

Tailored health education messages : conceptual and methodological issues

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TAILORED HEALTH EDUCATION MESSAGES: CONCEPTUAL AND METHODOLOGICAL ISSUES

Social marketers and other health professionals have typically applied the Theory of Reasoned Action, the Health Belief Model, or the Stages of Change model to specify the content of a health education message. One significant limitation when using these theories is that they do not examine the decision process at the individual level. We discuss an alternative approach that integrates the main components of these prominent theories, and use this approach to identify the content for a tailored message. We conclude with some suggestions for future research on tailored messages.

Keywords: Decision making, attitudes, affect, idiographic.

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Creating Tailored Health Education Messages

Social marketing efforts to modify health-related behaviors have included educational campaigns, such as Buckle Up America, Five A Day, and AIDS Action. One common feature of these campaigns is the use of multiple media to communicate the health message. For example, the Buckle Up America Campaign (<http://www.nhtsa.dot.gov/people/injury/airbags/buckleplan/buckleup/contents.html>) has developed an action kit that describes the use of press releases, PSAs, internet outreach and community involvement to convey the message that drivers should wear their seatbelt when driving. Overall seatbelt use has reached 70%, but has not changed in five years.

A limitation in the implementation of these social marketing campaigns is the use of a general message to communicate the risks associated with certain behaviors (e.g., no use of seat belts). These general messages are unlikely to address the key determinants and solutions for any specific population segment. For instance, a message to reduce the spread of HIV might focus on different behaviors (e.g., abstinence, condom use), but if this message is not directed to the relevant behavior for the given individual, it is unlikely to be effective in changing behavior.

Brinberg and Axelson (in press) present empirical evidence to support the greater effectiveness of a tailored messages on increasing the consumption of a target nutrient in low-income pregnant women than a general message.

Our focus in this paper is to present the conceptual and methodological practices used to develop these tailored messages, to discuss some limitations in these current approaches, and to propose future research in these domains for improved development of tailored messages. The paper is not intended as a comprehensive analysis of these models or methods. Rather, we hope to entice the reader to explore these approaches in more depth.

Tailored Messages – Conceptual Models

Intuitively, messages tailored to an individual's practices and preferences are expected to be more effective in modifying their health practices than a single message designed for the general population. Somewhat surprisingly, the current literature on tailored messages shows mixed results concerning their effectiveness in changing behavior. What is causing this inconsistency?

Three issues arise when attempting to develop tailored messages. First, has the researcher identified the determinants of a person's behavior? That is, does the model used to specify the content of the message accurately represent the underlying decision process? Second, has the researcher used a methodology (i.e., a set of measures and research design) that identifies the information needed to develop the message? Third, has the message been delivered so the recipient attends to and comprehends the content of the message?

Three theories dominate the research on health-related behaviors: the Theory of Reasoned Action, the Health Belief Model, and the Stages of Change Model. No studies have formally contrasted the relative effectiveness of these theories in specifying the content of a tailored message, although numerous studies provide empirical support for the use of each theory. The empirical evidence to support each model is substantial, and we will direct the reader to a review article that summarizes the empirical support for each model. Our focus will be on a presentation and subsequent critique of the dominant models. We will then describe a model that combines the main features of each theory.

Theory of Reasoned Action

Figure 1 contains a summary of the Theory of Reasoned Action developed by Fishbein and Ajzen (1975). The proximate determinant of a person's behavior is the intention to perform that behavior. Intention, in turn, is determined by the person's attitude toward performing that behavior and perceived social pressure (i.e., what most people who are important to me think I should do). Attitude is determined by the sum of the salient beliefs associated with the behavior multiplied by the evaluation of those beliefs. Social pressure is determined by the sum of the

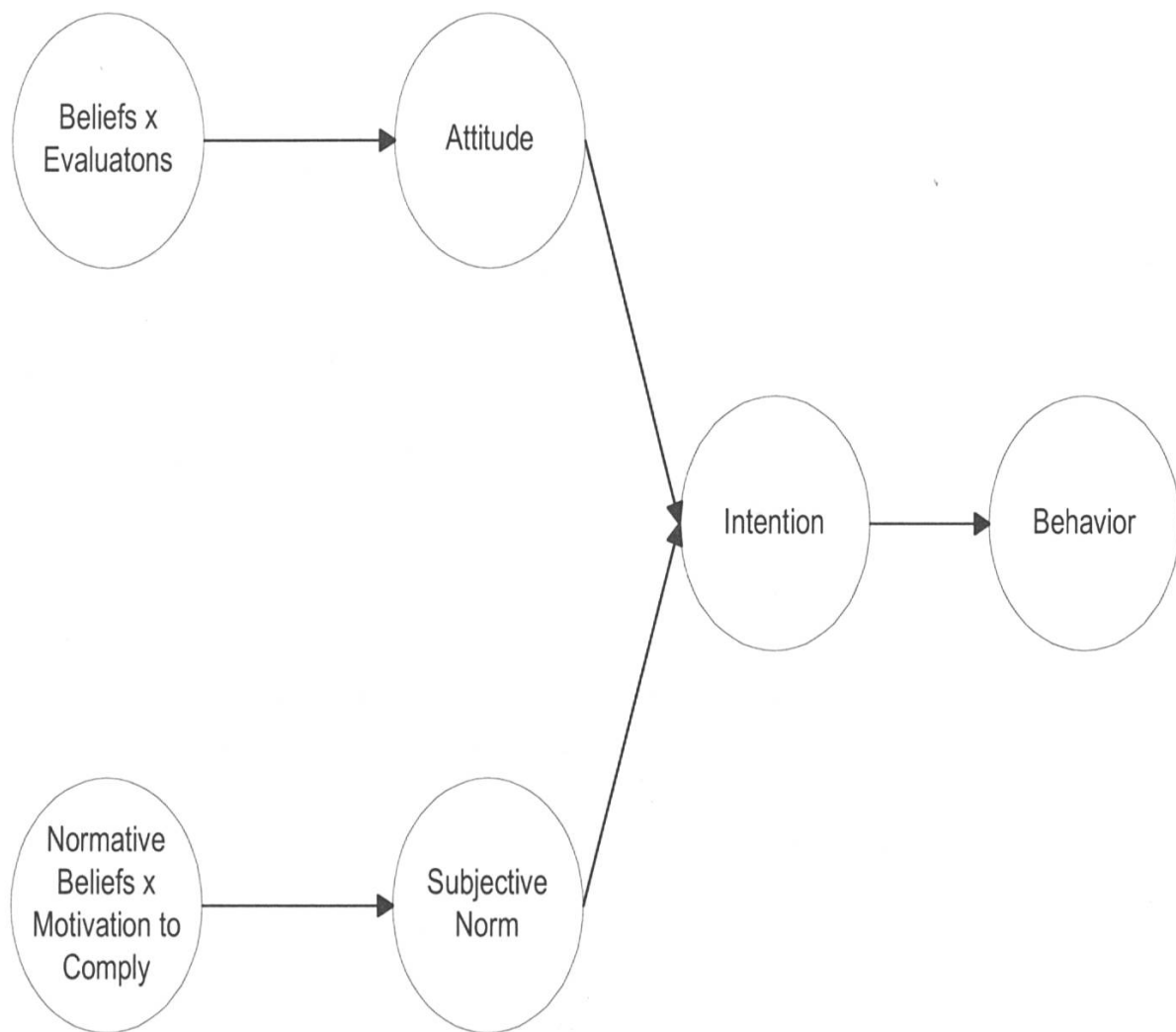


Figure 1: Fishbein and Ajzen Theory of Reasoned Action

beliefs that “important others” think you should perform the behavior multiplied by the motivation to comply with those beliefs.

One important aspect when applying this model to predict behavior is that the measurement of behavior, intention, attitude, and subjective norm should correspond with respect to four components: time, target, action, and context. For example, purchasing (action) a condom (target) in a store (context) within the next month (time) represent the four components of the behavior. Fishbein and Ajzen note that lack of correspondence among these components may reduce the effectiveness of the model in predicting intention and behavior.

The model contains two distinct relations: The determinants of behavior, and the determinants of intention. Although Fishbein and Ajzen acknowledge that factors other than intention may influence behavior

(2001), their position is that the effect of these factors on behavior is mediated by the person's intention, and will not have a direct effect on behavior. Other researchers (e.g., Triandis 1977; Brinberg 1979), however, propose constructs such as self-efficacy, past behavior, environmental forces will have a direct effect on behavior and might also moderate the relationship between intention and behavior.

Intention is determined by attitude and social pressure. The effect of all other factors (such as personality, emotion, self-efficacy) are hypothesized to be mediated by these two constructs. The evidence to support this mediational position is mixed. Ajzen (1991), for example, proposes and presents empirical support for the notion that self-efficacy has a direct influence on intention. Bodur, Brinberg, and Coupey (2000) provide evidence that emotion has a direct effect on intention. Fishbein and colleagues (1995, 1997) argue, however, that these direct effects are caused by inadequate measurement of attitude, and do not represent a "true" direct effect.

There is substantial support for the application of the Theory of Reasoned Action (TRA) to health-related behaviors. Sheppard *et. al.* (1987) conducted a meta-analysis of the TRA and found it to be a successful predictor of intention and behavior, with a mean correlation of .50 between intention and behavior, and a mean correlation of .69 between attitude and subjective norm with intention.

The Theory of Reasoned Action (TRA) has several significant limitations, however, that constrain its usefulness as a model of the decision to engage in a health-related behaviors. First, several researchers (e.g., Bodur, Brinberg and Coupey, 2000; Jaccard and Wood, 1986) have expressed concern that the TRA is incomplete in its identification of the determinants of attitude and intention. Substantial evidence exists (see Bodur, Brinberg, and Coupey 2000 for a review) that affect determines attitude independent of cognitive structure. A second concern with the TRA is that an independent measure of social influence is unnecessary because normative beliefs and are incorporated into the cognitive determinants of attitude.

The TRA is not designed to look at behavioral alternatives and only focuses on the intention to perform or not perform a specific behavior (i.e., to use or not use a condom). For the prediction and modification of health-related behaviors (e.g., food choice), this limitation is important because the TRA does not provide the health professional with information concerning the specific food(s) an individual would find acceptable.

From a methodological perspective, Jaccard and Dittus (1990) note that the TRA can create inaccurate predictions because behavioral alternatives are not examined and the analysis compares each individual's attitude score across individuals (i.e., individuals with higher attitude scores are more likely to perform the behavior) rather than compare an individual's attitude across each behavioral alternative. As we will discuss, all the dominant models use an aggregate (nomothetic) approach to predict the individual's decision.

Health Belief Model

Rosenstock (1990) provides a summary of the history, components, and applications of the Health Belief Model (HBM). This model was developed initially to explain why people did not participate in health-related programs (e.g., smoking cessation, vaccinations). Figure 2 contains a summary of this model. The HBM has two basic components. One construct addresses the perceived *threat* of the disease, which is determined by the perceived *susceptibility* to the disease (i.e., the person's perception of their risk of contracting the disease) weighted by the perceived *severity* of the disease (i.e., the person's perception that the disease, if left untreated, would result in serious health consequences such as death, disability, or pain). These two constructs (i.e., susceptibility and severity) may be viewed as analogous to the belief and the evaluation of the belief in the TRA. The second construct represents a mental accounting of the benefits and costs of performing the behavior; that is, the perceived *benefits* that would be gained from changing the at-risk behavior minus the perceived *barriers* that would make it difficult to perform the behavior. Janz and Becker (1984) and Becker (1990) present a detailed summary of studies that provide empirical support for the health belief model.

A recent modification of the Health Belief Model (as well as the Theory of Reasoned Action) is the inclusion of efficacy expectations; that is, the person's perceived ability to perform the behavior. This construct was proposed by Bandura [1986] as an essential factor in behavior change, and that the individual must feel there is an incentive (internal or external) to perform the behavior. Incentive to change comes from the belief that expected positive outcomes (increased self-esteem, acceptance from others) of performing the behavior outweigh expected negative outcomes (incongruence between actions and beliefs).

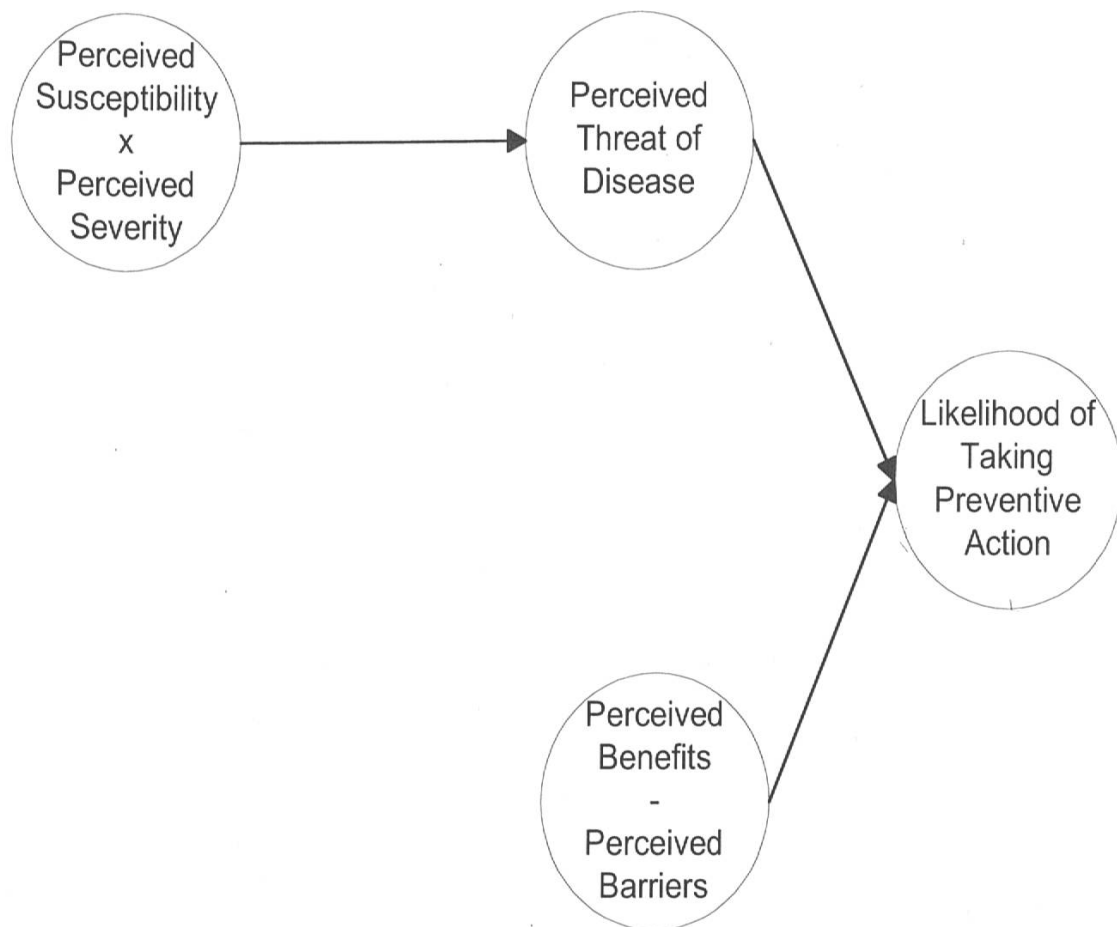


Figure 2: Health Belief Model

Skinner et. al. (1994) used components from the Health Belief Model to develop a tailored message to increase the frequency of a mammogram. A representative sample from an at-risk population was asked questions concerning the perceived *benefits* associated with a mammogram (e.g., the ability of mammograms to detect early breast cancer), and the perceived *barriers* to obtain a mammogram (i.e., "What would keep you from having a mammogram in the next 6 months?"). The women were also asked whether costs, discomfort, fear of finding cancer, and concern about radiation were seen as barriers. Tailored messages, in the form of mammography letters, were then sent to the individual. When compared with a control group that received a "standard" message, the group that received the tailored message was more likely to schedule a mammography.

There are several limitations in the application of the HBM. First, the constructs of the model are cognitive and do not reflect the emotional (affective), and behavioral components (past behavior) that are likely to influence a health-related behavior. Second, the model was designed to predict preventive behaviors, and not the modification of on-going behaviors that place an individual at-risk (e.g., unprotected sex, over-consumption of high fat foods). Third, as with the TRA, the analysis of the model focuses on a comparison across individuals (i.e., a standard regression analysis) and does not allow for the development of a message designed for the individual's needs

Stages of Change Model

Prochaska and DiClemente (1984) developed an overall framework to assess an individual's readiness for change. The framework serves as the central construct for the Transtheoretic Model, which is a model of behavior change. These authors propose that individuals are not all at the same readiness for change when adopting health preventative behaviors. Five specific stages are proposed: *precontemplative* (no intention to change/adopt behavior), *contemplative* (considering change in future), *preparation* (intention to adopt behavior in foreseeable future/attempts to adopt behavior), *action* (adoption of behavior), and *maintenance* (routine part of life). When attempting to change a person's behavior, their current stage of change should first be identified to determine the content of the message. This process is long-term, and change should be noted not only when behaviors have been adopted, but also with each progressive change in stage.

One important feature of the model is the importance it places on all stages of change, not just movement into behavior change. Another distinctive quality lies in its emphasis on the application of different behavioral theories in each stage of change. For instance, the Health Belief Model (HBM) would be more appropriate for examining the transition from precontemplative to contemplative (Rossi et al. 1986) because one key determinant in this model is the need to motivate change by increasing the likelihood that an individual perceives him/herself as susceptible to the disease (or negative outcome). Precontemplators, those people who are not considering a change in their behavior, may simply not see themselves as susceptible to any disease or aversive consequences of their current behavior. The Stages of Change Model and Health

Belief Model both indicate that consciousness-raising in some form is necessary to move individuals to a point where they will simply consider behavior change.

The stages of change has been applied to many areas where modifying at-risk behaviors is beneficial: smoking cessation, exercise, low fat diet, alcohol abuse, condom use, diabetes testing and compliance, seat belt use, stress management, and mammography screening (Velicer et al. 2000). Prochaska et al. (1993) looked at the effectiveness of several forms of messages toward smoking cessation: a standardized message, individualized messages tailored to stages of change, and an interactive message (using an expert system model) tailored to the stage of change and the individual's decision process. The standard message was contained in three separate manuals that allowed the individuals to choose those manuals they believed best matched their needs. Individualized manuals were developed based on the stage of change, and participants were sent the appropriate manual based on their stage of change. Participants who received interactive computer reports were sent information that described their stage of change, feedback, when necessary, about their underevaluating the pros of quitting and overevaluating the cons; how they compared with others who were more successful in progressing to the next stage, and a description of situations, with feedback on how to enhance their self-efficacy to navigate these situations successfully.

The stage of change was defined in the following manner: precontemplative is when smokers are not thinking of quitting smoking, contemplation is when they are thinking of quitting in the next six months, preparation occurs when they have tried to quit in the past year and are seriously planning to quit in the next month, action is when a smoker has made a concerted effort to stop smoking up to six months, maintenance is the period six months after action has begun, but the smoking is still not terminated as a problem (i.e., the desire to smoke still exists). The authors found the interactive message based on the stages of change model to be twice as effective in creating smoking cessation than the other two approaches.

The Stages of Change model is designed to describe the *process* of behavior change, but does not address the issue of the determinants of the behavior. Thus, even if the researcher is able to categorize the individual in the appropriate stage of change, the model does not articulate, although it does speculate about, the determinants of behavior within each stage. A second significant limitation of the model is the assump-

tion that the determinants of behavior within each stage are similar across health problems. In a recent article, Rosen (2000) provides evidence the processes within each stage vary across health problems. A third difficulty in the application of the model is a standard assessment of stage of change. Fourth, as with the TRA and the HBM, the stage of change has been applied primarily at the aggregate level, although recent research is beginning to use the SCM to develop tailored messages.

Conceptual Issues

In a recent chapter (Fishbein et al., 2001), the prominent scholars associated with these behavioral theories attempted to integrate the main constructs that determine behavior and behavior change. Figure 3 contains a summary of the integrated model. When predicting behavior, these theorists proposed the following constructs: intention, environmental constraints, knowledge/skills to perform the behavior, attitude (i.e., an expectancy-value model), social pressure, self-image or self-concept, affect, and self-efficacy. The authors do present explicit examples of measures of each construct.

A significant limitation in the creation of this "integrative" model is the lack of information regarding the hypothesized relationships among the constructs. The model presented in Figure 3 is a simple direct effects model, but the actual relations for a wide range of health-related behaviors is an avenue for future research. Without a structural model to organize the relations among the constructs, the value of this model as a determinant of health-related behaviors is problematic.

Even with the creation of a more "inclusive" set of constructs, several conceptual and methodological problems still exist in the use of these models to create tailored messages. The models from which these constructs originate were developed to predict a person's choice between two alternatives: Whether to perform the behavior or not to perform the behavior. These models were not designed to allow the researcher to assess the individual's choice from among a range of alternatives (such as various methods of birth control). For many health-related behaviors, such as dietary change, an individual often selects a behavior from among a wide range of alternatives.

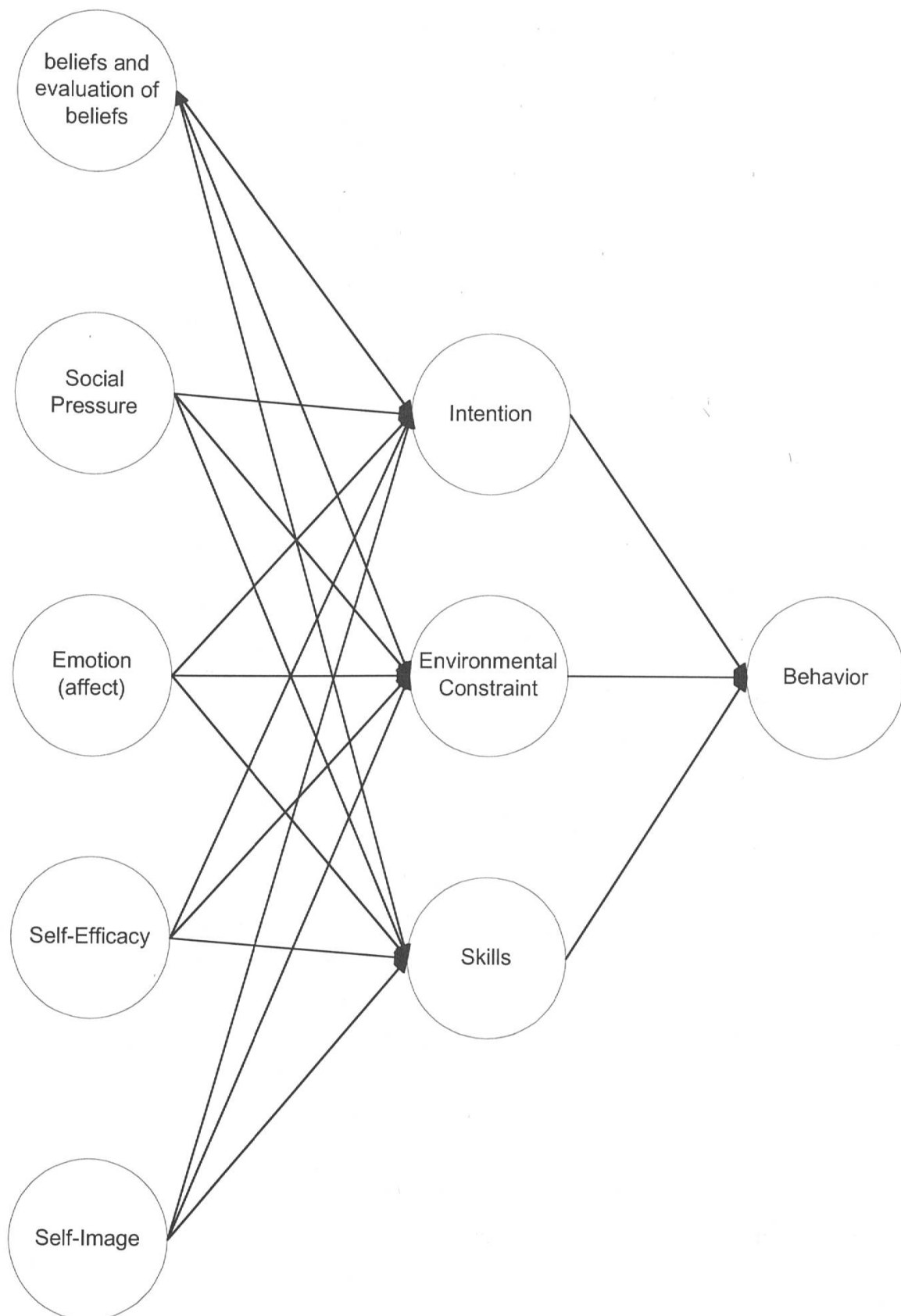


Figure 3: Integrative Model

As we have discussed previously, a limitation in research that has applied the Theory of Reasoned Action, the Health Belief Model, and the Stages of Change Model is the use of an aggregate (nomothetic) approach to data collection and data analysis. Jaccard and Dittus (1990) note that the aggregate analysis compares each individual's score across individuals (i.e., individuals with higher attitude scores are more likely to perform the behavior) rather than an analysis at the individual level.

Suppose we are interested in increasing the consumption of fiber-rich foods. Let's assume that broccoli (which is a good source of fiber) is evaluated negatively by an individual (remember the first George W. Bush comment?), but is viewed positively by the population. If a tailored message is developed based on the aggregate evaluation of broccoli, the message directed toward the individual who evaluated this alternative negatively would not be effective. More generally, if the population is heterogeneous with respect to the target behaviors (e.g., eat a wide variety of foods), an intervention developed using an aggregate rather than an individual model is unlikely to specify the target behaviors most relevant to an individual.

Tailored Messages – Integrating the Dominant Theories at the Individual Level

Jaccard (1981) has developed a theory of decision making, described as a behavioral alternatives model, which addresses the limitations associated with the prediction of a single behavioral alternative; such as choosing or not choosing a specific method of birth control. According to this theory, an individual is said to possess an attitude toward selecting a number of different alternatives (e.g., methods of birth control), where an attitude is the evaluation of the alternative (birth control method) on a bipolar scale (e.g., good-bad). For a selection among a set of n birth control method, there are n attitudes, one toward each method. The set of attitudes is called a preference structure. Each behavioral alternative (i.e., method) is evaluated on a set of attributes and the resulting matrix is described as a perceptual structure.

The analysis of both the preference and perceptual structure is different than traditional decision models because the focus is on the individual rather than a between-individual approach (which is reflected in the standard use regression-based analyses to examine the decision

process). Table 1 (adopted from Jaccard and Wood 1986) illustrates these differences.

Individual	Brand A	Brand B
1	4	9
2	2	8
3	0	-5

Table 1: Preference Structure

In standard regression, the individual is the unit of analysis and the interpretation of the coefficients reflects the judgment of one respondent relative to the other respondents in the analysis. For the data presented in Table 1, the interpretation from a regression analysis would predict that individual 1 would prefer alternative A. The behavioral alternatives model, however, would predict that the individual would prefer alternative B because that alternative is the one toward which the individual has the more positive attitude. Empirical studies (e.g., Jaccard, 1981; Jaccard and Wood, 1986) provide evidence that behavioral alternatives model is a more accurate predictor of consumer choice than traditional regression-based models.

The idiographic perspective underlying the behavioral alternatives model can also be applied to constructs other than attitude. Suppose we were to examine the notion of environmental barriers using a behavioral alternatives perspective. One would ask the respondent to evaluate the environmental barriers (or their skills) toward each behavioral alternative rather than rate environmental barriers in general. The researcher would then be able to determine the alternative toward which the respondent perceives the highest environmental barrier. A subsequent intervention might then focus on reducing the perceived barrier for this alternative (assuming, of course, the alternative was also evaluated positively).

One important consequence of this approach is that the researcher is able to determine the perceived difficulty (or attitude, self-image, affect)

of each alternative for that individual and make a tailored recommendation based on the relative ratings of each alternative. For example, suppose our health goal is to have an individual increase his consumption of dietary fiber. If we find, for that individual, the barriers to preparing fiber-rich foods are high, we would recommend that the person consume foods that are fiber-rich, but which involve little preparation (e.g., apples, oranges). An analysis across individuals, rather than across alternatives within an individual, may mask the importance of barriers associated with food preparation and decrease the effectiveness of a tailored message.

Tailored Messages – Methodological Issues

The methodology developed to test this behavioral alternatives model allows the researcher to examine at the individual level: (1) the relative evaluation/importance of each construct in the integrated model presented in Figure 3 for each behavioral alternative that is relevant for a specific health concern, and (2) the relationships among the behavioral alternatives. Based on the respondent's judgments, a researcher is able to develop a tailored intervention by focusing on the alternatives that are evaluated positively on the constructs in the integrated model determined to be important to that individual. Brinberg and Axelson (1990) present a detailed discussion of the methodology needed to create these tailored messages.

Behavioral Frequency Questionnaire. One set of questions focus on the frequency the individual performs the set of behavioral alternatives associated with the health-related problem. These questions provide information regarding both base-rate and ceiling effects, as well as the strength of the behavior. In the area of food, we would collect information regarding the frequency of consumption for a wide variety of foods that contain a target nutrient (e.g., fiber). If we examine a different health-related issue (e.g., unintended pregnancy), the researcher would examine the frequency of the various behavioral alternatives (e.g., use of various birth control methods, unprotected sex, abstinence) that comprise the domain for this problem.

Assessing the constructs in the integrated model. A key notion in developing tailored messages using all the constructs in the integrated model is to operationalize each component of the model for each behavioral alternative. By using this strategy, the researcher is able to collect sufficient information to conduct an analysis within rather than across respondents. The health education measure can then be tailored to the individual rather than inferred from aggregate measures of the constructs (which do not allow for within respondent inferences).

Respondents would be asked to evaluate each behavioral alternative (e.g., a measure of attitude), by using a 7- to 11-point scale anchored with extremely good to extremely bad. Affect would also be measured with respect to each behavioral alternative. Bodur, Brinberg, and Coupey (2000) describe a measure of affect that is both reliable and differentiates affect and attitude. A similar procedure (and set of questions) would be asked for the remaining constructs (i.e., environmental constraints, knowledge, intention, social pressure, and self-image).

The researcher also needs to determine the relative importance of each construct in predicting the person's decision to perform each behavioral alternative. We recommend using several approaches to measure importance. One approach would be a direct measure by asking the respondent to rate the importance of each construct using a 100-point, important-unimportant scale. A second approach would be to calculate, within respondent, the correlation between the construct and the decision to perform the behaviors. A third approach is to calculate a partial correlation, again within respondent, between each construct and the decision to perform each behavior by holding constant the impact of the remaining constructs of the model. The use of multiple indices of importance allows the researcher to better estimate the importance of each construct and to focus the tailored health message on those factors most important to the individual when making a decision.

Future Directions

The current approach used in the empirical research on tailored messages is to apply one of the dominant models of behavior and behavior change.

The presumption is that a single measure of a construct (or multiple measures of the same construct) is sufficient information on which to base a tailored message. We believe the standard approach, however, does not capture the information that determines an individual's decision, and will result in a less effective tailored message. The methodology developed to use these models does not allow the researcher to assess the individual's decision process or their choice from among a set of alternatives.

The increased use of the Internet as a medium to transmit information has created a new alternative to communicate health messages. The Internet has several advantages for communicating health information: (1) the ability to reach large audiences at low costs (2) the use of text, audio, and video to communicate the message and (3) the opportunity to customize (i.e., tailor) the content of the message. The Internet also can be used to gather information from its users and to apply that information to create advertisements or messages that may be of interest to the individual.

One avenue for future work is to contrast the effectiveness of the dominant models, and the more integrated model in specifying the content of the tailored messages. The primary criterion for success would be the magnitude of change in the health-related behavior. We would envision this work as examining the scope and limits of the various models; that is, under what conditions and for which behaviors are the models effective. A second avenue for future work is to apply methods at an idiographic (individual) level to specify the content of a tailored message. Methods to uncover and measure each behavioral variable with efficiency and accuracy should be explored. One facet of this research might compare the effectiveness of the current models, or the more integrated model, using the traditional nomothetic (aggregate) level approach with the same models applied at the idiographic (individual) level. A third avenue of research might examine the role of modality (i.e., text, audio, and video) on communicating tailored health-related messages.

We recognize that this brief paper, because of space constraints, only begins to hint at the many issues involved when developing tailored messages. We have presented the main conceptual models used to develop health messages and some of their limitations. Our intent was not a comprehensive review, but to provoke interest and discussion of alternative ways to improve the effective development and delivery of tailored messages.

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