

Beyond Protection Motivation: An Integrative Theory of Health Appeals

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We develop an integrated theory of health communication by combining protection motivation theory (PMT; Rogers, 1983) with the stages of change described in the transtheoretical model (Prochaska & DiClemente, 1982). Our study challenges the assumption implicit in PMT that perceptions of vulnerability, severity, response efficacy, and self-efficacy are equally weighted across individuals. Rather, we propose that people at different stages of readiness to change are differentially affected by levels of these predictor variables. Results from our experiment confirm that vulnerability, severity, and efficacy (response and self) are the main motivators to change behavior during the precontemplation, contemplation, and action stages, respectively. Furthermore, we explore how specific categories of beliefs identified by the transtheoretical model are associated with perceptions of vulnerability, severity, response efficacy, and self-efficacy.

Many theories have been proposed to examine health-related behavioral change. Rogers' (1975, 1983) protection motivation theory (PMT) is one of the most popular of these theories because it explicitly incorporates the role of health-related messages in effecting behavioral change. According to PMT, viewing a health-related message provides the impetus for an individual to assess the severity of an event, probability of the event's occurrence, belief in the efficacy of the recommendations provided in the message, and belief that one has the ability to perform the recommendations. Perceptions about these four factors arouse protection motivation (as indexed by behavioral intentions), which in turn provides the incentive to seek a healthier behavior (Rogers, 1975, 1983).

These variables do seem to be predictive in that intentions to comply are generally greater when the threat is severe, when the person feels vulnerable, when following the recommendations is perceived as an efficacious way to reduce the threat, and when the person feels able to perform the coping response (see Eagly & Chaiken, 1993, for a review of PMT findings). Despite

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overall acknowledgment of the importance of each of these variables, empirical studies of PMT fail to support Rogers' (1975, 1983) premise that these components are equally important in determining behavioral intentions. The presence of main effects (or interaction effects) of perceived vulnerability, severity, response efficacy, and self-efficacy varies from one study to the next (Eagly & Chaiken, 1993).

The inconsistent empirical support suggests the need for revised theorizing about PMT. The primary goal of this paper is to develop a richer theory of health communication that predicts when each of the four components of the PMT model will enhance behavioral intentions. We accomplish this goal by integrating PMT with the transtheoretical model from the clinical psychology literature. The transtheoretical model identifies six decision-making stages an individual undergoes when exposed to a health message recommending change: precontemplation, contemplation, preparation, action, maintenance, and termination (Prochaska, Norcross, & DiClemente, 1994). Our first step toward developing a richer theory of health communication is to propose that people at three of the six stages (specifically, precontemplation, contemplation, and action) are differentially affected by messages that vary levels of perceived vulnerability, severity, response efficacy, and self-efficacy. This proposition amends Rogers' (1975, 1983) original assumption that these components are equally important in determining behavioral intentions.

To further enhance our understanding of health communication effects, we explore how specific categories of beliefs identified by the transtheoretical model, like self-serving denials or self-compliments, are associated with the four main PMT beliefs. By investigating the relationship between these two types of beliefs, we hope to provide a starting point for practical ways to increase perceptions of vulnerability, severity, response efficacy, and self-efficacy. We begin by discussing PMT and the transtheoretical model to provide the conceptual background for our predictions.

Conceptual Background

Protection Motivation Model

Rogers' (1975, 1983) PMT is based on the principle that behavior is a function of two appraisal processes: threat appraisal and coping appraisal. In threat appraisal, one judges the factors that increase (e.g., intrinsic reward) and decrease (e.g., severity of the threat) the probability of the maladaptive behavior. In coping appraisal, one evaluates the ability to cope with and to avoid the negative outcome. Based on these appraisal processes, Rogers concludes that protection motivation is a positive linear function of four beliefs: (a) The

depicted threat is severe, (b) the person feels vulnerable or susceptible to the threat, (c) the recommended coping response is effective in averting the threat, and (d) the person feels able to perform the coping response. Additionally, the benefits of changing one's behavior must outweigh the associated costs. Thus, according to PMT, viewing a health communication would initiate message recipients' perceptions of severity, vulnerability, response efficacy, and self-efficacy. These beliefs arouse protection motivation, which in turn fosters acceptance of the advocated health-related changes in the message.

Rogers (1975) originally proposed that perceived vulnerability, severity, and response efficacy should combine multiplicatively to influence intentions (self-efficacy was not a component of the original model). Thus, if vulnerability, severity, or response efficacy were 0, intentions to change behavior would be 0. However, uncongenial empirical findings (Rogers & Mewborn, 1976) led Rogers to discard this three-way interaction. Instead, Rogers (1983) proposed an Efficacy \times Severity or an Efficacy \times Vulnerability interaction such that if response efficacy or self-efficacy is high, either high severity or high vulnerability will enhance intentions. However, the Efficacy \times Severity (or Vulnerability) interactions specified in the revised model have also not been substantiated (Eagly & Chaiken, 1993). Due to lack of empirical evidence, Rogers again discarded this rule in favor of an additive rule such that even if one of the predictor variables were 0, this could be compensated for by high levels of the other two variables. The additive model has received stronger support than the multiplicative model in the PMT literature (Maddux & Rogers, 1983; Mulilis & Lippa, 1990; Rippetoe & Rogers, 1987; Shelton & Rogers, 1981).

Both the multiplicative and additive predictions for PMT are based on the premise that the four components will have the same influence on intentions to comply with the message's recommendations, regardless of other personal characteristics. This study questions the premise that people exposed to a health communication will weigh their perceptions of severity, vulnerability, response efficacy, and self-efficacy equally when determining their intentions to comply with the message. In exchange, we propose that the mixed findings in the literature may be accounted for by the individual's decision-making stage. In contrast to PMT's assumption of homogeneous effects, we suggest that people at different decision-making stages are differentially affected by perceived response efficacy, self-efficacy, vulnerability, and severity.

The transtheoretical model identifies the key decision-making stages for an individual faced with a communication advocating health-related change. Our paper integrates the transtheoretical stage approach with PMT. In the next section, we discuss the transtheoretical model and its applications for designing effective health communications.

Stage Perspective

The transtheoretical model is one of most promising recent behavioral change models to emerge from clinical psychology. A review of the literature reveals 25 studies of the transtheoretical model between 1990 and 1995. Applications of the transtheoretical model can be found across a variety of addictive and nonaddictive health-related behaviors, including smoking cessation, alcohol abuse, AIDS risk reduction, exercise adoption, mammography screening, weight control, and sunscreen use (DiClemente & Prochaska, 1985; Prochaska & DiClemente, 1982; Prochaska, Norcross, et al., 1994; Prochaska, Redding, Harlow, Rossi, & Velicer, 1994).

Prochaska and colleagues identify six stages individuals go through for successful self-change. The six stages are precontemplation, contemplation, preparation, action, maintenance, and termination.² Linear progression through the stages is possible, but most people cycle and recycle back several times before successfully ridding themselves of unwanted behavior. DiClemente et al. (1991) note that particularly for addictive behaviors, such as smoking, movement through the stages is a cyclical process. A brief description of each stage follows (cf. Prochaska et al., 1994a for a more detailed description of each stage):

1. **Precontemplation:** Precontemplators resist change. They often do not see or they deny the problem and have no intention of changing their behavior.
2. **Contemplation:** Contemplators acknowledge they have a problem, but are not quite ready to do anything about it. Many have indefinite plans to take action in the next 6 months.
3. **Preparation:** In this stage, a person plans to take action within a definite time frame. A good example would be the familiar. "I'll start my diet on Monday."

²The actual number of stages has varied over the years of the transtheoretical model development. An early paper reported five stages as follows: precontemplation, contemplation, action, maintenance, and relapse (Prochaska & DiClemente, 1983). Relapse is an event that could follow the action or maintenance stages; relapse terminates the stage process and creates a cyclical movement back to either precontemplation or contemplation. Studies conducted between 1982 and 1988 report either four classifications (without relapse) or five (with relapse) for the analysis. A sixth stage, preparation, was later added to follow contemplation and to precede maintenance. Most recently, the transtheoretical model stages have been classified as precontemplation, contemplation, preparation, action, maintenance, and termination (Prochaska et al., 1994). However, most empirical studies of the transtheoretical model limit the analysis to a subset of these six stages (DiClemente et al., 1991).

4. Action: People in the action phase are modifying their behavior (e.g., eating less) and their environment (e.g., throwing out the cookies).
5. Maintenance: Maintenance is a long, ongoing stage during which the individual continues to resist temptation and to reinforce action (e.g., keeping weight off after the diet is over).
6. Termination: Termination occurs only when it is clear that the problem behavior will not return, and former temptations are no longer a threat. Many change attempts never reach the termination stage.

Stage Perspective and PMT

In contrast to PMT's assumption of homogeneous effects of the predictor variables, we suggest that people at different levels of readiness to act (i.e., different stages) are differentially affected by levels of perceived vulnerability, severity, response efficacy, and self-efficacy. Health communications are distributed primarily to persuade precontemplators and contemplators to engage in more healthful behaviors, and to some degree to reinforce the behavior to actors. Thus, the transtheoretical model can help inform hypotheses about the differential effects of perceived vulnerability, severity, response efficacy, and self-efficacy on the effectiveness of health communications for people in the precontemplation, contemplation, and action stages.

Precontemplation. By definition, precontemplators are not seriously considering changing their behavior. Precontemplators are defensive and avoid changing their thinking or behavior (Prochaska & DiClemente, 1983). In a study on home radon testing, Weinstein and Sandman (1992) found that precontemplators had the lowest perceived likelihood of radon problems in their homes. Stuteville (1970) suggests that lower perceptions of vulnerability may arise from the inability to imagine negative events, and avoidance and denial techniques such as "I am the exception to the rule." Consistent with this view, Folkes and Kiesler (1991) suggest that people have a general tendency to hold positive self-illusions regarding a negative event; they often see themselves as better than the average person and often hold overly optimistic views of their future. Similarly, Weinstein (1987) demonstrated an optimistic bias about susceptibility to harm for 32 different hazards with a wide range of severity.

These results indicate a bias to underestimate; that is, a tendency to claim that the risk is lower for oneself than for one's peers. Together, these studies suggest that precontemplators must first accept that they are vulnerable to the

danger before they begin to contemplate action. Thus, messages designed to increase precontemplators' perceived vulnerability should be more persuasive than messages designed to increase perceived severity, response efficacy, or self-efficacy. Stated formally,

Hypothesis 1. Increasing perceptions of vulnerability will lead to greater intentions to perform the recommended behavior than increasing perceptions of severity, response efficacy, or self-efficacy for people in the precontemplation stage.

Contemplation. Contemplators, on the other hand, are seriously thinking about changing their behavior, which implies that at some level they believe they are vulnerable or susceptible to the negative outcome. For people in the contemplation stage, then, we suggest that perceived severity is an important variable in moving them to action. This is supported by a study on oral hygiene behavior (Beck & Lund, 1981) in which patients were asked to participate in a dental health program as they were waiting for a dental appointment. A measure of flossing behavior obtained in a postexperimental telephone interview indicates that subjects exposed to the high-severity condition reported more flossing than did subjects exposed to a low-severity condition. Although Beck and Lund did not measure each subject's stage or the degree to which these subjects were thinking about changing their flossing behavior prior to experimentation, given that they were patients in a dental office and that the participants chose to participate in the experiment, we can reasonably assume that they would more likely be in the contemplation stage than the precontemplation stage.

A meta-analytic study on radon testing also supports the premise that contemplators' perceptions of severity are important for intended behavioral change (Weinstein & Sandman, 1992). Weinstein and Sandman pooled data collected in three prior studies on radon testing: Study 1 was conducted in 1986 with 657 New Jersey homeowners, Study 2 was conducted in 1988 to 1989 with 801 New Jersey homeowners, and Study 3 (date unspecified) was conducted with 1,600 New Jersey homeowners. Homeowners in each of six categories of radon-testing willingness were asked to rate the perceived severity of illness from radon exposure in the home. Pooled data indicate that perceived severity was the lowest for precontemplators, peaked among contemplators, and then stabilized at this level for actors. Based on these studies, we suggest that perceptions of severity will be the primary determinant of behavioral intentions for contemplators.

Hypothesis 2. Increasing perceptions of severity will lead to greater intentions to perform the recommended behavior than

increasing perceptions of vulnerability, response efficacy, or self-efficacy for people in the contemplation stage.

Action. Individuals in the action stage have begun to take the necessary steps involved in changing the behavior. At some level, these individuals are already convinced that they are susceptible to the negative outcome and that the consequences are severe enough to warrant action. Since these individuals are already engaging in the desired behavior, viewing a health communication should reinforce existing attitudes and intentions toward the recommended behavior. For actors, therefore, we do not expect varying levels of vulnerability or severity to differentially affect persuasion. What individuals in the action stage need is the confidence that they can perform the recommended behavior and the belief that the recommendations are effective.

Hypothesis 3. Increasing perceptions of response efficacy and self-efficacy will lead to greater intentions to perform the recommended behavior than increasing perceptions of vulnerability or severity for people in the action stage.

Hypotheses 1 to 3 indicate that vulnerability and severity are the main motivators to change behavior during the precontemplation and contemplation stages, respectively, and that response efficacy and self-efficacy are the main motivators to change behavior during the action stage. If this were the case, then an increase in these four variables would increase behavioral intentions in the corresponding stage; an increase in perceived vulnerability would increase behavioral intentions in the precontemplation stage, whereas an increase in perceived severity and efficacy (response and self) would increase behavioral intentions in the contemplation and action stages, respectively. Unfortunately, PMT does not specify ways to increase perceptions of vulnerability, severity, response efficacy, or self-efficacy. Consider a health communication designed to increase an individual's perception of vulnerability, for example, and thus increase behavioral compliance. From a communication standpoint, it would be useful to have guidelines based on health behavior theories that offer practical and effective ways to increase an individual's perception of vulnerability.

To aid us in identifying specific ways to increase perceptions of these predictor variables, we turned to Prochaska and colleagues (Prochaska, Norcross, & DiClemente, 1994) findings during their clinical practice. Although there are no scale measures or empirical evidence, Prochaska, Norcross, and DiClemente discovered different patterns of self-evaluative beliefs during the transition from one stage to the next. By investigating the relationship between these beliefs and the four main PMT beliefs, we hope to provide a starting point for practical

ways to increase individuals' perceptions of vulnerability, severity, response efficacy, and self-efficacy. Specifically, Prochaska, Norcross, and DiClemente found that the following self-serving denials enabled precontemplators to avoid seeing their problems: (a) positive self-illusions (e.g., with condom use behavior, a positive self-illusion is "I don't sleep around"); (b) rationalization ("I'm in a steady relationship"); (c) excuses ("I don't have time to think about this"); and (d) displacement ("It's the man's responsibility to wear a condom"). Awareness of these self-serving denials helps people to move from the precontemplation stage to the contemplation stage. Prochaska, Norcross, and DiClemente also found that the nature and quantity of these beliefs varied by context and sample. For example, displacement thoughts may not occur in response to a message on smoking cessation, or rationalization thoughts may occur more in an older than in a teenage sample faced with a message advocating condom use. Given that the more self-serving denials a person has the less motivation the person has to contemplate change, and our prediction (Hypothesis 1) that an increase in vulnerability should increase behavioral intentions in the precontemplation stage, we would expect these self-serving denials to be negatively correlated to perceptions of vulnerability. That is, someone with more excuses, displacement, rationalization, and positive self-illusions would probably feel less vulnerable.

Prochaska, Norcross, and DiClemente (1994) also describe anecdotal stories that illustrate how as people become aware of their defenses, motivation to consider change increases. We label this increased awareness of self-serving defenses, *awareness*.

Hypothesis 4. Self-serving denials (positive self-illusions, rationalizations, excuses, and displacement thoughts) should be negatively correlated with perceived vulnerability. Thoughts indicating awareness should be positively correlated with perceived vulnerability.

Similarly, Prochaska, Norcross, and DiClemente (1994) suggest categories of self-evaluative beliefs that help a person to move from contemplation to action. These include beliefs about the consequences of change to self ("Would it make sex less spontaneous?"), and the reaction that others would have regarding the change ("Would my boyfriend think I was having sex with other people?"). As perceived severity is predicted to influence intentions in the contemplation stage (Hypothesis 2), these two types of thoughts should be significantly correlated with perceived severity.

Hypothesis 5. Thoughts about the consequences of change to self and the reaction of others to change should be positively correlated with perceived severity.

Finally, people interested in maintaining their behavior after taking the initial action steps have been shown to have reassuring thoughts that support their action ("It is very important to use a condom every time I have sex") and thoughts that indicate self-reevaluation ("I wasn't using condoms before, but now I am"). Thus, as response efficacy and self-efficacy are predicted to influence intentions in the action stage (Hypothesis 3), these two thoughts should be significantly correlated with perceived efficacy.

Hypothesis 6. Reassurance and self-reevaluation thoughts should be positively correlated with perceived response efficacy and self-efficacy.

Hypotheses 4 to 6 are exploratory. To the best of our knowledge, there is no evidence on formal measurement of these thoughts or evidence relating them to perceptions of vulnerability, severity, response efficacy, or self-efficacy. Support for Hypotheses 4 to 6 provide a promising start for understanding potential methods to increase perceptions of vulnerability, severity, response efficacy, and self-efficacy.

Method

Experimental Overview and Design

One hundred twenty-seven graduate and undergraduate women participated in the experiment in exchange for a donation to an affiliated women's group (e.g., sorority house). Each student received a packet containing a cover letter, the questionnaires, and a brochure. The cover letter stated that the women were invited to participate in a market research study to determine the effectiveness of "safer-sex" brochures for women, and assured them of the confidentiality of their responses. Participants were instructed to first fill out the small questionnaire containing the stage classification measures. After completing this, they then read the brochure and filled out the longer questionnaire. Anonymity was assured by having the women return the completed survey to a predetermined lock box on campus.

The design of the study was a $3 \times 2 \times 2 \times 2 \times 2$ (Stages, Precontemplators/Contemplators/Actors \times Low/High Levels of Vulnerability \times Low/High Levels of Severity \times Low/High Levels of Perceived Self-Efficacy \times Low/High Levels of Perceived Response Efficacy). Respondents were divided into different stages and different levels of perceived self-efficacy and response efficacy on the basis of their responses on the relevant measures. Levels of vulnerability and severity were manipulated in the message.

Stage and Efficacy Classifications

Stage classification. After all of the data were collected, participants were divided into the exclusive categories of precontemplation, contemplation, or action, based on guidelines set forth by the transtheoretical model (Prochaska, Norcross, & DiClemente, 1994).³ The criterion for classification was each respondent's total score on a process-of-change self-assessment scale. Based on a decade of empirical validation, Prochaska, Norcross, and DiClemente conclude that precontemplators score less than half the maximum score on a series of four questions that measure the process that represents the first step toward intentional change (consciousness-raising process to increase level of awareness; see Appendix for scale items; e.g., "I look for information related to my problem behavior."). All of Prochaska's process self-assessment scales were created to be sufficiently broad so as to apply to any behavioral problem; the scales were adapted for this study by substituting "using condoms" for "problem behavior." Fifty-six women were categorized as precontemplators, using this criterion. Again following guidelines in the transtheoretical model, 34 women were classified in the action stage because they scored greater than the cutoff on the self-assessment scale that defines the action stage (countering process to substitute more positive behaviors for problem ones; e.g., "I engage in some other physical activity when I am tempted to give in to sex without a condom"). The remaining 37 women fell into the contemplation range on these scales (for a full review of the process scales and cutoff points, see Prochaska, Norcross, et al., 1994).

To check the validity of the decision-making stages, we measured the pros and cons of changing one's behavior. The transtheoretical model suggests that part of the decision to move from one stage to another is an evaluation of the pros versus cons of changing one's behavior. The pros represent advantages that encourage stage movement, while the cons represent disadvantages that inhibit

³Our original intention was to use the algorithm defined by Prochaska, Norcross, et al. (1994) that allows people to respond to four simple statements in order to assess their stage: (a) I solved my problem more than 6 months ago; (b) I have taken action on my problem within the past 6 months; (c) I am intending to take action in the next month; and (d) I am intending to take action in the next 6 months. Individuals who answer No to all four statements are precontemplators. Contemplators answer Yes to Statement 4, and No to all others. Actors answer Yes to Statement 2 and No to Statement 1. Approximately 40% of our respondents did not complete this question. In retrospect, we believe we may have intimidated people with our task instruction, which made salient the possibility of an existing socially correct answer ("Please tell us what you are doing or will do, not what you think you should be doing. In other words, we do not care about getting socially correct answers."). Analysis only on the subset of respondents who answered this question is not possible, since this leaves our design with one or more empty cells. The classification system that we use (and describe in detail in the text) is the best proxy for this simple algorithm.

stage movement. These components are relatively orthogonal, so that an individual can score high on one and low on the other, or high (low) on both. Studies on the transtheoretical model across 12 contexts (e.g., AIDS risk reduction, contraceptive behavior, smoking cessation) and various populations (student and high-risk samples) show that the pros account for more of the variance in stage movement from precontemplation to action, with the cons remaining relatively stable (Prochaska, Redding, et al., 1994). Two 10-item scales ranging from 1 (*not important*) to 7 (*extremely important*) developed by Grimley, Riley, Bellis, and Prochaska (1993) represent the pros and cons of condom use for disease prevention. The pro scale includes statements affirming condom use (e.g., "I would feel more responsible about STDs if I used condoms."; $\alpha = .90$); the con scale includes negative reactions to condom use (e.g., "Methods of contraception that prevent STDs are unpleasant to use"; $\alpha = .88$; all items are listed in the Appendix).

Our stage classification system would be consistent with those found in the previous literature if (a) intentions to comply with the message recommendations increased linearly from precontemplation to action, (b) the pros of condom use increased linearly across stages, and (c) the cons of condom use remained stable. Results of a trend analysis support a positive linear trend of behavioral intentions across stages, increasing from precontemplation to contemplation to action, $F(2, 111) = 7.60, p < .01$ (see Table 1 for means). Similarly, there is a significant positive linear trend of stage on the pros scale, $F(2, 101) = 5.83, p = .02$. By contrast, the linear effect of stage on cons was not statistically significant, although directionally the cons to behavioral change are highest for precontemplators and lowest for actors, $F(2, 104) = 1.39, p > .10$. Table 1 presents means and significance values for the linear trends.

Since our study was on safer-sex practices, we needed to make sure that our stage categories were not merely reflections of sexual activity. An examination of participants' self-reported sexual behavior revealed an encouraging distribution that was fairly consistent across all three stages. In each stage, a portion of participants currently have a steady partner (66%, 40%, and 38%, for precontemplators, contemplators, and actors, respectively), either currently have more than one partner or have had one or more partners over the past year (23%, 30%, 38%, for precontemplators, contemplators, and actors, respectively), or have not had any partners over the last year (11%, 30%, and 24%, for precontemplators, contemplators, and actors, respectively).

Response efficacy and self-efficacy classification. Subjects were divided into two groups that varied in their perceptions of self-efficacy as it relates to their situational confidence in changing a problem behavior and resistance to situational temptations (Prochaska, Redding, et al., 1994). The four-item self-efficacy scale adapted from Grimley, Riley, Bellis, et al. (1993) reflects situational confidence and resistance specifically as they apply to condom use

Table 1

Means, Standard Deviations, and F Ratios for Linear Trend of Behavioral Intentions and Pros/Cons of Condom Use Across Stage

	Stage			
	Precon- templation	Con- templation	Action	Linear-term <i>F</i> ratio
Behavioral intention	4.93 (0.91)	5.27 (0.76)	5.44 (0.74)	7.60**
Pros	4.63 (1.55)	5.06 (1.44)	5.40 (1.94)	5.83*
Cons	3.20 (1.39)	3.09 (1.36)	2.82 (1.20)	1.39

Note. All *F* values > .10 unless otherwise indicated. Parentheses enclose standard deviations.

* $p < .05$. ** $p < .01$.

($\alpha = .81$): (a) "In general, how confident are you that you would use a condom in a sexual encounter?" (b) "How confident are you that you would use a condom when you think your partner might get angry?" (c) "How confident are you that you would use a condom if you had been drinking or using drugs?" and (d) "How confident would you be helping your partner use a condom?" A mean split on the average of these items was used to divide the sample into two groups of self-efficacy ($M = 5.50$ on a 7-point scale). Fifty-nine and 62 women were in the low ($M = 4.10$) and high ($M = 6.38$) self-efficacy groups, respectively, $F(1, 117) = 149.55, p < .001$. Similarly, respondents were divided into two groups of low ($M = 4.21, n = 69$) and high ($M = 7.00, n = 57$) response efficacy based on a mean split ($M = 6.00$) on subjects' responses to whether the recommendations in the pamphlet were important in reducing the risk of STDs, $F(1, 122) = 156.32, p < .001$.

Stimulus Manipulations

The brochure encouraging safer-sex practices were a professionally printed, foldout design. The content of the brochure was a compilation of existing safer-sex brochures located in the University's Health Center. The inside

pages of all the brochures contained two sections: (a) "how-to" suggestions that explain how to bring up safer-sex discussions with a partner (e.g., "Be ready to talk when you have some quality time together and won't be interrupted."), and (b) recommended steps that help to ensure that safer-sex guidelines will be adhered to (e.g., "Use latex condoms. Latex acts as a barrier to STDs.").

Vulnerability classification. Perceived vulnerability was manipulated by varying the personal relevance of the brochure (Rook, 1986). The high-vulnerability brochure specifically appealed to the target group; the cover was titled "Women and Safer Sex" and contained the phrase "If you are a young unmarried woman in college, you should know about a woman's role in using condoms." By contrast, the low-vulnerability brochure was more generic in appeal: "Safer Sex. Everyone should know a partner's role in using condoms." On two 7-point semantic differential scales labeled *not at all vulnerable/very vulnerable* and *specifically written for college students/not specifically written for college students*, subjects in the low-vulnerability condition reported feeling less vulnerable ($M = 4.84$) than subjects in the high-vulnerability condition ($M = 5.16$), $F(1, 120) = 2.39, p = .06$. This manipulation mirrors real health brochures entitled "Of Importance to Women" put out by the National Institute of Mental Health (1995).

Severity classification. The manipulation of severity followed the conventional manipulation in the health-persuasion literature by varying the seriousness of the consequences (see Boster & Mongeau, 1984, for a review). The severity manipulation on all brochures began as follows, "If you don't insist that your partner use condoms every time you have sex, you could be infected by several sexually transmitted diseases. This could have a big impact on your health." The high-severity condition continued with:

Problems include: HIV (the AIDS virus), genital herpes, hepatitis, syphilis, and meningitis. Symptoms of some of these illnesses include AIDS-related cancers, dementia, and even death. Many of these diseases are curable, but condoms used correctly every time you have sex are a better preventative measure against getting sexually transmitted diseases in the first place.

By contrast, the low-severity condition read:

Problems include: oral herpes, genital warts, pelvic inflammatory disease, yeast infections, and genital itchiness and soreness. Symptoms of some of these illnesses include genital discharge, sores, and mild pain. Many of these diseases are curable, but

condoms used correctly every time you have sex are a better preventative measure against getting sexually transmitted diseases in the first place.

Perceived severity was measured on a three-item semantic differential scale: *extremely severe/not at all severe*, *extremely frightening/not at all frightening*, *extremely serious/not at all serious* ($\alpha = .86$). Responses on these three severity checks indicated that subjects in the low-severity condition thought that the risks were less severe ($M = 5.59$) than did subjects in the high-severity condition ($M = 5.98$), $F(1, 126) = 3.12, p < .05$.

Dependent Measures

Thought listing. After reading the brochure, subjects first responded to an open-ended elaboration task requiring respondents to write down the thoughts that crossed their minds and how they were feeling as they read the pamphlet. These thoughts were coded by an independent coder, blind to the experimental treatment conditions, and a random sample of these coded responses were checked by a second coder. The thoughts were coded into nine categories suggested by the transtheoretical model: (a) positive self-illusions, (b) rationalization of the problem, (c) excuses for noncompliance, (d) displacement of responsibility, (e) awareness of self-serving denials, (f) consequences of the behavioral change to oneself (self-change), (g) reaction of others to the change in behavior (other-change), (h) reassurance that one is effectively complying with the recommended behaviors, and (i) reevaluation of past and present behavior (self-reevaluation).

Behavioral intentions. The open-ended elaboration task was followed by a 14-item behavioral intention scale that reflects subjects' likelihood of complying with the recommended behavior. Public health researchers have determined that behavioral skills such as the ability to communicate with and to be successfully assertive with a potential sex partner are critical components of one's intentions to practice safer sex (Grimley, Riley, & Prochaska, 1993). Thus, following the suggestion of these health educators, respondents were asked to indicate on a 7-point scale their agreement with safer sex behavioral skills (e.g., "I will not have sex with someone who does not have a condom," "I will talk to my partner about safe sex before having sex," "I will carry a condom if there is a chance I will be having sex"; $\alpha = .70$; see Appendix).

Covariates. The questionnaire also included measures of covariates that might be associated with STDs or with health models (Tanner, Hunt, & Eppright, 1991). Credibility was measured by asking subjects whether the pamphlet was credible, believable, and typical of the kind of health-related

Table 2

Beta Coefficients and p Values for Behavioral Intentions Regressed on Vulnerability, Severity, Self-Efficacy, and Response Efficacy by Stage

	Stage			
	Precon- templation	Con- templation	Action	Overall
Vulnerability	.33*	-.15	-.01	.11
Severity	.20	.34*	.25	.26**
Self-efficacy	.25	.24	.53**	.36***
Response efficacy	.15	-.11	.42**	.13
R ²	.27*	.12*	.41**	.30**

Note. All *p* values > .10 unless otherwise indicated.

p* < .05. *p* < .01. ****p* < .001.

pamphlets disseminated by institutions. Perceived fear was measured on a five-item Likert scale (fearful, nervous, uncomfortable, scared, and tense; $\alpha = .92$). Respondents were also asked to indicate their ethnicity, whether they have ever been diagnosed with an STD, and whether they use condoms primarily for birth control or for protection against STDs. As these covariates were insignificant in their main effects and in higher order interactions, they are not discussed in subsequent analyses.

Results

Hypothesis Tests

Determinants of behavioral intentions in each stage. To evaluate Hypotheses 1 through 3, we tested three dummy variable regression equations, one for each stage, with intentions as the dependent variable and self-efficacy, response efficacy, severity, and vulnerability as the independent variables.

The first hypothesis predicted that increasing perceptions of vulnerability will lead to greater intentions to comply with the message's recommendations than increasing perceptions of severity, self-efficacy, or response efficacy for people in the precontemplation stage. Results of the first regression for precontemplators support Hypothesis 1: As shown in Table 2, for precontemplators, the only significant predictor of behavioral intentions was perceived vulnerability.

A similar regression analysis for contemplators supports Hypothesis 2. Increasing perceptions of severity led to greater intentions to practice safer sex than did increasing perceptions of vulnerability, self-efficacy, or response efficacy for people in the contemplation stage. Note in the third column of Table 2 that only perceived severity was significant in the regression analysis.

Consistent with Hypothesis 3, for those in the action stage, increasing perceptions of response efficacy and self-efficacy led to greater behavioral intentions than did increasing perceptions of vulnerability or severity. Table 2 contains the beta coefficients and significance values for each regression.

Exploratory analysis on thoughts during each stage. To test Hypotheses 4 to 6, we ran a correlation of the nine categories of thoughts suggested by the transtheoretical model with the measured values of self-efficacy, response efficacy, vulnerability, and severity (Table 3). Hypothesis 4 suggests that self-serving denials, (i.e., self-illusion, rationalization, displacement, and excuses) should be negatively correlated with perceived vulnerability, while an increase in awareness of these denials (awareness) should be positively correlated with vulnerability. As shown in Table 3, results partially confirm Hypothesis 4: As expected, awareness thoughts were positively and significantly related to vulnerability. While the self-illusion category was negatively correlated, it was not significant; nor were the other categories of denial techniques (displacement, rationalization, and excuses), significantly correlated with vulnerability.

In Hypothesis 5, we predicted that thoughts related to the consequences of change to self (self-change) and the reaction of change to others (other-change) should be positively correlated with perceived severity. Again, Hypothesis 5 is partially confirmed: Self-change was positively and significantly correlated with severity, but the correlation of other-change and severity was not significant.

Finally, the transtheoretical model suggests that people interested in maintaining their behavior have thoughts regarding reassurance and self-reevaluation (Hypothesis 6). Reassurance thoughts were positively and significantly correlated with self-efficacy, but self-reevaluation was not correlated with self-efficacy. None of the thought categories were significantly related to response efficacy.

Comparison With PMT

We conducted two sets of analyses to compare our findings with previous evidence on PMT. First, we tested the effectiveness of the PMT model, regardless of stage. We ran an overall regression with behavioral intentions as the dependent

Table 3

Correlations of Type of Thought With Perceptions of Vulnerability, Severity, Self-Efficacy, and Response Efficacy

	Vulnerability	Severity	Self- efficacy	Response efficacy
Self-illusion	-.15	.09	-.05	.02
Rationalization	.01	-.00	-.17	.02
Excuses	.05	-.03	-.04	.09
Displacement	.01	-.06	.06	.07
Awareness	.18*	.07	-.08	-.02
Self-change	.01	.23*	.06	-.02
Other-change	.07	.09	-.08	.06
Reassurance	-.03	.05	.19*	.12
Self-reevaluation	.13	.06	.04	.13

Note. All p values > .10 unless otherwise indicated.

* $p < .05$.

variable and perceived vulnerability, severity, response efficacy, and self-efficacy as the independent variables. The regression analysis indicated significant beta coefficients for self-efficacy and severity (last column, Table 2). The main effect of self-efficacy is consistent with previous studies on PMT. The main effect of severity on behavioral intentions has not been found as frequently in previous PMT studies (Maddux & Rogers, 1983; Shelton & Rogers, 1981; but see Mulilis & Lippa, 1990).

We also ran the same regression with main effects of the four independent variables, as well as all second-, third-, and fourth-order interactions. The interaction terms were mean centered to avoid multicollinearity. Results indicate no two-, three-, or four-way interactions of severity, vulnerability, response efficacy, or self-efficacy with the exception of a single third-order interaction: Severity \times Vulnerability \times Self-Efficacy ($\beta = .18, p < .05$; all other $ps > .10$). An examination of the means indicates that the highest level of all three variables generated the greatest intentions to change, and the lowest level of all three variables generated the lowest intentions. Specific contrasts confirm that the high-self-efficacy, high-severity, high-vulnerability condition is significantly greater than all other conditions, $F(7, 99) = 14.21, p < .001$, and the low-self-efficacy, low-severity, low-vulnerability condition is less than all other conditions,

$F(7, 99) = 13.47, p < .001$; means of self-efficacy/severity/vulnerability; H/H/H = 5.9, H/H/L = 5.4, H/L/H = 5.2, H/L/L = 5.4, L/H/H = 5.0, L/H/L = 5.2, L/L/H = 4.9, L/L/L = 4.4.

Our results are more supportive of an additive than a multiplicative specification of PMT. Consistent with the prediction of an additive model, the combination of high levels of the three variables produced the highest intention scores, and a combination of the lowest levels produced the lowest intention scores (Maddux & Rogers, 1983). The absence of a four-way interaction (Vulnerability \times Severity \times Self-Efficacy \times Response Efficacy) rejects the multiplicative combinatorial rule originally specified by PMT (Rogers, 1985). Additionally, for a three-way interaction, when behavioral intentions are plotted against any of the predictor variables, the other two variables should form a fan of diverging curves (Rogers, 1985). This is not the case for our Severity \times Vulnerability \times Self-Efficacy interaction. As noted earlier, the multiplicative rule has been rejected by previous PMT studies (Eagly & Chaiken, 1993).

As a starting point in integrating PMT with the transtheoretical model, we also conducted exploratory analysis on the comparison of means of PMT predictor variables across stages. The results of a trend analysis revealed a significant positive linear trend for self-efficacy, $F(1, 113) = 8.94, p < .01$, a positive linear trend for vulnerability, $F(1, 119) = 7.32, p < .01$, and insignificant linear trends for severity and response efficacy, $F_s < 1$. Note that although the means are higher for contemplators than for precontemplators or actors, there is no support for a quadratic trend, $F_s < 1$. We will discuss these results in more detail in the Discussion section of the paper. Table 4 presents the means and standard deviations for the PMT variables across stage.

Discussion

In this paper, we developed an integrated theory of health communication by combining PMT with the stages described in the transtheoretical model. Our study challenges the assumption implicit in PMT (Rogers, 1983) that vulnerability, severity, response efficacy, and self-efficacy are equally weighted across individuals. Rather, we propose a segmentation approach to suggest that people at different stages of readiness for change are differentially affected by levels of these predictor variables. Results from our experiment on safer-sex practices confirm our theorizing that the relative importance of vulnerability, severity, response efficacy, and self-efficacy vary from precontemplation to contemplation to action (Hypotheses 1 to 3).

Specifically, our results confirm that for those individuals who are not yet thinking about changing their behavior (precontemplators), increased levels of perceived vulnerability lead to greater intentions to follow the recommended

Table 4

Means, Standard Deviations, and F Ratios for Linear Trend of PMT Variables Across Stage

	Stage			
	Precon- templation	Con- templation	Action	Linear-term <i>F</i> ratio
Vulnerability	3.55 (1.30)	3.83 (1.44)	4.35 (1.25)	7.32**
Severity	5.82 (1.23)	5.90 (1.46)	5.74 (1.14)	0.06
Self-efficacy	4.79 (1.74)	5.26 (1.47)	5.80 (1.03)	8.94**
Response efficacy	5.23 (1.81)	5.74 (1.67)	5.47 (2.11)	0.51

Note. All *F* values > .10 unless otherwise indicated. Parentheses enclose standard deviations.

***p* < .01.

health advice than increased levels of severity, response efficacy, or self-efficacy. In other words, precontemplators must first accept that they are vulnerable to the danger before they can begin to contemplate action. On the other hand, those individuals already thinking about changing their behavior (contemplators) must be convinced of the severity of the consequences were they to disregard the health advice. Thus, for contemplators, increased levels of perceived severity lead to greater intentions to follow the recommendations than do increased levels of vulnerability, response efficacy, or self-efficacy. People already engaging in safer-sex practices (actors) to some degree already believe that they are susceptible to potential negative consequences and that these consequences are severe enough to deserve action. For people in the action stage, increased levels of response efficacy and self-efficacy lead to greater behavioral intentions than do increased vulnerability or severity.

Our exploratory analysis (Hypotheses 4 to 6) was driven by a desire to understand the thoughts associated with each stage and with people's perceptions of vulnerability, severity, response efficacy, and self-efficacy. Prochaska's anecdotal evidence on the common patterns of self-evaluation during

stage transition provided the starting point for our exploration. We ran a correlation analysis of the nine types of evaluations Prochaska discusses with the PMT variables and found: (a) thoughts indicating awareness of self-serving denials are correlated with perceived vulnerability, (b) thoughts about the consequences of change to oneself are correlated with perceived severity, and (c) reassuring thoughts supporting the action are correlated with perceived self-efficacy. We are excited about these findings because of the potential practical application they offer to health educators. For example, health communications might be able to increase behavioral compliance among precontemplators by employing techniques, such as mental simulation or imagery, that increase one's awareness of self-serving denials. Likewise, actors might be encouraged to maintain their behavior by increasing perceptions of self-efficacy through health communications that invoke self-compliments and other reassuring thoughts.

We also conducted exploratory analysis on the trend across stages for each of the PMT predictor variables. Since this is the first paper to explore means of each PMT variable for different segments of people, our interpretation of these results is post-hoc, and based primarily on logical expectations. For example, results indicate a significant linear trend from precontemplation to action for perceived self-efficacy and vulnerability. That actors should have the most confidence in their ability to carry out the recommendations and precontemplators the least confidence is a logical result. Seemingly, actors also have the highest levels of perceived vulnerability and precontemplators the least. What is most interesting about this result is that actors have the highest *perceived* susceptibility, regardless of actual susceptibility. To some extent, one can presume that these actors have lower levels of actual susceptibility because they are using condoms and practicing safer sex. Unfortunately, we cannot determine actual susceptibility from this study.

No significant linear (or quadratic) trends were evident for response efficacy. One of our primary reasons for measuring response efficacy, rather than manipulating it for this study, was to keep the recommended behavior constant across stages. Past studies have manipulated response efficacy by varying the actual behavior; for example, prevention versus detection of cancer (Block & Keller, 1995). Therefore, that perceptions of the effectiveness of the behavior in reducing the danger does not vary across stages in our study is also an appealing result. Finally, there were no significant linear (or quadratic) trends for perceived severity although, consistent with Weinstein and Sandman (1992), the highest mean occurs in the contemplation stage.

Approximately 40% of our sample did not complete the commonly utilized staging algorithm defined by Prochaska, Norcross, et al. (1994). This represents a shortcoming of our specific task instructions, which made salient the

possibility of a socially correct answer. It is important to note that the same staging algorithm has been used with diverse populations who have had no problems responding to assessments of current stage of change.

We view our exploratory analysis as the beginning of a stream of research that identifies cognitions associated with perceptions of vulnerability, severity, response efficacy, and self-efficacy (Block & Keller, 1997; Keller & Block, 1996, 1997). The data presented here are correlational; we cannot determine, for example, whether reassuring thoughts lead to increased perceived self-efficacy, or perceived self-efficacy leads to an increase in reassuring thoughts. We hope, though, that future research experimentally disentangles which of these precedes the other. Additionally, since the diagnosticity of these thoughts varies by context and sample, future research should explore the association of thoughts and the PMT variables for a variety of health behaviors in order to present a more generalizable conclusion.

It would also be interesting and would offer practical importance to extend this research longitudinally. Our paper proposes ways of increasing behavioral intentions for precontemplators, contemplators, and actors. However, there are many intervening variables between intentions to comply and actual compliance. In contexts other than safer sex (e.g., compliance with recommendations to lose weight or to lower cholesterol levels), it is possible for the experimenter to objectively determine compliance. Replication of this study in other contexts would also allow the possibility of checking movement from one stage to another after the individual has received the experimentally controlled health information.

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Appendix

Stage Classification: Consciousness Raising

I look for information related to condoms.

I think about information from articles and books on STDs to overcome my aversion to using condoms.

I try to get information about how people successfully use condoms.

I recall information people have personally given me about the benefits of using condoms.

Stage Classification: Countering

I engage in some other physical activity when I am tempted to give in to sex without a condom.

When I feel anxious about sex without a condom, I try to relax.

I find that there are other ways to be intimate that can substitute for sex without a condom.

When I think I am about to have sex without a condom, I think about or do something else.

Pros of Condom Use

I would feel protected against STDs if my partner and I used condoms.

My partner would feel more protected if we used condoms.

I would feel more responsible about STDs if I used condoms.

Protecting myself from STDs would increase my self-esteem.

Using condoms to guard against the transmission of STDs builds trust.

Condoms are easy to use.

Sex would be more enjoyable if I felt protected from STDs.

Methods that protect you from STDs are easy to obtain.

If I used contraceptives to prevent STDs, I would gain my partner's respect.

Condoms are affordable.

Cons to Condom Use

My partner would find sex less exciting if a condom were used.

I might hurt my partner's feelings if I suggested we use a condom.

I might spoil a sexual encounter if I brought up condom use.

It is harder to insist on condom use once a commitment has been made to a partner.

I might hurt my partner's feelings if I suggested we use a condom when we were already using the Pill.

Methods of contraception that prevent STDs are unpleasant to use.

My partner would be angry if I refused to have sex unless a condom were used.

Discussing STD prevention makes my partner uncomfortable.

Condoms take the spontaneity out of lovemaking.

I am uncomfortable discussing STD prevention with a partner.

Behavioral Intentions (R = reverse coded)

To avoid getting an STD, I will not have sex without a condom.

I will not have sex without a condom with someone I don't know well.

I will have sex with my partner before discussing protection. (R)

I will have sex with someone who does not have a condom. (R)

I will consider sex with someone who does not like to use condoms. (R)

I am likely to talk to my partner about condoms before I have sex.

I will not consider sex with someone who has refused to wear a condom before.

I will not consider sex with someone who I think will be upset if I suggest a condom.

I am likely to help my partner use a condom correctly from start to finish.

I will consider unprotected sex with someone who does not think it is appropriate to discuss his/her current sex life. (R)

I would not consider helping my partner use a condom properly from start to finish. (R)

I will talk to my partner about safer sex before having sex.

I will carry a condom if there is a chance I will be having sex.

I will consider unprotected sex with someone who is embarrassed to discuss his/her previous sex life. (R)