THE CUES TO BEHAVIOR CHANGE MODEL: INTEGRATION OF THE HEALTH BELIEF MODEL AND THE TRANSTHEORETICAL MODEL

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THESIS

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Strategic health communication can have a profound effect on interventions designed for changing unhealthy behaviors. Strategic health communication, in the form of cues to action, when combined with the Stages of Change from the Transtheoretical Model and perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and self-efficacy from the Health Belief Model, becomes a more comprehensive model for the design and implementation of health interventions than the Health Belief Model or the Transtheoretical Model alone. The Cues to Behavior Change Model is the result of the integration of these two largely successful health intervention models.
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Chapter One

Introduction

It is traditionally behavioral science that gets ignored, in favor of more traditional methods of disease prevention, such as medical science, or blanket public health initiatives. "While many public health practitioners who have worked in chronic disease prevention may understand the importance of behavioral science, many involved with preventing infectious diseases in the era of vaccines and antibiotics may be less familiar with it" (Curran, 1996, p. 3). As a result, behavioral and social science professionals need to instruct, facilitate, and aid in prevention interventions alongside their public health counterparts. In light of recent attempts by medical science to develop and implement more successful health interventions, many medical health professionals are recognizing the need for consultation with behavioral science professionals. Curran (1996) states:

Recent experience with developing and implementing recommendations for use of zidovudine during pregnancy to prevent perinatal HIV transmission emphasizes once more that the dichotomy between biomedical and behavioral interventions is artificial, and that there is a need to utilize behavioral and social science and research methods now to address emerging health problems (p. 3).

Curran's argument, taken in the context of discussing the need for initiation and acceptance of drug treatment from HIV positive mothers, stresses the point that if biomedical treatment is to be more successful in the future, it needs to partner with behavioral and social sciences. Curran is arguing the need (in the medical world) to
recognize the impact that behavioral science could have on the strictly biomedical world that cures ills and attempts to prevent sickness.

Behavioral science and its methods are critical in understanding, implementing, and evaluating the efficacy and success of prevention programs. When providing preventive interventions to individuals at highest risk, in the era of diseases like HIV/AIDS and cancer, there is a need and desire to attain a very low degree of error in intervention success. Says Satcher, "Success in HIV prevention often requires helping people make and maintain highly consistent behavioral changes, often with very little margin for error or relapses--a challenge virtually unprecedented in the behavioral sciences" (Satcher, 1996, p. 1). Hence the need for a partnership between medical and behavioral/social science is made even more evident, so that the existing bank of behavioral/social and medical science knowledge can be used to create more successful prevention programs. Health communication is one area of social science research that can answer some of the questions and set that needed precedent.

Health Communication

The field of health communication is growing rapidly. From anti-drug campaigns and safer-sex interventions, to the interactions of patients and providers, the use of health communication theory and research is expanding daily. Many may ask the question though, what exactly is health communication?

Health communication is defined in various ways. Kreps and Thornton (1992) define health communication in terms of human interaction as, "an area of study concerned with human interaction in the health care process" (p. 2). Ray and Donohew (1990) define health communication in terms of information dissemination as, "the
dissemination and interpretation of health related messages" (p. 4). A combined, more comprehensive definition, reflecting the two previous definitions, might look like the following: health communication is communication about personal, group, or community health, often occurring within a health care context, which is dependent upon dissemination and interpretation of health related messages. The components dealing with personal, group, and community health were added in an effort to identify all populations who have a role in the health care experience.

What makes the study of health communication important for medical professionals and behavioral scientists that work with those individuals, groups, and communities? Health communication is the primary method of information gathering as well as information giving. Kreps and Thornton (1992) explain the value of health communication well:

Human communication is the singularly most important tool health professionals have to provide health care to their clients. Not only do health care providers offer their services to consumers through communication contact, but they also gather pertinent information from their clients, explain procedures and regimens to clients, and elicit cooperation among members of their health care team through their ability to communicate (p. 2).

It is important to note that health professionals are not just nurses and doctors. Health care professionals are all those who have direct or indirect influence on the health outcome of an individual through the use of medical or educational training. Health professionals could be health outreach workers, health campaign workers, and health
educators--anyone with the requisite education necessary to be a source of health information.

Health communication as broadly defined encompasses almost any message that is related to health and depends on information dissemination. Though this is an acceptable definition for what health communication is and how we can recognize it, we need a more focused way to refer to the health communication that will be the central focus of this thesis. Health communication, as it will be discussed in this thesis, pertains primarily to health messages that are intentionally and strategically designed for a specific interventional purpose, with the goal of improving or maintaining the health of individuals and the public at greatest risk for a targeted illness and/or disease. When the term health communication is used as is, it will refer to the field of health communication as a whole, but messages designed specifically for use in health interventions, will be referred to as strategic health communication.

Health Communication and Theory

The most valuable tool in health communication is theory and the application of that theory. "Theory is particularly helpful in answering the following question, 'Will it work here?' Theories are general statements of principles about how behavior develops and changes" (Leviton & O'Reilly, 1996, p. 12). Leviton and O'Reilly (1996) expand this idea when they write,

Part of the training of the behavioral scientist is to (a) make predictions about behavior in specific circumstances; (b) translate overall theoretical concepts into specific implementation; and (c) establish criteria so that other professionals can
agree as to whether the specific implementation is an appropriate example of the overall concept (p. 12).

If we are to be effective in our efforts to improve the general health condition of those at whom our strategic health communication interventions are aimed, we must know what works, what does not work, and why that is so. Theory helps to answer these questions.

Taken from a "professional rather than scientific perspective, we view theories as tools to help health educators better understand what influences health-relevant individual, group, and institutional behaviors and to thereupon plan effective interventions directed at health-beneficial results" (Hochbaum, Sorenson, & Lorig, 1992, p. 298). It is theory that health professionals should use to provide the structure for health interventions. Hochbaum et al. (1992) argue that behavioral science needs to be incorporated into the process of formation, activation, and evaluation of future prevention efforts:

The primary goal of the social and behavioral sciences is to learn to understand the determinants of human behavior. Working towards this goal, researchers in these scientific fields have spent many years developing and testing theories. It seems foolish for applied fields, such as health education, not to draw on that work (p. 300).

So too, it seems foolish that the medical community, as well as those interested in developing successful interventions, should not draw on this work as well. Fishbein and Guinan (1996) noted, in regard to HIV prevention, that dissemination of information about HIV did not necessarily increase the
likelihood that an individual would attend to an intervention. "This approach failed to utilize the extensive behavioral science literature that has consistently found that having information about a disease and how it is spread does not necessarily increase the likelihood that one will take preventive action" (Fishbein & Guinan, 1996, p. 5).

Responding to the demand to utilize appropriate theoretical perspectives seriously, this thesis will draw on two specific frameworks which have been useful in planning effective interventions directed at improving health: the Health Belief Model (HBM) and the Transtheoretical Model (TTM). These two theories were chosen because of (1) their prevalence in the literature and (2) because of the support (presented later) that has been compiled for the components in each. Also, these components can be adapted rather easily for interventions pertaining to many different health behaviors. This modification is noted directly and indirectly in much of the research presented in this thesis.

Glanz, Lewis, and Rimer (1997) note that the HBM and TTM are among the top ten theories appearing in nearly 500 health education, health promotion and medical articles published from 1992-1994. In their review of 24 journals from the fields of health education, medicine, and behavioral sciences, the HBM appeared in 100 articles, and the TTM appeared in 50 articles.

The HBM and TTM address behavioral variables. The HBM addresses health behavior through the following components: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action (see Figure 1).
The TTM addresses health behavior through a series of health attention stages called the stages of change. The stages of change include the following stages: precontemplation, contemplation, preparation, action, and maintenance. Though the stages of change are not actual variables in and of themselves, various communication variables associated with movement through those stages can be considered useful to health behavior change. The interventional change that occurs between the stages of change deals with the messages and the strategic health communication associated with those messages. For many of these message-related variables, strategic health communication as we have defined it above could be the means of changing behavior or attitudes and norms in relation to a certain health behavior.

Additionally, the HBM and the stages of change within the TTM can help us to identify and influence two factors (stated as important to the relationship between behavioral science and public health) noted by Fishbein and Guinan (1996) that possibly influence a person's intentions and behaviors in respect to healthy behavior change. They are:

1. The person's perception that he or she is personally susceptible to a given disease or illness.
2. Self-efficacy, which involves the person's perception that he or she can perform the recommended behavior under a variety of circumstances.

In this thesis, we are concerned with both of these, as they are both noted to be integral pieces of the HBM (Strecher & Rosenstock, 1997) and the TTM (DiClemente, 1995). These will be elaborated on later in this text.
An additional benefit of using the HBM and TTM was stated as follows, "Some of the theories are easier to use than others. Sherry Turkle (1995) wrote about the appeal of the appropriable theories, those that can be manipulated and played with. Part of the appeal of the HBM and TTM is undoubtedly that they are appropriable theories" (Rimer, 1997, p. 146).

Another opinion about the use of the HBM helps us to understand the reasons for its rampant use. “One of the most appealing aspects of the Health Belief Model is its acceptance not only by health educators but by psychologists, physicians, dentists, nurses, and other professionals. It has a sort of intuitive logic, the central tenets are clearly stated, and beliefs can be measured by a variety of techniques ranging from clinical interviews to population-based surveys" (Rimer, 1997, p. 140).

While these theories have been prevalent in the health intervention research, this thesis presents a new model, one that integrates the best components of both the HBM and TTM. The resulting model should lead to more success in the creation, activation and evaluation of interventions.

This thesis will move through three steps. First, the history, components, and current research of the HBM and TTM will be discussed. Second, incorporation of the two models into a more integrated model that should lead to more success in the creation, activation, and evaluation of interventions will be discussed. Finally, the resulting model, which was developed based upon the relevant literature/research, will be presented.
Chapter Two

Health Belief Model

History of the Health Belief Model

The Health Belief Model (HBM) was developed in the early 1950s by a team of social psychologists at the U.S. Public Health Service, in an effort to explain the widespread failure of participation in programs and screenings designed to promote preventative health behaviors (Rosenstock, 1990). It was later modified to include individuals' attention and behavior related to diagnosed illness, and compliance to medical regimens that were designed to improve the overall health condition (Becker, 1974).

Specifically, it was the ineffectiveness of a tuberculosis screening program conducted by the Public Health Service in the 1950s (which offered tuberculosis screenings in mobile X-ray units, in various neighborhoods, at no charge to the recipients) which prompted development of the HBM. The lack of participation in the screenings prompted the Public Health Service to explore the reasons why the interventions were not being attended (see Hochbaum, 1958). It was out of the research conducted by Hochbaum (1958) that the main components of the HBM were established. The original main components were beliefs of susceptibility to tuberculosis and beliefs of personal benefits of early detection. With the exception of additional components being added and more in-depth descriptions of what is actually being monitored/measured with those components, the HBM itself has not changed much since its inception.

The HBM is a value expectancy theory, which states that an individual's behavior can be predicted based upon certain issues that an individual may consider (i.e. perceived
susceptibility, perceived severity) when making a decision about a certain behavior (Glanz, Lewis, & Rimer, 1990). When the value expectancy concepts were modified, by those conducting general health behavior research, the areas that corresponded were (1) the desire to avoid illness or to get well (value) and (2) the belief that a specific health action available to a person would prevent (or ameliorate) illness (expectancy) (Glanz et al., 1997). The further development of these concepts for use in health behavior contexts has continued through today. The initial refinements in the model included the ability of the individual to estimate personal susceptibility and personal benefits of detection and/or treatment of a negative health consequence.

Components of the Health Belief Model

The original HBM contained only the major categories of personal susceptibility and personal benefits. These have been elaborated on extensively in the years since the model was originally developed (see Becker, 1974; Janz & Becker, 1984; Rosenstock, 1974). The concepts now associated with the HBM are: cues to action, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy (see Figure 1).

Cues to action is considered a component in the latest variations of the HBM (see Glanz et al., 1997). Hochbaum (1958) noted that there could possibly be cues such as environmental or bodily events that could potentiate readiness to take action (Glanz et al., 1997). There have been very few organized and systematic studies regarding the integration of cues to action within the HBM. "Unfortunately, few HBM studies have attempted to assess the contributions of 'cues' to predicting health actions" (Janz & Becker, 1984, p. 3). Despite the lack of research in this area, there are many suggestions
about the importance of this variable's use in the HBM. The suggestions and the benefit they may have for the HBM in relation to strategic health communication will be elaborated upon later in this thesis.

Figure 1: Health Belief Model (Strecher & Rosenstock, 1997)

The *perceived susceptibility* component measures an individual's personal vulnerability to a condition and more specifically, in the case of medically established illness, belief in diagnosis, general susceptibility to illness, and estimates of resusceptibility (Janz & Becker, 1984).

The *perceived severity* component measures an individual's feelings concerning the seriousness of an illness or of not having an illness treated. There is large variance in relation to how different individuals may perceive severity of an illness. For example, an individual may perceive pneumonia to be extremely dangerous because of limited experience with the illness. Another individual though might perceive pneumonia to be
relatively harmless because of numerous bouts with the illness that were all managed successfully. The perceived severity component also looks at medical, clinical, and social consequences that arise out of beliefs about an illness (Janz & Becker, 1984).

The *perceived benefits* component is concerned with the effect that personal beliefs concerning the effectiveness of various available means of correcting/dealing with the illness at hand have on adoption of that healthier behavior. Therefore, if a certain action were not deemed to be beneficial or efficacious enough, the recommended health action would likely not be adopted.

The *perceived barriers* component concerns the perceived negative aspects of a recommended health action. It is similar to a cost/benefit analysis in the sense that if a recommended health action is deemed to be too painful, costly, dangerous, or inconvenient, an individual is likely not to adopt it (Janz & Becker, 1984). If, however, the benefits outweigh the costs, the recommended health action will be adopted.

*Self-efficacy* is defined as the process by which "…people process, weigh, and integrate diverse sources of information concerning their capability, and they regulate their choice behavior and effort expenditure accordingly" (Bandura, 1977 p. 212). In much simpler terms, self-efficacy is defined as, "One's confidence in one's ability to take action" (Glanz et al., 1997). Self-efficacy was not part of the HBM until the need to incorporate Bandura's work was called for specifically (see Rosenstock, Strecher, & Becker, 1988). It was added by Rosenstock et al. (1988) in an effort to increase the explanatory power of the HBM.
Examples of ways the health belief model has been used in the past suggest reasons for previous successes and failures in utilization of the HBM. Several HBM exemplars are reviewed below.

**HBM Exemplars**

In an attempt to provide the reader with some point of reference while reading the citations and examples that are given in the remainder of this thesis, three examples that demonstrate the applicability of the HBM and the manner in which a health intervention might operationalize the HBM, will be reviewed.

The first exemplar is an article written by Analee Beisecker (1991) titled: *Interpersonal communication strategies to prevent drug abuse by health professionals and the elderly: Contributions of the Health Belief Model*. Though this piece is not an empirical study, it is an excellent example of the use of the HBM components in relation to different populations and how the HBM might be used with those different populations.

Beisecker (1991) states that in applying the HBM to prevention of drug abuse, four things must occur if individuals are to engage in preventative behaviors (positive health behaviors): 1) individuals perceive themselves as susceptible to getting an illness (becoming addicted), 2) the addiction is perceived as having serious consequences, 3) the benefits of taking preventative action outweigh the barriers to that action, and 4) something triggers the individual to take action, such as a cue to action (Beisecker, 1991).

Beisecker describes why there is a drug abuse problem in health professionals and the elderly. She notes that much of the motivation for health care professionals to take drugs or alcohol stems from the usefulness of alcohol or other drugs as a mechanism for
dealing with stress and for relaxation. Beisecker (1991) further states the problem, "Impaired health care professionals report that, although they understood the negative effects of drug or alcohol use (the seriousness of the condition), they perceived that they were too strong to ever become addicted" (p. 242). Thus, health professionals had knowledge about drug abuse (severity of the behavior) but were not motivated to monitor or change their condition for reasons associated with their own perceived susceptibility.

The elderly, on the other hand, may also suffer from drug abuse, but not in the same manner as physicians. Many elderly have become ill at one time or another and many are taking prescription medication for medical treatment. The National Institute on Aging states that although the U.S. population over 65 only comprises 12% of the total U.S. population, 25% of all drugs prescribed in the U.S. are for those elderly (National Institute on Aging [NIA], 1995). Many of those elderly have difficulties in managing their medications. Whether the problem be in misunderstanding the pharmacist's instructions for dosage, interactions between multiple drugs taken, or lack of adequate monitoring by a physician, family member, or nursing home staff, the elderly are at risk in large numbers for drug addiction (Beisecker, 1991). Beisecker also notes that the elderly feel susceptible to the risks of taking prescribed drugs but are not educated enough in the uses, misuses, and dangers of those drugs to be able to choose a more positive health behavior in relation to possible drug addiction (and thus lack self-efficacy).

Consequently, physicians and the elderly are two seemingly polar opposites (in relation to drug addiction). "Prevention strategies should focus on susceptibility for health care professionals. In contrast, educational messages targeting the elderly should
focus on the serious consequences of the use of prescribed medications and OTC products" (Beisecker, 1991, p. 247). The HBM allows for different types of individuals to be targeted in ways that will be more beneficial to them. For the elderly, communication messages focusing on susceptibility will be less effective than messages focusing on the serious consequences of drug use. Health care professionals, on the other hand, have the education (in most instances) and messages concerning severity of consequences are not as effective as messages that would stress the susceptibility of the health care professional to become addicted.

Beisecker (1991) also notes that the HBM is useful in creating messages targeted towards adolescents (see Foon, 1986; Kandel & Andrews, 1987). "Adolescents do not realize the serious consequences of using drugs, alcohol, and tobacco, and they do not feel vulnerable to addiction. As a result, messages targeting adolescents need to focus on both seriousness and susceptibility" (Beisecker, 1991, p. 248).

The second exemplar reviewed is an empirical study conducted by Pederson, Wanklin and Baskerville (1984) and is titled: The role of health beliefs in compliance with physician advice to quit smoking. In this study, the researchers set out to evaluate the utility of the HBM in accounting for compliance with a physician’s recommendation to quit smoking. They hypothesized that: 1) patients who believed that: they were susceptible to a worsening health condition; that the health condition would be unpleasant and a cause for concern; and that cessation of smoking is an efficacious means of avoiding more severe disease as a result of smoking, would be more likely to quit smoking than those that do not hold those beliefs; 2) that components from the HBM can serve to explain relationships observed between other variables (i.e. sex, age, marital
status) and patient compliance; and 3) reasons given for smoking are related to compliance and serve to account for (in part) any observed discrepancies between health beliefs and compliance.

This study recruited 308 newly diagnosed pulmonary disease patients from 10 pulmonary specialist’s offices. The subjects were primarily heavy long-term smokers, 63.3% were males, and 36.4% were female with a mean age of 47.7%. Over half of the group (61.4%) was diagnosed as having chronic pulmonary disease, 30.8% were diagnosed as having other respiratory diseases, and 7.8% were diagnosed as having non-respiratory problems.

The study was described by the physician to the patient during the initial exam and all patients were advised, by the physician, to quit smoking. Information provided by the physician included the primary diagnosis, his prediction about whether the patient would quit, and a rating of the strength of the smoking cessation advice given to the patient. A follow-up questionnaire was then mailed to the patients after the examination. Questions covered: some socio-demographic information; smoking information (including duration of their habit and the reason they smoked); HBM variable questions (including perceived severity, probability [susceptibility], and self-efficacy); and general preventive health practices (including questions about exercise, seat-belt use, and regularity of dental check-ups). Smoking status was evaluated by a second mail questionnaire six months after the return of the initial questionnaire.

Initial questionnaires were returned by 279 patients (of these, 7 were lost to death and 7 others were not reached for the 6-month follow-up). Of those that follow-up
information was available for, 12.9% had quit smoking for at least 3 months. The remaining 87.1% were either still smoking or had quit for less than 3 months.

Approximately half of the respondents (52.5%) considered that quitting smoking would help their chest problem, 62.3% noted that they believed smoking to be very likely related to causing their chest disease (probability [perceived susceptibility]), and 68.1% considered such conditions to be very serious (perceived severity). Of the respondents, 74.6% reported that they wanted to stop smoking, most often citing doctor’s recommendation and health reasons for this desire (88.0%).

The relationship between smoking status and health beliefs (hypothesis 1) when looked at from individual variables was not significant. However, when all health beliefs were combined, the results were significant and the HBM variables (as a packaged whole) were a contributing factor to the relationship health beliefs have on smoking status.

There was a noted significance in the relationship between strength of advice from the physician and the patient's perceived severity. Also, the longer the smoking habit existed, the more likely the patient was to feel that it was a severe condition (perceived severity), the more likely the patient was to feel it was causing the problem (probability/susceptibility) and that quitting would be efficacious (self-efficacy).

The importance of health beliefs in accounting for observed relationships between other variables (demographic) and smoking status (hypothesis 2) was not supported. Health beliefs were not found to account for the relationships between socioeconomic characteristics and smoking status.
The importance of "reasons for smoking" in accounting for discrepancies between health beliefs and compliance (hypothesis 3) was weakly supported. Pederson et al. (1984) noted that increasing the strength of these health beliefs did have an effect on those patients who report that reduction of tension is their major reason for smoking. Though, health beliefs would not and did not have an effect on those smokers who were heavily addicted, habitual, or stimulant smokers.

The results of this study indicate that health beliefs should be considered when advising patients to quit smoking. The results also suggest that a patient’s response to advice may depend on the interaction of health beliefs and other variables such as reason for smoking. “Therefore the physician may have to tailor his/her message to the type of smoker who is being treated” (Pederson et al., 1984, p. 579).

The third exemplar reviewed is also an empirical study, written by Witte, Stokols, Ituarte, & Schneider (1993) titled: Testing the Health Belief Model in a field study to promote bicycle safety helmet use. In this study, Witte et al. (1993) set out to determine whether the HBM could be used as a model for health interventions through a field study designed to promote bicycle safety helmets. Previous interventions promoting bicycle helmet usage have achieved limited success. In this study, cues to action were observed to determine whether they were necessary to stimulate the decision making processes in an individual, in relation to a self-protective behavior. Perceived threat (perceptions of susceptibility combined with perceptions of severity) also was investigated to determine what role it played in the HBM process.

Witte et al. (1993) hypothesized the following: (1) perceived susceptibility and perceived severity (in relation to bicycle injury) together compose the single dimension
of perceived threat; (2) cues to action will increase perceptions of threat about bicycling injury; (3) the greater the perception of threat, the more favorable the attitudes towards safety helmets, the stronger the intentions to purchase safety helmets, the greater the likelihood of helmet ownership, and the greater the likelihood of helmet usage; and (4) cues to action will indirectly influence attitudes toward safety helmets, intentions to purchase safety helmets, safety helmet ownership, and safety helmet usage, as mediated by perceived threat.

A pretest/posttest study design was used to test the effectiveness of six different kinds of cues to action on perceived threat and bicycle helmet purchasing and usage. The primary dependant variables were helmet ownership and usage for each child. Each parent-child pair served as the unit of analysis for this study. Parents with children between the ages of 5 and 18 were selected via random-digit-dialing techniques (time 1) and were re-interviewed by telephone interview four months later (time 2).

Questions asked during the telephone interviews, at times one and two, dealt with issues such as: bicycling-behavior (how much parent's children rode their bicycle); perceived susceptibility (how often do you worry about your child being involved in a bicycle accident); perceived severity (asked question related to head injuries from bicycle injuries); perceived threat; dependant variables of attitude; intentions to purchase; behaviors (does your child own a helmet, does your child wear his/her helmet); and cues to action (has a doctor recommended that your child wear a helmet, have you seen any information in your newspaper about bicycle safety or helmets).

Six different cues to action were developed for this study. Three of these cues were community interventions: a special community event (this was done in the form of a
Bicycle Rodeo-in which safety demonstrations and presentations were given), mass media public service announcements, and physician counseling (additionally, physicians were given posters for office display and special prescription pads for distribution). The other three interventions were experimental individual interventions: direct mail communications (mail messages were sent to selected individuals stressing the possible susceptibility and severity of bicycle injury), phone messages (the same messages used in the mailings were read aloud in the form of questions over the phone), and safety helmet coupons (coupons for $10 off the cost of a bicycle helmet) were distributed in the mail.

The results of the study supported hypothesis 1; perceived susceptibility and perceived severity are represented in the single dimension of perceived threat. Hypothesis 2 was generally supported; five of the six cues to action increased perceptions of threat about bicycling injuries. Significant effects were seen in all three of the community-based interventions and in two of the three individual interventions (there was not a significant effect for the direct mailing). Additionally, "A one-way analysis of variance indicated a cumulative effect for the number of different types of cues to action on perceived threat such that the more interventions one was exposed to, the greater the perception of threat" (Witte et al., 1993, p.574). Hypothesis 3 was supported; perceived threat significantly influenced bicycle helmet attitudes, intentions, and behaviors. Lastly, hypothesis 4 was not supported. Perceived threat acted as a mediator in only one case (between physician counseling and attitudes). Cues systematically and consistently predicted perceived threat and perceived threat systematically and consistently predicted attitudes, intentions, and helmet ownership. This proves contrary to the original thought that cues to action might indirectly influence behaviors as mediated by the perceived
threat component. "According to the HBM, however, a cue such as a physician counseling would not be expected to have a direct influence on helmet-purchasing behaviors. Rather, physician counseling should first increase perceptions of threat, which then may impact helmet usage or purchasing" (Witte et al., 1993, p. 567). As they found, the community event (such as physician counseling) did significantly influence perceived threat, and perceived threat did in fact predict each outcome (such as helmet purchasing behaviors). However, a cue to action would fail to predict any of the outcomes, directly or indirectly.

Interesting discussion surrounds the results. Individuals exposed to each of the community-wide cues were more likely to perceive bicycle injuries to be more serious and more likely to occur to their children than those individuals not exposed to the community-wide events. This finding demonstrates that community-wide interventions/campaigns designed to increase awareness and relevance of health issues can be effective.

Overall, they found (through regression analysis) that cues to action were able to increase perceptions about threat and in turn, perceived threat was shown to be a powerful motivational influence on attitudes, intentions, and behaviors.

As these examples show, the HBM has many applications, and can be used with many target populations. The utility factor of different perspectives is vital to consider and thus, we can see the dynamic relationship between the HBM and health communication as another vital perspective to explore. This important association is elaborated on in greater depth below.
Health Belief Model in Health Communication

As noted by Glanz et al. (1997) in their review of 497 articles from 1992-1994, the HBM has been used in at least 100 of the articles reviewed. Additionally, the HBM has been said to be the most widely used conceptual framework in health behavior research (Strecher & Rosenstock, 1997).

While the HBM is being used in fields ranging from social psychology to health education, it is difficult to decipher and separate what is being done with the HBM in regards to strategic health communication. Much of the research that is being conducted using the HBM may have a strategic health communication perspective included within, but not elaborated upon explicitly. To use that knowledge and research to our benefit, various pieces of research, which suggest ways in which strategic health communication can be effective in the HBM, are presented in this thesis.

Strategic Health Communication in the Health Belief Model

Strecher and Rosenstock (1997) note that one of the most needed activities in relation to public health interventions concerns "three aspects of the HBM: its components, the relationships between those components, and how to use the HBM to examine issues of public health concern" (p. 41).

What we are interested in here are these three aspects of the HBM and how strategic health communication can generally inform this model and possibly make it more effective. The pieces that come into play now are the components of the HBM and how they are used. One of those components, self-efficacy, is a very powerful component of the HBM and the relationship between it and strategic health communication is discussed below.
Efficacy Expectations in Strategic Health Communication

As was noted earlier, efficacy expectations were an important addition to the HBM. These efficacy expectations may come from four major sources: (1) personal accomplishments, (2) vicarious experience, (3) verbal persuasion, and (4) physiological state (Strecher, DeVellis, Becker, & Rosenstock, 1986).

(1) Personal accomplishments are referred to as personal experience where one achieves a personal mastery over a previously feared task or activity.

(2) Vicarious experience refers to the learning that occurs as a result of observation of events or of persons.

(3) Verbal persuasion consists of the actual conversation concerned with trying to influence someone to change an unhealthy or adopt a healthy behavior.

(4) Physiological state is concerned with the arousal that one feels in relation to a certain behavior.

It can be seen quite clearly that at least two of the defined self-efficacy expectation sources come from variables that are very directly related to strategic health communication and therefore the component, cues to action: vicarious experience, and verbal persuasion. In these cases, health communication could both create situations where others can observe more healthy behaviors being practiced (perhaps in the form of a health fair), and can directly engage individuals in conversation designed to persuade someone to adopt a more healthy behavior (perhaps also in the before mentioned health fair). We must use this valuable information to inform our creation of future health interventions.
Cues to Action

Cues to action is another variable used in the operationalization of the HBM, as a partial predictor of perceived threat (though it also could be used as a message variable to influence perceived susceptibility, severity, barriers, benefits, and self-efficacy). According to the HBM, cues to action indirectly influence behaviors as mediated by the perceived threat component, though Witte et al. (1993) did not find this to be true. In a study on nonattenders in mammography screening, it was found that a physician's recommendation was the single best predictor of adherence to mammography (Lidbrink, Frisell, Brandberg, Rosendahl, & Rutqvist, 1995). And, in another study of mammography screening and prediction of why women get regular mammograms, the most significant predictor of having had a mammogram in the past year was suggestion by a physician to have a mammogram (Rimer, Trock, Engstrom, Lerman, & King, 1991). One study (Pederson et al., 1984), regarding smoking cessation noted, in regards to a physician's messages, that there was a positive association between strength of a physician's message and perceived severity. Possibly one of the most thorough studies on the importance of cues to action though, came in the study by Witte et al. (1993), reviewed as one of the previous exemplars.

This research demonstrates that cues to action, and therefore strategic health communication, are very useful in affecting perceived threat, and as a result, in affecting the likelihood of attending to a recommended health action.
Chapter Three
Transtheoretical Model

History of the Transtheoretical Model

The Transtheoretical Model (TTM), also known as the Stages of Change Model (SOC), emerged from a comparative analysis of the leading theories of psychotherapy and behavioral change (Prochaska, Redding, & Evers, 1997). This was done to consolidate the more than three hundred theories of psychotherapy that existed at that time.

The change processes (described below) were selected by examining the recommended change techniques across different theories, hence the term "transtheoretical" (Prochaska, DiClemente, & Norcross, 1992). The original model began with five stages of change: precontemplation, contemplation, preparation, action, and maintenance. Those were modified when further analyses suggested only four stages, leaving out the preparation stage. This happened through misinterpretation of data used to identify primary components in which subjects reported individual behaviors. Future re-evaluation of the data revealed that the preparation stage was being overlooked because of overlap in stage consideration. (Subjects were scoring high on the contemplation and action scales and this result was masking identification of preparation as a primary stage.) Further research re-identified preparation as a distinct stage and the TTM is once again considered to contain five (six, if including termination) stages of change (see DiClemente et al., 1991).

2 The Stage of Change dealing with termination is not used in all TTM research and may be ill-conceived. That is, individuals may never actually reach a stage where no attention given to maintaining said healthy behavior. One example of this perspective is the concept that an alcoholic is always an alcoholic and thus needs to constantly attend to the healthy behavior state.
Components of the Transtheoretical Model

The TTM attempts to explain, predict and lay the foundation for control of specific health behaviors by identifying stages of behavior change and processes of change within those stages. Administration of a pre-measure defines the stage of change that individuals are in at the beginning of any given intervention. Each of the stages of change will be described below. Pieces of the following explanations of the stages of change were taken from Prochaska, DiClemente, & Norcross (1992) and Prochaska et al. (1997).

1) *Precontemplation* is the stage in which an individual seemingly has no intention of changing, or taking action in changing a health behavior anytime in the foreseeable future. The foreseeable future time frame used here is 6 months. In the precontemplation stage, an individual may not even be aware of a negative health behavior.

2) *Contemplation* is the stage in which individuals seemingly do have intention to change, or will take action in changing a health behavior within the next six months. Individuals in the contemplation stage are aware of both the costs and the benefits of the target health behavior and will go through a kind of cost benefit analysis in deciding whether to continue contemplating the change in behavior. Prochaska et al. (1997) states that during the precontemplation and contemplation stages, action-oriented programs and traditional health promotion programs are not likely to be effective for individuals because of the lack of commitment to the behavior change.

3) *Preparation* is the stage in which individuals intend to take action, usually within the next month. These individuals have a plan of action, such as reading a
self-help book, joining a fitness club, or enrolling in a health education class. This is the stage in which individuals are most likely to attend to and participate in action-oriented programs and traditional health promotion programs (e.g.: a weight loss or smoking cessation program).

The first three stages of change (precontemplation, contemplation, and preparation) are affected by cognitive processes and movement through these stages is noted to be dependent upon motivation (a direct result of cognition) (DiClemente, 1995).

4) *Action* is the stage in which individuals have made specific changes in their behaviors and lifestyles in the past six months. Prochaska et al. (1997) notes that action is typically associated with behavioral change because it is observable behavior. (In other words, behavioral change is generally perceived to occur in only the action stage because of the ability to see the change. However, change may be occurring internally, in any one of the other stages of change included in the TTM.) In the TTM, though, it is only one of the steps in the process of behavioral change. "Individuals are classified in the action stage if they have successfully altered the addictive behavior (negative health behavior) for a period from one day to six months" (Prochaska et al., 1992, p. 1104).

5) *Maintenance* is the stage in which individuals work to prevent relapse. Though there is an effort expended to prevent relapse, there is not as much effort given as there is in the actual action step (because of greater confidence in ability to continue with recommended health action).

The preparation, action, and maintenance stages are considered to be affected by behavioral processes. One of the primary variables that has shown importance to the
movement through the action and maintenance stages (because of their grounding in behavioral processes) is self-efficacy (DiClemente, 1998). Self-efficacy though cognitive in nature (that is, change in self-efficacy requires a cognitive process), is considered to be a behavioral process, because without a sufficient level of self-efficacy, no behavioral change occurs or is maintained.

6) **Termination** is the step in which an individual will not return to the problematic health behavior. These individuals have complete self-efficacy. In the termination step, the individual will behave as though no harmful or negative behavior ever existed. Prochaska et al. (1997) state that termination may not be appropriate for certain behaviors such as cancer screening or dietary fat reduction, but do not explicitly state why that might be. The probable reason for this is because behaviors such as cancer screening and fat reduction are adopted behaviors as opposed to extinguished behaviors. This distinction between stopping an unhealthy behavior and starting a healthy one has been virtually ignored and there are probable significant differences influencing the factors that motivate each type of behavior.

Prochaska et al. (1992) note that the stages of change allow us to understand *when* particular shifts in attitudes, intentions, and behaviors occur, while the processes of change allow us to understand *how* those shifts occur. Those processes of change are: 1) consciousness raising, 2) dramatic relief, 3) self-reevaluation, 4) environmental reevaluation, 5) self-liberation, 6) helping relationships, 7) counterconditioning, 8) contingency management, 9) stimulus control, and 10) social liberation. Pieces of the
following explanations of the processes of change were taken from Prochaska et al. (1992, 1997).

1) Consciousness raising involves finding facts, ideas, and the like that support the healthy behavior change for the individual.

2) Dramatic relief involves experiencing the negative emotions that accompany the unhealthy behavior that is being targeted for change.

3) Self-reevaluation concerns the realization that the behavior change is an important part of one's identity as a person.

4) Environmental reevaluation concerns the realization that the negative health behavior or the positive effects of the positive health change affects one's social and physical environment.

5) Self-liberation involves the decision and personal commitment to make a positive health behavior change.

6) Helping relationships involves the seeking out and use of social support for help with the change to a healthy behavior.

7) Counterconditioning is the act of substituting healthier behaviors for the unhealthy behaviors currently being practiced.

8) Contingency management concerns increasing the rewards to be gained for the positive behavior change and decreasing the rewards for continuing to participate in the negative health behaviors.

9) Stimulus control is defined by removing cues that remind the individual of the negative health behavior and increasing cues that remind her/him of the positive health behavior.

10) Social liberation concerns the realization that an individual's social norms are changing in favor of the positive health behavior and away from the negative health behavior.

One of the earliest empirical relations to be discovered in the TTM allowed Prochaska et al. (1992) to map the processes of change onto the stages of change (integration of both the stages of change and the processes of change allowed for
mapping of the processes of change against the stages of change). As a result of this integration, one could see what strategies were most effective in each stage of change (see Figure 2). For example, if an individual were in the contemplation stage, it would not be effective to employ contingency management or counterconditioning. Those would be much more effective when aimed at an individual who is in the action stage. Each process of change has been placed beneath the stage(s) of change which is/are most responsive to that process of change.

Figure 2: Stages of Change in Which Change Processes are Most Emphasized (Prochaska et al., 1997)

<table>
<thead>
<tr>
<th>Stages of Change</th>
<th>Precontemplation</th>
<th>Contemplation</th>
<th>Preparation</th>
<th>Action</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processes</td>
<td>Consciousness-Raising</td>
<td>Dramatic Relief</td>
<td>Environmental-Reevaluation</td>
<td>Self-reevaluation</td>
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<td>Contingency management</td>
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<td>Counterconditioning</td>
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<td></td>
<td>Stimulus control</td>
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</tbody>
</table>

Though it is the case that the processes of change were mapped onto the stages of change, the current research has provided little explanation of the utility of the processes, in relation to the stages of change (DiClemente, 1998). The primary use of the TTM for researchers does not involve the use of the entire TTM model, but rather just the stages of change within the TTM. Much of the current TTM research focuses only on identifying study participants' stage of change, rather than identifying the stage of change and then
implementing the processes of change in an attempt to attain behavioral change (see Grimley, Prochaska, Velicer, & Prochaska, 1995; Pallonen et al. 1994; Velicer, Hughes, Fava, Prochaska & DiClemente, 1995). Though some research has been done using both the stages of change and the process which accompany those changes (see Velicer et al., 1993; DiClemente & Prochaska, 1982) more research still needs to be done in order to understand the processes of change better. Therefore, there is a need to integrate the processes of change with the stages of change or to indicate how another model or theory may be used in a beneficial fashion with the actual stages of change from the TTM (this is elaborated upon later in this work).

TTM Exemplars

As with the HBM, detailed examples of TTM research will be provided, to give the reader a point to refer back to while reading the TTM citations and examples given in the rest of this thesis.

The first TTM exemplar reviewed was written by Pallonen, Leskinen, Prochaska, Willey, Kaariainen, & Salonen, (1994) titled: A 2-year self-help smoking cessation manual intervention among middle-aged Finnish men: An application of the Transtheoretical Model. This piece is reviewed because it is widely cited in the literature and because it is a very sound example of the use of the TTM in an intervention.

This study explores the implementation of a smoking cessation intervention that is not immediately action-oriented (like many self-help smoking programs). Many smoking cessation intervention programs are directed at changing individuals' behavior in the first 2-3 weeks of participation in the program. However, large percentages of smokers report to be uninterested in quitting and only 10 to 20% of current smokers are ready to quit
within the next 30 days and could benefit from one of those action-oriented interventions (Pallonen et al., 1994). Therefore, we might be much more effective (in reaching a broader audience and moving them through the stages of change continuum) if we were to fashion our interventions to those that were not prepared to quit any time in the near future.

The intervention under review utilized a set of five self-help manuals developed for each stage of change to instruct/assist a smoker in achieving cessation. These manuals were validated in long-term follow-up among volunteers in the Northeast United States. They were then given to middle aged Finnish men whose smoking rates are quite comparable to those of their United States counterparts.

This longitudinal study initially recruited 533 Finnish male smokers for screening and possible admittance to the study. Two hundred sixty-five study participants were able to be evaluated due to others being excluded from the study based on factors such as illness, death, having quit smoking, or incomplete data. After recruitment, these study participants were surveyed with a TTM classification tool and were classified into one of three stages of change: precontemplation, contemplation or preparation. After stage of change was defined, two-thirds were randomly assigned to a treatment condition (received tailored messages through manuals designed to assist in the smoking cessation process) and one-third were assigned to a usual care condition (did not receive tailored manuals designed to assist in smoking cessation). Those in the manual treatment were assessed at the 6th, 12th, 18th and 24th months and those in the usual care treatment were assessed at the 12th and 24th months, to determine their stage of change. Those in the usual care treatment were only measured at the 12th and 24th months in an attempt to
reduce potential measurement reactivity (it is not noted why measurement reactivity was not a concern for those in the manual care treatment).

The manual interventions consisted of five 10-20 page self-help manuals designed for each of the five stages of change. One of these manuals was mailed to a subject biannually after stage assessment. For example, if an individual measured at the precontemplation stage at baseline, he would be sent a manual corresponding to that stage. If he then measured at the contemplator stage at the 6 month he was mailed the manual that was designed for the contemplators. If an individual measured at the same stage of change, no manual would be sent.

Results showed success for the intervention. The 2-year results showed that those receiving stage-matched manuals to help them with their cessation attempts quit smoking more and made more attempts to quit than did those that were in the usual care condition. In the first year, contemplators showed a quit rate of 25% and 28.8% in year two. In the first year precontemplators showed a quit rate of 7.6% in both years one and two. Also important to note is the fact that of baseline contemplators, 46% had regressed to the precontemplation stage and 40% had moved to the action and/or maintenance stages. This demonstrates the need for attention to follow-up measurements of the stage of change that an individual is in at any given time.

Though only 19.1% (in year one) and 14.4% (in year two) of the participants thought that the manuals were "quite helpful" or "very helpful," stage of change and usefulness rating were significantly related. This trend did not hold true in year 2, though. There was a significant relationship between exposure to the intervention and evaluation of the usefulness of the manuals. Those who reported reading most or all of
the intervention materials rated them as more useful than those who had not read them at all or only a little. This suggests that the intervention materials may have had an effect on those that did not read the intervention materials, if only they had read them. A strategy needs to be created to inspire these non-attenders to read the intervention materials if they are to be successful in adopting a healthy behavior (elaboration is given in chapter 5). Although, it must be noted that this is only one of a number of alternative hypotheses that are plausible. Another hypothesis might state that those who are more motivated to read intervention materials are closer to a change in stage, or vice versa.

The major intervention effect in the baseline contemplation stage was that exposure to manuals, designed to target individual stages of change, prompted significantly more smokers in the treatment condition than in the usual care condition to quit smoking. The bottom line of the study reported that the use of mailed stage-matched manuals has the potential to provide a cost-effective public health intervention to accelerate the smoking cessation process.

The second TTM exemplar reviewed was written by Grimley, Prochaska, Velicer, & Prochaska (1995) titled: Contraceptive and condom use adoption and maintenance: A stage paradigm approach. This study explores the applicability of the TTM to contraceptive and condom use maintenance among sexually active college-age men and women. In the United States each year, there are an estimated 13 million cases of STDs and nearly two-thirds of those STDs occur in people younger than 25 years of age (National Institute of Allergy and Infectious Disease [NIAID], 1998). This is a significant public health problem in need of being addressed and this study attempts to explain one solution using the TTM. The TTM has been applied to a wide range of
health behaviors, both theoretically (in regards to HIV prevention) and empirically (in regards to STD prevention and safer-sex practices).

The hypotheses of this study were: 1) that a more sensitive assessment of condom use may result from an examination of condom use behavior with main versus other partners, potentially leading to a better understanding of men’s and women’s attitudes and behaviors regarding condom use; 2) that individuals in the precontemplation stage would evaluate the negative aspects of using contraceptives and/or condoms as being higher than the pros of their use and that the relation between the pros and the cons would be reversed for those in the maintenance stage; and finally 3) that individuals were expected to report the lowest levels of perceived self-efficacy in the precontemplation stage and confidence levels were expected to rise moderately across the stages of change for the separate contraceptive behaviors.

Of a pool of 550 students from a northeastern university’s psychology classes, 303 volunteered to be included in this study and 248 were finally selected to be participants (55 met exclusion criteria: being married, being homosexual, and not being sexual active). Of the final sample, most were Catholic (70%), the large majority were Caucasian (94.7%), and most were female (62.5%).

Questions about basic demographics; sexual history assessment; stages of change algorithms for general contraceptive use, condom use with main partner, condom use with other partners; decisional balance measures (perceived barriers vs. perceived benefits); and self-efficacy measures for all three construct behaviors, were included. Participants were asked to complete the questionnaire anonymously.
Results of the study noted that half of the sample (58.7%) had engaged in vaginal intercourse by age 16, with 63.3% noting that a condom was used during this first sexual intercourse. More than half the sample reported having three or more sexual partners since becoming sexually active, with men reporting significantly more partners than women. Just over one third (39.8%) reported condom use with their main partner for prevention of pregnancy and disease, as compared to 75.3% of those having vaginal intercourse with other partners. Of those that used contraception, 64.2% used condoms (though, not consistently), 27.0% used the pill, 1% used the sponge (no longer available), and 7.8% reported using nothing.

Results indicated that 50.6% of the sample were not using a method of birth control every time (49.4% of the sample were in the action or maintenance stage for birth control use); 51.4% were not using condoms every time to prevent pregnancy and/or STDs when engaging in vaginal intercourse with casual partners (48.6% of the sample were in the action or maintenance stage for condom use with casual partners); and 70.4% were not using condoms every time with their main partners (29.6% of the sample were in the action or maintenance stage for condom use with main partners). No sex differences were found in the staging distributions.

The overall mean score of the decisional balance measure indicated the highest perceived benefit for both general contraceptive use and for condom use with a main partner was protection from pregnancy. For using condoms with casual partners, the highest reported perceived benefit was protection from diseases. These findings suggest that individuals in this sample may perceive themselves at risk for becoming pregnant with a main partner, and see themselves at greater risk for contracting diseases with
casual partners. The highest perceived barrier for general contraceptive use was that it can make sex feel unnatural. The highest perceived barrier for condom use with both partners was relying on a partner’s cooperation.

Contraceptive use and staging across the stages of change were consistent with Prochaska’s “strong and weak principles” for behavior change (Prochaska, 1994). The strong principle states that progression from the precontemplation to the action stage is a function of approximately 1 standard deviation increase in the pros of a health behavior change. The weak principle states that progression from the precontemplation to the action stage is a function of approximately one-half standard deviation decrease in the cons of a health behavior change. The findings of Grimley et al. (1995) noted that the pros of condom and contraceptive use increased approximately 1 standard deviation between the precontemplation and action stages for all three of the contraceptive behaviors. Additionally, the cons showed a half standard deviation decrease for two of the three behaviors. Significant differences were noted between the perceived benefits and perceived barriers across the stages of change for: general contraceptive use, condom use with main partner, and condom use with an “other” partner.

For self-efficacy, significant differences were found across the stages of change for all three contraceptive behaviors: general contraceptive use, condom use with main partner, and condom use with “other.” For each of these behaviors, self-efficacy climbs from its lowest point in the precontemplation stage to a peak in the action or maintenance stage.

“The overall findings suggest that the measures for the three constructs from the transtheoretical model—stages of change, decisional balance, and self-efficacy—hold
promise for their application to college men and women in the area of contraceptive and condom use adoption and maintenance” (Grimley et al., 1995). Men and women did not differ on present contraceptive and condom use or their intentions to use them in the future. Additionally, for all three contraceptive behaviors, individuals in the precontemplation stage of change were shown to evaluate the perceived barriers as higher than the perceived benefits of their use. The opposite was true of those in the maintenance stage of change. Crossover concerning the perceived benefits and perceived barriers were noted to occur before the move to the action stage of change. Self-efficacy was found to be highest for females in respect to using general contraceptives and for using condoms but only with “other” partners. In addition, lower levels of confidence were reported by both men and women in respect to efficacy and a main partner, suggesting that important intimate relationship issues (e.g., fidelity, commitment) may interfere with condoms being used. Finally, as noted before, perceived self-efficacy was the lowest for individuals in the precontemplation stage and was shown to increase as individuals moved further along in the stages of change.

Recommendations for future research suggest that health care providers assess an individual’s contraceptive use behavior with different types of partners. Additionally, recommendations for interventions that stress sex differences should also emphasize partner type. This and other research has shown that movement from precontemplation to contemplation is a function of an increase in the perceived pros of using contraceptives and/or condoms. Large scale, expensive media campaigns that focus on the negatives might be more effective if they were to focus on the positives and the advantages to the recommended behavior. The self-efficacy results suggest that, “Informational and
motivational strategies that will assist individuals in becoming better prepared for contraceptive and condom use are needed, if people are to acquire and maintain their recommended use” (Grimley et al., 1995). With a more complete knowledge of the TTM, we now move to discussion of the strategic health communication that can assist in making TTM intervention messages more effective.

**Strategic Health Communication Within the Transtheoretical Model**

Although the TTM has not yet gained the popularity of the HBM, its influence is increasing. As noted by Glanz et al. (1997), the TTM has been used has been used in 50 articles that were reviewed, and is today gaining more and more acceptance. "Another reason for its widespread acceptance surely is its intuitive appeal. Treating people as though they are all the same will inevitably dilute the impact of interventions. The TTM allows practitioners to treat individuals as individuals" (Rimer, 1997, p. 143). Because the HBM was devised in 1958 and the TTM in 1979, the gap in usage may correspond to the time frame each theory has been in use. However, it is clear from the number of articles citing use of the TTM/SOC that more will be done with this model in the future.

The research that exists on the TTM also has been geared toward uses in the health education and health behavior fields, similar to the HBM. Literature that suggests TTM primary usage in regards to the use of the strategic health communication perspective within intervention messages is non-existent (possibly because most TTM research seems to be focused on identifying people in their stage of change, as opposed to studying the processes of change at work within the stages themselves). Either more research needs to be done with the strategic health communication perspective in mind, or the literature that does exist needs to be looked at from the strategic health
communication perspective (as is being done here), so that the body of literature concerning the TTM might be able to provide more answers about the use of strategic health communication in the TTM.

Despite the lack of a strategic health communication perspective, the utility of the TTM is evident when looking at the research that now surrounds it. Though, until the very late 1970's and very early 1980's, the stages of change, as recognized today, were virtually unnoticed. "These naive [research] subjects were describing a phenomenon that was not included in current therapy theories. They were revealing that behavioral change unfolds through a series of stages" (Prochaska et al., 1997, p. 60). The interesting thing to note, though, is that the movement through those stages can only really be addressed by strategic health communication and the modification of intervention messages. Cues to action is the tool to use when modifying those TTM messages.

**Cues to Action Within the Stages of Change**

The most noticeable use of strategic health communication that surrounds the TTM literature is related to the modification of cues to action. These cues to action regard intervention messages based on the present stages of change of an individual or target population. Grimley et al. (1995) notes that interventions that blanket populations are not addressing the needs of all those being targeted. He suggests the following with regard to the use of the TTM in an intervention regarding condom use, "Information and motivational strategies that will assist individuals to become better prepared for using contraceptives and condoms are needed first if people are to acquire and maintain their recommended use" (Grimley et al., 1995, p. 33). Tailoring of cues to action was noted by many different studies to be of importance (Campbell et al., 1994; Marcus et al., 1992;
Pallonen et al., 1994; Skinner, Strecher & Hospers, 1994). In many cases, cues to action were changed to address qualities that were noted with formative and exploratory research/surveys. An example addressing fat intake and diet change is given below. In this example, individualized diet feedback was given, based upon baseline fat and fruit/vegetable intake measurements. Contemplators received information designed to increase self-efficacy and to decrease perceived barriers. "Depending on stage of change, self-efficacy, and history of past relapse, participants also received tailored recipes and to provide cues to action. Those individuals who were already trying to change received tailored recipes and messages aimed at preventing relapse" (Campbell et al., 1994, p. 785).

Though we will discover later in this text that addressing self-efficacy in the contemplation stage is not recommended, the general idea of stage targeting individual health belief components is a step in the right direction. More elaboration on this point will be made in chapter 5.

Various studies reviewed also addressed the need to tailor individual cues to action to the respective stages of change within the population targeted by the intervention at hand (Campbell et al., 1994; Marcus et al., 1992; Pallonen et al., 1994; Skinner et al., 1994). In addressing the need to tailor cues to action in the stages of change, Marcus et al. (1992) gave examples of how messages might be modified to address the various stages of change. An example of the suggestions for the contemplation, preparation, and action stages follows.
Contemplation:

The four page document that was sent to those in Contemplation was entitled 'What's in it for you?' and focused on the costs and benefits of activity, setting short and long term goals, rewards for activities, time management, and details on developing a walking program.

Preparation:

Subjects in Preparation were sent a four-page document entitled, 'Ready for Action.' This document focused on increasing physical activity, considering the social benefits of activity and learning how to reward oneself for increasing activity.

Action:

Subjects in Action received a four-page document titled 'Keeping it Going,' which focused on troubleshooting situations which may lead to exercise relapse, goal setting, rewards for activity, cross training, avoiding injury, and cultivating exercise partners (Marcus et al., 1992, p.427).

The tendency to focus materials only on information pertinent to individual patients also has been noticed in relation to behaviors such as breast cancer and mammography screening. "Whereas the standardized letters addressed a variety of factors that might be relevant to recipients, the tailored letters addressed only those that, according to the interviews, were relevant to the recipients. For instance, tailored messages reported the risk factor of age only for women who were older than 50 and the
risk factor of family history only for women who had a relative with breast cancer” (Skinner et al., 1994, p. 44).

Results are also better when using the stages of change to modify health messages in an effort to affect behavioral change. Campbell et al. (1994) notes, "Participants who were sent tailored messages were more than twice as likely as those who were sent non tailored messages to remember receiving the information” (Campbell et al., 1994, p. 786). Information retention, in reference to a recommended health behavior such as mammography screening or eating right, could be vitally important (Skinner et al., 1994).

The same study also noted results in reduction of dietary fat intake. "A study by Campbell et al. (1994) demonstrated that messages individually tailored to a person's stage of change generated a significantly greater reduction in dietary fat intake than non-tailored messages based on dietary guidelines” (Greene, Rossi, Reed, Willey, & Prochaska, 1994, p. 1109). This is just another example of the possibilities that exist when using cues to action within the TTM or even just within the stages of change alone.

Subtleties of Strategic Health Communication in the Stages of Change

Other work has focused on the need to address the stages of change and the differing beliefs that are associated with that population and their stage of change. Grimley et al. (1995) suggest, in relation to STD prevention and contraceptive use, that future campaigns might be best utilized if they were to focus on stressing the advantages and safety of contraceptives as opposed to the negative information giving that occurs as a result of informing about the negative effects of certain unhealthy behaviors. "Modification techniques should deal directly with the positive aspects of contraceptive and condom use for individuals who are in the precontemplation stage of readiness (e.g.,
'Using condoms tells your partner that you care about them')" (Grimley, 1995, p. 32). This is a new twist on the old style of information giving that we are used to seeing and hearing. Scare tactics as noted above, are less effective than positive messages, when addressing those that are already not very receptive to ideas about changing behaviors (precontemplators).

Modification and adaptation of future intervention messages might best be served by using cues to action to address the outliers to a stage of change as well as those that are firmly rooted in their present stage (this would require additional data gathering, designed to ascertain this information). The following observation addresses that point: "...for each stage, there was one subtype that was very similar to the next stage, and there was one subtype that was more similar to the previous stage (except Precontemplation)" (Velicer et al., 1995, p. 317). Velicer et al. (1995) suggest that the use of targeting to subgroups as well as the primary stages themselves might make the TTM more effective in eliciting behavioral change. More research needs to be generated in regards to this phenomenon if there is to be definitive use of subtypes and cues to action with regard to those subtypes in future TTM interventions.

Important to recognize as well is the idea that certain behaviors can be addressed through one type of cue (message) unsuccessfully and through another dealing with essentially the same behavioral change in a much more successful manner. In discussing contraceptive use, "The differences between birth control use and disease prevention contraceptive use across the five stages of change, in general, indicate that this college population is much further along in the stages of change for pregnancy prevention as compared with STD prevention" (Grimley, Riley, Bellis, & Prochaska, 1993, p. 467). In
In this case, it would make much more sense to target birth control interventions toward pregnancy prevention than it would to use STD prevention as the primary focus. Thus, the communication associated with forming and relaying that information, as well as the cues to action used, would have to change.

**Success Rates of Using the TTM in Interventions**

In the current research, there are many indications that the TTM aids in making more successful interventions. The majority of the successes are noted in interventions that deal with smoking cessation. "For example, an intensive smoking cessation program for cardiac patients, which focused on the Action and Maintenance stages, was highly successful for those in Preparation (94% abstinent) but was much less successful for those in Contemplation (35% abstinent) and Precontemplation (0% abstinent)" (Marcus et al., 1992, p. 425). It is helpful to those that are designing future interventions focusing on certain stages of change, in regards to behavioral change, to know how the stages of change might assist in intervention development.

In the above study, there was a noted change in the attention that was given to movement through the stages. In the Marcus et al. (1992) study, 30% of those in the Contemplation stage and over 60% of those in the Preparation stage at baseline had progressed to the Action stage after the six-week intervention. Additionally, another 30% of baseline Contemplators had moved forward to the Preparation stage by the conclusion of the intervention. The study fails to mention the percentage of stage change difference for the precontemplators, however, the authors did note that the intervention was very unsuccessful in changing behaviors for those in the precontemplation stage. This is likely
because no materials were directly tailored to those in the precontemplation stage but were only tailored to those in the contemplation, preparation, and action stages.

We must be careful to recognize that cues to action can take the form of any number of variables and a program could thrive or fail as a result of effective or poor cues to action. For example, if the cost of a pack of cigarettes was to increase by two dollars, a precontemplator might decide to consider smoking cessation, which might then lead to preparation for a change, and from there into active smoking cessation. In this example, the $2 price increase was the cue to action that motivated the smoker to move through the stages of change to adopt a more healthy behavior. In relation to patterns of sexual behavior change in men from various U.S. cities, Freeman notes: "Among men included in the four-city evaluation, positive changes in behavior may be associated with training in safer sex skills, enhancing a person's self-confidence in practicing those skills, and identifying and promoting peer support for HIV-risk reduction" (Freeman, Cohn, Corby, & Wood, 1991, p. 793). Freeman's note stresses the point that individuals may perform healthy behaviors more effectively if feelings of self-efficacy and actual ability to perform the recommended action well are reinforced by some sort of cue.

Another example of the use of strategic health communication in making TTM interventions more successful for smoking cessation follows. Manual intervention materials (manuals given to participants to allow for individual accomplishment of smoking cessation) given to both precontemplators and contemplators proved more successful in cessation of smoking than usual care conditions among the precontemplators and contemplators (see TTM exemplar, Pallonen et al., 1994). Precontemplators showed significant decrease in smoking cessation, where the quit rate
during the first year of the intervention reached 25.0% and 28.9% in the second year (Pallonen et al., 1994). The study shows that use of mailed stage-matched manuals has the potential to provide a cost effective public health intervention to accelerate the smoking cessation process even in a less-educated male population, a group which is less successful in quitting (Pallonen et al., 1994).

This same success in smoking cessation interventions also was also noted by Greene et al. (1994). "Individualized, self-help intervention materials based upon the person's stage of change more than doubled the rate of smoking cessation compared with the traditional action-oriented self-help manuals" (Greene et al., 1994, p. 1106). This stresses the point that individuals may be able to be targeted better if stages of change are determined and used to fashion intervention materials. From this point, we move to the suggested future use of the TTM.

**Future Use of TTM**

Many recommendations are given for the future of the TTM. The most thorough of them suggest a more complete, but still linear path for interventions that might be followed in the future.

The presence of subtypes has potential for utility in the design of interventions. We can view interventions as ranging from broadly targeted interventions to individually tailored interventions. In the smoking cessation area, a broadly targeted intervention would be the same for all smokers. Examples might include policy change, general use manuals, or media campaigns. A second, less broad level would include interventions designed for each of the stages. A third, even less broad level would be interventions designed for each of the separate subtypes.
within stages. No example has been developed yet. At the fourth level would be interventions tailored to individuals. Examples of this would include counselor calls, clinically-based interventions, or expert system interventions (Velicer et al., 1995, p. 318).

This example shows the importance of attention to individual stages of change, while also attending to a larger interventional goal. Though the above suggestion has not been empirically tested, but the theory supports its development and use (see Velicer, 1995).

Additionally, the use of: cues to action, perceived susceptibility, perceived severity, perceived barriers, and perceived benefits could all be useful in using the stages of change in intervention development and implementation. However, that attempted integration of models had not occurred until now. This integration of HBM and TTM components is needed so that future health interventions can capitalize on the successful components of both the HBM and the TTM. Without this union, HBM and TTM interventions will continue to lack perspective that the other can provide, through the use of each model's empirically proven components. With this union, a more thorough perspective concerning the benefits that both models can offer will prevail. This integration of these models is detailed in the following chapter and the result of that integration, a new more comprehensive model, is presented in chapter five.
Chapter Four

The Transtheoretical and Health Belief Model Pair

The Stages of Change as the Base for a More Comprehensive Model

The success of the HBM and TTM/SOC in interventions is clear. We must now consider how best to employ that HBM and TTM/SOC success, creating a base for a more productive partnership between these two models. Both models contain components that have shown success in interventions designed to achieve behavioral change; however, both also have components that have not been successful across similar interventions. Therefore, in an attempt to utilize and gain optimum performance from the components that have shown effectiveness in interventions using the HBM and TTM, a model that utilizes those effective components must be constructed. The stages of change from the TTM seem to provide us the best base for a new intervention model, as stage of readiness to change could possibly affect all other components and their effectiveness in bringing about behavioral change.

When evaluating recent studies on the TTM, it is important to note that many different approaches are taken when testing the model. In many studies, only the stages of change (less the processes of change) are used (Bowen & Trotter, 1995; Campbell et al., 1994; Fishbein & Guinan, 1996; Grimley et al., 1995; Skinner et al., 1994). Other studies state that the processes of change are being used, but they do not address how the processes are being used (no elaboration is given on the process measurement tools or the results of using the processes). Also important to recognize is that when there is indication of how the processes of change are being used, there is no elaboration given to understand what effect strategic health communication might have had on the processes.
(DiClemente & Prochaska, 1982; Grimley et al., 1996; Marcus et al., 1992). This lack of implementation of the process of change is not a deficiency of the TTM itself, but rather a deficiency in the use of the TTM by researchers. By not utilizing the processes of change in more studies, researchers cannot determine their effectiveness or ineffectiveness and we are left with components that are essentially ineffectual.

Two studies note that the processes of change are measured by questionnaire (DiClemente & Prochaska, 1982; Velicer et al., 1995), but these studies do not elaborate on the intervention materials and whether they addressed certain individual processes of change. They simply state that a questionnaire was used to elicit the participant's opinion of which processes of change were used by individuals during each stage of change. Gaining the knowledge about which process is being used by certain individuals is very important and interesting, but without using that information, future interventions will fail to improve. If there was attention given to the processes of change in these studies, it needs to be made evident and the results need to be given.

Complexity is one explanation for why the processes of change are not being used. Use of the processes of change would require extensive pre-measure validation, as well as repeated measurement throughout an intervention, so as to identify which processes of change individuals might be receptive to, at various times within differing stages of change. Rimer (1997) questions whether the processes of change would require constant measurement and states that if they did always have to be measured, that it would "certainly add to the measurement burden" (p. 143). It may be that the processes, rather than assisting in intervention development, make the simple nature of the stages of
change suddenly very complicated and intimidating (from a development, as well as measurement standpoint).

Strategic health communication, on the other hand, would not require continual measurement, but rather, would only require pre-measure validation, so as to make sure that messages and dissemination channels were being targeted correctly. Thus, strategic health communication could be used to tailor messages to individuals more easily and without the same measurement burden that accompanies the processes of change.

The processes of change, while interesting and useful in theory, have been ignored. Again, this is likely because their use and measurement is unwieldy and cumbersome. Something is needed that can inform message design within the stages of change. Many of the components from the HBM have been supported by empirical research and use of those components would be one very effective way to inform message design within the stages of change. If a model was developed that addressed the stages of change through individual process components for which behavioral science research has shown empirical support (perceived susceptibility, severity, barriers, benefits and self-efficacy), the misuse/non-use of the processes of change would not be all that important to the development of successful interventions.

We can see through the illustrations given above, interventions must be individualized if they are to be most effective. To do this, a new model that utilizes the successful components of the HBM and TTM must be constructed. As a result of the integration of the two theories, the inability to effectively use the successful HBM and TTM resources/components together would no longer take place. Chapter five discusses that new model.
HBM & TTM

In the reviewed research, components of the HBM were illustrated as important to the tailoring and implementation of certain intervention messages (both in the TTM and HBM interventions). One example, given by Skinner et al. (1994) noted that the use of tailored letters may have motivated forward movement through the stages of change, similar in nature to cues to action within the health belief model. The idea that the HBM and the TTM could be combined in a possibly more successful model is suggested more directly in the following, "The integration of HBM concepts into stage-of-change theory has potential utility in targeting belief interventions to an individual's specific cognitive stage in relation to a health behavior" (Champion, 1994, p. 1010).

Reference to HBM components are made in a study utilizing the TTM in an intervention designed to improve dietary behavior. "Each message addressed the participant's stage and addressed his or her beliefs about both susceptibility to diet-related diseases and perceived benefits of and motives for changing diet. Contemplators received information designed to decrease barriers to change and to increase self-efficacy" (Campbell et al., 1994, p. 785). Campbell et al. (1994) go on further to say that depending on individuals' stage of change, self-efficacy, and past history of relapse, tailored recipes and specific diet tips were given in an attempt to provide motivating cues to action.

The Importance of Health Beliefs within the TTM/SOC

The importance of health beliefs within the stages of change were noted (indirectly) by Prochaska et al., (1997). They state that in the precontemplation stage, individuals do not take action because they are uninformed of the consequences of their
behavior (they do not know they are susceptible). In the contemplation stage, individuals know about the pros and cons, but have a difficult time making a decision about their unhealthy behavior (difficulty in balancing the perceived barriers and benefits). In the maintenance stage, individuals may be tempted to relapse through the stages because they may not yet be confident enough to continue their changes (lack of self-efficacy).

Though no direct references were made to perceived susceptibility, perceived barriers and benefits, and self-efficacy, the importance of each was noted clearly enough. No explanation, as to the role of health beliefs in the preparation and action stages, was given either directly or indirectly. We can assume, though, that if these components are important for the move through the precontemplation, contemplation, and maintenance stages of change, they are also important in the preparation and action stages.

The examples given here show the possibilities that exist for components of the HBM to be incorporated into a new model based upon the stages of change. Additionally, lack of success with some components within both the HBM and TTM frameworks allow us to see the benefits of using only the successful (by empirical research standards) pieces in the construction of that new model.

Limitations of the HBM and TTM Use in Interventions

As both the HBM and the TTM have shown, certain advances can be made against non-beneficial health behaviors. With the guidance of these models, we can more effectively help individuals make healthy behavior changes. In both models, though, there are certain flaws in the utilization of their components that hinders the full effectiveness of the interventions created from them. One of the flaws (mentioned earlier) is the lack of use of the process of change within interventions operationalizing
the TTM (as identified in chapter 4, their elimination was suggested in favor of using only the stages of change from the TTM). Though more attention progressively is being given to the processes of change since its inception, too little attention has been given to them by researchers who have operationalized the TTM (DiClemente, 1998; Greene et al., 1994; Velicer et al., 1995; Campbell et al., 1994; Glanz et al., 1994; Grimley et al., 1993; Skinner et al., 1994; Grimley et al., 1995). Most choose to use only the stages of change. Often, the TTM is even referred to as the Stages of Change Model as opposed to its proper title, the Transtheoretical Model (Marcus et al., 1992; Glanz et al., 1994; Greene et al., 1994).

An additional problem lies not with the models themselves, but with the application of the models. The beneficial components of both the HBM and TTM are often not systematically used together, by researchers, in a single, proven, and effective form (though recent works have suggested this could be a very successful partnership) (see Champion, 1994). Though most of the TTM research has shown that staging for readiness to change can make intervention messages more effective, most of the HBM research conducted after the TTM's stages were recognized as successful, neglected to operationalize them in combination with the components of the HBM. Similarly, in research using the TTM, little attention has been given to monitoring or attempting to influence health beliefs of individuals within varying stages of change (Catania et al., 1992; Hahn, Simpson, & Kidd, 1996; Mirotznik, Feldman, & Stein, 1995; Strecher, Kreuter, & Kobrin, 1995; Weinberger, Greene, Mamlín, & Jerin, 1981; Witte et al., 1993). Together, however, the HBM and the stages of change could be fashioned into a new more inclusive and comprehensive model for behavior change. As was stated
earlier, "The integration of HBM concepts into a stage-of-change theory has potential utility in targeting belief interventions to an individual's specific cognitive stage in relation to a health behavior" (Champion, 1994, p. 1010).

An additional limitation of the models (primarily the HBM) is the lack of a specified relationship between variables that are shown to be effective. In the HBM, perceived barriers, benefits, susceptibility, and severity have all been shown to be strong variables (having strong explanatory power) (Janz & Becker, 1984). Despite this, there is a lack of elaboration about the relationships that exist amongst the variables. For example, the existing HBM literature does not specify if there is a dynamic relationship between perceived barriers and benefits (how each might affect the other, under certain conditions). However, Prochaska’s (1994) “strong and weak principles” for behavior change do elaborate this relationship. In evaluating twelve studies using the TTM, Prochaska (1994) found that, for certain health behaviors, there was a defined relationship between the perceived benefits and barriers. It was more likely that importance of the perceived benefits [pros] related to a certain health behavior would increase, as opposed to the importance of the perceived barriers [cons] related to that same health behavior decreasing. For behaviors related to safer sex, this relationship took on a 9.6:1 relationship; for behaviors related to quitting cocaine, this relationship took on a 6.8:1 relationship; and for condom use, this relationship took on a 4.8:1 relationship. If relationships like this could be empirically established with all the variables of the HBM and TTM, more effective interventions could be constructed and more certainty could be given when fashioning those interventions.
Integration of the stages of change and the HBM would allow us to target those within individual stages of the TTM with more accurate intervention messages, through the use of strategic health communication (cues to action) and information, elicited from those being targeted by a health intervention, about their current health beliefs. The TTM provides us a manner in which to evaluate what might be necessary to help an individual change an unwanted health behavior (e.g., health beliefs), in various differing stages of change. With the TTM, "one can determine empirically which of the theoretical factors one needs to focus on to move a person from one stage to the next" (Fishbein & Guinan, 1996, p. 8). For our purposes, the theoretical factors of interest are the individual's perceived susceptibility, severity, barriers, benefits, and self-efficacy. The inclusion of the HBM and TTM together would allow those theoretical factors to be addressed, all within the same framework.

Benefits of the HBM & TTM Combination

Beneficial results have been noticed when combining the HBM and TTM frameworks in an effort to make interventions more effective. Strecher et al. (1994) noted that while using the TTM to identify individuals’ stage of readiness to change, efforts at using the HBM to change perceived benefits and perceived barriers of smoking cessation, through tailored vs. non-tailored messages, were more effective. They state, "Of moderate to light smokers who received tailored health letters, 30.7% reported quitting smoking approximately 4 months later, vs. 7.1% of moderate to light smokers who received the generic smoking cessation letters" (Strecher et al., 1994, p. 265). The tailoring of messages in the above study was done using related patient data (elicited during initial survey interview) and a word processing program to create the messages
based on the variables for individual patients (messages were pre-tested in physician waiting rooms among patients not included in the study).

Some research has presented hopeful results, produced by components that could be likened to cues to action within the HBM. Skinner et al. (1994) note this in relation to the tailoring of mammography letters sent by physicians to patients. "Tailored letters may have simply received enhanced attention, which in turn led to forward stage movement. In the context of the Health Belief Model, they may have been more effective cues to action" (Skinner et al., 1994, p. 47). The incorporation of HBM components into the TTM is showing promise, and individuals may require a change in health beliefs if they are to change stages (as indirectly mentioned above through Prochaska et al., 1997). This change in health beliefs would be initiated by tailored cues to action.

This forward stage movement would be beneficial in advancing future interventions. Future interventions might then take into account both the stages of change and the components of the HBM and account for more interventional success. Rimer (1997) recognizes that people's beliefs have been understudied, and perceptions of threat and risk may be pivotal in establishing a smoker's readiness to quit. She notes that the HBM and TTM combination might be quite appropriate for this purpose. "The HBM can elucidate the personal beliefs that serve as barriers to quitting, and the TTM can characterize a person's stage and suggest interventions based on processes of change" (Rimer, 1997, p. 141).
Examples of Empirical Support for the HBM & TTM Partnership

As with the HBM and TTM, two examples that might help to illustrate the utility of the TTM and HBM partnership are given below. The first example comes from Skinner, Strecher, & Hospers, (1994) titled: Physician recommendations for mammography: Do tailored messages make a difference? In this study, Skinner et al., (1994) looked at the effects that tailored messages from a woman's physician can have upon initial mammography or mammography follow-up.

In this study, 497 women were recruited and enrolled. Of those women, half were randomly allocated to receive tailored letters, and the other half would receive standardized letters. Both the tailored and standardized letters would notify the women of their need for initial mammography or mammography follow-up.

These women also were separated into one of four stages of change: precontemplation, contemplation, action or maintenance (it is not noted why preparation was eliminated from the classification). Those that were not considering (within the following six months) or had never heard of a mammogram were considered to be in the precontemplation stage. Those that were considering having a mammogram in the next six months were considered to be in the contemplation stage. Those who were not due for a re-screening were considered to be in the action stage and those that had previously received two or more mammograms were considered to be in the maintenance stage. Also, information regarding the woman's knowledge and beliefs about breast cancer, her objective and perceived risk status, and barriers to screening were taken for use in future message tailoring.
Letters were fashioned based upon each woman's individual baseline interview information and were mailed to the women. More than 391,000 different tailored letters were possible. Therefore, unless women gave identical responses in baseline interviews, no two women received the same letter recommending a mammogram. The standardized letter was a modification of the 1987 surgeon general's mammography letter. (All letters had a picture on the stationery but the tailored letters' photographs were tailored based upon race and had a caption that identified the woman's stage (such as, "Since you, personally, have never even thought about having a mammogram...").

Phone calls were given 3 months and 8 months after the letters had been sent to study participants. Participants were asked if they remembered any health related correspondence from their physician. If they did not remember, they were prompted in an effort to gauge response to the letter. For those who did remember the letter, readership was assessed on a 4-point scale ranging from "Read all of it," to "Did not read any of it."

Most women remembered receiving letters (63%) and 54% remembered without being prompted. Only 17% of all women who remembered receiving letters did not read any of the information, whereas 36% read some of the content, 23% read most of it, and 24% read all of it. Among the women that read at least some of the content, 30% found the information to be very interesting and 59% found the information at least somewhat interesting.

The results of the study suggest that tailored letters from a physician are more effective than standardized letters for delivering the "need for mammography" message.

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3Examples of message tailoring were not given by Skinner et al., (1994) nor for Strecher et al. (1994) and thus, examples of that message tailoring are not able to be given here.
Tailored messages were more likely to be remembered and, among women who remembered the letters, they were read more thoroughly. Among those who remembered the letters, tailored letter recipients were more likely to have read most of the content of the letter (53%) than were those who received the standardized letter (40%). For those who were due for screening at baseline, more women who had received tailored letters (44%) as compared to those who had received standardized letters (31%) had received mammograms by follow up. Though the difference was not statistically significant, the means were in the predicted direction and suggested success in motivating mammography screening.

One of the reasons the tailored messages might have been remembered and read more is because of the tailored graphics and captions, as well as the title of the letter addressing a woman's stage of change (e.g., a woman in the precontemplation stage might have received a letter entitled, "I've had a mammogram but I never even thought about having another one"). The tailored letters also may have been simply more specific in the information presented (as a result of using the women’s own beliefs and perceptions about mammography to create the messages) and thus there might have been less to "put-off" recipients. Said very simply, "They may have been more effective cues to action" (Skinner et al., 1994). The authors suggest future tailoring research should explore different types and amounts of tailoring and different media channels.

The second example of the beneficial HBM and TTM partnership is a study by Strecher et al. (1994) titled: The effects of computer-tailored smoking cessation messages in family practice settings. Strecher et al. (1994) set out to study the effects of computer-tailored smoking cessation messages on family practice patients. Two studies were
reported on in this article. In the first study, 248 adult cigarette smokers were recruited from a cohort of family practice patients to participate. Each participant's stage of change was then assessed. Subjects who said that they were not interested in quitting smoking in the next six months were classified as "precontemplators." Smokers who were interested in quitting in the next six months (but not in the next 30 days) were classified as "contemplators." Smokers who were interested in quitting in the next 30 days were classified as being in the "preparation" stage. After smokers were questioned about their stage of change, they were asked why they were interested in quitting (perceived benefits) and what kept them from quitting (perceived barriers).

In a manner similar to that of the research conducted by Skinner et al., (1994), a computer program was used to create tailored messages (including graphics) which could create more than 55,000 different versions of the tailored health letters (each dependent upon the responses in initial interviews).

Following the baseline interviews, subjects were assigned to the experimental group or the comparison group. Each subject was then mailed either a tailored letter that included information pertinent to his/her perceived benefits/barriers and stage of readiness to change or a standardized letter (based upon the National Cancer Institute pamphlet "Quit for Good"). It was "hypothesized that lighter smokers would benefit more from our tailored letters since tailoring for cognitive and behavioral factors alone would likely have little effect on heavy smokers" (Strecher et al., 1994, p. 264). This is likely because of nicotine addiction.

The results at four-month follow-up showed that smoking cessation rates were 20.8% in those receiving tailored letters and 7.4% in those receiving standardized letters.
A significant effect was shown for light smokers when tailored letters were received. Of moderate to light smokers who received tailored letters, 30.7% reported quitting approximately four months later, as opposed to the 7.1% of moderate to light smokers who received the standardized letter.

In the second study, 1484 eligible patients were recruited. In this study, however, 27.6% were not included in the analyses because they had been identified as being "precontemplators." Of the remaining smokers, those who said that they were interested in quitting smoking in the next 6 months were randomly assigned to receive either a tailored letter or no letter at all (different from the control in the first study). Both groups were then reassessed six months later to determine smoking status. Changes to the letter-tailoring procedures included placing much less emphasis on perceived threat and measures of causal attribution (because of difficulty in measurement) though the same attention was given to perceived barriers and benefits. These changes resulted in the number of letter combinations reduced to only 5000. Analysis procedures were similar to those used in the first study.

The results of the second study similarly revealed that (of a 67% response rate) tailoring of letters for smoking cessation was only found to be significant in the moderate to light smokers. At 6-month follow-up, 19.1% of moderate to light smokers who received tailored letters reported quitting smoking, compared to 7.3% of moderate to light smokers who received no letter at all.

The results of the studies presented in this research by Strecher et al. (1994), indicate that computer tailored smoking cessation letters result in positive effects for
appropriately targeted groups. This significant effect was shown, however, only for moderate to light smokers.

As can be seen, the cues to action used in both pieces of research (messages tailored to each stage of change) were more effective motivators for assisting in behavioral change. Both examples illustrate how successful HBM components and the stages of change are together. In both studies, participants were asked questions about their perceived barriers, perceived benefits, and general health beliefs. These health beliefs were then addressed through strategic health communication, operationalized in the form of various different cues to action. Each of the different cues to action (numbering 446,000 if all letter combinations are considered) attempted to "reach" an individual in his/her stage of readiness to change.

It should be noted that researchers, who integrated individual components of the HBM and TTM for the studies presented in this thesis, did not create a comprehensive model of the two, either prior to or as a result of their research. As a result of the benefits shown and the lack of a formal, more comprehensive model having been created, it is vital that an integrated and more comprehensive model be developed. Creation and implementation of this new model would allow for the systematic construction of successful interventions using strategic health communication (cues to action) as the primary tool to assist in changing individuals' perceived susceptibility, severity, barriers, benefits, and self-efficacy in a manner that would create additional movement through the stages of change and eventually lead to successful health behavior change. The development of that model follows in chapter five.
Chapter Five

Cues to Behavior Change Model (CBC)

New Model Development

In this final chapter, the Cues to Behavior Change Model (CBC) will be presented. The CBC model was developed from the integration of the stages of change, cues to action, perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and self-efficacy. First, the CBC model and the components contained within it will be described. Second, each component of the CBC model and the justification for its inclusion into this model will be given (as well as elaboration about the relationship between variables). Lastly, this thesis will conclude with a description of what an intervention might look like if designed using the CBC model.

As a result of the research presented in the previous four chapters, this thesis proposes that the theoretical factors necessary to move a person between the stages of change are present in the HBM. These are perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and self-efficacy. These factors are chosen for two reasons: 1) they fit the phenomenon found by Prochaska and DiClemente dealing with cognitive versus behavioral processes (discussed more fully, later in this chapter) (DiClemente, 1995); and 2) they have been shown to be significantly related to various health behaviors (i.e. mammography, bicycle helmet use, condom use, etc). At this point, the different components of the proposed CBC model will be discussed and the resulting model will be presented.
**New Model Description**

As a result of past attention given to the stages of change, cues to action, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy, the CBC model is proposed as a more complete and effective strategic health communication model to be used in the development of future interventions addressing the suggested acceptance of health behavior change (See Figure 3). Each of the HBM components incorporated into the CBC has a specific role in the process of motivating an individual to move through the stages of change. The HBM components included with the stages of change in this new model are stage-matched in a manner that makes each most effective in its ability to assist in achieving movement through the stages of change, with strategic health communication functioning as the catalyst that makes this movement happen. This conclusion was reached through careful examination of the research presented in this thesis. Those research results suggest the use of certain components of the HBM at differing stages along the stages of change (with attention given to the cognitive versus behavioral value of the components and their utility at various different stages along the stages of change continuum). This stage-matching of health beliefs to specified stages of change is necessary if individuals are to be influenced by cognitive variables in the precontemplation, contemplation and preparation stages; and by behavioral variables in the preparation, action, and maintenance stages (DiClemente, 1998). Though the model itself has not been empirically tested, the research reviewed in this thesis suggests its utility (see Skinner et al., 1994; Strecher et al., 1994). The following sections elaborate on the utility of certain components from the HBM and TTM to the proposed CBC model.
Stages of Change Pre-measure

The first step in the CBC model involves a pre-measure of individuals' stage of readiness to change. Research has shown that the TTM is effective in determining stage of change in relation to certain health behaviors (e.g., alcohol and substance abuse, eating disorders, high-fat diets, HIV/AIDS prevention, mammograms, cervical cancer screening, and smoking cessation) (Glanz et al., 1997). Thus, if we can identify the stage of change that an individual is in, we will be able to target that individual's *health beliefs* for that stage. The main component that will be used in this model to affect all other components is cues to action. The role of cues to action in the CBC model are discussed below.

Figure 3: Cues to Behavior Change Model (CBC)
Cues to Action as Strategic Health Communication

The major component of the proposed model that is different (from the TTM/SOC base model) is the use of strategic health communication and cues to action as the origin (after stages of change pre-measure and necessary formative research) for all intervention materials. Despite the fact that "few HBM studies have attempted to assess the contribution of 'cues' to predicting health actions" (Witte et al., 1993, p. 565), Witte et al. (1993) attempted and were successful in confirming the inclusion of cues to action in relation to increasing perceptions of threat in the HBM. Taplin, Anderman, Grothaus, Curry, & Montano (1994) were successful in supporting cues to action in an HBM study to promote mammography use. And Hahn et al. (1996) were successful in supporting cues to action in a parental involvement program for drug prevention in school children.

Many studies have discussed the use of cues to action indirectly. Attention has been given to the idea that differing messages need to be given to different populations at different stages of change, even though the authors may not have made definitive reference to cues to action as the method with which to do this. Grimley et al. (1996) assert that using similar assessment and evaluation instruments across differing populations may not yield the most effective interventions:

College students reported that the major benefit of using condoms in important intimate relationships was to prevent pregnancy; protection from disease was the biggest advantage of using condoms with partners they considered less intimate. Women at risk, however, reported that the main advantage of using condoms with both types of partners was protection from diseases (p. 413).
The above example demonstrates that while both populations need information, the same information for both groups may not be effective. To be most effective, this information would need to address varying perceptions of susceptibility and severity (which then would affect perceived benefits and barriers) for differing populations through the use of strategic health communication and varying cues to action. These would address the appropriate cognitive or behavioral processes, stage-matched with the individual's stage of readiness to change. For example, in the above description about condom use for college students, cues to action designed to change beliefs about perceived susceptibility might be more effective if designed to give two messages; one stressing the need for condoms with an intimate partner to prevent pregnancy; and a second message stressing the benefit of condom use with less intimate partners for protection from venereal disease. These two messages would take the place of a single message given in an attempt to "cover all." In this case, good formative research could identify that two messages discussing the same issue from different viewpoints would be more effective than just one message from one viewpoint.

Cues to action have been defined differently in various studies. Taplin et al. (1994) operationalized cues to action as mammography recommendation letters and follow-up post cards. Witte et al. (1993) defined cues to action as: special community events, mass media public service announcements, physician counseling, direct mail communications, phone messages. Cues to action could also exist internally as things such as bodily events (e.g., feeling of sickness brought on by an unhealthy behavior). Though internal cues are not as easily manipulated by an intervention, cues could be created which remind an individual about an unhealthy condition in a way that might
address internal cues (e.g., "You know that nagging cough..."). It is possible that these internal and external cues to action could create a greater level of consciousness, where individuals would feel the need to think through all factors and variables related to their unhealthy behavior and thus possibly move forward in the stages of change towards behavior change.

With this information/support, a number of conclusions can be drawn. Cues to action can be represented in a varying degree of forms, from interpersonal communication to mass mediated public service announcements. Additionally, support for cues to action as a construct affecting perceived threat (directly influenced by perceived susceptibility and severity) is supported, as described by Witte et al. (1993), who state that various cues to action (with the exception of the direct mailing), "all significantly influenced perception of threat" (p. 573). Thus we can see the utility of cues to action in the CBC model.

Cues to action also have been shown to affect self-efficacy. As was stated by Strecher et al. (1986) in Chapter One, efficacy expectations can come from four major sources: personal accomplishments, vicarious experience, verbal persuasion, and physiological state (see also Rosenstock et al., 1988). Three of those, vicarious experience (obtained through observation of successful or unsuccessful performance of others), verbal persuasion (while less powerful than performance accomplishments or vicarious experience, it can be a useful adjunct to more-powerful influences), and physiological state (particularly anxiety, may inform the individual, correctly or not, that he or she is/not capable of performing or maintaining a given action) could be affected directly by external cues to action and could therefore also affect self-efficacy itself.
Personal accomplishments (the most influential sources of efficacy information because they are based on personal mastery experience), vicarious experience, and physiological state could be directly affected by *internal* cues to action and again could also affect self-efficacy. Thus, the effect that cues to action can have on self-efficacy can result from internal or external cues to action and those cues can originate from a variety of different sources.

With support given for the use of cues to action as a means to affect behavioral change and more specifically as a means to affect perceived threat (perceived susceptibility and perceived severity) (Witte et al., 1993), and additional support for the effects of cues to action on self-efficacy (Rosenstock et al., 1988; Strecher et al., 1986), these cues to action (type of cue would depend on the target and circumstance) again will likely be successful in motivating change in the cognitive and behavioral processes described below.

Cognitive Processes—Perceived Susceptibility and Perceived Severity (Perceived Threat)

The second component of importance to the CBC is cognitive processes. Cognitive processes (such as thinking about perceived susceptibility and perceived severity and their effects on behavior) are noted by DiClemente (1998) to be of significant value to the precontemplation and contemplation stages and are noted to benefit movement through the precontemplation, contemplation and preparation stages of change. This movement between the precontemplation, contemplation and preparation stages also was noted by DiClemente (1995) to be dependent upon motivation (a direct result of cognition). Likewise, Becker (1974, 1985) states that perceived susceptibility and perceived severity are directly related to health motivation. Thus, with DiClemente
(1995) noting that movement though the stages of change is dependant upon motivation, and Becker (1974, 1985) stating that perceived susceptibility and perceived severity (cognitive processes) are directly related to motivation, perceived susceptibility and perceived severity also can be considered to be related to motivation and therefore can affect movement through the stages of change. Because of those relations, individuals in the precontemplation, contemplation, and preparation stages of change can be assisted in their movement through the stages of change as more attention is given to cues to action that focus on perceived susceptibility and perceived severity. Perceived susceptibility and perceived severity would then motivate forward movement in stage of readiness to change.

Perceived susceptibility was found to be a strong predictor of whether or not individuals engage in health-protective behaviors (Janz & Becker, 1984). And though perceived severity has not found as much support as perceived susceptibility (Janz and Becker, 1984; Aiken, West, Woodward, & Reno, 1994), various studies have demonstrated that it is possible for perceived severity to have an impact on influencing individuals to engage in health-protective behaviors (Champion, 1994; Mirotznik et al., 1995; Yep, 1993). The most interesting thing to note about perceived susceptibility and perceived severity, though, was that Witte et al. (1993) found these two components could be combined and accounted for in a single dimension labeled perceived threat. Additionally, Janz and Becker (1984) noted that interventions obtained the best results in operationalizing the HBM when they gave increased attention to perceived barriers, perceived benefits, and perceived susceptibility, respectively. In the CBC model, the perceived barriers and benefits are targeted in the move between each individual stage of
the stages of change (e.g., within the precontemplation, contemplation, and preparation stages, by targeting perceived susceptibility and severity with cues to action), through the use of strategic health communication (using information elicited from pre-measure questionnaire data pertaining to individual's perceived barriers and benefits concerning behavior change).

The importance of perceived susceptibility for movement between stages of change is noted here. Hingson, Strunin, Berlin, & Heeren (1990) noted that respondents in their study on condom use and AIDS were more likely to always use condoms if they felt susceptible to AIDS. Likewise, Lidbrink et al. (1995) noted in a study involving mammography screening, that the two most frequent reasons for not participating in the screening program were disinterest (felt it was not necessary—lack of perceived susceptibility) and because participants were not concerned with mammography because of other health problems (could relate to perceived susceptibility and severity) (Lidbrink et al., 1995). Lack of participant concern for mammography, as a result of other health problems, may arise from the lack of time or emotional, intellectual, and physical energy needed to cognitively deal with the need for mammography. Other health problems may then appear to be much more important, when in reality, the proper amount of evaluation may not have been given to the perceived susceptibility and perceived severity of consequences related to not getting a mammogram. This helps confirm the idea that, when people feel susceptible to a negative health behavior and when they also feel the consequences of that negative health behavior to be severe enough, the recommended health action will likely be attended to. With support for the importance of the use of the cognitive processes—perceived susceptibility and perceived severity—we move now to
the behavioral process component and the primary variable that assists movement through the preparation, action, and maintenance stages, self-efficacy.

Behavioral Process-Self-Efficacy

Behavioral processes have been identified as a component that affects movement through the preparation, action, and maintenance stages of change. Self-efficacy was noted by DiClemente (1998) to be both a behavioral process and an integral part of the process of movement through the later stages (preparation, action and maintenance) of the stages of change. Therefore, the importance of self-efficacy within the CBC model is discussed below.

An extensive literature supports the importance of self-efficacy as a component that affects an individual's acceptance and practice of a recommended healthy behavior (Bandura, 1977; Pederson et al., 1984; Rimer et al., 1991; Strecher et al., 1986). Gilchrist and Schinke (1983) developed an intervention for adolescents that presented factual information on contraception and reproduction and also provided information on skills training and use of contraceptive information (Strecher et al., 1986). In this instance, strategic health communication and the modification of messages were used in an effort to more effectively target a specific population and their self-efficacy in using contraceptive information. Strecher et al. (1986) note the success of this use of cues to action within Gilchrist and Schinke's (1983) work designed to affect student's self-efficacy:

As a result of this cognitive-behavioral intervention, students showed marked improvements in efficacy ratings of their own abilities to use birth control, exhibited more effective contraceptive problem solving abilities, and had greater
intentions to use contraception at next intercourse than did a group of students not receiving the intervention (p. 85).

Additionally, Hingson et al. (1990) noted that subjects were more likely to always use condoms if they believed condoms were effective (response-efficacy), and if they were exposed to more cues to action. We can only imagine what effect cues to action, tailored to the individual stages of change, might have had.

In relation to the proposed CBC model, self-efficacy is used in the same way as the adolescent intervention mentioned above, but is targeted to a particular stage of the stages of change, in an attempt to move individuals through the preparation, action, and maintenance stages more successfully. Targeting self-efficacy within the preparation, action, and maintenance stages is stated by Glanz et al. (1994) to be a more effective strategy as a result of research that was conducted in regards to adopting a healthy diet. "For example, providing detailed information on reading nutrient labels to someone in precontemplation would be a waste of resources. It would be more effective to attempt to increase that person's awareness and personal concerns about nutrition and health before introducing action strategies" (Glanz et al., 1994, p. 514). In the previous example, the self-efficacy of providing detailed information on reading nutrient labels is related to the idea that you need to increase attention and concern about healthy eating before you introduce action strategies such as reading nutrient labels. Grimley at al. (1995) also support cues to action targeting self-efficacy within the preparation, action, and maintenance stages as a result of their research which shows a sharp rise in self-efficacy at the preparation stage or immediately after, in the action stage, with a corresponding level of self-efficacy in the maintenance stage. They also note very similar feelings about
the use of self-efficacy in the stages of change. "Information and motivational strategies that will assist individuals to become better prepared for using contraceptives and condoms are needed first if people are to acquire and maintain their recommended use" (Grimley et al., 1995, p. 33). And again, this same sentiment is voiced by Grimley et al. (1996), "Later stages would need assistance with increasing self-efficacy in order to take successful action and to prevent relapse" (p. 413). Additionally, Bowen and Trotter (1995) note that, "Specifically, the precontemplators and contemplators were lower in assertiveness than the participants in action groups" (p. 245).

Furthermore, the findings of Grimley et al. (1995, 1996) give indication that self-efficacy is lowest at the precontemplation stage and rises rapidly until the move from action to maintenance.

Across the stages, self-efficacy scores increase almost linearly from precontemplation to maintenance. In the precontemplation stage, self-efficacy scores are the lowest; in the action and maintenance stages; self-efficacy scores are at their highest. Thus, self-efficacy is an important predictor of progress, but only in the later stages of action and maintenance (Grimley et al., 1996, p. 408).

Thus, if we are to target certain populations with intervention materials that suggest an active behavioral change, we should address the efficacy that exists in these individuals and make an effort to gain movement to a future stage of change where active behavioral change might actually take place, based upon the increased self-efficacy of the individual at that stage. The stress on self-efficacy would only be necessary if an individual is in the preparation, action, or maintenance stage of the stages of change. If in the precontemplation, or contemplation stage, perceived susceptibility and perceived
severity would be of much greater importance (for reasons mentioned earlier in Chapter 5).

Self-efficacy is noted as vital to the CBC model in the preparation stage, both in relation to the cognitive (perceived susceptibility and perceived severity) and behavioral processes (self-efficacy). This is because of the importance of moving from one stage to another (cognitive to behavioral) with reasonably equal attention given to both the cognitive and behavioral processes, so as to prevent relapse in stage of readiness to change.

The move between the stages of change is the result of a cost-benefit analysis (operationalized in the CBC as perceived barriers versus perceived benefits) that provides motivation for forward movement when the analysis is positive and for relapse when the analysis is negative. Perceived benefits and perceived barriers involved in the costs vs. benefits analysis are described in greater detail below.

Perceived Barriers & Perceived Benefits/Decisional Balance

The last component of the CBC model to affect movement through the stages of change is that of perceived barriers and perceived benefits (known in the TTM as decisional balance). Perceived barriers have been looked at in reference to many different health behaviors, ranging from cancer screening and smoking cessation, to condom use, dietary fat intake, and bicycle helmet use (Campbell et al., 1994; Catania et al., 1992; Strecher et al., 1994; Taplin et al., 1994; Witte et al., 1993).

Two decisional balance measures, the pros and the cons, have become critical constructs in the TTM as well as the HBM. The balance between these pros and cons varies, depending on an individual's stage of change. Decisional balance was the concept
explained in the TTM as the theoretical equivalent of the cost-benefit analysis. In the construction of the CBC model, this thesis will proceed one step further in this equation of constructs and say that decisional balance is commensurate in nature to the balancing of perceived barriers and perceived benefits (these are conceptually the same and thus will be treated as such in this thesis). Strecher and Rosenstock (1997) support this equation of constructs when they state that perceived barriers are the "potentially negative aspects of a particular health action" (p. 46) (that potentially negative aspect would be similar to a cost in the cost-benefit analysis). Strecher and Rosenstock (1997) also note (again in relation to perceived barriers vs. perceived benefits) that, "A kind of cost-benefit analysis occurs, wherein the individual weighs the action's expected effectiveness against perceptions that it may be expensive, dangerous, unpleasant, inconvenient, time consuming, and so forth" (p. 46). Additionally, this decision making was conceptualized by Janis and Mann (1977) as a decisional "balance sheet" of comparative potential gains and losses. As can be seen, the equation of the constructs associated with a cost-benefit analysis and with the balance of perceived barriers and perceived benefits has been indirectly stated before. That equation of constructs will be operationalized in the CBC model through the use of perceived barriers and perceived benefits.

According to the CBC, forward movement in the stages of change occurs when a cost/benefit analysis reveals to the individual that progressing forward is cognitively or behaviorally beneficial to the individual (this cost vs. benefit analysis results from the increased need to cognitively evaluate the health issue at hand). Therefore, each time an individual receives a motivating cue to action, that in turn affects perceived susceptibility,
perceived severity, or self-efficacy and that then necessitates a weighing of the perceived benefits and the perceived barriers (consciously or unconsciously, depending on the levity of the situation and behavior). The resulting decisional balance (positive or negative) allows an individual to proceed forward to the next stage, stay in the stage that they are presently in, or relapse to a previous stage. This thought was supported by Rosenstock (1974) when he noted that "the combined levels of susceptibility and severity [provide] the energy or force to act and the perception of benefits (less barriers) [provide] a preferred path of action" (Strecher & Rosenstock, 1997, p. 46). The preferred path of action would be forward movement in the stages of change.

A breast cancer intervention conducted by Skinner et al. (1994) found perceived barriers to be a variable of importance in behavior change. "Among factors correlated with mammography status are women's beliefs about breast cancer and the ability of mammography to detect the early breast cancer, and perceived barriers to mammography screening, such as cost, concern about radiation exposure, or fear about finding cancer" (Skinner et al., 1994, p. 43). Increased attention to (depending on stage of change) an individual's perceived susceptibility and severity or to an individual's self-efficacy (in relation to women's beliefs about the ability of mammography to detect breast cancer) associated with these recommended healthy behaviors might assist in weighting the scales to the perceived benefits side and helping to change behavior through movement through the stages of change.

Perceived barriers, in relation to topics such as condom use or condom negotiation, appear to be strongly influenced by communication skills (Catania et al., 1992). This is stated in the following:
Females may be using condoms less than males because of the greater complexity of the task for women. A young woman must not only communicate her desire to her partner, but may also have to negotiate with him to change his behavior. This suggests that interventions with women would do well to include skills training in negotiating and communicating their desires with their partners (Gillmore, Morrison, Lowery, & Baker, 1994, p. 235).

What Gillmore explains is that to be effective in negotiating the use of condoms (after feeling susceptible to the risks that exist without using a condom), a woman must believe she is able to manage this negotiation; she must feel efficacious about the condom negotiation. In this case, to tackle the perceived barriers that exist in relation to an unhealthy behavior, we must take note of the lack of self-efficacy that may exist, and address that lack of self-efficacy with appropriate strategic health communication (cues to action).

On a vastly different health behavior, fat intake, the communication associated with perceived barriers is also noted (indirectly) to be very important. In response to a desire to increase intake of fruits and vegetables to help with decreasing individuals' dietary fat intake, researchers conducting phone interviews discovered that many planned to increase their intake but were waiting until those foods came into season (Campbell et al., 1994). In this example, it was not enough to try to get the individuals targeted by the intervention to attempt to adjust their health behaviors. The intervention messages also needed to address the lack of vegetables that were being suggested in the intervention. In this circumstance, cues to action focusing on the self-efficacy of the recommended health action (with additional suggestions about how to overcome the lack of produce at the
time) might have been much more effective. Such a cue to action might say, “Even though you can't buy fresh vegetables, frozen veggies are just as jam packed with vitamins as the fresh stuff.”

Thus, these examples have shown the importance of perceived barriers and perceived benefits for use within the CBC model, and more specifically, the effect of self-efficacy on those perceived barriers and perceived benefits. An example of how the CBC model might influence interventional design, development, implementation, and evaluation is given below.

CBC Model Application

The CBC model can be used to create an intervention for health behaviors ranging from mammography to smoking cessation; from colorectal cancer screening to healthy eating. The main consideration in all these possible interventions, though, is the importance of strategic health communication and the role that cues to action play in the persuasion of individuals in the intervention.

An intervention using the CBC model would begin with a pre-measure of the population being targeted. Conceive constructing a breast cancer intervention for women ages 40+. This intervention would urge them to be screened for breast cancer with a mammogram. The pre-measure would include an analysis tool (a short questionnaire that asks questions about an individual's stage of readiness to change) that would classify each of the women in the study for stage of readiness to change. It also would request information regarding health beliefs about breast cancer and mammography in general, questions about perceived susceptibility for breast cancer, and for perceived severity (if the woman was, for whatever reason, to not be screened). Perceived barriers and
perceived benefits to being screened for breast cancer by mammography, how contented a woman in the intervention felt about being able to have a mammogram (self-efficacy), and how comfortable that woman felt about the results of the mammogram being able to detect breast cancer in its early stages (response-efficacy) would also be measured.

These women would then be classified into the appropriate stages of change and their individual health beliefs in relation to breast cancer and mammography would be recorded in a database for future use in tailoring the strategic health communication messages for the intervention. These strategic health communication messages or cues to action could take on various forms, as Witte et al. (1993) noted. One possible route might be similar to that of Skinner et al. (1994), where women were sent tailored letters, based upon data from initial interviews. In this circumstance, women in the precontemplation, contemplation, and preparation stages would receive letters tailored to their individual health beliefs, with emphasis on more detailed information pertaining to perceived susceptibility and perceived severity. Women in the preparation, action, and maintenance stages would receive letters tailored to their individual health beliefs, with additional stress on self-efficacy and the ability of the women to be able to get a mammogram, as well as the ability of the mammogram to detect early stages of breast cancer.

Overlap in the preparation stage occurs because the cognitive and behavioral processes both play a strong role in that stage. Stage of change relapse would be of greater concern if only cognitive or behavioral processes (individually) were stressed to a woman who had managed to move through the contemplation stage to the preparation stage. This woman might now perceive herself to be susceptible to breast cancer and
consider the severity of the consequences of breast cancer to be great if she were to do nothing in relation to screening. If the intervention then gave her no reinforcement about her ability to get a mammogram and the ability of the mammogram to detect possible breast cancer, the intervention might be unsuccessful in persuading her to get a mammogram, which could increase her chances of discovering a breast cancer early (if in fact she will ever get breast cancer). If not presented both cognitive and behavioral process cues, this woman might then regress to the contemplation or precontemplation stage of change and revert to health beliefs that she was, at one time (with adequate support), prepared to dispel. The need for strategic health communication and tailored cues to action is vital at all stages of change within the CBC model. Administration of tailored cues to action would proceed after pre-testing (that would occur in 4-6 month intervals, for up to 2 years, in order to account for complete forward movement in the stages of change), and cues to action addressing alternating stages of change would be addressed by these new individualized cues to action (that would then be administered to those who had moved forward or backward in their stages of change).

If the CBC model is accurate, results of each post-test would reveal that as women begin to feel more susceptible, and as they begin to see the severity of the consequences of doing nothing about the risky health practice (not being screened for breast cancer with mammography), they would move forward in their stage of change for mammography screening. These women would consider the susceptibility and severity of not taking action and would weigh the perceived barriers and benefits of mammography screening. It is at this point that if the cues to action (while being novel, plausible, palatable enough to gain and keep these women's attention) were effective in
persuading these women that they were susceptible (to breast cancer) and the severity of consequences to a lack of action were great enough, they would weigh the benefits (e.g., early detection/prevention of cancer) to mammography screening more heavily than the barriers (e.g., possibility of detecting a cancer) and would progress in their stage of change, eventually to the preparation stage.

It is at this point that the cues to action would change focus and the women would receive more individualized cues that would focus on self-efficacy issues related to mammography screening. Attention would still be given to issues of susceptibility and severity (in a lesser degree) in the preparation stage, however the stress on self-efficacy would occur in an effort to move the women in the intervention towards more behavioral processes and active behavior change. After receiving these cues to action focusing on the self-efficacy of mammography and the efficacy of mammography to be able to detect early breast cancers, women at the preparation stage would weigh the perceived barriers and benefits again in favor of moving forward to gain the benefits of mammography (thus moving forward in the stages of change to the action or maintenance stages).

End results should find many more women in the action and maintenance stages than were there initially. Though this is just an example of how the CBC model might be operationalized in an intervention, and though the CBC model has not yet been empirically tested, the numerous studies presented in this thesis support the development of this new model and its subsequent testing in the future.

Conclusion

In this thesis, discussion and review of the pertinent literature resulted in the construction of the Cues to Behavior Change Model. In chapter one, the impact of
behavioral science theory on the formation of successful interventions designed to attain behavioral change was discussed. In chapters two and three, descriptions of the Health Belief Model and the Transtheoretical Model, respectively, gave us a better picture of the interventional components that are part of the successful behavioral change process. In chapter four, the benefit of a new, more comprehensive and possibly more successful model for the construction of health interventions was examined. And in chapter five, the CBC model was presented.

This thesis recognizes that certain limitations exist in relation to the development, use, and possibly even the success of the CBC model. The CBC model targets the individual and related micro systems (i.e., family or close friends involved in the behavior change process). Interventions designed for large audiences through blanket messages would not be able to optimally operationalize the CBC model. Additionally, more collectivistic societies/cultures (as compared with the American individualistic culture) might not benefit from the use of the CBC model, as it was designed for interventions targeting individual behavior change. Lastly, lack of empirical evidence (testing the CBC model) makes it difficult to evaluate the model outside of theoretical confines. Future health communication research will hopefully provide the needed empirical data concerning the effectiveness of the CBC model.

The CBC model is different from current/past health behavior theories in that it allows for distinct health beliefs (perceived susceptibility, severity, barriers, and benefits) to be addressed (through strategic health communication/cues to action) at integral points along the stages of change continuum, with special attention given to cognitive and behavioral variables at times when each are optimally advantageous.
The resulting CBC model leaves us with a theoretically more comprehensive model to be used in the construction and activation of future health interventions. The future of the CBC model lies in the development, activation, and evaluation of health interventions to be created with careful consideration given to the constructs laid out in the CBC model. When testing of the CBC model does occur, it is the hope of the author that construction of health interventions will be easier and interventional results will show more success in attaining behavior change than the HBM or TTM have independently.
References


