavior: A methodological critique. *AIDS Education and Prevention, 9*, 373–390.

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs, 2*, 1–8.

Sheeran, P., Abraham, C. S., & Orbell, S. (1999). Psychosocial correlates of heterosexual condom use: A meta-analysis. *Psychological Bulletin, 125*, 90–132.

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research*, *15*, 325–343.

Slater, M. (1999). Integrating application of media effects, persuasion and behavior change theories to communication campaigns: A stages of change framework. *Health Communication, 11*, 335–354.

Weinstein, N. D., & Nicolich, M. (1993). Correct and incorrect interpretations of correlations between risk perceptions and risk behaviors. *Health Psychology, 12,* 235–245.

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs, 59*, 329–349.

Witte, K. (1995). Fishing for success: Using the persuasive health message framework to generate effective campaign messages. In E. Maibach & R. Parrott (Eds.), *Designing health messages: Approaches from communication theory and public health practice* (pp. 145–166). Newbury Park, CA: Sage.

Yzer, M. C., Cappella, J. N., Fishbein, M., Hornik, R., & Ahern, R. K. (in press). The effectiveness of gateway communications in anti-marijuana campaigns. *Journal of Health Communication.*

Yzer, M. C., Cappella, J. N., Fishbein, M., Hornik, R., Sayeed, S., & Ahern, R. K. (2003). The role of external variables in an integrative model of behavior change: The effects of adolescents' risk for regular marijuana use on intention to use marijuana. Manuscript submitted for publication.

Zillmann, D. (1999). Exemplification theory: Judging the whole by some of its parts. *Media Psychology, 1*, 69–94.