

## ORIGINAL ARTICLE

## Seeking Information About Sexual Health: Applying the Theory of Motivated Information Management

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*Although considerable research attention has been devoted to studying the spread of HIV, recent attention to general sexual health has refocused attention to the far greater prevalence of other sexually transmitted infections. One way we might help control the spread of these infections is by better understanding the information management process as it relates to sexual health. Toward that effort, this investigation offers an empirical test of the Theory of Motivated Information Management (W. A. Afifi & Weiner, 2004), applying it to college students' search for target-related sexual health information. The results contribute to our understanding of information-seeking processes, offer mixed results regarding the theory's utility in this context, and show an association between information seeking and safer-sex behavior.*

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The rate of transmission of sexually transmitted infections (STIs) in the United States is alarming and, despite significant research and media attention, shows relatively little slowing (Center for Disease Control and Prevention [CDC], 2002). Although the vast majority of research funds have been spent on HIV (see Wasserheit, Valdiserri, & Wood, 1999), the incidence of several other STIs is far greater and their consequences, while often not fatal, are potentially serious. The American Social Health Association (1998) estimated that 15 million new cases of STIs occur each year in the United States. Because of the particularly high incidence of sexual activity and risky behavior during adolescence and young adulthood, individuals in these age groups are at elevated risk of infection. In fact, two thirds of the new cases each year occur among 15- to 24-year-olds and over 40% of sexually active college students are estimated to be infected with human papillomavirus (HPV) (Academy for Educational Development, 2000). The physical health consequences of STIs may include cancer, various neurological syndromes, pelvic inflammatory diseases, infertility, ectopic pregnancy, and preterm delivery (see Aral, 2001; CDC). The

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psychological, social, and economic consequences for the infected are also devastating (e.g., Nack, 2000; Siegel, 1999).

Some scholars have argued that the way to gain some control over the epidemic is to encourage individuals to discuss sexual histories with their partner, noting that it is an important component of responsible sexual decision making (e.g., Cleary, Barhman, MacCormack, & Herold, 2002; Coleman & Ingham, 1999). Others disagree, suggesting that such discussions may unintentionally promote unsafe sexual decisions (e.g., Van Campenhout, 1999). Surprisingly, though, we still know relatively little about the information-seeking process that individuals go through with regard to the sexual health of their partners. This investigation applies the Theory of Motivated Information Management (TMIM) (W. A. Afifi & Weiner, 2004) to help understand this process.

### The Theory of Motivated Information Management

The TMIM is a new framework that accounts for *active* information management efforts and is focused on information management occurring through *interpersonal* channels. As such, it is ideally suited to examine the information management decisions that individuals make about others' STI status. The framework shares important links with Efficacy Theory (Bandura, 1997), the Theory of Uncertainty Management (Brashers, 2001), Problematic Integration Theory (Babrow, 2001), and the Comprehensive Model of Information Seeking (Johnson & Meischke, 1993). Among the contributions that it brings to the landscape of uncertainty management theories are (a) explicit awareness of the dyadic and interactive process of uncertainty management within interpersonal exchanges, (b) a detailed accounting of the decision-making process, (c) an emphasis on the role played by multiple efficacy components, and (d) an analysis of the role played by the provider (W. A. Afifi & Weiner, 2004). Although the theory's propositional framework surrounding information providers is not yet developed, tests of the information *seekers'* behavior have produced partial confirmation of the theory across several contexts (W. A. Afifi, Cupach, & Spitzberg, 2004; W. A. Afifi, Dillow, & Morse, 2004; W. A. Afifi et al., 2005). TMIM proposes that information management decisions can be generally captured through a three-phase process represented by interpretation, evaluation, and decision steps. Each will be briefly described.

### Interpretation phase

The first step in the information management process involves individuals' awareness of a discrepancy between the amount of uncertainty they desire about an important issue and the amount of uncertainty they currently have about that issue. In other words, TMIM does not rely on the level of uncertainty, per se, as the process's ignition, but on its comparison to the level that is desired (see also, Babrow, 2001; Brashers, 2001). The TMIM contends that this awareness then leads to anxiety about the uncertainty discrepancy.

### Evaluation phase

The TMIM proposes that the experience of anxiety influences, and is followed by, an evaluation phase. This phase involves assessing the expected outcomes of an information search (outcome assessments) and the perceived ability to gain the sought-after information (efficacy assessments). These assessments are argued to mediate the effect of anxiety on the information management decision (W. A. Afifi & Weiner, 2004).

W. A. Afifi and Weiner (2004) define outcome expectancies as “individuals’ assessments of the benefits and costs of a particular information-seeking strategy” (p. 176). Consistent with several theoretical frameworks (for review, see Kirsch, 1999), such expectations are proposed to play a critical role in individuals’ decisions to seek information. Indeed, recent empirical tests support the role of outcome expectancies in the process (e.g., W. A. Afifi, Cupach, et al., 2004; W. A. Afifi, Dillow, et al., 2004; W. A. Afifi et al., 2005). Past studies of sexual health have also successfully applied the concept. For example, Quina, Harlow, Morokoff, Burkholder, and Deiter (2000) reported that participants were willing to discuss sexual health issues with their partners to the extent that they expected a positive response.

TMIM proposes that outcome expectancies are partly mediated by perceptions of efficacy. Perceptions of efficacy have been shown to play an important role in behavioral decisions across a wide array of contexts (for review, see Bandura, 1997), but have generally been absent from theorizing in the information-seeking realm. To address this deficiency, W. A. Afifi and Weiner (2004) advanced three distinct efficacy assessments relevant to interpersonal information management: coping efficacy, communication efficacy, and target efficacy. Coping efficacy is defined as “the extent to which information managers believe that they have the emotional, instrumental, and other resources (e.g., network support) to manage the outcomes they expect from the information-seeking strategy under consideration” (W. A. Afifi & Weiner, 2004, p. 178). Based on Bandura’s original conceptualization of efficacy beliefs types (Bandura, Reese, & Adams, 1982), coping efficacy has received increased attention for its success as a predictor of behavior. Most recently, Benight and colleagues’ program of research has highlighted the success of coping efficacy as a predictor of individuals’ response to trauma (e.g., terrorism, natural disasters, death of a spouse; for review, see Benight, Flores, & Tashiro, 2001). T. D. Afifi (2003) has also noted the importance of coping efficacy in children’s adjustment to divorce.

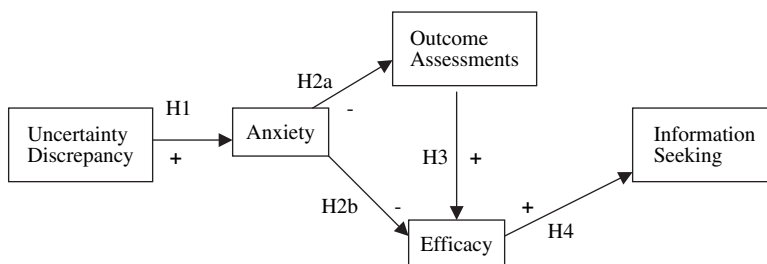
Communication efficacy reflects individuals’ perceptions that they can successfully engage in the communication or observational task required to gather the sought-after information (W. A. Afifi & Weiner, 2004). Recently, W. A. Afifi et al. (2005) reported communication efficacy to be a strong predictor of individuals’ searches for information about their family’s organ donation beliefs. Applying it to the context of interest for this investigation, Kalichman and Nachimson (1999) found that individuals’ perception that they were able to disclose their HIV-positive status to partners strongly predicted disclosure decisions.

The last efficacy component is target efficacy, which is considered to be the “belief that the information target is able and willing to produce the sought information” (W. A. Afifi & Weiner, 2004, p. 179). The likelihood that partners may not be completely honest on these issues (see Williams, 2001) makes this component of efficacy especially relevant to the study of sexual health. To our knowledge, however, no studies have directly investigated individuals’ belief in whether their partner has the necessary information (i.e., ability) and is sufficiently willing to honestly discuss their sexual health.

As noted, these efficacy judgments are proposed to be influenced by, and to partly mediate, outcome assessments (W. A. Afifi & Weiner, 2004). The predicted direction of influence (i.e., outcome assessments impacting efficacy beliefs) is based on the argument that individuals determine the sorts of costs and rewards they expect from an information-seeking action prior to making assessments about their ability to enact the strategy and/or cope with those costs and rewards. W. A. Afifi and Weiner further proposed that efficacy’s role as mediator is lessened in cases where outcome expectancies are generally positive. In such cases, fears associated with enacting the communication strategies and concerns regarding coping abilities likely vanish, resulting in a diminished role for efficacy in the information management process. Nevertheless, target efficacy judgments may still maintain its position as an important influence.

### Decision phase

The evaluation phase leads individuals to the decision phase, encapsulating a wide range of information management options. The strategy of interest for our purposes is direct discussion with the person in question. Direct pursuits of STI information from target others is the strategy that is the most sexually responsible (Cleary et al., 2002) and likely most effective—it targets the person who would have greatest access to that information and does so in a way that makes response evasion difficult. Our predictions (H1–H4), based on the TMIM framework, are summarized in Figure 1.



**Figure 1** Predictions Stemming from the Theory of Motivated Information Management

Note: The hypotheses divide the overall model into discrete predicted paths. The sign opposite the letter indicates the predicted direction of association.

Separate from the question of whether we are able to predict individuals' decisions to seek information about a target person's STI status is the question of whether such information foraging contributes to wise health decisions. The extant research offers mixed evidence on that front.

### **The consequence of information seeking about STIs**

There appears to be two contrasting views on the implications of seeking information from a partner about STIs. The first view suggests that the process is biased toward a decision that discourages condom use. This conclusion is based on several empirical findings. First, individuals are predisposed to perceive partners with whom they are considering sexual activity as the "type of person" who is free of STIs (W. A. Afifi, 1999). Ellen, Vittinghoff, Bolan, Boyer, and Padian (1998) found that one third of their STD-clinic participants incorrectly believed that their partners had not engaged in risk behavior. Similarly, Niccolai, Farley, Ayoub, Magnus, and Kissinger (2002) noted only a 46% accuracy regarding partner infection status among a group of HIV-infected persons, with over 70% of those who incorrectly identified their partner as being HIV positive reporting "knowing" their partner's status, not "guessing" it. So, individuals enter into sexual discussions with a predisposition toward believing that their partner is free of STIs.

Second, the mere act of discussing a private topic such as sexual issues has been shown to promote intimacy, comfort, and trust (see Greene, Derlega, Yep, & Petronio, 2003)—qualities that discourage the use of condoms (e.g., Van Campenhoudt, 1999). In fact, some have argued that the emotional impact of these discussions overrides the rationale imperative to practice safe sex (see Lear, 1997). Finally, there is considerable evidence that individuals lie about their sexual history, either through concealment or fabrication (e.g., Stebleton & Rothenberger, 1993; Williams, 2001). For example, DeRosa and Marks (1998) found that only 57% of HIV-positive men who were sexually active with HIV-negative men disclosed their HIV status to those partners. As such, decisions based on information attained during the discussion will likely tend toward a judgment that protection is not necessary. In sum, it appears dangerous to rely on sexual discussions as an informational tool guiding safer-sex decisions. In fact, given these findings, we would expect direct information-seeking efforts to be negatively associated with safer sexual practices.

However, another set of empirical findings contradict that explanation, suggesting instead that sexual discussions with partners promote condom use. For example, Kelly and Kalichman (1995) concluded that "communication between sexual partners about sex in general—and safer sex in particular—has emerged as one of the strongest predictors of consistent condom use" (p. 910; see also Quina et al., 2000; Wingood & DiClemente, 1998). Transferring this knowledge to education programs, Kelly, Murphy, Washington, and Wilson (1994) and DiClemente and Wingood (1995) showed that intervention programs focused on improving communication

skills have a positive effect on participants' use of condoms. In a related vein, DeRosa and Marks (1998) found that HIV-positive individuals who were least certain about their partners' HIV status were most likely to engage in unprotected sex. In other words, certainty about partners' HIV status (likely a result of sexual discussions) was associated with safer sexual practices. It seems, then, that individuals sometimes see sexual discussions as one aspect of a set of responsible sexual behaviors, not as vehicles from which to make a decision about whether or not to practice safer sex. If that is the case, then efforts at information-seeking should be promoted—both because information about the partner's sexual health can play a critical role in overall health and well-being (Coleman & Ingham, 1999) and because it is associated with safer sexual practices.

Given this contrasting set of empirical findings, we advance the following research question:

RQ: What is the association between information seeking about STIs from a target person and sexual decisions with that person?

## Method

### Participants

Because of their heightened risk for STIs, college students were our target population. Two hundred and sixty-six participants were recruited from undergraduate public speaking courses at the Pennsylvania State University (PSU) and received extra credit for participating in both phases of the investigation. The sample averaged approximately 20 years of age ( $M = 19.87$ ,  $SD = 1.68$  years) and was evenly split between males ( $n = 129$ , 49%) and females ( $n = 136$ , 51%), with one participant failing to report his/her sex. Consistent with the demographics of PSU undergraduates, a large majority of the sample was Caucasian (85%). The vast majority also reported being heterosexual (97%). The average relationship length at the time of completing the first survey was approximately 16 months ( $SD = 15$  months). As a whole, the sample had a moderately active sexual history (average number of past sexual partners = 2.52,  $SD = 3.18$ ).

### Procedure and design

Participants were randomly assigned to the experimental group ( $n = 92$ ), the control group ( $n = 97$ ), or the no-pretest group ( $n = 77$ ). All data collection occurred in classrooms scheduled specifically for that purpose; every other seat was left unoccupied to ensure privacy. Members of the experimental and control groups received two surveys, separated by 3 weeks, to allow for the measurement of change across time. The no-pretest group was included to assess the degree to which testing posed a threat to validity. Participants in that condition only completed one survey, distributed at the time that others received their second surveys. A series of *t* tests failed to show significant differences between the pretest and no-pretest groups on the

variables of interest. These results suggest that individuals' responses on the second survey were not a function of them completing a similar survey 3 weeks earlier (i.e., testing was not a credible threat to validity). The no-pretest group was excluded from subsequent analyses.

The difference between the experimental and control group was that the former received an information fact sheet regarding STIs attached to the front of their first survey (information on the sheet was adjusted based on results from a pilot study,  $N = 125$ ). The purpose of the fact sheet was to increase variance in the theory's interpretation-phase variables (i.e., uncertainty discrepancy, anxiety regarding uncertainty discrepancy). Preliminary analyses tested the success of the manipulation, first by conducting an F-max test, comparing the variance of those two variables in the pretest group versus the no-pretest group, then by contrasting the means of the two pretest groups on those variables (comparing those who received a message and those who did not). The first set of analyses was based on the assumption that the message condition should add variance to the pretest samples, vis-a-vis the no-pretest samples. The second set was based on the assumption that the message condition should produce higher mean levels on these variables than the no-message condition. No significant differences emerged in either case. However, the F-max test for uncertainty discrepancy (F-max = 1.21) and the  $t$  tests for both uncertainty discrepancy ( $t = 1.02$ ,  $p_{\text{one-tail}} = .15$ ) and anxiety ( $t = 1.43$ ,  $p_{\text{one-tail}} = .08$ ) showed that the differences were in the predicted direction. Given that these trends may be accentuated in their effects on other variables over time, condition was included as a dummy-coded factor (0 = *control condition*) in all analyses.

### Instrumentation

Participants were asked to think of a current romantic partner ( $n = 126$ , 67%), if applicable. Those who were not in a romantic relationship were asked to think of a current nonromantic sexual partner ( $n = 18$ , 10%) or friend of the opposite sex with whom they had romantic interest ( $n = 38$ , 20%). Seven participants (3%) did not report their relational status. Participants returned to the scheduled classrooms to complete Phase 2 of the study 3 weeks after completing the first survey. The first and second surveys were identical, except that the latter included a few additional measures (not of interest for this investigation). All measures were adapted from other published efforts at capturing similar constructs and used 7-point scales with end-point labels appropriate to the item. "Partner" was the label used in the items to refer to the target person; those who were not reporting on a romantic or sexual partner were directed to "replace all references to 'partner' with 'friend with romantic interest.'"

### *Uncertainty discrepancy about target's sexual health*

An instrument was developed to measure the difference between individuals' current and desired levels of uncertainty regarding their partner's sexual health. First, an index was created by subtracting participants' response to "How much information do you *know* about your partner's sexual health?" (1 = *nothing* to 7 = *everything*)

from their response to “How much information do you *want to know* about your partner’s sexual health?” The index score ranged from  $-4$  to  $+6$  ( $M = 1.28$ ,  $SD = 1.72$ ). Three additional items (e.g., “How much information do you have about your partner’s sexual health” [ $1 = \textit{more than I want}$  to  $7 = \textit{less than I want}$ ]) were then added to the index score to provide a more comprehensive measure of uncertainty discrepancy. The scales for the three additional items were recoded so that they ranged from  $-3$  to  $+3$ , negative scores indicating a desire for less information than they have and positive scores indicating a desire for more information. The four items formed a reliable indicator of uncertainty discrepancy (Cronbach’s  $\alpha = .83$ ,  $M = 0.99$ ,  $SD = 1.20$ ). It is worth noting that 12% of participants had negative scores on the combined measure; that is, they expressed that they had too much information about their partner’s sexual health.

#### *Anxiety about the uncertainty discrepancy*

An instrument was developed to assess participants’ anxiety about their level of uncertainty discrepancy. A 5-item measure (e.g., “The size of the similarity/difference between how much I know and how much I’d like to know about my partner’s sexual health is ——— [*extremely comforting/anxiety-producing*]”) produced high reliability (Cronbach’s  $\alpha = .87$ ,  $M = 3.04$ ,  $SD = 1.42$ ).

#### *Outcome expectancy*

The outcome expectancy measure consisted of two items repeated for six specific STIs and one general STI assessment. Participants rated the extent to which they expected that a search for information about ——— (e.g., their partner’s HPV status) would produce  $1 = \textit{extremely negative}$  to  $7 = \textit{extremely positive}$  and  $1 = \textit{extremely bad}$  to  $7 = \textit{extremely good}$  information. The reliability for this 2-item scale measure was very high (Cronbach’s  $\alpha = .99$ ). The reliability of the seven assessments (collapsing across the two scales) was also high (Cronbach’s  $\alpha = .98$ ,  $M = 6.40$ ,  $SD = 1.32$ ). The measure was heavily skewed, with 64% of outcome expectancy scores equaling 7.0, indicating that they expected information about the target person’s sexual health to be extremely positive/good.

Participants were also asked to indicate whether they expected that their partner had an STI. Only two participants (1%) predicted that their partner did. Participants were then asked to rate how certain they were about that expectation, using one item that ranged from  $1 = \textit{very certain}$  to  $7 = \textit{not at all certain}$  ( $M = 2.16$ ,  $SD = 1.62$ ). Seventy-four percent of participants rated their level of certainty as a 1 or 2 on a 7-point scale (i.e., were very certain).

#### *Efficacy*

All four efficacy components were measured. The *communication efficacy* items were developed to measure participants’ perceived level of skill and comfort with talking to their partner about her/his sexual health. A 4-item measure (e.g., “I feel like I have the ability to approach my partner to ask about her/his sexual health”) produced



high reliability (Cronbach's  $\alpha = .84$ ,  $M = 5.91$ ,  $SD = 1.26$ ). The *coping efficacy* measure was created to measure participants' ability to handle discovering that their target person is infected with an STI. The six items in the measure (e.g., "I feel I can manage discovering that my partner has an STI") were reliable indicators of coping efficacy (Cronbach's  $\alpha = .91$ ,  $M = 3.62$ ,  $SD = 1.56$ ). Finally, the *target efficacy* measure consisted of two subcomponents and was created to assess participants' perceptions of their target person's *ability* to provide them with adequate information and their perception of the *completeness* of the information that this person would provide. The ability dimension was captured with three items (e.g., "I feel that my partner could provide me with information about her/his sexual health") that were moderately reliable as indicators of that construct (Cronbach's  $\alpha = .71$ ,  $M = 5.99$ ,  $SD = 1.14$ ). The *information completeness* dimension was assessed with four items (e.g., "I feel that my partner would be completely honest about her/his sexual health") that achieved very high reliability (Cronbach's  $\alpha = .87$ ,  $M = 5.97$ ,  $SD = 1.19$ ).

#### *Information-seeking strategies*

Three items were included to capture the extent to which individuals *directly* sought information from their target person about her/his sexual health (e.g., "How many questions have you asked your partner regarding her/his sexual past"; scale range from 1 = *no questions* to 7 = *a lot of questions*). The measure produced high reliability (Cronbach's  $\alpha = .89$ ,  $.93$  for Time 1 and Time 2, respectively;  $M_{T1} = 4.71$ ,  $SD_{T1} = 1.87$ ,  $M_{T2} = 4.90$ ,  $SD_{T2} = 1.73$ ). Despite an overall change across time of only 0.19, a paired-sample *t* test showed that the participants reported significantly more information seeking at Time 2 than at Time 1,  $t(188) = 2.45$ ,  $p < .05$ .

#### *Sexual behavior*

During both phases, participants were asked if they were sexually active with the target person and, if so, "how often [they] practice safer sex (e.g., use condoms, dental dams) with [the target person]?" with options ranging from 1 = *never* to 7 = *always*. Fifty-eight percent of the participants reported being sexually active with the target person during the first phase, and 54% reported being so during the second phase. Further inspection showed that 6% of participants first initiated sexual activity with the target person, and 11% stopped sexual activity with him/her, between the two phases. The self-reported frequency of safer-sex behavior exceeds 5 on the 7-point scale for both Time 1 ( $M = 5.53$ ,  $SD = 2.04$ ,  $n = 112$ ) and Time 2 ( $M = 5.40$ ,  $SD = 2.04$ ,  $n = 108$ ).

## Results

### Model testing

A structural equation model (using AMOS 5.0) was used to test the TMIM's ability to predict change in individuals' information-seeking behavior across time. Time 1 data were used for all model predictors (uncertainty discrepancy, anxiety, outcome

expectancy, and efficacy assessments), while Time 2 data were used for the model outcome (information seeking). The only difference between the predicted model (see Figure 1) and the empirical model was the addition of covariates. Four covariates were included in the model: the dummy-coded condition variable, an assessment of whether the individual was reporting on someone with whom they were sexually active at Time 1, a 1-item measure that assessed the importance of their partner's sexual health as an issue, and the Time 1 report of information seeking. The condition variable was included to account for the influence of the STI message over time, the sexual activity variable was included because of its possible effect on the salience of the target other's sexual health, and importance was included because the TMIM framework involves a scope condition that makes it applicable only to important issues. These covariate paths were only included if they were significant in at least one of the three models tested (see below reference to the three models). The Time 1 assessment of information seeking served two purposes. First, the relatively lengthy history of the relationships on which participants were reporting necessitated that we account for the sexual health information seeking in which participants had already engaged with this partner. Second, the regression of a Time 1 variable on related Time 2 data is a common method for examining change over time, especially when the difference score is highly correlated with Time 1 data (thereby biasing variance in the change score; see Allison, 1990, for comparison of these two methods, with special attention to his reference to the "true causal effect" condition, pp. 107–108). However, it is important to note that the resultant outcome is the residual of Time 2 information seeking after the removal of variance due to Time 1 information seeking. As such, it is not a change score, per se, but an indication of the degree of information seeking at Time 2 with assumptions of equality in the level of information seeking at Time 1.

The measurement model was tested for the three general types of efficacy (coping, communication, and target) to examine whether they formed a single latent efficacy construct. Although model fit was good,  $\chi^2(12, N = 189) = 2.22, p > .05$ , examination of the paths showed that the coping efficacy,  $\beta = .08, p > .05$ , did not contribute to the latent efficacy construct. Follow-up analyses also revealed that the inclusion of communication efficacy in the latent construct, even when treated as a second-order factor, obscured unique effects that otherwise emerged for target efficacy. As such, a decision was made to test three separate models, one for each of the types of efficacy. That decision allowed for examination of the unique contribution made by each efficacy type.

To control for measurement error, the error variance for each of the observed variables was fixed to  $(1 - \alpha) \times$  the variance of the indicator (see Bollen, 1989; Stephenson & Holbert, 2003). Besides reporting  $\chi^2$ , we relied on past literature to guide us to two indexes of fit as assessors of empirical model fit. Specifically, we set somewhat conservative a priori guidelines that the models should exceed .95 for the comparative fit index (CFI) and be lower than .08 for the root mean squared error of approximation (RMSEA) (see Holbert & Stephenson, 2002). Maximum likelihood estimation was utilized to estimate the models.

*Model with communication efficacy*

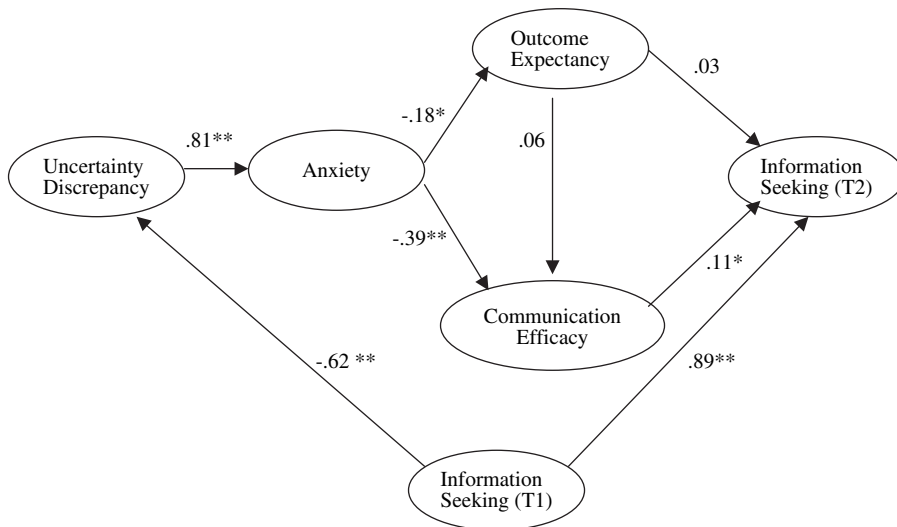
The model for communication efficacy approached the a priori criteria of fit but did not meet them,  $\chi^2(21, N = 189) = 65.06, p < .001, CFI = .93, RMSEA = .11$ . However, all predicted paths, except those from outcome expectancy, were statistically significant (see Figure 2). The significance of the paths, especially the strength of the path from communication efficacy to Time 2 information seeking, is encouraging, despite the failure of the fit statistics to meet our a priori guidelines.

*Model with coping efficacy*

The model for coping efficacy surpassed the a priori criteria of fit,  $\chi^2(21, N = 189) = 19.56, p > .05, CFI = .99, RMSEA = .01$ . However, several paths were nonsignificant, including that path from outcome expectancy to efficacy and from efficacy to Time 2 information seeking (see Figure 3). In fact, given the nonsignificant paths, it is appropriate to conclude that the empirical model fits moderately with the theoretical model.

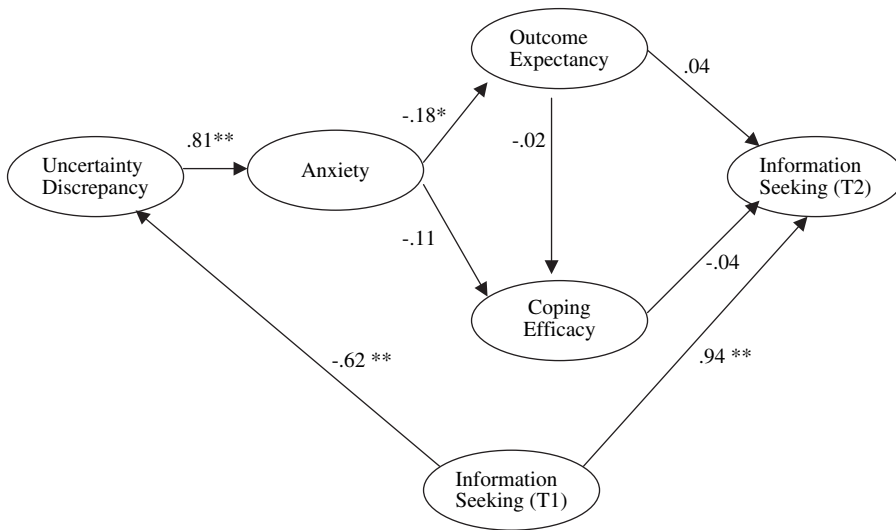
*Model with target efficacy*

The model for coping efficacy surpassed the a priori criteria of fit,  $\chi^2(28, N = 189) = 38.95, p > .05, CFI = .98, RMSEA = .05$ . Moreover, all predicted paths except those from outcome expectancy were significant (see Figure 4). As such, it is



**Figure 2** Model With Communication Efficacy

Note: All parameter estimates are standardized. The asterisks by the path coefficients represent significance at  $**p < .001$  or  $*p < .05$ . For visual simplicity, the manifest variables, the error terms, and the covariates (except T1 information seeking) are excluded from the graphical model.



**Figure 3** Model With Coping Efficacy

Note: All parameter estimates are standardized. The asterisks by the path coefficients represent significance at \*\* $p < .001$  or \* $p < .05$ . For visual simplicity, the manifest variables, the error terms, and the covariates (except T1 information seeking) are excluded from the graphical model.

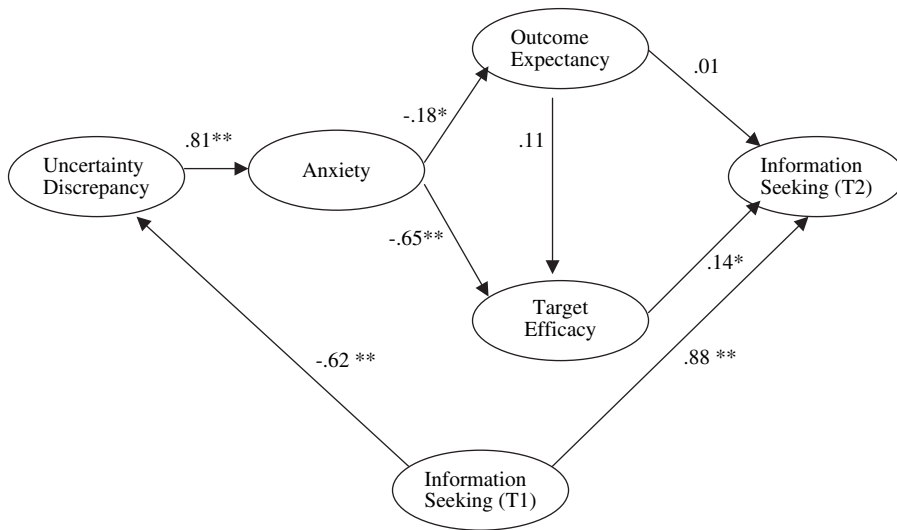
fair to conclude that the overall empirical model had good fit with the theoretical model for target efficacy.

*Mediation predictions*

The theory predicts that (a) outcome expectancy and efficacy mediate the influence on uncertainty-discrepancy anxiety on information seeking and (b) efficacy partly mediates the influence of outcome expectancy on information seeking. Evidence of mediation first requires significant zero-order correlations between the variables of interest, then requires evidence that the mediator accounts for influences of the independent variable on the outcome (see Baron & Kenny, 1986). The Sobel test (Sobel, 1982) provides one possible test of the mediation effect. In some cases due to the absence of significant zero-order correlations (i.e., the correlation between outcome expectancies and change in information seeking) and in other cases due to non-significant Sobel tests (i.e., the mediational role of efficacy on anxiety’s influence), results from this study fail to provide empirical support for the theory’s predicted mediation paths.

**The influence of information seeking on sexual behavior**

Two analyses were performed to test the research question that asked whether the degree of information seeking is associated with sexual decision making. The first analysis examined whether the amount of information seeking was associated with



**Figure 4** Model With Target Efficacy

Note: All parameter estimates are standardized. The asterisks by the path coefficients represent significance at \*\* $p < .001$  or \* $p < .05$ . For visual simplicity, the manifest variables, the error terms, and the covariates (except T1 information seeking) are excluded from the graphical model.

the decision to initiate sexual activity with the target person. To do that, we selected participants who reported not being sexually active with the target person at Time 1 ( $n = 76$ ). Then, examining the report of sexual activity at Time 2, we created a dummy-coded variable that identified those who had first engaged in sexual activity with the target person between Time 1 and Time 2 (coded as 1) and those who remained sexually inactive with that person across time (coded as 0). Next, a proxy for change in information seeking was created by saving the residual score from the regression of Time 1 onto Time 2 information seeking (see earlier discussion of this method). Finally, a hierarchical logistic regression was conducted with the dummy-coded sexual activity variable as the outcome, the residual information-seeking score and the condition variable entered in the first step, and the interaction of the residual score and the condition variable entered in the second step. The analysis revealed that both information seeking (i.e., the residual score),  $Wald = 4.51, p < .05$ , and the condition membership,  $Wald = 4.64, p < .05$ , were positively associated with the decision to initiate sexual activity,  $\chi^2 = 8.58, p < .05$ , Nagelkerke  $R^2 = .19$ . The interaction term was not significant. In other words, individuals were increasingly likely to initiate sexual activity if they received the STI message and searched for information about STIs from the target person across the study time period.

The second analysis examined the role of information seeking on safer-sex behavior with the target person. To do that, participants who reported being sexually active with the target person at both data collection phases were selected for analysis ( $n = 92$ ). A

hierarchical regression was then conducted with the frequency of safer-sex behavior at Time 2 as the outcome, the Time 1 data for that variable entered in the first step, information seeking (the residual score) and the condition variable entered in the second step, and the interaction of condition and the residual score entered in the third step. By entering Time 1 data in the first step, we again created an outcome that captured individuals' frequency of condom use once initial variance on that measure was removed (i.e., a proxy for change in the frequency of condom use). The analysis revealed that individuals were increasingly likely to use condoms to the extent that they sought information from their partner,  $\beta = .17$ ,  $t(84) = 2.76$ ,  $p < .01$ ,  $R^2\Delta = .03$ . Neither the condition main effect nor its interaction with residual score approached significance.

## Discussion

The goal of this investigation was to examine individuals' information-seeking behavior as it relates to a target person's sexual health and to test whether information seeking is associated with sexual decision making. To do so, we applied the TMIM (W. A. Afifi & Weiner, 2004) and gathered data from participants across time. Our results contribute to knowledge about sexual health information seeking in four primary ways: (a) testing the role of uncertainty discrepancy, (b) lending insight into the degree of cognitive bias associated with a partner's sexual health, (c) clarifying the role of efficacy in the process of information seeking, and (d) contributing to our understanding of the consequences of information seeking for sexual decision making. The results also help direct future work on TMIM as a theory of information seeking.

### The effect of uncertainty discrepancy on information seeking

An important conclusion from this investigation is that individuals who most want information about their partner's sexual health may be least likely to seek it from them. This pattern (a negative indirect effect between uncertainty discrepancy and information seeking) adds to growing evidence that the association between information seeking and uncertainty is more complex than initially believed (see Babrow, 2001; Brashers, 2001). Under certain circumstances—where information acquisition is psychologically risky (sexual health being such a case)—the anxiety created by uncertainty discrepancy seems to ultimately discourage direct information seeking. Specifically, the anxiety leads to negative outcome expectancies and lowers perceptions of efficacy, which, in turn, inhibits direct information seeking. Of course, it is important to keep in mind that this investigation is unable to empirically establish the causal direction of these effects. Considerably more work needs to be done to examine the conditions under which uncertainty discrepancy initiates a process that encourages information seeking and when it produces a process that sabotages it.

Beyond discovering an indirect negative relationship between uncertainty discrepancy and information seeking, the results offer some support to Brashers' (2001)

and Babrow's (2001) views of the uncertainty construct. These scholars argued that individuals sometimes prefer heightened uncertainty over a reduction of uncertainty. W. A. Afifi and Weiner (2004) adopted their conceptualization in arguing for uncertainty discrepancy as the guiding force, rather than uncertainty per se. TMIM proposed that the desire for more information and less uncertainty is typical but acknowledged that some people, in some situations, prefer to have less information and more uncertainty than they have. Although this investigation did not compare uncertainty with uncertainty discrepancy as predictors, we did find that 12% of participants reported having more information than they desired about their partner's sexual health. So, a discrepancy in the direction of desiring less uncertainty is clearly the typical scenario but does not capture the entirety of individuals' experiences. Those who desire more uncertainty reflect an important subpopulation that remains understudied and one that challenges past notions of what motivates behavior. In the specific context of partner's sexual health, these individuals would be missed by public health efforts guided toward decreasing uncertainty on that front. They may also be especially likely to engage in risky sexual behavior brought about by motivated ignorance about their partner's sexual past. Future investigations should more closely examine the implications of motivated efforts at elevated uncertainty about a partner's sexual health.

#### **Biased perceptions of partners' sexual health**

The rates of STIs on college campuses are astounding. Recent reports estimate that over 40% of sexually active college students are infected with HPV, the most prevalent form of an STI (Academy for Educational Development, 2000). Yet, of the 189 participants in our study, only 2 (i.e., 1%) believed that their partner had an STI. Moreover, they were extremely certain about that prediction ( $M = 2.16$ , 74% reported their level of certainty as a 1 or 2 on the 7-point scale, with 1 indicating extreme certainty). These data suggest a tremendous lack of awareness by college students about the sexual health realities they face.

The literature on cognitive biases may shed light on this finding. First, considerable research on the notion of positive illusions in relationships shows that individuals tend to view their sexual partners through rose-colored glasses. It has been long held that individuals conduct biased searches for information (for review, see Murray & Holmes, 1993; Vorauer & Ross, 1996). Murray (1999) notes, "individuals need a sense of conviction in the conclusion that [their] partner really is the 'right' person and can be counted on to be caring and responsive across time and situations" (p. 23). She continues by arguing that, as a result, people "see romantic partners through the generous interpretive filters provided by images of the ideal partner" (p. 25). Second, Kahneman and Tversky's work on cognitive biases show that individuals rely heavily on appearance to predict characteristics of others (for review, see Kahneman, 2003; Tversky & Kahneman, 1982). Indeed, individuals carry perceptions of individuals infected with a sexually transmitted illness that imply very negative appearances. For example, Lear (1997) noted an interview subject who

relied on the fact that his sexual partner “paid attention to detail and stuff like that” (p. 80) to conclude that he did not have an STI. She also summarized results from a study in which 40% of participants reported not using a condom because “[their] partner looked healthy” and 34% reported failing to do so because “[their] partner was really good looking.” Given the stigmatized nature of STIs, it is unlikely that individuals would expect sexual or potential sexual partners to be infected. In fact, believing so would likely cause too much dissonance to allow continued companionship (W. A. Afifi, 1999). It should not be surprising, then, that so few of our participants expected their partners to have an STI. Nevertheless, the scale of such mass misperception is noteworthy and has important implications for how we understand, and try to shape, individuals’ sexual decisions.

### **The performance of TMIM**

The results of this investigation produced mixed success for the TMIM framework. On the positive end, the uncertainty discrepancy variable worked as predicted, the model showed excellent fit with target efficacy and moderate fit with the other efficacy components, many predicted paths were significant, and the models were able to predict information-seeking behavior across a 3-week period. These successes are especially noteworthy given that the time period between data collection phases was short (3 weeks) and that the change was generally very small. The performance also supports the utility of the model as a predictor of information-seeking behavior in an important applied context and offers promise for its continued development as a theoretical framework.

However, there were also some noteworthy empirical failures for the models. Specifically, outcome expectancy generally did not operate as predicted, coping efficacy did not emerge as a significant predictor of information-seeking behavior, the three efficacy types did not form a unified latent efficacy construct, and the expected mediational paths did not materialize. These results suggest the need to more carefully consider two aspects of the theory in particular: the role of outcome expectancy and the conceptualization of efficacy, with close attention to the impact of coping efficacy.

### *The role of outcome expectancies*

Outcome expectancy’s poor performance calls for additional investigation into the role it plays in the information-seeking process. Importantly, these results are inconsistent with past tests of the theory, all of which have shown outcome expectancy to play a significant role (W. A. Afifi, Cupach, et al., 2004; W. A. Afifi, Dillow, et al., 2004; W. A. Afifi et al., 2005). Thus, it would be premature to argue that the theory is mistaken to include outcome expectancies as part of the explanatory calculus. Nevertheless, closer scrutiny of its role is appropriate.

One explanation for its failure in this investigation is that participants had very positive outcome expectancies related to the target person’s sexual health. Specifically, 64% of participants averaged 7.0 on a 7-point scale, indicating that they fully



expected the information about their target person's sexual health to be *extremely positive*—a range restriction that may have impacted the variable's performance. However, there may also be theoretical reasons that account for the limited role of outcome expectancies in this investigation.

Perhaps, the key in this case is that the positive expectations were about a stigmatized issue. On the one hand, some people may consider information seeking to be relatively cost free in such instances (given the positive expectancies) and seek it. On the other hand, because the mere act of asking about sexual health has been shown to have relational consequences (e.g., Coleman & Ingham, 1999; Lear, 1997), some may consider a search for information in the case of positive expectancies foolish, and rest with the comfort of their expectations. That variance in possible responses to this circumstance may be self-negating and ultimately account for the weak impact of outcome expectancies in these cases.

Finally, the current investigation did not examine the role of emotion in this process. Studies have shown that affect colors outcome expectancies, efficacy assessments, and ultimately behavioral decisions (for review, see Forgas, 2003). The emotions associated with the issue of sexual health are likely to impact the information-seeking process in a manner not yet adequately considered in the TMIM framework. Additional investigation should further examine the influence of emotion in the information-seeking process, as well as the other explanations offered for the poor performance of outcome expectancy in this study.

#### *The role of efficacy*

Two of the three efficacy types played important roles in individuals' decision to seek sexual health information. This finding is consistent with growing evidence of the applicability of efficacy notions to communication decisions in interpersonal and relational contexts. Most specifically, Faulkner and Greene (2002) recently showed that the likelihood of sexual self-disclosure with partners increased with rises in individuals' efficacy for such discussion, and Afifi and colleagues (e.g., W. A. Afifi, Cupach, et al., 2004; W. A. Afifi, Dillow, et al., 2004; W. A. Afifi et al., 2005) have consistently found interpersonal efficacy components to predict information seeking in close relationships. Together with the findings from this investigation, it seems that efficacy has an important role as a predictor of relational behavior. But what components may be especially worth attending to?

Communication efficacy reflects individuals' perceptions that they can effectively engage in communicative act(s) to gather the information they desire. Importantly, our results show that low communication efficacy beliefs translate to a failure in direct information seeking. That, in turn, likely leads to continued ignorance about the partner's sexual health, with possible health consequences. In contrast, our data imply that individuals who have elevated communication efficacy are able to counter the otherwise active pressure to avoid searching for potentially distressing information. What we have here seems to be two sets of experiences. The first set involves individuals who want more information, yet do not feel equipped to gather

it due to low communication efficacy. Because of their efficacy levels, these individuals may remain in a recurring uncertainty-discrepant state. The second set involves individuals who want more information and feel able to gather it—action that has important implications for their health, as we will later show.

These findings direct prevention programs to focus on communication efficacy as an important factor contributing to safer-sex decisions. However, the data also imply that communication efficacy's role may be considerably muted if individuals do not perceive their target as being willing to provide the information or knowing it. In fact, the target efficacy components had the greatest impact on information seeking among efficacy types. This, too, offers guidance for both theory and education efforts in this area. Specifically, interpersonal communication theory should more closely examine the role of target efficacy and related perceptual biases in behavioral decision making across contexts. Relatedly, safer-sex educators must take more seriously the role of partner-related perceptions in shaping individuals' health-related behaviors. Of course, given the inaccuracy of perceptions (see Fiske & Taylor, 1991), it is troubling that the failure to engage in information-seeking efforts is, in part, dependent on a hunch that the partner may be dishonest or not know his/her sexual health status.

#### *The failure of coping efficacy*

The failure of the coping efficacy component was puzzling, given the strong role that it has played in recent investigations (e.g., Benight et al., 2001). However, closer inspection of the measurement of that variable suggests that the cause may be methodological. Specifically, we assessed coping efficacy by asking participants to rate how well they could cope with the discovery of negative information about their partner's sexual health. In contrast, the construct is conceptualized as the extent to which individuals perceive they can cope with the outcome they expect. The problem here lies in that participants' perceptions of their ability to cope with negative information (our operationalization of coping efficacy) are only relevant for those who expected negative information. As noted earlier, the participants in our investigation almost universally did not expect negative information. As such, it should not be surprising that the measure of coping efficacy used in this investigation had limited empirical connection to information seeking. More accurate fits between the operational and conceptual definitions of coping efficacy are likely to produce a stronger role for coping efficacy. However, this finding is also consistent with other recent investigations that found a weak role for coping efficacy in the TMIM framework. It may be that coping efficacy affects decisions only in the case of negative expectancies and, even then, may not contribute as much as we originally believed (see W. A. Afifi, Dillow, et al., 2004). In fact, the general conceptualization of efficacy in TMIM may need revisiting. Although efficacy repeatedly has been shown to be a critical component of the information-seeking process, the notion that communication, coping, and target efficacies form three components of a single overall efficacy construct seems unsubstantiated. Future research must carefully consider the ways in

which these efficacy types work in concert and the ways in which they contribute in unique ways to individuals' information-seeking decisions.

### **Predicting sexual decisions**

The literature regarding the impact of seeking sexual health information with partners is mixed. Some data suggest that the search for information is consistent with a general safer-sex profile, thereby associated with the use of condoms (e.g., Cleary et al., 2002). Other findings imply otherwise, showing that sexual health discussions are likely to lead to risky sexual behavior (e.g., Van Campenhoudt, 1999). The data from our investigation not only offer encouraging evidence about the role of information seeking in this context, but also suggest the need for additional inquiry.

Our results show that individuals are increasingly likely to use condoms to the extent that their search for sexual health information from their partner increases. The importance of this finding is heightened when one considers that 99% of individuals reported expecting that their partner would not have any STIs, that most had been involved relationally for several months, and that the data were collected at two points in time (i.e., are only minimally influenced by recall biases). This finding, along with evidence that individuals who received an STI message were more likely to use condoms at Time 2, supports the efforts of some health educators to base their programs around encouraging the discussion of sexual issues between partners (Kelly et al., 1994). Unfortunately, we do not know the details of these interactions, so it is impossible to tell how the content affected condom-use decision. Future work should more closely examine how the information exchanged during such discussions shapes the decision-making process. Regardless, though, it appears that the act of seeking information from the partner is itself associated with an increase in condom-use rates over time—a good result.

We also examined the association between a change in information seeking over time and the decision to initiate first sexual activity with the target person. Results showed that the amount of information seeking about sexual health is positively associated with the initiation of first sexual activity. So, the act of seeking information seems to have an unintended consequence of encouraging sexual activity for those who were previously inactive. Given the association between information seeking and condom use for the sexually active subsample, it is likely that those who initiate sexual activity after information seeking also practice safer sex. Unfortunately, the small number of participants who first initiated sexual activity during the study made it impossible to test this expectation here. Perhaps this finding should not come as a surprise. We know that disclosure about intimate topics increases intimacy (Derlega, Metts, Petronio, & Margulis, 1993) and that increases in intimacy encourage sexual activity (Sprecher & McKinney, 1993). As such, it is consistent that sexual health discussions promote sexual activity. Nevertheless, we are not aware of other studies that have reported an association between information seeking and the decision to initiate sexual activity or of education efforts that account for that empirical tendency. Targeted research must be conducted (with a much larger sam-

ple of first-sexual-activity instances)—and the finding replicated—before speculation about its impact can be made. Clearly, though, theoretical efforts in this domain need to better account for the role of intimacy development in behavioral decisions (see Van Campenhoudt, 1999).

### Limitations

The sample for this investigation offered both strengths and weaknesses. We specifically targeted college students in this investigation because of their heightened risk for STIs and their elevated level of sexual activity. Nevertheless, the sample was limited by the lack of variance in perceptions of their partner's sexual health. As noted earlier, only two participants expected that a search for information would reveal that their partner was infected with an STI. This limited variance likely produced a conservative estimate of the model's success in this domain. A more varied population, in terms of perceived partner risk, could shed light on some of the intricacies and nuances associated with sexual health information-seeking behaviors. Specifically, targeting high transmitters, defined as individuals who have a high number of sexual contacts and engage in high-risk sexual behavior (Storti, 2000), would have better clarified the role of both outcome expectancy and coping efficacy in this context.

### Conclusion

In sum, the results of this investigation provide insight into the process of information seeking in the context of sexual health, add to our understanding of the role of information seeking on sexual decisions, and suggest important directions for future research. Sustained exploration into the nature of the information management process as it relates to sexual health, greater recognition of the many options available to information managers, and continued testing of the TMIM framework across contexts would contribute in important ways to what we know about individuals as information managers.

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