ORIGINAL ARTICLE

The Role of Theory in Developing Effective Health Communications

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This study attempts to show the relevance of behavioral theory for developing communications designed to promote healthy and/or to prevent or alter unhealthy behaviors. After describing an integrative model of behavioral prediction, the model's implications for designing persuasive communications are considered. Using data from a study on smoker's intentions to continue smoking and to quit, it is shown how the theory helps identify the critical beliefs underlying these or other intentions. Finally, it is argued that although behavioral theory can help identify the beliefs that should be targeted in a persuasive communication, our ability to change these beliefs will ultimately rest on communication theory.

During the past decade, there has been a growing recognition of the usefulness of behavioral theory in the development of behavior-change interventions (see, e.g., National Institutes of Health, 1997). Theories of behavioral prediction and behavior change are useful because they provide a framework to help identify the determinants of any given behavior, an essential first step in the development of successful interventions to change that behavior. Clearly, the more one knows about the determinants of a given behavior, the more likely it is that one can develop an effective communication or other type of intervention to reinforce or change that behavior. The purpose of this study was to show the relevance of behavioral theory for developing communications designed to promote healthy and/or to prevent or alter unhealthy behaviors.

Although there are many theories of behavioral prediction such as the Theory of Planned Behavior (Ajzen, 1985, 1991; Ajzen & Madden, 1986), the Theory of Subjective Culture and Interpersonal Relations (Triandis, 1972, 1977), the

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Transtheoretical Model of Behavior Change (Prochaska & DiClemente, 1983, 1986, 1992; Prochaska, DiClemente, & Norcross, 1992; Prochaska, Redding, Harlow, Rossi, & Velicer, 1994), the Information/Motivation/Behavioral-skills model (Fisher & Fisher, 1992), the Health Belief Model (Becker, 1974, 1988; Rosenstock, 1974; Rosenstock, Strecher, & Becker, 1994), Social Cognitive Theory (Bandura, 1977, 1986, 1991, 1994, 1997), and the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; Fishbein, Middlestadt, & Hitchcock, 1991), a careful consideration of these theories suggests that there are only a limited number of variables that must be considered in predicting and understanding any given behavior (Fishbein, 2000; Fishbein et al., 2001; IOM Committee on Communication for Behavior Change in the 21st Century: Improving the Health of Diverse Populations, 2002; NAS Committee on the Youth Population and Military Recruitment, 2002, 2004). By focusing on these variables, Fishbein (2000) proposed an integrative model of behavior that attempts to bring together a number of theoretical perspectives. This integrative model is presented in Figure 1.

According to the model, any given behavior is most likely to occur if one has a strong intention to perform the behavior, has the necessary skills and abilities required to perform the behavior, and there are no environmental or other constraints preventing behavioral performance. Indeed, if one has made a strong commitment (or 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 very high probability that the behavior will be performed (Fishbein, 2000; Fishbein et al.,
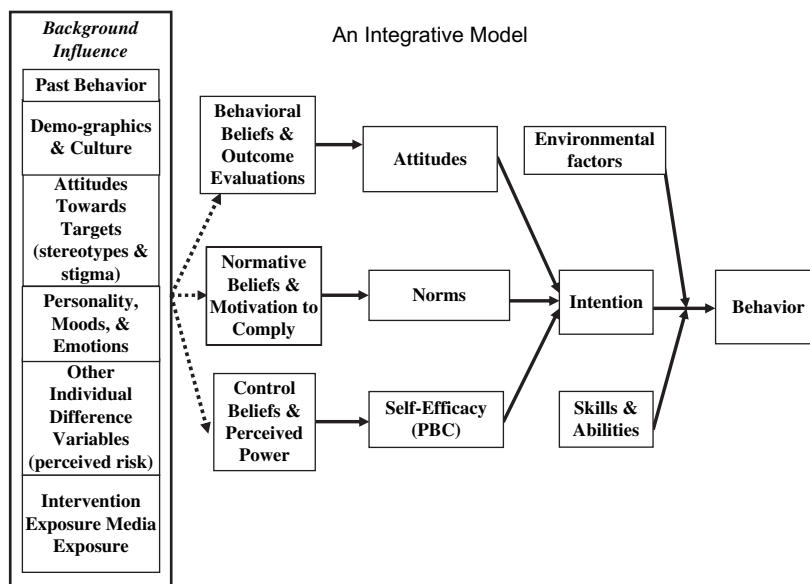

Figure 1 An integrative model.

2001). The model also suggests that there are three primary determinants of intention: attitude toward performing the behavior, perceived norms concerning performance of the behavior, and self-efficacy with respect to performing the behavior. The relative importance of these 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, whereas another may be primarily influenced by self-efficacy. Similarly, a behavior that is attitudinally driven in one population or culture may be normatively driven in another. Clearly, to understand why people do or do not hold a given intention (or perform a given behavior), it is important to first determine the degree to which that intention (or behavior) is under attitudinal, normative, or self-efficacy control in the population in question. For example, among adults older than 40 years, the factors influencing intentions to get a colonoscopy are very different from those influencing intentions to exercise regularly. More specifically, although the intention to get a colonoscopy is almost completely under normative control, the intention to exercise is influenced by both attitudes and self-efficacy (Smith-McLallen & Fishbein, 2006). Thus, very different communication strategies will be necessary to increase the number of adults older than 40 years, who engage in these two behaviors.

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 and/or behaviors of specific referents, and the specific barriers to (or facilitators of) behavioral performance. Thus, for example, the more one believes that performing the behavior in question will lead to "good" outcomes and prevent "bad" outcomes, the more favorable should be one's attitude toward performing the behavior. This would be true for such cancer-related behaviors as quitting smoking, eating five or more fruits and vegetables per day, and getting screened for cancer. Similarly, the more one believes that specific others are (or are not) themselves performing the behavior in question, or that these important others think that one should (or should not) perform the behavior in question, and the more one is motivated to be like or to comply with, those specific others, the more social pressure one will feel (or the stronger the subjective norm) with respect to performing (or not performing) the behavior. Finally, the more one perceives that one can (has the necessary skills and abilities to) perform the behavior, even in the face of specific barriers or obstacles, the stronger will be one's self-efficacy with respect to performing the behavior.

It is at this level of underlying beliefs that the substantive uniqueness of each behavior can be seen most clearly. For example, the barriers to getting a mammogram and/or the outcomes (or consequences) of getting a mammogram may be very different from those associated with taking a prostate specific antigen (PSA) test or getting genetic screening for cancer susceptibility. Yet, it is these specific beliefs that ultimately underlie and determine intentions and behavior. Although an investigator can sit in her or his office and develop measures of attitudes, perceived norms, and self-efficacy, she or he cannot tell you what a given population (or a given person) believes

about performing a given behavior. Thus, ultimately, one must go to members of that population to identify salient outcome and normative and efficacy beliefs. To put this somewhat differently, one must understand the behavior from the perspective of the population for whom interventions are being developed. Once understood in this way, these beliefs can serve as the basis for messages and other interventions that can have an impact on the target behavior through the mediating mechanisms.

Finally, the figure 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. For example, although men and women may hold different beliefs about performing some behaviors, they may hold very similar beliefs with respect to others. Similarly, rich and poor, old and young, those from developing and developed countries, those who do and do not perceive that they are at risk for a given illness, those with favorable and unfavorable attitudes toward doctors, those high and low in sensation seeking, and those who do or do not have health insurance may hold different attitudinal, normative, or control beliefs with respect to one behavior but may hold similar beliefs with respect to another. Thus, for example, Blacks and Whites may have very similar beliefs about smoking but very different beliefs about getting a colonoscopy. When such demographic, personality, or individual difference variables are systematically related to underlying beliefs, they are likely to be related to the behavior in question. However, when these "external" or "background" variables are unrelated to behavioral, normative, or control beliefs, they are unlikely to be related to the behavior in question. Thus, there is no necessary relation between these external or background variables and any given behavior. Nevertheless, external variables such as cultural and personality differences and differences in a wide range of values should be reflected in the underlying belief structure. When properly applied, the integrative model recognizes, and is sensitive to, cultural and population differences. For example, as described above, the relative importance of each of the variables in the model should vary as a function of both the behavior and the population being investigated. Moreover, application of the model requires one to identify the behavioral, normative, and control beliefs that are salient in the population being considered. Thus, the Integrative Model (IM) is both population and behavior specific.

Applying the model

The first step in using this, or any other behavioral prediction or behavioral change model, is identifying the behavior that you wish to understand, reinforce, and/or change. Unfortunately, this is neither simple nor straightforward. First, it is important to distinguish between behaviors, behavioral categories, and goals. The most effective behavior-change communications 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).

Second, it is important to recognize that the definition of a behavior involves several elements: the action (getting), the target (a mammogram), and the context (at the Women's Clinic). Clearly, a change in any one of these elements changes the behavior under consideration. Thus, for example, getting a mammogram is a different behavior than getting a genetic screening test (a change in target). Similarly, getting a mammogram at the Woman's clinic is a different behavior than getting a mammogram at University Hospital (a change in context). Moreover, it is also important to include an additional element in defining a behavior—time. For example, having had a mammogram in the past 3 months is a different behavior than having had a mammogram in the past 2 years.

To illustrate why changes in target, context, and time change the behavior under consideration, one needs to only think about the beliefs people may have about performing the different behaviors. A woman may believe that getting a mammogram at the hospital is inconvenient (e.g., difficult to get to) and expensive, and she may also believe that she will not be treated with respect. In contrast, when she considers getting a mammogram at the clinic, she may believe that it is convenient and reasonably priced and that the staff is friendly and courteous. In the same way, the beliefs one may hold about getting a mammogram in the next 3 months may be very different from those about getting a mammogram in the next 2 years. Consider, for example, women who have had a mammogram in the past 6 months. Clearly, these women will have very different beliefs about getting a mammogram in the next 3 months than about getting a mammogram in the next 2 years. If nothing else, most will believe that their doctors do not think that they should have a mammogram in the next 3 months, but that they should have a mammogram in the next 2 years. Moreover, they are likely to believe that getting a mammogram in the next 3 months would be foolish and unnecessary, whereas it is unlikely that they will hold these beliefs with respect to getting a mammogram in the next 2 years.

Once one or more behaviors have been identified, the theory can be used to understand why some members of a target population are performing the behavior and others are not. That is, by obtaining measures of each of the variables internal to the model (i.e., beliefs, attitudes, norms, self-efficacy, intentions, and behavior), one can determine whether a given behavior (e.g., getting a colonoscopy) is not being performed because people have not formed intentions to perform the behavior (e.g., to get a colonoscopy) or because they are unable to act on their intentions (e.g., they encounter unanticipated constraints such as finding out their insurance would not cover it). Similarly, one can determine, *for the population under consideration*, whether the intention to get a colonoscopy is influenced primarily by attitudes, norms, or self-efficacy. Finally, one can identify the specific beliefs (be they behavioral, normative, or control beliefs) that discriminate between those who do and those who do not (intend to) perform the behavior. As will be discussed below, it is these discriminating beliefs that need to be addressed in a theory-based communication. That is, although the ultimate goal of health-related persuasive communications should be to reinforce or to change a given behavior, communications, at best,

create, change, or reinforce specific beliefs. When the beliefs are appropriately selected, these changes should, in turn, influence attitudes, perceived norms, or self-efficacy—the proximal determinants of one's intentions to engage in (and often the actual performance of) that behavior.

The role of theory in developing communications and other interventions

Those who design interventions to improve health behaviors are faced with a number of decision points when developing interventions. These decisions include the primary goal of the intervention, its target population, and the selection of messages for the intervention. We will show that behavioral theory provides an important tool to make informed decisions when dealing with such issues. The model in Figure 1 suggests that a given behavior may not be performed because either a person has formed an intention to perform the recommended behavior but is unable (or unwilling) to act upon it or the person has little or no intention to perform the recommended behavior. As Fishbein and Yzer (2003) pointed out, a 2 × 2 intention–behavior matrix can be constructed to identify whether a person did or did not intend to perform a behavior and whether the person did or did not act upon his or her intention.

The importance of such a 2 × 2 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. Table 1 summarizes the implications of the integrative model for these four groups. If people have formed the desired intention (e.g., to quit smoking, to get a mammogram) but are not acting on it, a successful intervention will be directed at either skills building or removing (or helping people to overcome) environmental constraints—that is, at factors other than those underlying the intention to perform the behavior in question. However, if people have formed strong intentions and are, in fact, acting upon them, an intervention may not be necessary or one might wish to reinforce their current intentions or find some other way to help people maintain their health-protective behaviors.

In marked contrast, if strong intentions to engage in some health-protective behaviors have not been formed (e.g., if people do not intend to get a mammogram or to quit smoking), the intervention should focus on changing attitudes, perceived norms, and/or self-efficacy with respect to the behavior in question—that is, on the factors predicting intention. The relative importance of these three variables will depend upon both the particular behavior and the population being considered.

The intention–behavior matrix implies a series of decision points that should be addressed. Perhaps most important, one must decide which cell (or cells) in the intention–behavior matrix should be the focus of intervention. Decisions should be guided by the frequencies within each cell. For most behaviors, there is an asymmetry between intentions and behaviors, that is, only three of the four cells will be prevalent. That is, when people do not intend to perform a health-protective behavior or

Table 1 Intention–Behavior Matrix: Implications for Interventions

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

other socially desirable behavior (e.g., to quit smoking or to get a colonoscopy), it is very unlikely that they will do so. However, when people do intend to perform such a behavior, there will usually be some (between 26% and 57%; Sheeran, 2002) who do not (or cannot) act on this intention. Thus, one must decide whether it will be more effective to intervene with the nonintenders (i.e., develop communications or other interventions to change their intentions), with the intenders who are not acting on their intentions, or both.

To illustrate the intention–behavior matrix, consider the following data from a longitudinal survey of current smokers. As part of a larger study, 197 adult smokers were asked to indicate their intentions to smoke in the next month as well as their intentions to quit smoking permanently and completely in the next 3 months. Approximately 1 year later, they were asked to report their smoking behavior during the past year. Table 2 shows that, in general, intentions to smoke in the next month provide quite accurate predictions of smoking behavior. More specifically, intentions to smoke accurately predict smoking behavior in 152 of the 197 cases (77%, $p <$ .001). Consistent with expectations, however, although almost all those with intentions to smoke did so (133/164, 81%), fully 42% (14/33) of those who intended not to smoke were unable to act on their intentions. So, should the intervention be designed to decrease smokers' intentions to smoke or to help smokers who intend

Table 2 The Intention–Behavior Matrix for Smokers' Intentions to Smoke in the Next Month

| Intentions | Smoked in Past Month | | |
	Yes	No	Total, n (%)
Will smoke	133	31	164 (83.2)
Would not smoke	14	19	33 (16.8)
Total, n (%)	147 (74.6)	50 (25.4)	197

not to smoke act on their intentions? In this case, although 67.5% (133/197) of the population intended to smoke and did so, only 7.1% (14/197) intended not to smoke but were unable to act on their intentions. Thus, it would seem that, at least in this case, an intervention designed to change intentions would have a better chance of reducing the number of smokers than the one designed to help people act on their nonsmoking intentions. With other populations and other behaviors, the intention–behavior matrix might look quite different, and depending upon the frequencies in each cell, very different decisions about the aim of an intervention would be made. Moreover, it will always be important to consider whether more than a single intervention would be worthwhile. For example, how many people who do not intend to perform a recommended behavior or who do intend to perform the behavior but do not act upon it are needed to justify focusing on these groups? Another consideration might be the extent to which the performance (or nonperformance) of the behavior puts others at risk. That is, should one intervene with even small samples when the behavior in question may affect the health of others? Unfortunately, theory does not provide answers to these questions.

Once one has decided whether to intervene with nonintenders and/or with intenders who are unable to act on their intentions, another set of decisions need to be made. For example, if one decides to intervene with intenders who are not acting on their intentions, one needs to determine whether these people are unable to act upon their intention because they lacked the skills to perform the behavior, because environmental factors hindered performing the behavior, or both. Alternatively, these people could have changed their intentions in the time between assessment of intentions and assessment of behavior. Each of these reasons for not acting on intention suggests a very different intervention strategy.

Designing messages to change intentions

Similarly, if one decides to intervene with nonintenders, it will be important to determine the relative importance of attitudes, perceived norms, and self-efficacy as determinants of the intention (and behavior) in question. As indicated above, the relative importance of these determinants will vary as a function of both the behavior and the population being considered. But knowing that a given behavior is under attitudinal, normative, or self-efficacy control is only one step in the process of understanding or attempting to change a person's intention to perform that behavior. To understand or change attitudes, perceived norms, or feelings of self-efficacy, one must first identify their determinants, that is, the behavioral, normative, or control beliefs underlying these constructs. That is, knowing that attitudes and self-efficacy are important determinants of the intention to exercise regularly does not tell us how to change these variables. More specifically, we need to identify the behavioral or control beliefs that would have to be addressed in order to change attitude and self-efficacy.

Through formative elicitation research, one can identify the set of salient beliefs that members of a given population hold about the behavior in question. Once it has been demonstrated that one can predict attitudes, norms, and self-efficacy from these salient beliefs, one can search for differences in these beliefs among those who do and do not intend to perform the behavior in question. Such an analysis not only provides information concerning the factors influencing a person's decision to perform or not perform the behavior in question but also identifies those beliefs that would have to be changed to produce a change in attitudes, perceived norms, or self-efficacy.

Alternatively, there is another way to bring about change in intentions—through priming already existing beliefs, attitudes, perceived norms, or self-efficacy. Priming strategies attempt to increase the accessibility of specific beliefs in order to increase their influence on intentions. For example, focusing upon one or more behavioral beliefs in a communication may increase the salience (or accessibility) of those beliefs. Thus, even in the absence of belief change, one may influence the relative importance of behavioral, normative, and control beliefs as determinants of attitudes, perceived norms, and self-efficacy. Similarly, priming may change the importance of attitudes, norms, or self-efficacy as determinants of intention. More specifically, there is evidence that priming has occurred when there is an increase in the correlation between the primed variable and the outcome variable (e.g., the primed belief and attitude or the primed attitude and intention).

Persuasion (i.e., attempts to change underlying beliefs) and priming are not mutually exclusive and may, in fact, be synergistic. That is, a message can simultaneously produce changes in the mean values of one or more beliefs as well as changes in the strength of the association between a predictor variable and its outcome.

To illustrate how behavioral theory can be used to help develop a persuasive message, we consider the behavior of quitting smoking. As part of the study described above, current smokers were asked to indicate their intentions to "quit smoking permanently and completely" in the next 3 months. In addition, they provided information about their attitudes, perceived norms, and self-efficacy with respect to quitting smoking permanently and completely in the next 3 months. The survey also assessed their behavioral, normative, and control beliefs concerning "my quitting smoking permanently and completely in the next 3 months."

Consistent with the findings concerning intentions to smoke, intentions to quit significantly predicted quitting behavior ($r = .41$, $df = 196$, $p < .001$). A consideration of the intention–behavior matrix suggested that the intervention with the potential for decreasing the greatest number of smokers would be one directed at changing the intentions of smokers who did not intend to quit. It is therefore important to identify the critical determinants of intentions to quit.

The intention to quit was significantly predicted ($R = .48$, $df = 446$, $p < .001$) from attitude ($r = .47$, $p < .001$; $\beta = .39$, $p < .001$), perceived normative pressure ($r = .20$, $p < .01$; $\beta = .14$, $p < .01$), and self-efficacy ($r = .31$, $p < .001$; $\beta = .08$, $p < .10$). In addition, attitudes ($r = .51$, $p < .001$), perceived normative pressure ($r = .53$,

$p < .001$), and self-efficacy ($r = .66$, $p < .01$) were all highly correlated with their underlying beliefs.

One immediate implication of these findings is that, at least in this population, the most effective intervention to increase quitting would be one directed at changing attitudes toward quitting. Based on the regression weights, it would appear that there would also be some value in increasing perceived normative pressure to quit but that relatively little would be gained by directing an intervention at increasing self-efficacy to quit. However, looking at the zero-order correlations, it would appear that all three determinants are potential targets for an intervention. Although theoretically, the regression weights provide the best estimate of the independent contribution of attitudes, norms, and self-efficacy to intention, it is important to recognize that low regression weights may be due to the intercorrelations among the predictor variables. Thus, one should also consider the zero-order correlations in deciding whether to target a given variable. In general, however, the best strategy is to target the variable with the highest regression weight; in this case, attitude. Given that the attitude toward quitting is strongly and significantly related to the underlying behavioral beliefs previously identified by formative research (i.e., $r = .51$), we can now identify those beliefs that discriminate between those who do and those who do not intend to perform the behavior in question.

Table 3 presents the mean behavioral beliefs of those who do and those who do not intend to quit. It can be seen that 12 of the 13 beliefs significantly discriminate between intenders and nonintenders. But which of these beliefs should one attempt to change? Hornik and Woolf (1999) have suggested three criteria for identifying the beliefs to be targeted in a communication or other type of intervention: (a) the belief should be significantly related to the intention, (b) there should be enough people who do not already hold the belief to make the intervention worthwhile, and (c) it should be possible to change the belief, that is, it should be possible to develop a strong (and preferably an empirically supported) argument.

Table 3 also includes the correlation between each of the behavioral beliefs and the intention to quit, as well as the percentage of intenders and nonintenders who strongly hold the belief. Note first that 10 of the 13 beliefs are significantly correlated with the intention to quit. Note too, however, that with only one exception, the differences between intenders and nonintenders are primarily a matter of degree rather than of kind. For example, although both intenders and nonintenders believe that quitting would reduce their chances of heart disease, those intending to quit are significantly more certain of this ($M = 1.47$) than those not intending to quit ($M = 1.25$; pdiff $< .05$). Indeed, even among nonintenders, the majority strongly believe that quitting will improve their health and reduce their chances of getting heart disease and cancer. This is not the case, however, when one considers the five most highly correlated beliefs (all of which discriminate between intenders and nonintenders at a significance level of less than .001). That is, only a minority of nonintenders strongly believe that if they quit, they would respect themselves more (26%, $r = .35$), be showing their independence (22%, $r = .34$), be showing that they could not be manipulated by the tobacco

Table 3 Mean Behavioral Beliefs of Intenders (to quit, Iq) and Nonintenders (Inq); the Correlation Between Belief Strength and the Intention to Quit, and the Percentage of Intenders and Nonintenders who Strongly Hold Each Belief

Beliefs	Mean Belief Strength			Percent Saying Very Likely	
	Inq	Iq	r	Inq	Iq
Good time with nonsmoking friends	0.92	1.32***	.18***	41	80
Good time with smoking friends	0.60	0.80 ns	.05	27	72
Less harm to others	0.38	0.97***	.26***	30	60
Weight problems	0.55	0.74***	.06	38	64
More tense	−0.35	0.29***	.21***	16	36
Easier to play sports	0.81	1.30***	.25***	40	73
Better health	1.39	1.63**	.19***	61	90
Decrease heart disease	1.25	1.47*	.16***	56	87
Decrease cancer	1.34	1.58*	.15**	62	88
Show my independence	0.28	1.07***	.34***	22	59
Show no manipulation by tobacco	0.33	1.00***	.26***	31	60
Nothing to do, bored	0.39	0.70*	.07	33	60
Respect myself more	0.48	1.20***	.35***	26	66

Note: Scales range from −2 (*very unlikely*) to +2 (*very likely*).
*$p < .001$. **$p < .01$. ***$p < .05$.

industry (31%, $r = .26$), be doing less harm to others (30%, $r = .26$), and be better able to exercise and participate in sports (40%, $r = .25$).

Given that these five beliefs meet Hornik and Woolf's (1999) first two criteria, we must next ask whether one can support the belief with a plausible argument based on strong evidence. Unfortunately, deciding whether a particular belief can or cannot be changed is largely a subjective judgment. Nevertheless, it is reasonable to assume that beliefs based on direct experience will be more difficult to change than those based on inference or on information provided by some outside source (see Fishbein, von Haeften, & Appleyard, 2001). This suggests that it probably will be more difficult to convince smokers that by quitting they would "respect themselves more" or "be better able to exercise and participate in sports" than to convince them that by quitting, they would be doing less harm to others and that quitting would show their independence and, in particular, would show that they were not being manipulated by tobacco companies. It is interesting to note that these latter two beliefs have been at the heart of the American Legacy Foundation's "Truth" campaign (Farrelly, Davis, Haviland, Messeri, & Healton, 2005; Farrelly et al., 2002).

In addition to changing attitudes by changing beliefs, attitudes can also be changed by strengthening the association (i.e., the correlation) between the already

existing beliefs and the attitude, that is, by priming existing beliefs. Thus, for example, although the criteria of Hornik and Woolf (1999) suggest that one should not focus on health-related beliefs (Table 3; primarily because a majority of those who do not intend to quit already hold these beliefs quite strongly), it could be argued that making these "proquitting" beliefs more salient would increase the likelihood they would be taken into account when one was deciding whether or not to quit.

To summarize briefly then, at least for this population of smokers, a theoretically based message directed at those who do not intend to quit would attempt to persuade people that (a) their smoking has harmful effects on others, (b) their quitting would show their independence, and (c) their quitting would show that they are not being manipulated by tobacco companies. In addition, the message would try to prime beliefs about the negative health consequences of smoking.

Just as one can analyze the behavioral beliefs underlying attitude, so too can one consider normative and control beliefs. When properly implemented, behavioral theory can help one identify the critical beliefs underlying the performance (or nonperformance) of any given behavior. These beliefs can then serve as the targets of a persuasive communication or other type of intervention. But knowing which beliefs are the most critical determinants of a behavior does not tell us how to best address these beliefs in a persuasive communication. Although theories of behavioral prediction and change can identify the critical beliefs underlying any given behavior, we must turn to theories of communication to help us craft messages that will increase the likelihood of belief change.

The role of communication theory

Unfortunately, at this point in time, theories of communication are not as advanced as theories of behavioral prediction and change. Indeed, although it seems quite clear that to be effective (i.e., to produce change in a given dependent variable), a message must be attended to, comprehended, accepted, and yielded to (see Hovland, Janis, & Kelley, 1953; McGuire, 1985), the distinction between acceptance and yielding is often overlooked. Clearly, if a receiver already holds the beliefs advocated in a message, she may accept the message, but such acceptance will not lead to belief change. In addition, messages often have unintended effects. For example, the message may change beliefs that were not directly addressed in the communication but that may be important determinants of the behavior in question. That is, the message may have impact effects (Fishbein & Ajzen, 1981). For example, a message that points out the health advantages of quitting smoking may actually strengthen receiver's beliefs that quitting smoking will lead to weight gain and a decrease in one's ability to concentrate. Although theories of communication have advanced our understanding of the types of message factors that might increase or decrease the probability that one will attend to a given message (see, e.g., Donohew, Palmgreen, Lorch, Zimmerman, & Harrington, 2002; Petty & Cacioppo, 1979, 1986), as well as our understanding of the conditions under which a receiver may centrally or peripherally process a given message

(see, e.g., Petty & Cacioppo, 1979, 1986), theorists and researchers have been less successful in identifying factors that influence acceptance, yielding, or impact. We do know, however, that a message is more likely to be accepted (and possibly yielded to) if it produces more positive than negative thoughts or if it leads to relatively little counterarguing. Unfortunately, we know relatively little about the factors that reduce counterarguing or increase positive thoughts. It seems fairly obvious that people will be less likely to counterargue messages that are consistent with their own positions, but will these types of messages produce yielding as well as acceptance? Almost by definition, messages designed to change beliefs, attitudes, intentions, or behaviors will advocate a position that is discrepant from the position of the receiver. How does one design such a belief-discrepant or counterattitudinal message to reduce the likelihood that counterarguing will occur? Some of the articles in this special issue directly address this question (see Green, 2006; Rimer & Kreuter, 2006).

We are told that a "strong" message produces less counterarguing than a "weak" one (see, e.g., Greenwald, 1968; Petty & Cacioppo, 1986), but we know relatively little about what makes for strong and weak messages. Indeed, the definition of a message as strong or weak is typically done post hoc, based on either its ability to bring about change in some dependent variable or the ratio of positive to negative thought it generates. One possible approach to identifying strong and weak messages has been to assess perceived message effectiveness (see, e.g., Fishbein, Hall-Jamieson, Zimmer, von Haeften, & Nabi, 2002; Grillova & Dillard, 2003). Although there is some evidence that messages are more likely to be perceived as "effective" the more they are judged as realistic, and the more receivers feel that they have learned something new from the message (see, e.g., Fishbein et al., 2002), there is, at best, limited evidence that messages perceived as effective do, in fact, produce greater changes in beliefs, attitudes, intentions, and behavior than messages perceived as weak or less effective (Barrett, Ahern, Cappella, Fishbein, & Yzer, 2006).

Another approach to understanding factors that enhance message effectiveness has focused on the way in which a message is framed (see, e.g., Rothman, Bartels, Wlaschin, & Salovey, 2006; Rothman, Martino, Bedell, Detweiler, & Salovey, 2003; Salovey, 2005; Schneider et al., 2001). For example, Salovey proposed that the relative influence of gain- and loss-framed messages is contingent on people's perception of the risk or uncertainty associated with adopting the recommended behavior. Specifically, loss-framed messages are expected to be more effective when promoting illness-detecting (screening/high risk) behaviors, but gain-framed messages are expected to be more effective when promoting health-affirming (prevention/low risk) behaviors. Although there is growing evidence to support this hypothesis (see, e.g., Rothman et al., 2003; Salovey, 2005; Schneider et al., 2001), the data are still quite limited.

Although research on perceived effectiveness and framing is clearly the steps in the right direction, we still have a long way to go to develop valid, comprehensive theories of message effectiveness. This is both a challenge and an opportunity for those interested in designing effective communications to reduce risky or to promote healthy behaviors.

Summary and conclusions

To summarize briefly then, when properly applied, theories of behavioral prediction and behavioral change allow us to identify critical beliefs underlying a person's intention to perform (or not perform) any given behavior. These beliefs can serve as the targets for persuasive communications. We have tried to show that such communications can attempt to increase the strength of beliefs that will promote healthy behaviors, reduce the strength of beliefs that promote risky behaviors, or prime existent beliefs that support healthy behaviors (i.e., increase their accessibility) so that these beliefs will carry more weight as determinants of attitudes, norms, self-efficacy, and intentions. Behavioral theories do not tell us how best to design messages so that they will be attended to, accepted, and yielded to. We would argue that this is the role of theories of communication. Although communication theory and research have advanced our understanding of factors influencing attention, it is just beginning to advance our understanding of what makes a message effective, that is, of the factors that influence acceptance and yielding. We hope that today's communication scholars, and particularly those interested in developing communications to protect the public's health, will join in accepting this challenge and will begin to focus their efforts on developing comprehensive theories of message effectiveness.

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