

MONITORING STYLES IN WOMEN AT RISK FOR CERVICAL CANCER: IMPLICATIONS FOR THE FRAMING OF HEALTH-RELEVANT MESSAGES^{1,2}

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ABSTRACT

We explored the interaction effects of individual attentional style (high versus low monitoring) and the framing of informational messages on the responses of women undergoing diagnostic follow-up (colposcopy) for precancerous cervical lesions. Prior to the colposcopic procedure, patients ($N = 76$) were randomly assigned to one of three preparatory conditions: (a) Loss-framed message, which emphasized the cost of nonadherence to screening recommendations; (b) Gain-framed message, which emphasized the benefit of adherence; and (c) Neutrally-framed message. It was hypothesized that low monitors (who are more positively biased about their health) would show a more adaptive pattern of response to loss-framed information than high monitors (who are more negatively biased about their health). The results of a series of hierarchical multiple regression analyses were consistent with this prediction. Low monitoring was associated with greater knowledge retention ($\beta = .61, p < .05$) and less canceling/rescheduling of follow-up appointments in the loss condition than in the neutral condition ($\beta = .82, p < .002$). High monitoring, however, was associated with greater intrusive ideation when information was presented in the loss-oriented frame as compared to the neutral frame ($\beta = .99, p < .01$). Knowledge retention and screening adherence were not affected by the framing manipulation. The differences between high versus low monitors as a function of loss or neutral frame suggest an interaction effect, wherein both the type of framing message and the individual's attentional style lead to distinctive cognitive-affective and behavioral patterns. The findings may have clinical implications for the tailoring of health messages to the individual's signature style.

(Ann Behav Med 1999, 21 (1):27-34)

INTRODUCTION

The incidence of precancerous conditions of the cervix has recently been increasing, particularly among younger women (1,2). Adherence over time to follow-up screening regimens is therefore crucial, as the data clearly show that early detection and management can prevent the development of invasive cervical carcinoma (3). These findings indicate that it is important to design health messages that effectively communicate information about cancer risk, thereby increasing the individual's motivation to adhere to medical recommendations (4,5). At the same time, excessive levels of perceived vulnerability can activate avoidance behaviors that may eventually interfere with adaptive responding (6). To address this issue, a message framing manipulation has been suggested as one way of effectively conveying information (7). However, while framing is certainly important, more may be needed. In particular, data show that the individual's attentional style interacts with the type of message conveyed (8-11).

This work suggests that the framing of health messages, in interaction with individual attentional style, should affect a variety of outcomes, including affect, cognition, and behavior (12). A recent approach to this general issue is the Cognitive-Social Health Information Processing (C-SHIP) model, which specifies that dimensions such as monitoring-blunting for threats and risks to the self are best conceptualized as cognitive-affective dispositions that interact with particular features of the message (4,6,7). High monitoring involves attention to, and scanning for, threatening medical cues; whereas low monitoring involves distraction from, and minimization of, such cues (13). Such an interactive approach requires the simultaneous examination of message features (7,14,15) and the individual's attentional style (12,16,17).

In the present study, we examined attentional style as it interacts with the framing of information designed to improve distress, knowledge, and adherence among women undergoing diagnostic follow-up for precancerous cervical lesions (4). The focus was on the distinctive cognitive, affective, and behavioral profiles of high versus low monitoring, in the face of different framing conditions (18,19). When dealing with health threats, individuals tend to organize information in terms of potential gain (i.e. avoiding an undesirable outcome, such as reducing one's risk of cervical cancer) or in terms of potential loss (i.e. obtaining an undesirable outcome, such as increasing one's risk of cervical cancer) (e.g. 7,14,15,20,21). Based on the framing approach, adherence should be enhanced when the message is negatively framed, in terms of potential loss (7,18,20,22).

However, exposure to negatively-framed messages has not been consistently associated with greater adherence to follow-up

¹ Preparation of this manuscript was supported in part by NIH grants CA58999, CA61280, CA06927, HG0166, ACS grant PBP-89318, DOD grants BC971638 and OC970004, and appropriations from the Commonwealth of Pennsylvania.

² The authors wish to acknowledge the assistance of Rob Sipps, Leeann Speechley, and Lloyd Ohls.

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screening recommendations among at-risk cancer populations (5,23). These findings suggest that situational features, such as framing, may interact with dispositional features of the individual. One such feature appears to be the individual's level of personal involvement, along with the degree to which he or she engages in systematic, in-depth processing of threat (7,14,21,22,24). Individuals become more involved as the health threat becomes more salient and personally relevant (14,20). High levels of personal involvement, in turn, tend to activate in-depth information processing, in which relevant messages are evaluated and subsequently integrated into an overall impression (25,26). When this type of processing occurs, loss-framed messages tend to be associated with greater intentions to adhere to recommended detection regimens (21).

Other dispositional features of the individual may moderate how the individual processes personally relevant stressors (4). One feature, in particular, focuses on how individual differences in attentional style (i.e. high versus low monitoring) impact on health threats of equivalent personal relevance. Specifically, high and low monitors diverge in the depth with which they process important threats to their health (4,12,17,27). High monitors are less positively biased about their medical condition and attend intently to information about it (e.g. 28,29). As a result, they systematically seek out and retain greater and more accurate knowledge about their condition and its management (9,30,31).

The systematic processing of medical feedback among high monitors has been shown to enhance the performance of adherence behaviors (30,32,33). At the same time, however, high monitors tend to experience heightened intrusive ideation about the stress source, which can ultimately interfere with systematic information processing (34–36). High monitors should therefore not benefit from a loss-framed message in the face of health threats. Given that high monitors are already aroused, adding negatively-framed messages can only increase their arousal to disruptive levels. A neutrally-framed message should effectively convey needed knowledge without promoting potentially disruptive arousal (8–10,37,38).

Low monitors, on the other hand, feel less vulnerable to health threats and so are less likely to experience high levels of arousal (8,30,32,37,39–41). Given their tendency to distract from medical threats, they are also less likely to retain health-relevant information and to engage in recommended screening regimens (30,31,33). Low monitors at risk for cervical cancer should therefore benefit from communications that emphasize the cost of not performing recommended diagnostic behaviors (7). A loss-framed message should increase the salience of the threat, thereby enhancing in-depth, systematic processing of risk-related information (42,43). This, in turn, should improve the cognitive retention and execution of medical recommendations without resulting in unduly heightened levels of intrusive ideation.

In this study, we examined three aspects of the response of high and low monitoring to differently framed messages: (a) patient distress, in terms of levels of intrusive ideation about their gynecologic condition; (b) patient knowledge about their gynecologic condition; and (c) patient adherence to recommended screening follow-up. Since high monitors perceive themselves to be extremely vulnerable to medical threats, it was predicted that they would experience heightened intrusive ideation with a loss-framed message (which increases the salience of threat) than with a neutrally-framed message. Levels of knowledge retention and adherence behavior were predicted to be equivalent for high monitors in the two message conditions. In contrast, since low

monitors perceive themselves to be less vulnerable to medical threats, it was predicted that they would show increased levels of knowledge retention and adherence with the loss-framed message. Levels of intrusive ideation were expected to be equivalent in the two message conditions. No specific predictions were generated for the effects of gain-framed messages, given the generally weak effects of positive framing on detection behaviors reported in prior studies (7,20,22).

METHOD

Study Participants

The sample consisted of gynecologic outpatients with dysplastic cervical lesions scheduled for diagnostic follow-up (colposcopy) at one of two gynecologic oncology practices in Philadelphia (Pennsylvania Hospital: $n = 45$, 59.2%; Graduate Hospital: $n = 31$, 40.8%). Colposcopy entails examination of the cervix and uterus through a low-powered microscope, along with biopsy of affected tissue. Patients were excluded if they had: (a) an inability to read and communicate readily in English; (b) past or present evidence of invasive cervical carcinoma; or (c) another life-threatening medical condition. Among the 124 women scheduled for colposcopy who were originally contacted, 88 (71%) agreed to participate and completed both the intervention and a standard colposcopic examination. Over the course of the study, 12 (13.6%) participants were withdrawn due either to failure to return the follow-up measures on time ($n = 10$) or to experimenter error ($n = 2$). Attrition rates did not differ significantly across the framing groups, $\chi^2(2) = 1.86$, *ns*. Further, there were no differences between these participants and the remaining sample on the study variables (i.e. intrusive ideation, knowledge, screening, and health behaviors). The final sample included 76 participants, 28 in the positive framing condition, 26 in the negative framing condition, and 22 in the neutral framing condition.

The age of participants ranged from 20 to 69 years ($M = 34.9$ years, $SD = 9.22$). The majority of patients were Caucasian (82.7%); 10.7% were African-American; 2.7% were Asian-American; 2.7% were Hispanic; and 1.3% indicated "other" as their ethnicity. Married patients comprised 46.7% of the sample; the remaining patients were single (41.3%), living with a partner (4.0%), divorced (4.0%), separated (2.7%), or widowed (1.3%). Most of the sample (74.6%) was employed; 21.1% did not work outside the home; and 4.3% were retired. Patients were also asked to indicate their highest education level: 2.7% indicated less than high school; 16.2% reported completing high school; 24.4% reported some college work; 29.7% reported an undergraduate degree; and 27.0% reported some graduate work. The average number of previous colposcopies was 3.8 (Range = 1–20; $SD = 3.99$). Histologic analyses of the colposcopically-obtained biopsies were as follows: 24% normal or squamous metaplasia, 3% inflammation or cervicitis, 15% atypia or condyloma, 16% cervical intraepithelial neoplasia (CIN) I, 18% CIN II, and 24% CIN III or carcinoma in situ.

Design and Procedures

Approximately 2 weeks prior to their scheduled visit, patients were contacted by telephone, reminded of their upcoming appointment, and informed about the study. If they agreed to participate, a preappointment packet was mailed to them, which included an informed consent form along with measures of demographic status and attentional style. Following telephone contact, participants were randomly assigned (using a random numbers table) to one of the three study groups.

On the day of the appointment, participants were greeted by a health educator prior to the colposcopic exam. After completing baseline measures of intrusive ideation and screening adherence, participants listened to a 20-minute audiotaped informational message that varied by group (described below). They then filled out a knowledge measure and subsequently underwent the colposcopic procedure. At the end of the examination, patients were given a packet of measures (for assessing intrusive ideation and knowledge) to take home and complete in the following week. They were also given a one-page informational sheet that briefly summarized the material provided on the audiotape. Patients who failed to return the postage-paid, addressed packet were provided with a telephone prompt. Reassessments of attentional style and adherence were obtained at the 6-month recommended follow-up screening visit.

Intervention Groups

For all participants, the preparatory message provided information about cervical dysplasia (i.e. an overview of the classification system, the role of human papillomavirus, and recommended management regimens); the colposcopic examination (i.e. a brief description of the procedural and sensory aspects); and recommended medical follow-up (i.e. the importance of attending scheduled gynecologic visits). Patients were also given an illustrated booklet containing the identical information presented on the tape, so that they could read along with the message. The way in which information was presented varied according to the condition to which the participant had been assigned. The framing of the informational messages was based on prior research (7,14,20,44). The study groups were as follows:

Loss-Framed Information: The loss-framed message was designed to emphasize the cost of not adhering to recommended screening behaviors in terms of the impact on the individual's gynecologic condition. The main cost emphasized was reduced ability to effectively track, and thereby treat, dysplastic changes in a timely manner. For example, patients were told: "Your doctor will want to screen your gynecologic condition with regular appointments. This usually means that he/she will want you to have a repeat Pap smear every 6 months and a repeat colposcopy every year. It is important to keep these appointments. If you do not come for your appointments, your doctor will not be able to track any changes in your gynecologic condition that may occur. This will make it harder for your physician to provide the best medical care and will reduce the physician's ability to successfully treat your condition. Late detection of precancerous conditions can decrease the chance that your treatment will be effective. . . ."

Gain-Framed Information: Patients randomized to this condition received the identical information, but the emphasis was on the benefits of adhering to recommended screening and health-protective behaviors. For example, patients were told: "Your doctor will want to screen your gynecologic condition with regular appointments. This usually means that he/she will want you to have a repeat Pap smear every 6 months and a repeat colposcopy every year. It is important to keep these appointments. If you come for your appointments, your doctor will be able to track any changes in your gynecologic condition that may occur. This will make it easier for your physician to provide the best medical care and will improve the physician's ability to successfully treat your condition. Early detection of precancerous conditions can increase the chance that your treatment will be effective. . . ."

Neutrally-Framed Information: Patients randomized to this condition received the basic information about adhering to recommended medical and health-protective behaviors outlined above, without the extended framing manipulation. For example, they were told: "Your doctor will want to screen your gynecologic condition with regular appointments. This usually means that he/she will want you to have a repeat Pap smear every 6 months and a repeat colposcopy every year. It is important to keep these appointments." To equate for time and attention, patients received information about the history of the hospital.

Measures

Attentional Style: The Monitoring-Blunting Style Scale (MBSS) is a self-report instrument designed to assess individual differences in monitoring and blunting processing styles (12). Specifically, the scale asks individuals to imagine four hypothetical stress-evoking scenes of a largely uncontrollable nature (e.g. "Imagine that you are afraid of flying and you have to go somewhere by plane"). Each scene is followed by eight statements that represent different attentional strategies for dealing with the stressful event. Four statements following each scene are of a monitoring or information-seeking variety (e.g. "I would read and reread the safety instruction booklet"), and four statements are of a blunting or distracting variety (e.g. "I would watch the in-flight film, even if I had seen it before"). The monitoring score is obtained by summing the total number of monitoring options endorsed across the four situations (range 0-16; higher score equals more monitoring) and is the MBSS index used here. In previous research with medically-related stressors, this score has been found to be reliably related to patient response (12,17). Test-retest analysis has shown the MBSS to be highly stable (in the 0.8 range) over a 3-month period (29). Internal consistency for the monitoring scale has been within the acceptable range (i.e. Cronbach's alpha equal to or greater than 0.70) (13,29,45). The MBSS has also been shown to have good discriminative validity and to be independent from such dimensions as state and trait measures of anxiety (13). The monitoring score used in the present study is from the MBSS included in the preappointment packet. For participants in the study who completed the MBSS for a second time at their 6-month follow-up medical visit, the test-retest reliability for the scale was .84.

Affective Response: Intrusive Ideation: The Revised Impact of Events Scale (RIES) is a 15-item self-report scale which measures threat-related intrusive ideation (36). This scale has been used with a variety of medical populations, including patients at risk for cervical cancer (34,35,46). Test-retest reliability (1-week) has been shown to be 0.89 and internal consistency, as calculated by Cronbach's alpha, has been shown to be 0.78 (43). For the purposes of this study, patients were asked to report intrusive ideation with respect to their gynecologic condition during the past week. Intrusive ideation was measured twice: one week prior to the colposcopy appointment and one week after the colposcopy appointment.

Cognitive Response: Knowledge Retention: The knowledge questionnaire contained 20 true-false items that assessed how much participants recalled about the information provided in the educational materials in terms of their gynecologic condition, its treatment, and adherence behaviors (8). Scores on this instrument ranged from 0-20. Knowledge retention was measured twice: at the colposcopy appointment (immediately after the framing manipulation) and 1 week after the colposcopy appointment.

Behavioral Response: Screening Adherence: The self-report screening measure assessed how often patients had canceled or rescheduled their recommended gynecologic appointments, rated from 1 ("Never canceled or rescheduled appointments I made") to 5 ("Canceled or rescheduled more than 3 out of every 4 appointments I made"). In prior work, self-reports of adherence to diagnostic screening have been shown to have significant correspondence to documented adherence extracted from chart reviews (47). A baseline measure of adherence was obtained for all participants in the week prior to the initial colposcopy appointment. A follow-up measure of adherence was obtained for those patients ($n = 40$) who returned to the same gynecologic oncology health care providers for the 6-month screening visit. The follow-up adherence repeat sample did not differ from the full sample on their initial responses to this measure or on any of the baseline demographic, medical, and study variables.

Perceived Emphasis of Message: Two items were administered after the framing intervention immediately prior to the colposcopic procedure. The first item assessed the extent to which the information emphasized the cost of nonadherence to recommended screening and health-protective regimens (i.e. "To what extent did the information stress the negative consequences to your gynecologic health, or losses, that may occur if you do not come in for your recommended colposcopy?"). The second item assessed the extent to which the information emphasized the benefit of adherence to recommended screening regimens (i.e. "To what extent did the information stress the positive consequences to your gynecologic health, or gains, that may occur if you do come in for your recommended medical appointments?"). Participants were asked to answer each of the questions on a five-point scale, from 1 = "not at all" to 5 = "extremely."

RESULTS

Preliminary Analysis of Variables

The relationships between the background variables and message type were examined, using one-way analyses of variance for continuous variables and chi-square analyses for discrete variables. None of the demographic, disease, or clinic site variables were significantly associated with message type. The background variables were also unrelated to monitoring style, intrusive ideation, and knowledge retention. Hierarchical multiple regression analyses were used to explore the effects of monitoring level and message type on: (a) intrusive ideation one week postappointment; (b) knowledge retention one week postappointment; (c) screening adherence six months post-appointment; and (d) the manipulation checks. Since message-framing was a three-level categorical variable, it was recoded as two dummy variables for each analysis. For each analysis, one variable tested the effects of loss versus neutral framing and the second variable tested the effects of gain versus neutral framing. These two dummy variables were multiplied by each participant's standardized monitoring score in order to obtain the two interaction variables.

Affective Consequences

Preappointment intrusive ideation was entered on the first step of the regression to control for any preexisting baseline differences and was a significant and positive predictor of postappointment intrusive ideation, $R^2 = .16$, $F(1, 74) = 14.6$, $p < .001$; $\beta = .46$. Monitoring style and the two variables representing message type were entered on the second step. These variables did not account for a significant amount of the variance in intrusive ideation, either

TABLE 1
Summary of Hierarchical Regression Analysis for Variables Predicting Intrusive Ideation One Week Postcolposcopy Appointment

Variable	B	SE B	β
Step 1			
IES Intrusive Ideation One Week Prior	0.46	0.12	0.41**
Step 2			
MBSS Monitoring	0.08	0.11	0.08
Dummy1 (Gain v. Neutral Frame)	-.24	0.25	-.12
Dummy2 (Loss v. Neutral Frame)	-.12	0.26	-.06
Step 3			
MBSS \times Dummy1	0.47	0.28	0.31
MBSS \times Dummy2	0.99	0.30	0.62**

Notes: $R^2 = 0.16$ for Step 1 ($ps < .001$); $\Delta R^2 = 0.02$ for Step 2 ($ps = n.s.$); $\Delta R^2 = 0.12$ for Step 3 ($ps < .01$); * $p < .05$; ** $p < .01$.

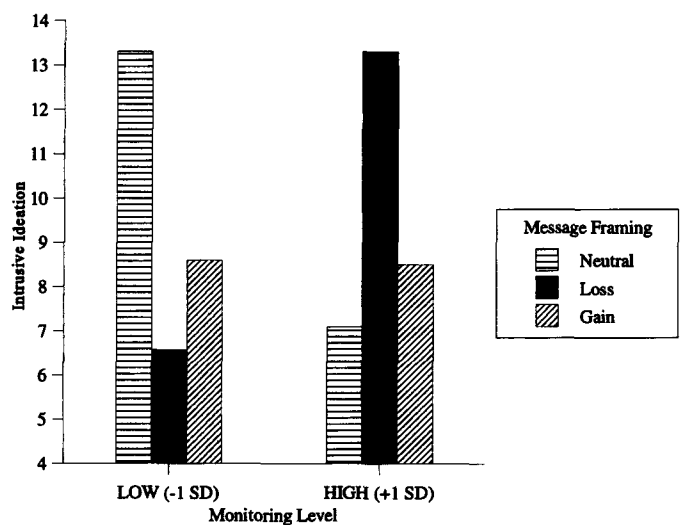


FIGURE 1: The effect of monitoring level and message framing type on intrusive ideation (one week postcolposcopy).

as a group, $\Delta R^2 = .02$, $F_{inc}(3, 71) = .44$, ns , or individually. The two dummy variables were multiplied by each participant's standardized monitoring score to obtain the two interaction variables and were entered on the third step. This step was significant, $\Delta R^2 = .12$, $F_{inc}(2, 69) = 5.80$, $p < .01$. Inspection of the individual coefficients revealed that the interaction comparing the loss- and neutrally-framed groups was significant, $\beta = .99$, $t(69) = 3.3$, $p < .01$ (see Table 1).

To aid in interpretation, a graph of the interactions was created by predicting postcolposcopy intrusive ideation scores for high and low monitors in each framing condition, using the obtained regression equation. High and low monitors were defined as being one standard deviation above and below the mean, respectively (48). To test whether high monitors exhibited significantly greater intrusive ideation in the loss condition than in the neutrally-framed condition, a means of post-hoc comparison was used in which the simple slope for each value of the continuous variable (i.e. high versus low monitor) was calculated and an error term was used to perform a t-test (48). As shown in Figure 1, low monitors exhibited significantly less intrusive ideation in the loss-framed condition (predicted $\bar{x} = 6.6$) than in the neutral-framed condition (predicted $\bar{x} = 13.4$), $t(69) = -2.82$, $p < .01$; whereas high monitors in the loss-framed condition (predicted $\bar{x} = 13.3$) reported significantly

TABLE 2

Summary of Hierarchical Regression Analysis for Variables Predicting Knowledge Retention One Week Postcolposcopy Appointment

Variable	B	SE B	β
Step 1			
Knowledge Level Immediately Postintervention	0.57	0.10	0.56**
Step 2			
MBSS Monitoring	0.11	0.10	0.11
Dummy1 (Gain v. Neutral Frame)	-.27	0.23	-.14
Dummy2 (Loss v. Neutral Frame)	0.15	0.23	0.07
Step 3			
MBSS × Dummy1	-.10	0.26	-.07
MBSS × Dummy2	-.61	0.26	-.37*

Notes: $R^2 = 0.31$ for Step 1 ($ps < .0001$); $\Delta R^2 = 0.04$ for Step 2 ($ps = n.s.$); $\Delta R^2 = 0.07$ for Step 3 ($ps < .05$); * $p < .05$; ** $p < .01$.

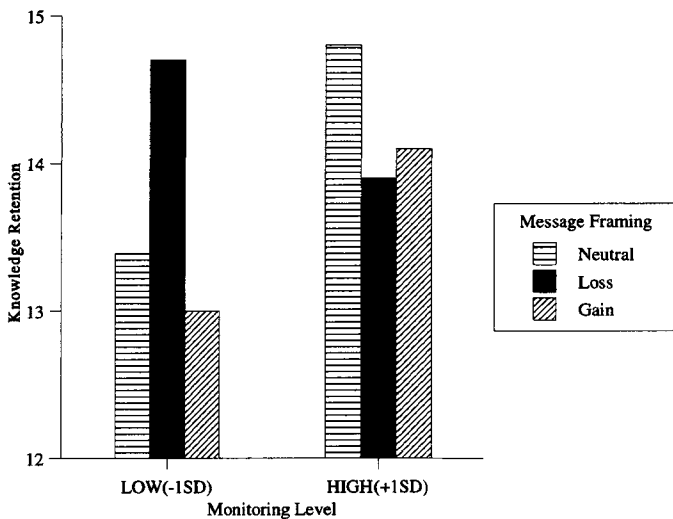


FIGURE 2: The effect of monitoring level and message framing type on knowledge (one week postcolposcopy).

greater intrusive ideation than high monitors in the neutrally-framed condition (predicted $\bar{x} = 7.1$), $t(69) = 2.39, p < .02$.

Cognitive Consequences

Knowledge level immediately after the framing manipulation was entered on the first step of the regression as a control variable and was a significant and positive predictor of knowledge level 1 week postcolposcopy, $R^2 = .31, F(1, 74) = 33.5, p < .0001; \beta = .57, t = 5.79, p < .0001$. Monitoring level and the two dummy variables representing message type were entered on the second step. These variables did not account for a significant amount of the variance in knowledge levels, either as a group, $\Delta R^2 = .04, F_{inc}(3, 71) = 1.46, ns$, or individually. The interactions between message type and monitoring level were entered on the third step and were significant as a group, $\Delta R^2 = .07, F_{inc}(2, 69) = 4.03, p < .05$. Inspection of the individual coefficients revealed that the interaction comparing the loss- and neutrally-framed groups was significant, $\beta = -.61, t(69) = 2.33, p < .05$ (see Table 2).

To aid in interpretation, a graph of the significant interaction was created by predicting 1 week postcolposcopy knowledge scores for high and low monitors in each condition (48). As shown in Figure 2, low monitors (predicted $\bar{x} = 14.7$) retained significantly more knowledge in the loss condition than in the neutral-framed condition (predicted $\bar{x} = 13.4$) $t(69) = 2.09, p < .05$. The

TABLE 3

Summary of Hierarchical Regression Analysis for Variables Predicting Canceling and Rescheduling Behavior at Six Months Follow-Up

Variable	B	SE B	β
Step 1			
Precolposcopy Canceling/Rescheduling Behavior	0.76	0.09	0.80**
Step 2			
MBSS Monitoring	-.09	0.10	-.10
Dummy1 (Gain v. Neutral Frame)	-.14	0.19	-.08
Dummy2 (Loss v. Neutral Frame)	-.28	0.20	-.16
Step 3			
MBSS × Dummy1	0.79	0.25	0.57**
MBSS × Dummy2	0.82	0.25	0.52**

Notes: $R^2 = 0.65$ for Step 1 ($ps < .0001$); $\Delta R^2 = 0.02$ for Step 2 ($ps = n.s.$); $\Delta R^2 = 0.07$ for Step 3 ($ps < .05$); * $p < .05$; ** $p < .01$.

effect for high monitors was in the opposite direction but was not significant, $t(69) = -1.43, p < .20$.

Adherence Consequences

Precolposcopy canceling/rescheduling behavior was entered on the first step of the regression and was a positive and significant predictor of the same behavior 6 months postcolposcopy, $R^2 = .65, F(1, 40) = 72.9, p < .0001; \beta = .76$. Monitoring level and the two dummy variables representing message type were entered on the second step. These variables did not account for a significant amount of the variance in canceling/rescheduling behavior, either as a group, $\Delta R^2 = .02, F_{inc}(3, 37) = .87, ns$, or individually. The interactions between message type and monitoring level were entered on the third step and were significant as a group, $\Delta R^2 = .08, F_{inc}(2, 35) = 5.80, p < .007$. Inspection of the individual coefficients revealed that both the loss-neutral, $\beta = .82, t(35) = 3.22, p < .002$, and gain-neutral, $\beta = .79, t(35) = 3.13, p < .004$, interactions were significant (see Table 3).

The level of reported canceling/rescheduling behavior 6 months postcolposcopy was predicted for high and low monitors in each condition (48). Low monitors in the loss condition (predicted $\bar{x} = 1.23$) reported significantly less canceling/rescheduling than low monitors in the neutral condition (predicted $\bar{x} = 2.10$), $t(35) = -3.67, p < .001$; there was no effect for high monitors, $t(35) = .85, ns$. When comparing the gain- and neutrally-framed conditions, low monitors in the gain-framed condition (predicted $\bar{x} = 1.32$) reported significantly less canceling/rescheduling than did low monitors in the neutrally-framed condition (predicted $\bar{x} = 2.10$), $t(35) = -3.18, p < .01$. Again, there was no effect for high monitors.

Perceived Emphasis of Message

Perceived Emphasis of Message on the Cost Of Non-adherence: Monitoring level and the two dummy variables representing message type were entered on the first step which was significant, $R^2 = .26, F(3, 72) = 8.46, p < .0001$. Inspection of the individual coefficients revealed that participants receiving either a gain-framed message, $\beta = .62; t(72) = 2.50, p < .02$, or a loss-framed message, $\beta = 1.24, t(72) = 4.88, p < .0001$, perceived a higher emphasis on the cost of nonadherence than did participants who received a neutrally-framed message. There was no significant main effect for monitoring level. The interactions between message type and monitoring level were entered on the third step and were not significant, either as a group, $\Delta R^2 = .001, F_{inc}(5, 70) = .03, ns$, or individually (both p 's $> .75$).

Perceived Emphasis on the Benefit of Adherence: Monitoring style and the two message type dummy variables were entered on the first step, $R^2 = .46$, $F(2, 72) = 20.2$, $p < .0001$. Participants receiving either a gain-framed, $\beta = 1.57$; $t(72) = 7.37$, $p < .0001$, or loss-framed message, $\beta = 1.32$; $t(72) = 6.09$, $p < .0001$, perceived greater emphasis on the benefits of adherence than did participants who received a neutrally-framed message. There was no significant main effect for monitoring level.

The two variables representing the interaction between message type and monitoring level were entered on the second step which was marginally significant, $\Delta R^2 = .04$, $F_{inc}(2, 70) = 3.06$, $p < .053$. Inspection of the individual coefficients revealed that the interaction comparing the loss-framing group with the neutral-framing group was significant, $\beta = -.61$, $t(70) = -2.5$, $p < .02$, but the interaction comparing the gain group with the neutral group was not significant, $\beta = -.42$, $t(70) = -1.7$, *ns*. The main effects of message type remained significant.

Benefit perception scores were calculated for high and low monitors in each condition. Low monitors in the loss condition perceived a greater emphasis on benefit (predicted $\bar{x} = 4.78$) than low monitors in the neutral condition (predicted $\bar{x} = 2.41$), $t(70) = 5.99$, $p < .001$. High monitors also perceived a significantly greater emphasis on benefit in the loss condition (predicted $\bar{x} = 3.44$) than in the neutral condition (predicted $\bar{x} = 3.17$), $t(70) = 2.14$, $p < .05$. The significant interaction reflects the fact that there is a larger effect size between the loss- and neutral-framing conditions for low monitors ($\eta^2 = .34$) than for high monitors ($\eta^2 = .06$).

DISCUSSION

Consistent with the C-SHIP model (4,6,27), it was predicted that there would be an interaction between attentional style and message framing on the cognitive-affective and behavioral responses of patients undergoing diagnostic follow-up for precancerous cervical lesions. Specifically, it was expected that loss-framing would intensify high monitors' perceptions of risk resulting in heightened levels of distress, in comparison with neutral-framing. This hypothesis was supported. High monitors who received preparatory information framed in terms of potential loss reported greater intrusive ideation about their gynecologic condition 1 week after the visit than did high monitors who received neutrally-framed information. The interaction between monitoring and message framing accounted for 12% of the variance in intrusion.

Hence, high monitors were found to manifest their signature maladaptive affective response to health risk feedback, but only when the message was presented in a negative, threat-oriented frame (12,17). Although distress has not generally been systematically assessed in studies on framing, results of a previous study showed that individuals exposed to loss-framed information reported greater negative affect than those exposed to gain-framed information (14). The present findings suggest that the association between loss-framed messages and negative affect is more likely to be prototypic of high monitors.

The differential framing of health messages did not affect the cognitive and behavioral responses of high monitors. These results are consistent with the attentional style characteristics of these individuals. High monitors seek out, and act on, informational feedback about their health. Therefore, although they experience heightened affective distress, they manifest greater retention of knowledge (9,28-31) and better adherence to recommended regimens (30,32,33). However, other research shows that heightened levels of distress become more dysfunctional for the high monitor

when the threat is more extreme than in the case of cervical cancer risk. For example, in the face of more severe, uncontrollable, or prolonged medical conditions, intrusive ideation has been found to trigger avoidant strategies, such as distancing and denial. These strategies ultimately disrupt information processing sufficiently to interfere with knowledge retention and undermine adherence (34-36,49,50).

As predicted, low monitors were characterized by their own signature response to the framing message (12,17). These individuals showed a more adaptive pattern of cognition and behavior when the threat was negatively framed. Specifically, information retention was greater when the cost of not adhering to the recommended screening regimen was emphasized (42,51). Six months later, low monitors in the loss-framed condition also engaged in less canceling/rescheduling of their gynecologic appointments than in the neutral frame condition. Further, low monitors who received loss-framed information were able to retain and act on their knowledge base, without experiencing an affective toll in terms of greater intrusive ideation. The results for low monitors are generally in accordance with the previous literature on framing (see 7 for a review).

The cognitive and behavioral efficacy of negative-framing may be related to how low monitors process the incoming message. Low monitors in the loss-framed condition were particularly likely to focus on the perceived benefit of screening, in comparison with those who received neutral information. This finding is consistent with evidence that individuals instinctively convert loss language into gain language (52). The conversion of loss language into gain language appears to require greater effort, resulting in more systematic and intensive processing of threat (52,53; see also 15 for a review). For low monitors, the increased salience of threat appears to force them to confront their disease risk (8,9,28-31). Hence, they remain more cognitively attentive and behaviorally adherent. Under more neutral conditions, however, low monitors exhibit their characteristic tendency to distract from, and ignore, health recommendations.

Taken together, the results suggest that high and low monitors differ in the extent to which they systematically process personally-relevant health information in the face of equivalent medical threats (7,14,21). High monitors appear to engage in more systematic and in-depth processing, given their greater attentiveness to such threat. Therefore, they show a more adaptive pattern with neutrally-framed information, which decreases their distress without disrupting knowledge and behavior. In contrast, low monitors appear to engage in less systematic and in-depth processing of threat. Therefore, they show a more adaptive pattern with negatively-framed information, which increases their knowledge and adherence without producing disruptive levels of distress.

However, the study was not designed to explicitly test the relationship between monitoring and processing of threat. As such, the mechanisms underlying the interaction of monitoring and message framing on the study outcomes are presently unclear. In future research, it will be important to directly explore whether high monitors are more likely to engage in greater systematic processing of threat under personally relevant health conditions, and whether this difference, in turn, accounts for the effects obtained.

Consistent with the existing literature, there were only limited effects for the positive framing manipulation. Gain-framed messages had no impact on the cognitive-affective and behavioral profiles of high monitors. The only benefit of gain-framed information for low monitors was reduced rates of appointment canceling/

rescheduling. The effect on behavior was not accompanied by the cognitive and affective correlates that typically underlie sustained adherence (4,6). These findings are convergent with other evidence, showing that the positive effects of gain-framing on initial detection intentions are not robust over time (20).

There are a number of limitations of the present design. First, the sample was mainly Caucasian, well-educated, and dealing with a chronic condition. Different considerations may apply in the case of individuals from traditionally underserved groups (4,23), particularly when patients are facing more unfamiliar procedures (6,7). Second, given the limited sample size, it is possible that the effects observed only reflect the particular patients under study. On the other hand, the findings are consistent with recent theorizing and evidence in the literature on monitoring. In follow-up work, it will be important to replicate the results with a larger, more representative patient group.

Third, the follow-up assessment procedures were less than ideal. For example, the affect and knowledge measures were obtained via return mail. Moreover, it was not feasible to use chart reviews to assess follow-up screening, since this information was not routinely recorded. The screening adherence measure used was derived from patient self-report, in a single-item format, to reduce respondent burden. However, previous work with similar populations has found self-reported screening adherence to be a reliable index of chart-documented adherence (47). Future studies should explore whether the effects obtained are robust when more objective, extensive, and long-term measures of adherence are utilized. At the practical level, the utility of informational framing in routine medical care will depend on the extent to which screening adherence and other health-protective behaviors are maximized over time.

In summary, high and low monitors were found to manifest distinctive cognitive-affective and behavioral profiles in response to cervical cancer risk follow-up, but only under predictable, message-framing conditions (4,50). These results may have clinical implications for the tailoring of health-related information in the face of a variety of cancer risk and disease threats (14,15). Print and audiovisual materials represent a cost-effective public health strategy for conveying screening recommendations (20). When designing these materials, it may be important to take account of dispositional differences in attentional style, especially for health conditions where the medical consequences are probabilistic and delayed (23,54). Under these circumstances, it may be useful to identify the subgroups of patients who are most, and least, likely to benefit from particular types of educational materials.

High monitors may fare best when the health care provider does not explicitly prime their perceptions of threat. More neutral messages appear to minimize their level of affective distress, without compromising their ability to retain, or act on, relevant factual knowledge. In contrast, low monitors may fare best when the provider increases the psychological salience of threat. For these individuals, knowledge retention and adherence appear to be enhanced with a loss-framed message, without simultaneously activating potentially disruptive levels of affective distress (5). The principles tested should be relevant not only to the surveillance of cervical cancer risk, but also to the psychosocial management of other precancerous conditions that require sustained adherence to screening and management regimens over time.

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