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Perspectives on Health Behavior Theories That Focus on Individuals

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Theories that focus on beliefs and actions of individuals were among the first theories of health behavior to be developed and remain the most widely used today. In this chapter, we comment on four theories introduced in Part Two of this book: Health Belief Model, Theory of Planned Behavior, The Transtheoretical Model, and Precaution Adoption Process Model. We discuss why theory is needed, examine some of the strengths and weaknesses of the four theories and consider challenges and opportunities in the field.

Why Theory?

Most interventions to change health behavior are based on ideas about what will work. Some are guided by formally stated theories, such as those discussed in this book (see Chapters 1 and 2). Others are guided by less formally-defined notions about behavior developed from personal experiences, intuition and opinions. Which approach is better?

Theory provides a bridge from findings in one study to another. Using well-defined constructs allows researchers to compare findings across studies to identify “active ingredients.” Using well-developed constructs can help to identify when findings from one population are likely to generalize to another population. For example, will a study of condom use among sex workers in Tanzania yield findings that apply to sex workers in China? Will it generalize to people who aren’t sex workers? If studies and interventions are designed without theory, it will be more difficult to generalize findings to other populations, settings

and times.

Interventions informed by well-developed and tested theories also may be more effective in changing behavior than those not based on theory. Several reviews have compared interventions developed using theories to those developed without formal theoretical frameworks. Five of seven meta-analyses that analyzed whether using theory to design condom use interventions improved their effectiveness found that theory-based interventions were somewhat or clearly superior (Noar, in press). However, a meta-analysis of interventions to increase mammography use found that theory-based interventions were not more effective in increasing mammography uptake (Legler, et al., 2002). A limitation of such systematic reviews is that the key factor (theory-based vs. not) relies on whether investigators accurately reported their use of theory. The reviews may overstate the effectiveness of interventions that reported having used theory-based approaches, because they may have differed on many other correlated dimensions, including care with which the interventions were designed and implemented and fidelity to the theories. However, the benefits of using theory may be understated, because some investigators may have used constructs from theory in their interventions without necessarily reporting that they were using theory. Additionally, theory may have been used, but the process of translating theory into interventions requires many discretionary judgments.

Another approach to understanding whether theory-based interventions are more effective in

changing behavior is to examine interventions that emphasized constructs central to key theories. A meta-analysis of almost 200 intervention studies to increase condom use found that many constructs in commonly-used theories of health behavior were changed successfully by interventions, and some of these constructs mediated changes in condom use (Albarracín et al., 2005). A systematic review of counseling interventions to increase healthy diets drew similar conclusions about the benefits of targeting theorized mediating variables (Pignone, et al. 2003). These reviews provide modest support for the benefits of using theory-informed interventions.

Despite many potential benefits of using theory, one theory is unlikely to be enough for all or perhaps even most health behavior problems. While the theories we discuss in this chapter focus primarily on individual-level beliefs and processes, powerful influences occur at other levels such as interpersonal relationships, neighborhoods, work settings and policies. Later chapters in this book focus on these influences and relevant theories. Readers should consider integrating theories from more than one level and using these theories to design and evaluate health behavior interventions.

Which Theory to Use?

We encourage researchers and practitioners to be critical consumers of health behavior theories. Although this chapter focuses primarily on four theories, there are dozens of health behavior theories (see Chapter Two). Many are variations on others, sharing key constructs, such as self-efficacy, or assumptions, such as progressing through a series of stages before behaviors get adopted. Theories also differ in their focus on different variables or processes. This complexity has prompted students as close as Chapel Hill and as far as Iran and China to pose versions of the same question to us about theory: “*How do you pick one theory over another?*” We address how to choose among health behavior theories that focus on individuals.

Some theories are much more widely-used than others, and the use of some has increased markedly over time. Three of the theories covered in Part Two (Health Belief Model, Theory of Planned Behavior, and The Transtheoretical Model) are widely cited and used (see Chapter Two; Noar & Zimmerman, 2005). Some theories are more

intuitively appealing than others, matching people’s naïve theories of the motivators of health behavior. Other theories are quite complex, and their use in the health behavior field increases only after accessible measurement scales are developed (e.g., the Revised Illness Perception Questionnaire for the Common Sense Model of Self-Regulation, Moss-Morris, et al., 2002) or a specific application to the health domain is derived from a more general theory (e.g., recommendations for when to use gain- and loss-framing as derived from Prospect Theory; Rothman and Salovey, 1997). Although using theory in designing studies and interventions can be beneficial, little evidence suggests that any one theory is preferable to another. Of almost 3,000 articles reporting studies guided by health behavior theories, only 19 empirically compared multiple theories (Noar and Zimmerman, 2005). Of these, only three did so using rigorous methods that included longitudinal (as opposed to cross-sectional) designs and behavioral outcomes (Weinstein and Rothman, 2005). In the absence of good data on which theory is better, researchers and practitioners should select theories based on their assessments of the theories’ merits and appropriateness to their specific questions including empirical support for the theories’ constructs in predicting (or changing) a specific behavior or with the population of interest.

A Closer Look at Individual-Level Theories

In this section, we discuss the four theories presented in Chapters Three through Six to aid readers in evaluating the theories’ merits and suitability for answering their research and practical questions.

Health Belief Model

One of the most appealing aspects of the HBM is its intuitive logic and clearly-stated central tenets (Chapter Three). The HBM is based on the idea that value and expectancy beliefs guide behavior. In other words, people are more inclined to engage in a health behavior when they think doing so can reduce a threat that is likely and would have severe consequences if it occurred. Expectancy and value apply to the health threat (perceived likelihood and severity of harm) and the health behavior (perceived benefits and barriers of taking action). Cues to action, a fifth HBM construct not based on

expectancy or value, may be as diverse as medical symptoms, a doctor's recommendation, reminders from a health plan or a media campaign. Self-efficacy, a sixth construct proposed well after the model was initially formulated, is also not based in expectancy value, but if self-efficacy is construed as the perceived probability that an attempt to perform a behavior will be successful, it fits into the expectancy value framework. In HBM, self-efficacy applies especially to performance of repeated or habitual behaviors such as physical activity, eating, smoking, and sexual practices (Rosenstock, Strecher, and Becker, 1988), but it may not be needed for health behaviors that are relatively easy to accomplish.

Symptoms are central to patients' experiences of disease, and it is surprising that the HBM and one other long-standing health behavior theory (The Self-Regulation Model, Leventhal et al., 1980) are among the few to explicitly include them. This often under-appreciated dimension of the HBM, theorizing that medical symptoms are cues to action that prompt behavior, is as relevant today in studying AIDS, diabetes and cancer prevention as it was in helping to explain tuberculosis screening behavior in the 1950's. These diseases are treated most successfully if diagnosed before a person develops symptoms. For some individuals, the belief that cancer always causes recognizable symptoms may be a critical variable in explaining non-participation in cancer screening. Some women feel they do not need mammograms because they do not have symptoms (Stoddard et al., 1998). Ironically, their not having symptoms is what makes the mammogram precisely the right test, and this applies to other screening tests as well.

Constructs in the HBM have received substantial empirical support for their ability to predict behavior based on correlational studies (Janz and Becker, 1984; Mullen, Hersey, and Iverson, 1987) and to a lesser extent in intervention studies (Albarracín et al., 2005). There are not yet systematic review or meta-analyses of HBM interventions across a range of health behaviors that allow us to know whether interventions designed using the model are more effective than those designed in some other way.

When the HBM is used as the theoretical basis for data collection, several important conceptual and statistical issues should be considered.

Perceived threat, a central component of the HBM yielded by the combination of perceived susceptibility and severity is tested by examining their statistical interactions (Strecher and Rosenstock, 1996; Weinstein, 1993). However, reviews of the model and of the effects of risk perception have looked only at the simple effects of perceived susceptibility and severity (Brewer, et al., 2007; Janz and Becker, 1984; Mullen, Hersey, and Iverson, 1987), and few studies have found the predicted interaction (Weinstein, 1993). Another issue is that subtracting ratings of perceived barriers from ratings of perceived benefits can be limiting. Doing so prevents researchers from better understanding the roles that perceived barriers and benefits separately play in health behaviors. Careful attention to statistical tests of the HBM is warranted, as analyses too often examine each construct's relationship to the health behavior of interest without combining them.

Study design, especially the implied temporality among variables, affects the interpretability of data gathered using the HBM (and the other three models). Beliefs can motivate behavior as the model suggests, but behavior can also cause people to reassess their beliefs (Brewer, et al. 2004; Brewer, et al. 2007). Cross-sectional studies may yield confusing and potentially incorrect information about the size and even the direction of belief-behavior relationships (Brewer, et al. 2004; Weinstein, 2007). This problem has been demonstrated empirically for perceived likelihood, but it may also apply to other HBM constructs. For example, a negative correlation of vaccination to risk perception does not necessarily mean that people at high risk were less likely to get vaccinated; it may simply be that people who got vaccinated correctly see themselves as less at risk. In other words people can align (and realign) their beliefs to match their behaviors.

In focusing on individuals' health-related perceptions, the HBM does not explicitly address important social, interpersonal and contextual issues. This observation is relevant to most individually-focused theories of health behavior. They also may miss important factors that are not intrinsically health-related but play an important role in shaping health behaviors.

The HBM can be a parsimonious model in terms of the number of questions needed to assess key

constructs, requiring as few as six questions in total. HBM constructs can be measured by a variety of techniques, ranging from clinical interviews to population-based surveys. Although substantial HBM measurement work has occurred in select topic areas (see Chapter Three), the HBM never has had the kind of broad-based standardized measurement approaches called for in the Theory of Planned Behavior (see Chapter Four). Important work remains to be done with the HBM, especially in understanding better the effectiveness of HBM-based interventions, but the model is a proven way to identify correlates of health behavior.

Theory of Planned Behavior

The Theory of Planned behavior (TPB) and the HBM share a foundation in arguments that behavior reflects expected value. TPB aims to explain rationally motivated, intentional health and non-health behaviors. The model applies as well to protecting oneself from infectious disease as it does to voting and consumer behaviors.

TPB assumes a causal chain that links attitudes, subjective norms, and perceived behavioral control to behavior through behavioral intentions. Several aspects of this claim merit additional discussion. First, the theory requires highly specific behavioral intentions measures that closely match the intended behaviors. Behavioral intentions measures can assess planning (e.g., “Do you plan to use a mosquito net over your child’s bed?”), desire (e.g., “Would you like to use a mosquito net over your child’s bed?”), and expectation (“How likely is it that you will use a mosquito net over your child’s bed?”) (Conner and Sparks, 2001). Using multiple items increases statistical power by increasing measurement reliability. In recent years, researchers have proposed two new conceptualizations of intentions that go beyond the behavioral intentions conceptualization of the TPB. *Behavioral willingness* addresses behaviors that people may not necessarily intend to engage in (such as an adolescent trying marijuana or having unsafe sex) (Gibbons, Gerrard, Blanton and Russell, 1998). *Implementation intention* interventions encourage people to specify exactly when and under what conditions they will engage in a behavior. Behavioral willingness can predict behavior above and beyond behavioral intentions, and

implementation intentions are a potent intervention, stronger than only having people form more general intentions to act (Gollwitzer, 1999).

Second, TPB postulates that intentions lead to behavior, but the empirical data suggest a more qualified assessment. Although longitudinal studies suggest a very strong intention-behavior relationship (Sheeran, 2002), better designed, experimental studies show a much smaller effect (Webb and Sheeran, 2006). Furthermore, intentions often overstate but sometimes understate actual behavior. Many factors affect the relationship between change in intentions and change in behaviors. The relationship is substantially weaker for risk behaviors typically performed in a social context, for behaviors supported by habits, and when intentions were measured further away in time from behavior (Webb and Sheeran, 2006). Many other factors can weaken intention-behavior relationships to a lesser extent. The many uncertainties that accompany whether or not intentions will yield behavior change mean that behavioral intentions, while potentially useful in preliminary or pilot studies, are an inadequate primary outcome for studies and interventions intended to benefit the public’s health. This same caveat applies equally to the idea of using stage change toward contemplation or preparation in the TTM as a proxy for actual behavior change.

Third, TPB posits that attitudes can affect behavior only through intentions. Data from as far back as the 1970s lead us to question this assertion, showing that attitudes often directly predict behavior not mediated by intentions (for a review of the technical issues, see Liska, 1984). Intentions can change over time, as can attitudes, making their relationships to behavior something of a moving target. A related problem is that people do not form intentions for all behaviors, especially when the window of opportunity for action is a long time away. Analyses that control for past behavior often find that intention is no longer a significant predictor of behavior (Hagger et al., 2002), but others question whether it is appropriate to control statistically for past behavior in examining these relationships (Weinstein, 2007).

The TPB provides a systematic method to identify those issues that are most important to a person’s decisions about performing specific behaviors. Because many important beliefs and

attitudes are changeable, they are ideal targets for subsequent interventions. Measurement methods stipulated by the TPB, though powerful for prediction, are challenging in practice. They rely on extensive pilot work, including interviewer-administered personal interviews, and can require more items than many modern surveys can realistically accommodate. Although ultimately useful, this can be a demanding, costly process and also reduce participation rates. Collecting more intensive pilot data can be challenging when programs must be developed quickly. On the other hand, the emphasis on specificity of the intended behavior is both central to the TPB and one of the model's most important strengths.

Because the TPB is a theory of behavior that results from rational planning, some important health behaviors may not be explained by its principles. Although more experimental work remains to be done in testing the mediating relationships proposed in the model, the TPB is well supported by existing data from laboratory experiments, field studies and health behavior interventions.

The Transtheoretical Model

Due in part to its intuitive appeal, The Transtheoretical Model (TTM) (Chapter Five) quickly became one of the most widely-used models of health behavior. TTM departs substantially from many other individually-oriented models of health behavior by focusing more on changes in behavior and less on the cognitive variables (such as perceived risk or perceived barriers) believed to predict health behavior and behavior change. TTM argues that people are in different stages of readiness to make health behavior changes, and these stages are qualitatively different with respect to the constructs and processes that move people closer to behavior. TTM postulates that people should receive interventions appropriate for their stage in the behavior change process. If TTM assumptions are correct, treating people as though they are all the same inevitably dilutes the impact of interventions. For example, if a factory worker is unaware that chemical and particulate matter exposures at her worksite may be harmful to her, providing detailed information about protective behaviors is pointless.

It would be far better to raise her awareness of the harms associated with the exposures and the benefits to be achieved from behavioral change. The fundamental underlying assumption is similar to the basic health education principle of "starting where the people are" (Green and Kreuter, 2005). Once stage of change is assessed, people can be provided with therapist-guided, self-initiated, or other interventions suited to their needs.

Researchers are vigorously debating several aspects of TTM. Several literature reviews have not found support for stage-based interventions as an effective way to change some behaviors including physical activity and smoking (Bridle et al., 2005; van Sluijs, van Poppel, and van Mechelen, 2004; Riemsma, et al., 2005), although the chapter provides several examples of effective interventions. An intriguing study that deliberately mismatched interventions for smokers concluded that matching did not increase the likelihood of quitting, and smokers who received the active intervention were most likely to quit, regardless of stage (Quinlan and McCaul, 2000). . Reviews of TTM research may overstate empirical support for the model, because many studies' control conditions lack the intensive personal contact of the interventions. Reviews also may underestimate the power of the TTM, because many TTM-informed interventions did not use the full model (using, for example only the stages of change). In sum, reviews provide mixed evidence and suggest that TTM-guided interventions do not always change health behaviors, but readers should also carefully analyze the reviews.

Another concern is that stages of change may be just another way of measuring behavioral intentions. Current measures of stages of change place people in categories ranging from inaction to action, and these measures share substantial similarity with intention measures assessing whether one is unlikely or likely to act (Sutton, 2001). Stages of change and behavioral intentions often are correlated highly suggesting significant overlap in the two constructs (e.g., de Vet, de Nooijer, de Vries, and Brug, 2007). In correlational studies, intentions measures do as well at predicting subsequent behavior as stages of change (Abrams et al., 2000), a finding that makes the additional contribution of stages of change less clear.

Moving people from one early non-behavioral stage to another is not equivalent to behavior change, and interventions that alter stages of change (or intentions) may or may not yield behavior change (see also the earlier comments on TPB). It is also not clear whether people have to move through all these stages. Readers interested in other more detailed discussions of stage models and concerns that have been raised about the TTM should look at work by Sutton, Weinstein and others (Sutton, 2001; Weinstein, Rothman and Sutton, 1998; West, 2005).

Some apparent limitations of the TTM may result not from the model's deficiencies but instead from how researchers operationalize stages of change and design interventions. Stage definitions that are arbitrarily set at certain time points (e.g., 30 days, 6 months) may be better defined using less arbitrary cut points and may vary by population and, certainly, by behavior. Measurement of stage can also be inaccurate, because people do not always correctly respond to questions that would put them in one or another stage, and they can move among stages during the time of a study or intervention, and between measurement occasions. Fewer or more stages may be appropriate depending on the population and behavior. It is also unclear whether the *processes* of change must always be measured and in fact, they are often not assessed in TTM-based studies or practice applications. Important questions exist about the appropriate statistical analyses for assessing stage-related changes (for example, see Hedeker, Mermelstein, and Weeks, 1999). Many steps occur between theory and application, and it usually is not clear why an intervention designed using a particular theory is unsuccessful.

TTM has spawned a large body of research and lively debate. The many reviews of the TTM no doubt reflect the substantial enthusiasm and attention the model has received. TTM framework has a likeable simplicity, but researchers and practitioners who use it should do so wisely, comprehensively, and critically.

Precaution Adoption Process Model

The Precaution Adoption Process Model (PAPM) also assumes that people go through stages before modifying their behaviors (Chapter Six).

Although bearing some similarity to TTM, PAPM stages differ somewhat both in their number and conceptualization. The PAPM explicitly recognizes a stage in which people may be unaware of a risk or precaution, and it includes a stage in which people have specifically decided not to act that TTM does not include. The early stages of precaution adoption also focus more on increasing awareness of risk than similar TTM stages.

PAPM provides a framework of behavioral change that emphasizes the role of risk perceptions, an emphasis that is shared with the HBM. PAPM highlights processes not emphasized in other frameworks, such as consideration of costs and benefits over time and the competition between precautionary behaviors and other life demands. These considerations also can be found in the HBM, but the PAPM articulates them more precisely. Growing awareness of the threat posed by avian flu illustrates how quickly people may go from a state of unawareness to awareness and action (i.e., travelers cancelling trips to Asia and flight attendants wearing face masks). PAPM also provides a heuristic framework to categorize people at different stages of behavior change, and it includes mediating variables amenable to assessment in intervention programs.

PAPM has been studied most comprehensively by Weinstein and his collaborators and has received less critical attention than the other theories in this section. The model has not been used enough to provide a substantial body of data that either can affirm or refute its predictions. However, concerns about risk perception related to the HBM apply to this model as well. Although risk perception robustly predicts behavior in cross-sectional and longitudinal studies (Brewer, et al., 2007), interventions focused on risk perception have had difficulty changing it and subsequently changing behavior, at least for HIV prevention interventions (Albarracín, et al., 2005).

PAPM is more of a conceptual framework than a completely specified theory (i.e., providing detailed specification of the causes of change between stages). If the stages are valid, they should help in identifying causal factors (by comparing stages), but the model doesn't provide an *a priori* list of these factors. In this way, the PAPM is similar to the TPB which calls for developmental work to identify the specific beliefs and attitudes of

the target population.

Commonalities and Differences across the Theories

Theories in this section have much in common. Perceived barriers inhibit behavioral change explicitly in the HBM, TPB and TTM and implicitly in the PAPM. Perceived risk is important in the HBM, PAPM and, depending on the results of pilot work for a given study, may be important in the TPB. Self-efficacy is embodied in three of the theories (TTM and included in modifications of the HBM and TPB). Readiness is a central component of the TTM and the HBM.

The models differ in their intended scope. HBM grew out of research on disease prevention, initially focusing more on factors affecting people without diagnosed conditions (Rosenstock, 1974). TPB emerged from research to understand why attitudes did not always prompt behavior. This general focus persists today in the model's emphasis on rationally-decided behaviors but explicitly excludes behaviors that are automatic (e.g., habits). TTM places special emphasis on stages beyond action, including maintenance of the behavior which may be especially important for behaviors such as dietary change in which the steps required for losing weight may differ from those involved in keeping it off. The same can be said for smoking cessation, maintenance of quitting, and physical activity. PAPM refers to adoption of precautions, but not commencement of risky behaviors (such as drug use). It does not claim to explain the full range of health-affecting behaviors as do the other individually-focused theories covered in Part Two.

Stage-based theories have a long tradition in behavioral research reaching back to Lewin's stage model (Lewin, 1935). Of the two stage theories we discussed, PAPM and TTM, only the former explicitly recognizes a distinct state in which one is unaware of a risk. In the TTM, persons who are unaware generally would be classified as in precontemplation. This puts those strongly opposed to the recommended behavior and those who simply have not heard of it in the same category. These groups are actually quite different (Greene et al., 1999). Although stage-based models are appealing, support for stage-matched interventions is

equivocal.

Some theories are easier to use than others. Appropriate theories, those that can easily be adapted, are especially appealing to researchers and practitioners (Turkle, 1995). Part of the appeal of the HBM and TTM is undoubtedly that they are appropriate theories. PAPM and TPB are perhaps more challenging but worth the effort. Many people are attracted to the TTM because of its intuitive logic. We all know people who are precontemplators for a particular behavior or we may have experienced the state of chronic contemplation with regard to a behavior we want to change but have not been able to achieve. The fact that one theory may appear to be harder to use and another a lot easier should not keep theory users from taking an informed second look.

Measurement of key variables in each of the theories requires careful attention. More attention is needed not only to the appropriate, consistent measurement (or manipulations) of independent and dependent variables in these models but also to understanding the mediators of behavior (Baron and Kenny, 1986; Sussman and Wills, 2000). Understanding mediators of behavior change is an important step in advancing theory and developing more effective interventions (Baranowski, Anderson, and Carmack, 1998; Sallis, 2001).

Following recommended measurement strategies can be resource intensive. In practice, many who use the TPB probably do not do the extensive development work the authors recommend, and no literature of which we are aware demonstrates that questions developed through this process more powerfully predict behavior, although it certainly makes intuitive sense. Using the TTM as its developers intended can also be a daunting challenge. Many researchers and practitioners have used the decisional balance measures but not the processes of change. If theory users would make more of their questions openly available, theory testing would be enhanced, and it would facilitate using some of the less accessible theories.

Different theories in this part of the book have many similarities. Recognizing this fact, Fishbein (2000) recommended the use of an integrated model (see Chapter Four) that includes key variables from several of the theories in this section as well as Social Cognitive Theory. The Integrative

Behavioral Model is appealing, because it incorporates intra-individual factors, including self-efficacy, as well as environmental factors known to influence health behaviors. More research is needed to determine the viability of this expanded model.

It is common for researchers and practitioners to combine or blend theories. Thoughtful combinations may result in more robust interventions. However, a potential downside is the practical limit to how many theories can be combined. If relevant constructs in the models are not measured or are not measured well, it may not be possible to really understand how an intervention exerted its impact. If our theories are to be refined, it is critical that some researchers continue to focus on rigorous tests of single theories and on studies that critically compare two or more theories.

Limitations

In the last several years, researchers and practitioners in health behavior and health education have paid increasing attention to the larger environment in which behavior occurs. Some groups have criticized the focus on individuals and their health-related beliefs as typified by the theories in Part Two (Smedley and Syme, 2000). For behaviors where individual action is required, such as stopping smoking, individual-focused theories are usually appropriate, but even a very individual behavior such as getting mammograms can be strongly affected by policy or social context. Program developers should not ignore the array of higher-level influences that affect behavior. A recent review found that the combination of access-enhancing and individual-directed interventions were the most effective type of strategy for promoting mammography use (Legler et al., 2002). The recommendation also is supported by a systematic review of adult preventive behaviors that found benefits for educating individual patients, but larger benefits for financial incentives and organizational change (Stone et al., 2002).

More attention in all the theories should be paid to maintenance of behavior change. The TTM and PAM explicitly include maintenance of behavior changes, but the HBM and TPB do not exclude it. However, conceptualization and prediction of maintenance of behavior change may require

refinement of constructs and measures or other theories altogether (Rothman, 2000). One study found that the TPB was useful in predicting attendance at health screening, but the theory could not reliably differentiate people who delayed attending or initially attended and then relapsed (Sheeran, Conner, and Norman, 2001). These apparent nuances are very important, not only in classifying and describing health behavior, but also in developing new interventions.

New Directions

Health behavior theories that focus on individuals have remained remarkably similar for the past fifteen years (Chapter Two; Weinstein and Rothman, 2005). One issue is the paucity of studies comparing theories, and another is the relative absence of the developers of the main theories in these activities. Of 19 studies that are comparing theories of health behavior, none involved the developers of the theories (Nigg and Jordan, 2005). The theories make specific, testable predictions about behavior, and, in time, some theories will be supported while others are not. We encourage researchers to design studies to test two or more theories.

Theories should be tested using stronger study designs. The broad health field is demanding higher quality evidence to identify effective intervention techniques (Harris et al., 2001), and we should demand the same rigor of health behavior theory. Although many early studies using these theories were cross-sectional, and subsequently conducted longitudinal studies gave us better data, more experimental studies are needed to test these theories (Weinstein, 2007).

In many cases, intervention studies have used research designs that miss opportunities to identify “active ingredients.” All four theories in this section can claim successful health behavior change interventions, indicating their potential value. However, factorial designs would more quickly advance our understanding of which components are most useful in predicting or changing behavior (Rimer and Glassman, 1999). These designs offer studies the option of testing an additional “free” research question, by nesting additional conditions within the existing ones.

Although the number of meta-analyses is increasing, allowing us to better assess what is

known, meta-analyses provide definitive answers only when sufficient high quality data exist. Meta-analyses of experiments provide very strong evidence of effectiveness. However, the results of meta-analyses that compare studies with different features cannot replace the results of true experiments that directly compare those features.

New Constructs and Theories

Many other theories of health behavior, in addition to those included in this section, emphasize the individual. Prospect Theory (Kahneman and Tversky, 1982), contributed to understanding message framing of the positive or negative consequences of a behavior. One prediction from Prospect Theory's tenets is that gain-framed messages should be more effective in increasing prevention (e.g., sunscreen use) and recuperation behaviors (e.g., medication use), whereas loss-framed messages should more effectively motivate detection (e.g., HIV testing) (Rothman and Salovey, 1997). The benefits of gain-framing but not loss-framing are supported by recent meta-analyses (O'Keefe & Jensen, 2007).

The Common Sense Model of Self-Regulation was developed to address the health behaviors of medical patients (Leventhal, Meyer and Nerenz, 1980). One unique characteristic of the theory is a substantive and nuanced description of the representation or beliefs about the disease, condition or recommended action. These include the constructs of identity/symptoms, timeline, consequences, causes, and cure/control, which can be assessed using a standardized instrument (Moss-Morriss et al., 2002). The model has been used in over twenty illness populations (Hagger and Orbell, 2003). However, because most evidence is from cross-sectional studies, there are insufficient data about the effectiveness of interventions based on the model constructs.

Although emotions play a prominent role in several theories of health behavior, they deserve more attention than they receive in the four theories in this section of the book. For example, although TPB has called attitudes (the feeling that outcomes can be good or bad) a type of emotional response and locates other emotions as distant antecedents of attitudes, new findings call for a separate and more central role for affect (Frederickson, 2000).

Research suggests at least four ways that emotions affect decisions related to health, including focusing people's attention on a threat, helping people choose among several courses of action, facilitating decisions about dissimilar outcomes such as money and health, and prompting people to spring into action. Emotions can be negative (e.g., fear, anticipated regret), but they can also be positive (e.g., joy, hopefulness) (Frederickson, 2000; Salovey, Rothman, Detweiler, and Steward, 2000). Some constructs, such as worry, seem to mix emotion and cognition. Health behavior theories that place special emphasis on emotions include the Common Sense Model, Protection Motivation Theory (Prentice-Dunn and Rogers, 1986), the Extended Parallel Process Model and theories of stress and coping (see Chapter Ten). Although specifics differ across models, they suggest that people cope with threats either by addressing the threat (see a doctor) or by addressing their emotional reactions to the threat (put it out of their minds).

Given the special role of fear communication in the history of health behavior interventions, it is surprising that none of the most commonly used theories can adequately explain key findings in this literature (Witte and Allen, 2000). Fear appeals in HIV prevention interventions are more effective when they are of greater intensity (Albarracín, et al., 2005). The hypothesis that fear appeals become less effective past a certain point is probably untrue. Fear communications generally are most effective when people are given clear guidance about how to take or plan action (Witte and Allen, 2000).

The models in Chapters Three through Six all emphasize rational decisions based on thoughts and feelings that people can report using interviews and surveys. Health behaviors are influenced by many other motivations and factors that may be unconscious or uncontrollable. Some theorists argue that most behavior is outside of conscious control and have impressive data to support their claims (Bargh and Chartrand, 1999; Gollwitzer, 1999). For example, recent work on goal states has shown that what people want depends on the situations they are in, or even who they recently were thinking about (Shah, 2003). A similar issue is that much of our planning and intentional behavior requires that we have an accurate idea of what we will want in the future. Recent work on

affective forecasting suggests that most people are not good at anticipating their future responses to health outcomes and other life changes (Wilson and Gilbert, 2005). Health behavior theories that take into account effects of environmental and structural factors partially address some of these issues, but current theories that focus on the individual may need to be revised to consider processes that are outside of conscious awareness.

Disappointing outcomes for some health behavior interventions should drive us to consider, or reconsider, the use of persuasion strategies in combination with effective intervention (Cappella, 2006). Several well-tested theories of persuasion, including the Elaboration Likelihood Model (Petty and Cacioppo, 1986), Heuristic Systematic Model (Chaiken, Liberman and Eagly, 1989), and the Unimodel (Kruglanski and Thompson, 1999) deserve more attention. These theories postulate that people process messages deliberately or through less effortful means (Rudd and Glanz, 1990).

Conclusion

Some commentators have dismissed these theories, saying they do not take into account the complexity of factors that influence health behaviors. Focusing on individual acceptance of bed nets to prevent malaria use must account for the fact that many of the people we want to reach might want to use bed nets but not be able to find stores that sell them. We could spend months and years on bed net adoption and fail if we did not account for lack of availability. Theories that emphasize individual health behavior have an important role to play in our understanding of how to improve human health. But they are not the answer to all health problems. One must nearly always consider the social and community context to understand where beliefs come from and to find ways to change both beliefs and external constraints. We encourage students and health professionals to consider the nature of the health problem or condition on which they wish to intervene and select the appropriate theory, sometimes employing multiple theories to permit intervention at multiple levels.

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