Journal of Health Psychology
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J Health Psychol 2005 10: 65
DOI: 10.1177/1359105305048556

The online version of this article can be found at:
http://hpq.sagepub.com/content/10/1/65

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Message Framing and Pap Test Utilization among Women Attending a Community Health Clinic

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ACKNOWLEDGEMENTS. Research reported in this article was funded by a grant from the National Cancer Institute (R01-CA68427). Preparation of this manuscript was also facilitated by grants from the National Institutes of Mental Health (P01-MH/DA56826), National Institute on Drug Abuse (P50-DA13334) and the Ethel Donaghue Women's Health Investigator Program at Yale University. We gratefully acknowledge Stephen Updegrove, MD, and the staff at the Hill Health Center for their contributions to this research; Domenic Cicchetti for his statistical guidance; and Alexander Rothman and Wayne Steward for their advice and comments on earlier drafts of the manuscript.

COMPETING INTERESTS: None declared.

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Journal of Health Psychology

London, Thousand Oaks and New Delhi,
www.sagepublications.com
Vol 10(1) 65–77
DOI: 10.1177/1359105305048556

Abstract

In a randomized experiment, women ($N = 441$) watched either a loss- or gain-framed video emphasizing the prevention or detection functions of the Pap test to test the hypothesis that loss- and gain-framed messages differentially influence health behaviors depending on the risk involved in performing the behavior. As predicted, loss-framed messages emphasizing the costs of not detecting cervical cancer early (a risky behavior) and gain-framed messages emphasizing the benefits of preventing cervical cancer (a less risky behavior) were most persuasive in motivating women to obtain a Pap test.

Keywords

cervical cancer, health message framing, low-income women, Papanicolaou test, persuasion

EARLY STAGE cervical cancer can be asymptomatic. The most effective tactic for detecting precancerous or cancerous cells and preventing the progression of cervical cancer is the Papanicolaou (Pap) test, which screens for precancerous and cancerous vaginal and cervical cells (Centers for Disease Control and Prevention (CDC), 2003a). Lower-income, ethnic minority women have higher rates of cervical cancer (American Cancer Society (ACS), 2003a) and lower rates of regular Pap test adherence than higher-income, non-minority women (CDC, 2003a; Norman, Talbott, Kuller, Krampe, & Stolley, 1991). The success of the Pap test in reducing cervical cancer in vulnerable women requires more effective strategies for encouraging adherence to an appropriate Pap test regimen and to follow-up after abnormal test results.

There are several reasons why women may not obtain regular Pap tests. First, they may not know they need regular Pap tests. Women who are not aware of the risks of cervical cancer or screening guidelines are less likely to be tested compared to women who know the risks and guidelines (Suarez, Roche, Nichols, & Simpson, 1997). Second, Pap test adherence decreases with age, especially in minority populations (Mandelblatt, Traxler, Lakin, Kanetsky, & Kao, 1992; Rimer et al., 1996), suggesting that some women may think that they are not at risk for developing cervical cancer after menopause (ACS, 2003a). Third, women who believe cervical cancer is fatal are less likely to get a Pap test (Gregg & Curry, 1994; Pearlman, Clark, Rakowski, & Ehrich, 1999; Suarez et al., 1997). Thus, some women may avoid obtaining a Pap test for fear of discovering what they believe will be terminal cancer.

This last factor—the inherent risk associated with particular behaviors involved in the early detection of a disease—is important to consider when constructing messages to encourage health-promoting decisions. A theory of decision making called *prospect theory* suggests that people are willing to tolerate risks when thinking about the potential *losses* or negative consequences of a choice, but avoid risks when thinking about the potential *gains* or benefits of a choice (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981). In the domain of health behavior, prospect theory suggests that when faced with a risky outcome (e.g. the possibility of discovering that one has a disease), people may be more easily persuaded by a message that focuses on the losses associated with failing to perform a health behavior than by a message that focuses on the gains associated with performing a health behavior. However, when faced with an outcome involving little risk (e.g. receiving information that one is healthy), they may be more persuaded by a message that focuses on the gains associated with performing a health behavior than by a message that focuses on the losses associated with failing to perform a health behavior (Rothman & Salovey, 1997).

Detection behaviors, such as mammograms and clinical skin examinations, are inherently risky because they may indicate the presence of a disease. In contrast, prevention behaviors, such as sunscreen use and physical exercise, reduce the possibility or progression of disease and are generally regarded as involving little risk. Therefore, messages emphasizing losses (e.g. 'Failing to detect breast cancer early through mammography can cost a woman her life') should be more effective in promoting detection behaviors than messages emphasizing gains (e.g. 'Detecting breast cancer early through mammography can save a woman's life'). Messages emphasizing gains (e.g. 'Using sunscreen increases your chances of maintaining healthy, young-looking skin') should be more effective in promoting prevention behaviors than messages emphasizing losses (e.g. 'Not using sunscreen increases your risk for skin cancer and prematurely aged skin'). Experimental research employing *message framing*, or the presentation of messages with equivalent information that make salient either gains or losses from some reference point (Rothman & Salovey, 1997; Tversky & Kahneman, 1981; Wilson, Purdon, & Wallston, 1988), demonstrates that, indeed, loss-framed messages are more effective in promoting detection behaviors (Banks et al., 1995; Schneider et al., 2001), and gain-framed messages are more effective in promoting prevention behaviors (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999; Rothman, Salovey, Antone, Keough, & Martin, 1993).

Depending on which features of the Pap test one chooses to focus, the procedure may be

perceived either as preventing the possibility of developing cervical cancer or as detecting the presence of abnormal cells. Yet, like many health behaviors, each function of the Pap test implicates the other—to prevent the development of cervical cancer, the abnormal cells first must be detected, and by detecting such cells, the progression of cervical cancer can be prevented—making the distinction between the prevention and detection functions of the Pap test complex. Drawing attention to one function of the Pap test while framing the behavior using an appropriately matched message (i.e. loss-framing a detection behavior or gain-framing a prevention behavior) may be especially effective in persuading women to obtain a Pap test.

A recent series of experiments showed that framing a behavior in terms of gains or losses is differentially effective depending on whether the primary function of the *same* behavior is described as detection or prevention (Rothman, Martino, Bedell, Detweiler, & Salovey, 1999). In one study, participants read brochures about dental health and gum disease and were told about a mouth rinse that either prevented plaque build-up and gum disease or detected the presence of plaque and gum disease. The prevention and detection behaviors were gain- or loss-framed in a 2 (behavior function)×2 (framing) factorial design. Participants were most likely to intend to partake in the recommended behavior when it was presented as either a prevention behavior and gain-framed or as a detection behavior and loss-framed, compared to the other two conditions.

Although the application of message framing principles to behaviors that can be construed as prevention or detection has been demonstrated in the laboratory (Rothman et al., 1999), the effectiveness of such manipulations has not been tested in more ecologically valid settings. We sought to present differently framed messages emphasizing either the prevention or detection function of the Pap test to lower-income, ethnic minority women, a population in which cervical cancer rates are higher and screening rates are lower than in the general United States public (ACS, 2003a; CDC, 2003a). We predicted that when a Pap test is presented as a detection behavior, loss-framed messages would be more effective, and when presented as a prevention behavior, gain-framed messages would be more effective (i.e. a message frame by behavior function interaction).

Method

Overview

Participants were randomly assigned to view one of four video presentations about the importance of obtaining an annual Pap test. Videos varied in how they presented the function of the behavior (either emphasizing the prevention or detection function) and in the type of message frame (gain or loss) in a 2×2 factorial design. We examined self-reported Pap test utilization 6 and 12 months following participation in the study. Even though Pap tests should be obtained annually, we chose short- and long-term follow-up points for two reasons. First, the effectiveness of one message may be limited to behaviors performed in the shorter term, leading to our hypothesis that the predicted interaction would be stronger at the 6-month follow-up. Second, we were targeting a highly transient population; using the 6-month follow-up would ensure a greater likelihood of contacting participants after the experiment. Because women were randomly assigned to the conditions, we can assume that those who were not due for a Pap test within the 6 months following participation would be similarly represented in each condition. Variables previously found to be related to Pap test adherence specifically and health behaviors generally also were assessed.

Participants

Women who attended an urban community health clinic, which serves predominantly minority and lower-income populations, from November 1998 through April 1999 were asked to participate in the study. The health clinic is a collaborative effort between Yale–New Haven Hospital and other hospitals in the community with a wide range of health care professionals (e.g. internists, Ob/Gyns, pediatricians, psychiatrists, nurse practitioners, dentists and dental hygienists) to provide care to approximately 20,000 lower-income patients each year. Potential participants were attending the clinic to see a health professional in internal medicine for non-gynecological reasons. Participants were recruited from the main clinic waiting

room only. Patients in the main clinic waiting room typically have appointments with health professionals in internal medicine for acute problems (e.g. shortness of breath), chronic illnesses (e.g. diabetes, heart disease) or for physical examinations. Women who were visiting the health center for obstetric or gynecological reasons wait in a separate room and were not approached about this study.

Approximately half of the 995 women approached met the inclusion criteria (spoke English or Spanish fluently and were at least 18 years old) and agreed to participate ($N = 497$). The guidelines at this health clinic recommend that women who had hysterectomies continue to obtain regular Pap tests, thus hysterectomy status was not an exclusion criteria. All participants were required to show identification to ensure that they met the age requirement and had not participated previously in the study (names were matched to a master list, updated daily). The experiment was conducted in groups of 2 to 7 participants. Participants received 10 dollars at the end of the session.

Procedure

Trained female research assistants asked all women who entered the waiting room in the health clinic who appeared to be 18 years of age or older if they would like to participate in a study of women's health. The research assistant initially approached potential participants in English but switched to Spanish if the participant was Spanish-speaking. If a Spanish-speaking research assistant was not available, participants were given information in Spanish about how to enroll in the study at a later time.

Women who agreed to participate were presented with an informed consent form to read and sign, and then were provided a self-administered questionnaire to complete before their clinic appointment. A researcher was available to read the informed consent form and the questionnaire to participants if they requested; less than 1 percent requested this service. As part of informed consent, women were told they would be re-contacted later to answer additional questions. Immediately after their scheduled appointments, the research assistant led the participants to a video-viewing room in the clinic. Groups of participants were assigned to frame (gain or loss) and behavior function (prevention or detection) conditions using a computer-generated table of randomly sorted combinations of conditions. Participants viewed the 10-minute video presentation and then filled out a post-video questionnaire. After all participants in the group completed the questionnaire, the research assistant answered any questions and reminded participants that they would be contacted by telephone in the next few months. Participants provided contact information for three individuals who would know how to get in touch with them if they were not accessible at their present location for the follow-up questions.

Six months after watching the video, participants were contacted for a brief telephone interview to assess Pap test utilization since baseline. To increase contact rates, participants were called at various times during the day and, if they could not be reached by telephone, were sent postcards requesting them to contact the research assistant. Participants who did not obtain Pap tests were contacted again 12 months after baseline to assess Pap test utilization. On average, it took 196 days after baseline to contact participants at the 6-month follow-up (ranging from 161 to 554 days) and 379 days after baseline to contact participants at the 12-month follow-up (ranging from 363 to 788 days). Contact rates did not differ by condition at the 6-month follow-up or overall; χ^2s (1) < 1, $ps > .05$.

Materials

Several steps were taken to develop effective study materials for this population. To ensure that the information presented was understandable, we created all study materials (videos, questionnaires and consent forms) according to recommendations for producing easy-to-read health materials from the National Institute for Literacy (Plimpton & Root, 1994; Root & Stableford, 1996). Additionally, several focus groups were conducted with women from this population to learn how they communicate about the Pap test, cervical cancer and general women's health issues. Information gathered from these focus groups was used to design the questions and messages.

The study materials were available in English or Spanish. The English materials were translated into Spanish and then back-translated into

English to ensure semantic equivalence. Two native Spanish speakers independently prepared translations and back-translations.

Video presentation We created four professional-looking video presentations about cervical cancer and the Pap test by matching 64 photographs, drawings and graphics to narration (97 sentences). Photographs were of women of various ethnicities (African American, Latina, White). The 10-minute videos contained equivalent information about cervical cancer, risk factors associated with the disease, facts about the Pap test and the importance of obtaining Pap tests regularly. Physicians and social workers in the Obstetrics and Gynecology Department and a patient advocate at the community health clinic reviewed the videos to ensure medical accuracy and sensitivity to community issues.

Each video emphasized either the prevention or the detection function of the Pap test. In addition, the prevention videos referred to the target behavior as a Pap *smear* and emphasized how it was used to prevent cervical cancer, whereas the detection videos referred to the behavior as a Pap *test* and emphasized how it was used to detect cervical cancer. There were 35 references in each video to the Pap as either a smear or as a test, and, more importantly, 36 sentences devoted to describing it generally as having prevention or detection functions. Each video also described either the benefits of obtaining a routine Pap (gain-frame) or the costs of not getting a Pap (loss-frame). Twenty-six percent of the narrative contained framed information, and 11 percent of the visuals were framed. Table 1 contains samples of both the behavior function (prevention and detection) and framing (gain and loss) manipulations.

Pre-video questionnaire Variables previously found to be associated with Pap test adherence were measured prior to the video presentation. These variables included intentions to perform the behavior, prior engagement in the behavior, feelings about the Pap test and cervical cancer (Norman et al., 1991), beliefs about whether cervical cancer is fatal (Pearlman et al., 1999) and demographics (e.g. age, education, income, smoking status, insurance, presence of risk factors for cervical cancer; Pearlman et al., 1999). In both questionnaires, the term 'Pap' was used without 'test' or 'smear.'

To assess *intentions*, participants indicated whether they planned to have a Pap in the coming year using a 5-point scale (1 = definitely not; 5 = definitely yes). *Prior Pap behavior* was measured by asking participants whether they had ever obtained a Pap (1 = no, 2 = not sure, 3 = yes) and how long it had been since their last Pap, using a 5-point scale (1 = never had one, 2 = 5 years or more, 3 = 4 to 5 years, 4 = 2 to 3 years, 5 = a year). Participants rated how anxious and nervous they felt when thinking about getting a Pap and how worried they felt about getting cervical cancer using the same 5-point scale. These items were combined into a single *negative affect* measure by averaging scores on each item (Cronbach's $\alpha = .69$). *Fatalism* about

Table 1. Samples of the content of the four behavior function and framing conditions

Behavior function and framing manipulations	*Samples*
Prevention, Gain-Framed	If you get regular Pap smears, you can prevent cervical cancer from developing . . . and preventing cervical cancer can save your life.
Prevention, Loss-Framed	If you don't get regular Pap smears, you can't prevent cervical cancer from developing . . . and not preventing cervical cancer can cost your life.
Detection, Gain-Framed	If you get regular Pap tests, you can detect cervical cancer early . . . and detecting cervical cancer early can save your life.
Detection, Loss-Framed	If you don't get regular Pap tests, you can't detect cervical cancer early . . . and not detecting cervical cancer early can cost your life.

cervical cancer was assessed with the item, 'I can change my chance of getting cervical cancer' (1 = disagree a lot; 5 = agree a lot).

To assess the risk of developing cervical cancer, women indicated their age at first sexual intercourse, number of sexual partners, health history and whether they ever had an abnormal Pap. Finally, participants reported their income level, education, marital status, age, ethnicity, smoking status (1 = current smoker, 2 = smoke sometimes, 3 = used to smoke but quit and 4 = never smoked), and type of health insurance (Medicare/Medicaid, private, none).

Post-video questionnaire The post-video questionnaire assessed whether participants attended to and understood the message presented using a series of questions about the content of the video. We assessed whether participants were aware of the behavior function manipulation (detection/prevention) by soliciting their agreement with two statements: (a) 'Getting a yearly Pap helps to prevent the development of cervical cancer' (prevention); and (b) 'Getting a yearly Pap helps to detect cervical cancer early' (detection). We also assessed whether participants were aware of the framing manipulations by soliciting their agreement with two statements: (a) 'The video was mostly about the good things that could happen if you get regular Paps' (gain-frame); and (b) 'The video was mostly about the bad things that could happen if you don't get a Pap' (loss-frame). Participants responded using 5-point scales (1 = disagree a lot; 5 = agree a lot). Participants also rated how believable and interesting the video was using 5-point scales (1 = not believable/interesting; 5 = very, very believable/interesting).

Outcome efficacy was assessed by level of agreement with two statements ('Paps are accurate or correct' and 'Paps can find abnormal changes in the cervix before cancer develops'), measured on 5-point scales (1 = disagree a lot; 5 = agree a lot). Responses to the two questions were averaged to form an outcome efficacy index; r (473) = .50, $p < .001$. *Self-efficacy* was determined by asking how confident the participant was that she could: (a) show up for a Pap appointment; (b) schedule a Pap every year; and (c) get a Pap if she believed that she was at risk for cervical cancer. Responses to these questions also were assessed using 5-point scales (1 = not sure; 5 = very sure) and averaged to form a self-efficacy index (Cronbach's $\alpha = .89$).

Participants also answered questions repeated from the pre-video questionnaire (i.e. intentions, and negative affect) and indicated their familiarity with English using the following language preference scale: 1 = Spanish only, 2 = mostly Spanish, 3 = Spanish and English equally, 4 = mostly English, 5 = English only.

Results

Demographics

Table 2 lists the demographic information for the participants included in all subsequent analyses. Fifty-six women were excluded from the original sample (N = 497), leaving a total sample of 441 women. Women age 65 or over (n = 19) were excluded because the recommendations for Pap testing among women in this age group are ambiguous at this particular health clinic and nationally (CDC, 2003a). One woman who did not indicate her age also was excluded. Twenty-three participants who misreported their prior Pap behavior were excluded. Responses to two questions about previous Pap tests ('have you ever had a Pap' and 'how long ago did you have a Pap') were compared to ensure the answers were consistent. For example, a participant who answered that she had never obtained a Pap test, yet at the same time reported that she had a test a year ago, was classified as inconsistent, as would a participant who answered that she had obtained a Pap before, yet when asked the amount of time since her last Pap test responded, 'never had one'. This comparison was done to account for some of the potential error that may result from women overestimating whether they obtained a Pap test, which may occur because the Pap test is often confused with other gynecological procedures (Pizarro, Schneider, & Salovey, 2002). Finally, participants with cervical cancer (n = 9) or who did not indicate cancer status or type (n = 4) were excluded.

The final sample included predominantly lower-income women of minority status with limited education who received public health insurance (Medicare, Medicaid). About half of the participants were or had been married, most spoke only English and about a third were

Table 2. Demographic profile of participants

Variable	*Percentage*	*Variable*	*Percentage*
Yearly income		Age	
$4000 or less	26	Mean (Standard deviation)	37 (10.8)
$4001 to $7000	33	Range	18–64
$7001 to $24,000	38	Health insurance	
$24,001 to $81,000	3	None	17
Ethnicity		Public (e.g. Medicare, Medicaid)	73
African American	59	Private	10
Hispanic	27	Marital status	
White	11	Never married	51
Other	3	Married	16
Education		Separated or divorced	27
Grade 6 or less	3	Widowed	6
Grade 7 to 9	13	Smoking status	
Grade 10 to 12	53	Current smoker	36
Some college	24	Smoke sometimes	17
College degree or more	7	Used to smoke but quit	16
Language preference		Never smoked	31
English only	67	How long since last Pap?	
Mostly English	10	Never had one	4
Spanish and English Equally	10	1 year	80
Mostly Spanish	4	2 to 3 years	10
Spanish only	9	4–5 years	3
Have you ever had a Pap?		5 years or more	3
Yes	96	Ever had abnormal Pap?	
No	4	Yes	26
		No	70
		Not sure	3

Note: $N = 441$. Totals may not add up to 100% due to rounding

smokers. The majority of participants reported a Pap test at least once previously, and most had a Pap test within the last year. Most participants did not report having previous abnormal Pap test results. The mean age for first sexual intercourse was 16.4 years old (SD = 3.9), and the mean number of sexual partners was 6.9 (SD = 11.0).

Understanding and evaluating the videos

Responses to several questions were assessed to determine whether there were any differences between the four groups in their understanding and evaluations of the videos. First, we wanted to determine whether participants perceived the Pap procedure in terms of preventing or detecting cervical cancer. As expected, participants in the prevention condition ($M = 4.74$, SD = 0.67) agreed more strongly that the Pap procedure prevents cervical cancer than participants in the detection condition ($M = 4.51$, SD = 1.06; F (1, 437) = 7.00, $p < .01$, $\eta^2 = .016$), and participants in both the prevention and detection conditions agreed that the Pap procedure detects cervical cancer, (M = 4.78 and 4.83, SD = 0.64 and 0.59, for prevention and detection respectively), F (1, 434) = 0.55, NS. There was no main effect for the framing condition and no interaction between these two independent variables. The effect sizes are small and should be interpreted with caution. For both questions there may have been ceiling effects, as 79 percent responded with '5s' on the 5-point scale for the first question described and 87 percent responded with '5s' for the second question described.

Next we assessed whether participants perceived the videos as either loss- or gain-framed. As expected, participants in the loss-frame condition ($M = 4.07$, SD = 1.32) more strongly agreed that the video was framed in terms of costs than participants in the gain-frame condition ($M = 3.68$, SD = 1.55; F (1, 433) = 7.89, $p < .01$, $\eta^2 = .018$). Further, participants

in the gain-frame condition (M = 4.50, SD = 1.02) more strongly agreed that the video was framed in terms of benefits than participants in the loss-frame condition (M = 4.08, SD = 1.33; F (1, 435) = 14.27, p <.001, η^2 = .032). There was no main effect for behavior function and no interaction between framing and behavior function for these variables.

Finally, there were no differences in evaluations of the videos in terms of believability, interestingness, outcome efficacy and self-efficacy. Participants across all conditions rated the video as believable (M = 4.51, SD = 0.64) and interesting (M = 4.36, SD = 0.82). Additionally, participants across all conditions reported high outcome efficacy about the Pap (M = 4.50, SD = 0.69) and high self-efficacy about getting a Pap (M = 4.56, SD = 0.71). There were no significant main effects for behavior function or frame and no significant interactions for any of these variables.

Behavioral follow-up

At the 6-month follow-up, 312 women (312/441 = 71%) were successfully contacted. Given our target population, this attrition rate was deemed acceptable. One hundred thirty-nine of the contacted women (139/312 = 45%) obtained a Pap test. Six months later, we successfully contacted 164 of the 302 women who, at the 6-month follow-up, were either not reached or who had not obtained a Pap test. At the 12-month telephone call, 78 of these women (78/164 = 48%) had obtained a Pap test. By the 12-month follow-up, we had appropriate data on Pap test utilization for 343 participants. The results of two multivariate analyses of variance (MANOVAs) revealed that there were several demographic differences between those contacted and those not, both at 6-months and overall; Wilks' λ = .90 and .90, Fs (24, 353) = 1.64 and 1.65, ps < .05 for the 6-month follow-up and overall, respectively. Compared to those not reached, women successfully contacted were more educated (Fs (1, 437) = 9.28 and 4.91, ps < .05 for 6-month follow-up and overall, respectively), were less likely to be smokers (Fs (1, 438) = 20.95 and 22.48, ps <.01 for 6-month follow-up and overall, respectively), and had higher incomes (Fs (1, 410) = 12.73 and 7.19, ps < .01 for 6-month follow-up and overall, respectively).

The percentage of women in each condition who obtained a Pap test during the six months after the video presentation is shown in Fig. 1. This pattern of frequencies provides initial evidence that our hypotheses were supported. At the six-month follow-up, a greater percentage of women contacted in the gain-frame/prevention and loss-frame/detection conditions obtained Pap tests compared to women in the other two conditions. A gain-framed message appeared to be more effective when the prevention function of the Pap test was described, and a loss-framed message appeared to be more effective when the detection function of the Pap test was described.

To test the framing by behavior function interaction hypothesis, we conducted a logistic regression analysis that included the frame by behavior function interaction term. Self-reported Pap test utilization at the six-month follow-up was the criterion. Prior to conducting this regression analysis, intercorrelations among the predictors were examined. Zero-order correlations among all variables under consideration are listed in Table 3. As Table 3 shows, women in this sample who were more likely to get a Pap test were younger and reported: (a) greater intentions of getting a Pap; (b) greater perceived ability to change their chance of contracting cervical cancer (lower fatalism); (c) more negative affect about receiving a Pap, and (d) having an abnormal Pap test at least once.

In the first step of the regression model depicted in Table 4, we controlled for prior Pap behavior, smoking behavior and education, which are associated with Pap testing behavior in similar community samples (Pearlman et al., 1999) and familiarity with English. We also included variables measured at baseline that were associated with the criterion: age, intentions to obtain a Pap, fatalism, negative affect and history of abnormal Pap. The second step of the regression model included the framing and behavior function condition assignments as categorical variables. The final step of the model included the interaction term (frame×behavior function).

The final model revealed a borderline significant framing×behavior function interaction (b = .918, SE = .521, p = .078) in accounting for Pap test utilization after 6 months and a borderline significant improvement in model fit

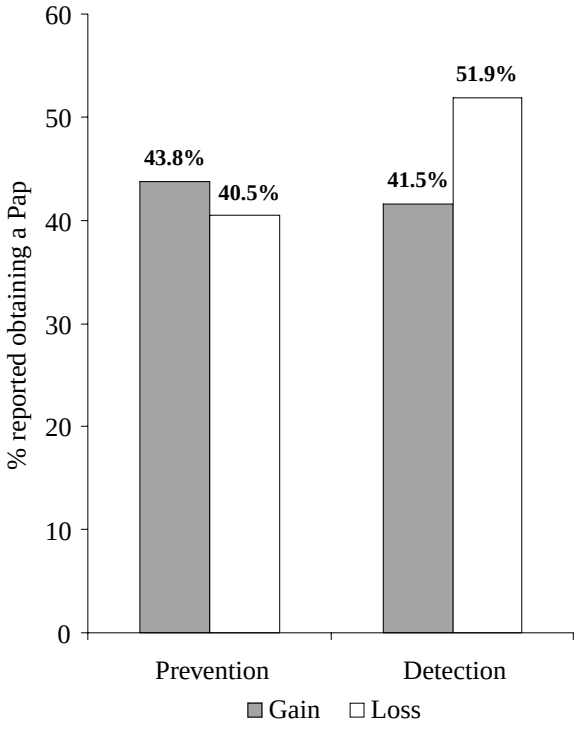

Figure 1. Percent of women who obtained a Pap test at six-month follow-up by condition.

(Wald $\Delta\chi^2$ (1) = 3.15, p = .076), reported in Table 4. As predicted, 6 months after viewing the video, participants in the gain-frame/prevention and the loss-frame/detection condition were generally more likely to obtain a Pap than participants in the other two groups. Based on the calculated odds ratios, when the Pap was described as a detection behavior, women were 2.00 times (95% CI = 0.91, 4.39) more likely to get a Pap when the message was loss-framed than when it was gain-framed. When the Pap was described as a prevention behavior, women were 1.14 times (95% CI = .55, 2.36) more likely to get a Pap when the message was gain-framed than when it was loss-framed. Only the first odds ratio approached significance, but both simple effects were in the predicted directions. Although we tested all hypotheses with two-tailed tests, a one-tailed test could be justified given our specific, directional predictions about the expected interaction. A one-tailed test of the interaction was significant at p = .038.

Identical analyses that included the women successfully contacted at both the 6- and 12-month follow-up (n = 343) did not yield support for the predicted interaction (b = .538, SE = .503, $p > .05$) and did not improve the model significantly (Wald $\Delta\chi^2$ (1) = 1.15, NS). Although relatively effective in the medium term (6 months after the manipulation), framing effects weakened with the passage of time, as might be expected (Apanovitch, McCarthy, & Salovey, 2003; Schneider et al., 2001; but see Banks et al., 1995, in a middle-class sample). Results of a MANOVA revealed no significant differences between those who had obtained a Pap by the 6-month follow-up and those who obtained a Pap by the 12-month follow-up on variables previously found to be related to Pap test utilization (i.e. age, intentions of getting a Pap, fatalism, negative affect about receiving a Pap, abnormal Pap history, prior Pap behavior, smoking behavior, education intentions and familiarity with English) and video effectiveness (i.e.

Table 3. Point-biserial correlations between Pap testing behavior after six months and variables measured at the start of the experiment and included in the regression model

Variable	*Pap behavior*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1. Age	–.25**	–	–	–	–	–	–	–	–
2. Intentions	.16**	.00	–	–	–	–	–	–	–
3. Fatalism	.13*	–.01	.01	–	–	–	–	–	–
4. Negative affect	.13*	.03	.10	.05	–	–	–	–	–
5. Abnormal Pap history	.15*	–.20**	.07	–.02	.15**	–	–	–	–
6. Prior Pap behavior	–.07	.07	–.42**	–.02	.05	–.10**	–	–	–
7. Education	–.01	–.04	–.02	.07	–.15**	.13	.08	–	–
8. Smoking status	.10	.02	.05	.05	–.09*	–.02	.02	.09*	–
9. English familiarity	–.08	.04	–.03	–.01	–.20**	.07	.01	.22**	–.22**

Note: * $p < .05$, ** $p < .01$. Only women successfully contacted at the 6-month follow-up are included in these analyses, $n = 304$ to 311. *Pap behavior* is scored 0 = no Pap obtained and 1 = Pap obtained. *Intentions* is scored on a 5-point scale where 1 = definitely do not plan to get a Pap this year and 5 = definitely plan to get a Pap this year. *Fatalism* represents a woman's perceptions of whether she can change her chance of getting cervical cancer and was coded on a 5-point scale where 1 = disagree a lot and 5 = agree a lot (higher score reflects less fatalism). A higher score on the *negative affect* scale indicates greater negative affect. *Abnormal Pap history* is coded as follows: 1 = never had an abnormal Pap; 2 = not sure; and 3 = had an abnormal Pap. *Prior Pap behavior* represents how long it had been since woman had a Pap and was coded as 1 = 1 year; 2 = 2–3 years; 3 = 4–5 years; 4 = 5 years or more; 5 = never had one. *Education* represents highest level of education completed, 1 = grade 6 or less; 2 = grade 7–9; 3 = grade 10–12; 4 = some college; 5 = college degree or more. *Smoking status* is coded as follows: 1 = current smoker; 2 = smoke sometimes; 3 = used to smoke but quit; and 4 = never smoked. *English familiarity* indicates preferred language, 1 = Spanish only; 2 = mostly Spanish; 3 = Spanish and English equally; 4 = mostly English; and 5 = English only

understanding of the video); Wilks' $\lambda = .87$, $F(24, 165) = 1.05$, NS.

Discussion

Although predictions about message framing based on prospect theory have received support when applied to decisions about health behaviors, many of the studies thus far have examined behaviors that are easily classified as serving prevention or detection functions (Salovey & Wegener, 2003). However, some important health behaviors do not fit clearly into these traditional distinctions; the Pap test is one such example.

The Pap test is often described both as a prevention behavior and as a detection behavior. For example, the CDC (2002) states, 'Detection and treatment of precancerous lesions found during a Pap test can actually prevent cervical cancer, as well as find cervical cancer at an early stage when it is most curable.' Similarly, the National Cancer Institute (NCI) (2002a) states, 'Regular gynecological exams and Pap tests are the most important steps in preventing cervical cancer. Abnormal changes in the cervix can be detected by the Pap test and treated before cancer develops.' In contrast, note the consistent reference to the detection function of mammograms in messages aimed at promoting mammography use: 'Mammography is the best way to detect breast cancer in its earliest, most treatable stage' (CDC, 2003b); 'A screening mammogram is an x-ray of the breast used to detect breast changes in women who have no signs or symptoms of breast cancer' (NCI, 2002b); and 'A mammogram is used to detect and diagnose breast disease in women' (ACS, 2003b).

The complex descriptions associated with behaviors such as the Pap test present a challenge when trying to frame persuasive messages to target at-risk populations. Should such behaviors be matched with gain-framed messages (most effective for prevention behaviors) or loss-framed messages (most effective with detection behaviors)?

Using evidence from research on message-framing, in the present field experiment we sought to address this challenge by constructing

Table 4. Hierarchical logistic regression analyses of behavior function and message framing as predictors of Pap behavior six months after exposure to video presentations

						Model	
Predictor		*b*	*SE*	*Odds ratio*	*95% CI*	$\Delta\chi^2$	*p*
Step 1:	Age	–.051**	.012	.95	(.93, .97)		
	Education	–.052	.154	.95	(.70, 1.28)		
	Smoking	.156	.107	1.17	(.95, 1.44)		
	Prior Pap behavior	.022	.158	1.02	(.75, 1.39)		
	Intentions to obtain a Pap	.356*	.158	1.43	(1.05, 1.95)		
	Previous abnormal Pap	.185	.145	1.20	(.91, 1.60)		
	Negative affect	.199	.127	1.22	(.95, 1.57)		
	Fatalism	.191*	.093	.83	(.69, .99)		
	English familiarity	–.037	.107	.96	(.78, 1.19)	39.54	.001
Step 2:	Age	–.051**	.012	.95	(.93, .97)		
	Education	–.042	.155	.96	(.71, 1.30)		
	Smoking	.162	.107	1.18	(.95, 1.45)		
	Prior Pap behavior	.030	.158	1.03	(.76, 1.41)		
	Intentions to obtain a Pap	.360*	.160	1.43	(1.05, 1.96)		
	Previous abnormal Pap	.159	.148	1.17	(.88, 1.57)		
	Negative affect	.215†	.130	1.24	(.96, 1.60)		
	Fatalism	.193*	.093	.83	(.69, .99)		
	English familiarity	–.030	.107	.97	(.79, 1.20)		
	Behavior function	.183	.251	1.20	(.73, 1.97)		
	Frame	.253	.256	1.29	(.78, 2.13)	1.58	.454
Step 3:	Age	–.054**	.013	.95	(.92, .97)		
	Education	–.044	.156	.96	(.71, 1.30)		
	Smoking	.157	.108	1.17	(.95, 1.45)		
	Prior Pap behavior	.026	.159	1.03	(.75, 1.40)		
	Intentions to obtain a Pap	.361*	.160	1.43	(1.05, 1.96)		
	Previous abnormal Pap	.142	.148	1.15	(.86, 1.54)		
	Negative affect	.247†	.132	1.28	(.99, 1.66)		
	Fatalism	.194*	.093	.82	(.69, .99)		
	English familiarity	–.056	.109	.95	(.77, 1.17)		
	Behavior function	.637†	.361	1.89	(.93, 3.84)		
	Frame	.213	.368	1.24	(.60, 2.54)		
	Behavior function × Frame	.918†	.521	2.51	(.90, 6.94)	3.15	.076

Note: † $p < .10$, * $p < .05$, ** $p < .01$

messages that either emphasized the prevention or detection function of the Pap test, and pairing them with gain- or loss-framed information. In addition, we sought to test the effectiveness of these messages with lower-income, ethnic minority women—a group identified as at greatest risk for contracting cervical cancer (ACS, 2003a; CDC, 2003a). Women who received a loss-framed message paired with a description of the Pap test as a detection behavior and women who received a gain-framed message paired with a description of the Pap test as a prevention behavior were somewhat more likely to obtain a Pap test six months later than those in the other two groups (i.e. prevention/loss-frame, detection/gain-frame). The findings from this study are consistent with previous research motivated by prospect theory, demonstrating that individuals are more likely to engage in a behavior with a risky outcome, such as a behavior that detects the presence of an illness, when considering the costs of not performing the behavior than when considering the benefits of performing it. In contrast, individuals are more likely to engage in a behavior with a less risky outcome, such as a behavior

preventing illness from developing or progressing, when considering the benefits of performing the behavior than when considering the costs of not performing it.

We take these findings, generally, as further evidence that using matched messages (messages containing the most effective pairs of descriptions, i.e. detection/loss-frame and prevention/gain-frame) is an effective strategy for constructing educational and public health campaigns. However these results should be interpreted with caution given that conventional levels of statistical significance were not always attained in this experiment.

Exploring the limitations of this study may yield insight into why the predicted interaction only reached marginal statistical significance. First, the effect of the interaction may have been less strong because the messages had limited impact. Although the items assessing the manipulations revealed significant effects, the differences between the conditions, when measured as effect sizes, were small. Ceiling effects may be responsible for the small effects. Participants in all conditions tended to agree that the video presentations were about preventing as well as detecting cervical cancer, and that the presentations were about the benefits of the Pap procedure as well as the disadvantages associated with not obtaining the Pap procedure—a high percentage reported '5s' on the 5-point Likert-type scales.

Second, attrition rates and selection bias may have contributed to the weak interaction. The targeted population was difficult to track over the 12-month period causing us to lose almost half of our sample. Also, we targeted women in a community clinic who were not seeking gynecologic care, but it may be that the motivation to seek medical care is related to the effectiveness of our messages.

A third limitation of this field experiment is that self-report of Pap testing may be susceptible to error, especially false positives. The Pap test can be misreported because women often confuse it with other gynecologic procedures (Pizarro et al., 2002). We took care to describe the Pap test carefully in the video presentations, providing some assurance that in this sample, self-report measures assessed after the video may be relatively accurate. Also, the actual date of the most recent Pap test prior to the study was not assessed here. It is possible that women may not have been due for a Pap test in the first six months following participation in the study, the time-frame of our primary outcome measure. Given that women were assigned randomly to experimental conditions, we can assume that those who were not due for a Pap test were similarly represented in each condition. Future studies should determine not only the date of recent Pap tests, but also obtain verification that women are reporting their Pap history accurately (i.e. through medical records).

Finally, it may be that message framing is less effective for behaviors that are classifiable as having both prevention and detection functions. Future research in which various health behaviors are targeted on the basis of their standing on a relative prevention/detection continuum may shed light on this possibility, as would a meta-analytic review of literature based on the types of health behaviors that are most responsive to framing manipulations. Other issues to address in future work include the need for stronger and more focused messages, reducing participant attrition, targeting specifically vulnerable health consumers and verifying self-reported health behaviors. Despite its limitations, the current study, combined with the growing body of research on the framing of health messages, provides consistent evidence that small differences in how health messages are communicated can make important differences in their overall effectiveness and that health promotion and detection behaviors can be increased through the utilization of persuasive messages.

References

American Cancer Society (ACS). (2003a). *What are the risk factors for cervical cancer?* Available at: http://www.cancer.org/docroot/CRI/ content/CRI_2_4_2X_What_are_the_risk_factors_for_cervical_cancer_8.asp?sitearea = &level =, accessed 9 May 2003.

American Cancer Society (ACS). (2003b). *Prevention and early detection: Mammograms and other breast imaging procedures.* Available at: http://www.cancer.org/docroot/PED/content/PED_2_3X_mammography_and_Other_Breast_Imaging_Procedures.asp?sitearea = PED, accessed 9 May 2003.

Apanovitch, A. M., McCarthy, D., & Salovey, P. (2003). Using message framing to motivate HIV

testing among low-income, ethnic minority women. *Health Psychology*, *22*, 60–67.

Banks, S. M., Salovey, P., Greener, S., Rothman, A. J., Moyer, A., Beauvais, J., & Epel, E. (1995). The effects of message framing on mammography utilization. *Health Psychology*, *14*, 178–184.

Centers for Disease Control and Prevention (CDC). (2002). *Fact sheet: The national breast and cervical cancer early detection program.* Available at: http://www.cdc.gov/cancer/nbccedp/about.htm, accessed 9 May 2003.

Centers for Disease Control and Prevention (CDC). (2003a). *The national breast and cervical cancer early detection program.* Available at: http://www.cdc.gov/cancer/nbccedp/info-cc.htm, accessed 9 May 2003.

Centers for Disease Control and Prevention (CDC). (2003b). *Breast cancer and mammography information.* Available at: http:// www.cdc.gov/cancer/nbccedp/info-bc.htm, accessed 9 May 2003.

Detweiler, J. B., Bedell, B. T., Salovey, P., Pronin, E., & Rothman, A. J. (1999). Message framing and sunscreen use: Gain-framed messages motivate beach-goers. *Health Psychology*, *18*, 189–196.

Gregg, J., & Curry, R. H. (1994). Explanatory models for cancer among African-American women at two Atlanta neighborhood health centers: The implications for a cancer screening program. *Social Science and Medicine*, *39*, 519–526.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decisions under risk. *Econometrica*, *47*, 263–291.

Mandelblatt, J., Traxler, M., Lakin, P., Kanetsky, P., & Kao, R. (1992). Mammography and Papanicolaou smear use by elderly poor black women. The Harlem Study Team. *Journal of the American Geriatrics Society*, *40*, 1001–1007.

National Cancer Institute (NCI). (2002a). *Prevention of cervical cancer.* Available at: http://cancer.gov/cancerinfo/pdq/prevention/cervical/patient/#Section_14, accessed 9 May 2003.

National Cancer Institute (NCI). (2002b). *Screening mammograms: Questions and answers*. Available at: http://cis.nci.nih.gov/fact/5_28.htm, accessed 9 May 2003.

Norman, S. A., Talbott, E. O., Kuller, L. H., Krampe, B. R., & Stolley, P. D. (1991). Demographic, psychosocial, and medical correlates of Pap testing: A literature review. *American Journal of Preventive Medicine*, *7*, 219–226.

Pearlman, D. N., Clark, M. A., Rakowski, W., & Ehrich, B. (1999). Screening for breast and cervical cancers: The importance of knowledge and perceived cancer survivability. *Women and Health*, *28*, 93–112.

Pizarro, J., Schneider, T. R., & Salovey, P. (2002). A source of error in self-reports of Pap test utilization. *Journal of Community Health*, *27*, 351–356.

Plimpton, S., & Root, J. (1994). Materials and strategies that work in low literacy health communication. *Public Health Reports*, *109*, 86–92.

Rimer, B. K., Conaway, M. R., Lyna, P. R., Rakowski, W., Woods-Powell, C. T., Tessaro, I., Yarnall, K. S., & Barber, L. T. (1996). Cancer screening practices among women in a community health center population. *American Journal of Preventive Medicine*, *12*, 351–357.

Root, J., & Stableford, S. (1996). *Write it easy-it-read: A guide to creating plain English materials (especially for the Medicaid market).* Biddeford, ME: Maine AHEC Health Literacy Center.

Rothman, A. J., Martino, S. C., Bedell, B. T., Detweiler, J. B., & Salovey, P. (1999). The systematic influence of gain- and loss-framed messages on interest in and use of different types of health behavior. *Personality and Social Psychology Bulletin*, *25*, 1355–1369.

Rothman, A. J., & Salovey, P. (1997). Shaping perceptions to motivate healthy behavior: The role of message framing. *Psychological Bulletin*, *121*, 3–19.

Rothman, A. J., Salovey, P., Antone, C., Keough, K., & Martin, C. D. (1993). The influence of message framing on intentions to perform health behaviors. *Journal of Experimental Social Psychology*, *29*, 408–433.

Salovey, P., & Wegener, D. T. (2003). Communicating about health: Message framing, persuasion, and health behavior. In J. Suls & K. Wallston (Eds.), *Social psychological foundations of health and illness* (pp. 54–81). Malden, MA: Blackwell.

Schneider, T. R., Salovey, P., Apanovitch, A. M., Pizarro, J., McCarthy, D., Zullo, J., & Rothman, A. J. (2001). The effects of message framing and ethnic targeting on mammography use among low-income women. *Health Psychology*, *20*, 256–266.

Suarez, L., Roche, R. A., Nichols, D., & Simpson, D. M. (1997). Knowledge, behavior, and fears concerning breast and cervical cancer among older low-income Mexican-American women. *American Journal of Preventive Medicine*, *13*, 137–142.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*, 453–458.

Wilson, D. K., Purdon, S. E., & Wallston, K. A. (1988). Compliance to health recommendations: A theoretical overview of message framing. *Health Education Research*, *3*, 161–171.