

Using Message Framing to Motivate HIV Testing Among Low-Income, Ethnic Minority Women

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This study compared the effectiveness of 4 videotaped educational programs designed to motivate HIV testing among low-income, ethnic minority women. Four hundred eighty women were assigned randomly to watch one of 2 gain-framed or 2 loss-framed videos. Consistent with prospect theory, participants' perceptions of the certainty of the outcome of an HIV test moderated the effects of framing on self-reported testing behavior 6 months after video exposure. Among participants who reported being certain of the test's outcome, those who saw a gain-framed video reported a higher rate of testing than those who saw a loss-framed message. Among women who perceived the outcome of HIV testing as relatively uncertain, gain- and loss-framed videos led to similar rates of self-reported testing, with some advantage for the loss-framed message.

Key words: message framing, HIV testing, health promotional materials, HIV education

Although there is currently no cure for HIV, many gains have been made in the management of HIV disease since the discovery of highly active antiretroviral therapeutic agents in 1996. Complex drug cocktails can now significantly reduce viral load and stabilize T-cell counts in some people with HIV. The advent of these new therapies has reduced mortality associated with HIV dramatically. These innovations in the treatment of HIV have highlighted the importance of early detection of HIV infection. Identification of HIV-positive people is generally a prerequisite to their treatment. As such, it is important to continue to promote HIV testing among people whose behaviors place them at risk for HIV infection (Fisher & Fisher, 1992).

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HIV testing and associated counseling also have the potential to serve as a preventive intervention to encourage those who test negative to stay HIV-free and to help those who test positive to manage their disease and reduce the risk of infecting others. Although some investigators have focused on the disappointing results of HIV testing and counseling in terms of primary prevention (e.g., Ickovics, Morrill, Beren, Walsh, & Rodin, 1994), less attention has focused on the utility of testing in terms of preventing progression of HIV disease in those who test positive and transmission of the virus to others. Identification of HIV-positive individuals, counseling on transmission risk-reduction strategies, and referral for treatment may help to contain the epidemic. To that end, this article aims to identify factors that influence the persuasiveness of materials promoting HIV testing among low-income women.

One factor that may influence the effectiveness of a health appeal is the frame of the message. Prospect theory proposes that people are differentially persuaded when a choice is framed in terms of its associated costs (loss framed) or associated benefits (gain framed)—even when the two frames describe objectively equivalent situations (Kahneman & Tversky, 1979, 1982; Tversky & Kahneman, 1981). The literature on message framing and health behavior reveals that neither gain- nor loss-framed messages are consistently more persuasive across all health behaviors (Rothman & Salovey, 1997; Wilson, Kaplan, & Schneiderman, 1987; Wilson, Purdon, & Wallston, 1988). Rather, loss-framed messages are most persuasive for behaviors with probabilistic or uncertain outcomes, in which one risks an undesirable result (such as discovery of illness), whereas gain-framed messages are most persuasive for behaviors with relatively certain outcomes. As such, we propose that the moderating factor in understanding the effects of message framing is likely to be an individual's perception of the (un)certainly of the expected behavioral outcome.

Generally, the perceived certainty of an outcome is linked to the function of the behavior that produced it, such that those actions commonly represented as illness detection behaviors are perceived

as less certain than actions generally taken to prevent disease. Research on the framing of health messages has suggested that the function of a health behavior is important in determining the optimal frame for messages promoting the behavior (Rothman & Salovey, 1997). Loss-framed messages are more efficacious than gain-framed messages for promoting detection behaviors such as mammography screening (Banks et al., 1995; Schneider et al., 2001) and breast self-examination (Meyerowitz & Chaiken, 1987). Gain-framed messages have encouraged preferences for prevention behaviors such as use of infant car restraints (Christopherson & Gyulay, 1981; Treiber, 1986), regular physical exercise (Roberson & Rogers, 1988), and obtaining sunscreen (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999; Rothman, Salovey, Antone, Keough, & Martin, 1993). Many early-detection behaviors are better promoted by loss-framed than by gain-framed messages because they involve risky and uncertain outcomes (e.g., getting a mammogram could lead to a troubling result). Many prevention behaviors, in contrast, have relatively certain outcomes (e.g., using sunblock reliably reduces the risk of skin cancer), and therefore they are better promoted by gain-framed messages than by loss-framed messages (Rothman, Martino, Bedell, Detweiler, & Salovey, 1999; Rothman & Salovey, 1997; Salovey & Pronin, 1995).

In one experiment we actually manipulated the perceived certainty of a simple health behavior (using a mouth rinse) by portraying it as serving a prevention goal (prevention of plaque buildup) or a detection goal (detection of existing plaque). As predicted, among those participants who had read about the certain, preventive rinse, gain-framed mouth-rinse promotion messages produced higher rates of mouth-rinse requests as compared with loss-framed messages. Loss-framed messages, in contrast, led to more requests than gain-framed messages among those participants who had read about the plaque-detecting rinse (Rothman, Martino, et al., 1999). In the experiment described here, we measured perceived certainty of a single behavior, HIV testing, whose function was not directly manipulated, and tested for an interaction between this perception and message framing.

Because HIV testing is a detection behavior whose outcome is uncertain, one might assume that it is viewed as psychologically risky (one risks finding out that one has the virus). On the basis of this assumption, we could expect higher rates of HIV testing among participants exposed to a loss-framed message. In support of this assumption, Kalichman and Coley (1995) reported a loss-frame advantage for promoting willingness to be tested, as compared with an unframed message. The Kalichman and Coley study did not provide a definitive test of message framing, however, as the researchers did not include a gain-framed message in the experimental design. They also manipulated other factors that may have affected the persuasiveness of their messages (e.g., matching to participant ethnicity or gender). We anticipate that framing effects may differ in the domain of HIV testing from those domains previously studied, such as breast cancer, because HIV is an infectious disease linked to identifiable behavior. Therefore, some individuals may feel they can estimate the certainty or uncertainty of testing positive on the basis of their past behavior (cf. Gerrard, Gibbons, & Bushman, 1996). Some participants may consider themselves at very low probability of testing positive for HIV and therefore view the behavior as relatively low risk. For these individuals, HIV testing is a psychologically safe behavior with a

certain outcome, because they consider themselves as having no chance of testing positive. Such individuals should be more persuaded by gain-framed messages. Those persons who consider testing to be a behavior with an uncertain outcome because there is some probability that they will test positive should be more persuaded by loss-framed messages. This experiment tested the hypothesis that individuals' perceptions of the certainty of HIV testing interact with message framing to motivate interest in HIV testing among members of an underserved and at-risk population, ethnic minority and low-income women.

Ethnic minority women have been disproportionately affected with HIV and AIDS. In the United States, African American women and Latinas represent less than 25% of the female population yet account for 77% of the reported HIV cases and 78% of the reported AIDS cases among women (Centers for Disease Control [CDC], 2000). Comparatively, the national rate of AIDS cases in 1998 was 25 times higher in African American than in White women (50 and 2.0 per 100,000, respectively; CDC, 1999). A national survey of women living in public housing (82% of whom were African Americans) found that approximately one third of female residents were at high risk for HIV because of the behaviors of their sexual partners (Sikkema et al., 1996). Nonetheless, low-income and ethnic minority women are especially likely to hold misconceptions about HIV infection, transmission, and therapeutic interventions (Bergstrom & Sherr, 1999; Hobfoll, Jackson, Lavin, Britton, & Shepherd, 1993; Mantell, Schinke, & Akabas, 1988; Poma, 1987). Given the disproportionate and growing impact of the epidemic on such women and the relative lack of educational programs targeted toward them, we elected to test framed videos created specifically for this population.

The current experiment compared videotape messages promoting HIV testing among low-income women. We explored whether perceptions of the certainty of the outcome of HIV testing differentially affected the impact of framed messages that emphasized the benefits of obtaining an HIV test (gain framed) or the costs of avoiding an HIV test (loss framed). We expected women who viewed HIV testing as a behavior with a relatively uncertain outcome to be more persuaded to obtain an HIV test by a loss-framed than by a gain-framed message, whereas women who viewed HIV testing as a behavior with a relatively certain outcome would be more persuaded by a gain-framed than by a loss-framed message.

Method

Design

Many previous studies have manipulated framing in terms of positive outcomes, emphasizing either their attainment (gain frame) or the failure to attain them (loss frame). However, framed messages can also be manipulated in terms of their valence, emphasizing either desirable or undesirable outcomes (Fagley, 1993; Petty & Wegener, 1991). Gain-framed messages can focus on the attainment of a desirable outcome or the avoidance of an undesirable outcome, both of which are beneficial. Loss-framed messages can emphasize the attainment of an undesirable outcome or the failure to attain a desirable outcome, both of which are risks (Detweiler et al., 1999; Rothman & Salovey, 1997). In the present experiment we developed two types of gain-framed and two types of loss-framed videos to control for any differences in the operationalization of message framing, by factorially manipulating action (attain vs. not attain) and valence (desirable vs. unde-

sirable). Perceived certainty of the outcome of an HIV test was an individual-difference factor (certain vs. uncertain). A three-way (Action \times Valence \times Certainty) analysis of variance yielded no significant main effects due to action or valence on self-reported HIV-testing behavior and related outcome variables. Therefore, in the analyses presented, we collapsed across action and valence of health outcomes to facilitate a more straightforward comparison of gain- versus loss-framed messages (see also Detweiler et al., 1999). Thus, the experiment is characterized as a two-way factorial, certainty (certain vs. uncertain) by framing (gain vs. loss).

Participants

All participants were women from a low-income neighborhood in a small Northeastern city, recruited from public housing developments ($n = 342$) or a community health center ($n = 189$). We collected baseline data from 531 women between 18 and 50 years of age. Of these 531 participants, 24 reported being HIV-positive, 6 reported having had sex only with women, 6 left the study before completing the baseline assessment, 7 completed the baseline session more than once (eliminating 12 records from the database), 2 drank alcohol during the experimental session, and 1 reported never having had sex during her lifetime. These participants were removed from all further analyses, leaving a sample of 480 women.

Over 90% of these 480 participants were ethnic minority group members; the sample was 66% African American, 21% Latina, 9% White, 1% Asian, and 1% American Indian or Alaskan Native; 2% indicated other ethnicities. The average age of the women in this sample was 32 ($SD = 8.76$, range = 18–50). Most (65%) of the women were single (never married), 82% had a high school diploma or less education, and their average annual income was \$8,076 (including government assistance).

Procedure

A multicultural team of interviewers recruited women from the lobby of the community health center or door-to-door at public housing sites. Age was the only exclusion criterion for the experiment: women had to be at least 18 and no older than 50 years of age. The baseline experimental session entailed watching a randomly assigned video and answering questions via a one-on-one structured interview in the participant's preferred language (English or Spanish). We assessed participants face-to-face both before and after watching the video and via telephone or face-to-face 3, 6, and 9 months following baseline data collection, although only the 6-month follow-up data are presented here. Assessments were conducted as structured interviews to ensure participants' comprehension of the questionnaire. Face-to-face interviews elicit higher (and presumably more accurate) estimates of self-reported risk behavior and minimize refusal rates as compared with self-administered paper-and-pencil questionnaires (James, Bignell, & Gillies, 1991).

Six months following exposure to the videotape program, we conducted interviews over the phone or in person with 425 (89%) of the 480 participants in the final sample, a retention rate comparable to other studies with similar populations and time frames (DiClemente & Wingood, 1995; Ickovics et al., 1994; Kalichman, Kelly, & Stevenson, 1997). Women were paid \$10 for completing the baseline session and \$5 for completing each follow-up interview.

Materials

In the course of developing the videos, we elicited detailed feedback on draft scripts from six people who provide medical, educational, or social services to members of the target population. To ensure that the scripts were equivalent in English and Spanish, we conducted in-depth interviews with five Latina women from the target population, then had the video-scripts and study materials translated by a native speaker of Spanish and back-translated into English by another native Spanish speaker. Informa-

tion from these sources and a literature review was considered in the design of both the script and images for the video. To ensure that the videos would be relevant to all of our participants, we included models from diverse ethnic backgrounds. Approximately 40% of the images depicted people who were African American, 30% White, 28% Latino, and 1% Asian.

We developed four videotaped educational programs, identical in informational content but framed differently. The goals were to keep the arguments in each video factually equivalent and to minimize any non-framing-related differences among the 15-min programs, including naturalness of phrasing. The message framing was accomplished by framing nearly 30% (41/139) of the sentences and 21% (25/118) of the accompanying images in each video script. The remaining 70% of the sentences and 79% of the images were identical in each of the four videos. In most cases, framed text was accompanied by a framed image. In rare cases, however, visual depiction of all four possible outcomes was not feasible (i.e., it was difficult to depict the absence of a desirable outcome visually). In these cases, the same image was used in the two loss-framed videos or the two gain-framed videos. The framed sections of the videos addressed four topics relevant to HIV testing: medical consequences, psychological consequences, responsibility to family members, and responsibility to the community. Within each of these areas, the videos detailed several specific desirable or undesirable outcomes of testing or not testing for HIV, respectively, accompanied by a visual illustration of the corresponding outcome. Following is a brief example of how two sample sentences in the video were framed:

Attain, desirable (gain-framed): There are many benefits, or good things, you may experience if you get tested for HIV. If you decide to get HIV tested you may feel the peace of mind that comes with knowing about your health. (Accompanied by a photo of a couple embracing on a couch.)

Not attain, desirable (loss-framed): There are many benefits, or good things, you may not experience if you don't get tested for HIV. If you decide not to get HIV tested you won't feel the peace of mind that comes with knowing about your health. (Accompanied by a photo of a couple sitting at opposite ends of a couch.)

Attain, undesirable (loss-framed): There are many problems, or bad things, you may experience if you don't get tested for HIV. If you decide not to get HIV tested, you may feel more anxious because you may wonder if you're ill. (Accompanied by a photo of a couple sitting at opposite ends of a couch.)

Not attain, undesirable (gain-framed): There are many problems, or bad things, you may not experience if you get tested for HIV. If you decide to get HIV tested, you may feel less anxious because you won't wonder if you're ill. (Accompanied by a photo of a couple embracing on a couch.)

Measures

Checks on confounding variables. We strove to create videos equivalent in informational value, credibility, and interest. Following exposure to one of the framed videos, we asked participants to respond to four items. Participants were asked to rate how interesting (1 = *not at all*; 5 = *very*) and believable (1 = *not at all*; 5 = *very*) the video was. Participants were also asked how much they learned from the video (1 = *nothing*; 5 = *very much*) and the general feeling they had regarding the video (1 = *very negative*; 5 = *very positive*). Participants also completed a six-item test of HIV/AIDS knowledge that was constructed on the basis of a scale developed by Carey, Morrison-Beedy, and Johnson (1997), specified for use with low-literacy adults. A knowledge score was developed by summing the correct responses to the six true-false items, with higher scores indicating greater HIV knowledge. Knowledge was assessed only once, immediately following video exposure. Because participants were assigned randomly to watch one of the videos and all the videos contained identical

information regarding HIV/AIDS, we expected HIV/AIDS knowledge would not vary according to exposure to different videos.

Perceived certainty. We were interested in classifying participants on the basis of differences in their perception of HIV testing as having a certain (low-risk) or uncertain (risky) outcome. After watching the video, participants were asked the likelihood that if they were tested for HIV, the test would be HIV positive (1 = *not at all likely*; 5 = *very likely*). Participants were also asked the likelihood that they would someday get HIV (1 = *not at all likely*; 5 = *very likely*). An index of participants' uncertainty was created by calculating the mean of these two items, $r(471) = .50, p < .001$. We separated participants into two groups: individuals who viewed HIV testing as a behavior with a certain outcome (not at all likely or a little likely the test would be positive now or in the future; index score ≤ 1.5) and those who viewed HIV testing as a behavior with uncertain outcomes (some likelihood that the test would be positive now or in the future; index score > 1.5). We did not consider scores of 5 on each of these two items to reflect certainty of a positive test result because the endpoint of the scale was labeled *very likely* rather than *definitely*, so even these scores reflect some uncertainty. About 66% of participants were classified as certain, and the remaining 34% were classified as uncertain.

Previous HIV testing. We were interested in controlling for participants' baseline frequency of HIV-testing behavior. Before watching the video, participants were asked if they had ever been tested for HIV and, if so, how many times they had been tested. Participants were also asked whether they had ever been told that they were HIV-positive (i.e., they had HIV). Participants who answered yes were excluded from subsequent analyses, as described above.

Objective HIV risk. Prior to viewing the video, participants reported the number of times they had engaged in vaginal, oral, and anal intercourse in the preceding 30 days; with how many partners; how many times they had used a condom; and whether they had used a condom the last time they had intercourse (similar to questions used in Morrill, Ickovics, Golubchikov, Beren, & Rodin, 1996). An index of sexual risk behavior for HIV infection was created by subtracting the number of protected vaginal, anal, and oral sex acts from the total number of sex acts for each participant. Participants were asked how many partners they had had sex with within the past 30 days and year, and during their lifetime. They also reported whether they thought that any sexual partner in their lifetime had any of the following risk factors: injection drug use, sex with men, imprisonment, or a sexually transmitted disease (STD). In addition, participants indicated whether they had ever had an STD or injected drugs themselves.

Intentions. We measured testing intentions with two items, based on procedures described by Prochaska, DiClemente, and Norcross (1992), both before and after video exposure. First, participants were asked whether they planned to get an HIV test in the next year (1 = *no*; 5 = *yes*). Second, those who reported some likelihood of getting tested were asked to choose when within the next year they thought they would get an HIV test (1 = *in the next week*; 2 = *in the next month*; 3 = *in the next six months*; 4 = *in the next year*). Participants who replied 1 (*no*) to the first question were given a 5 (*not in the next year*) for the second question. An index of participants' intentions to get an HIV test was created by calculating the mean of these two items, with the second item reverse-coded, $r(480) = .76, p < .001$.

Subsequent HIV-testing behavior. At the follow-up interviews culminating 6-months after viewing the videos, participants were asked how many times they had been tested since their last contact with our team. In this analysis, participants were classified as having been tested if they reported getting an HIV test at any point within 6 months after seeing one of the videotapes. Participants were also asked whether they were HIV-positive or -negative.

In addition to the variables listed above, we assessed a number of additional constructs, including social norms regarding testing, perceived risk of HIV infection, perceived severity of HIV, worry about contracting

HIV, and sexual behavior. These variables are not discussed further in this article as they did not mediate or moderate the influence of perceived certainty or message frame on HIV testing.

Results

Preliminary Analyses

Chi-square tests and analyses of variance revealed that there were no differences among the four video conditions in participants' age, education, ethnicity, income, marital status, religion, previous HIV testing, or baseline intentions to get an HIV test (all $ps > .20$). Also, because perceived certainty was assessed after video exposure, we tested for differences in perceived certainty across video conditions. The chi-square test was not significant, $\chi^2(3, N = 467) = 2.13$. However, baseline intentions differed between the two levels of the postvideo perceived certainty factor. Those participants who were certain they had no probability of testing positive for HIV had lower baseline intentions ($M = 2.94, SD = 1.30$) to be tested than those who perceived some likelihood that they may test positive ($M = 3.45, SD = 1.07$), $F(1, 467) = 18.63, p < .001$. There was a main effect for certainty in postvideo intentions to get tested as well ($M = 3.54, SD = 1.10$; $M = 3.88, SD = 0.77$), in these two conditions, respectively, $F(1, 461) = 12.48, p < .001$. To control for these differences, we entered baseline and postvideo intentions in logistic regression models before perceived certainty and the message frame by certainty interaction in predicting self-reported HIV testing. Because of concerns about multicollinearity given the zero-order correlation between the two intention measures, $r(463) = .73$, we also conducted logistic regression analyses, removing one or the other of them from the model. However, these analyses produced essentially the same findings as those reported below, which were based on analyses containing both intention measures.

Participants' evaluations of the videos were examined to confirm that the differently framed video programs did not differ on potentially confounding variables. As expected, analyses of variance indicated that the participants' reported interest, believability, knowledge, and general feeling evoked by the video did not differ across the four video conditions (all $ps > .50$).

Risk of HIV Infection

We estimated participants' objective risk for HIV infection on the basis of their sexual behavior, STD history, and injection drug use history. The mean scores on these items, summarized in Table 1, reflect a relatively high level of risk for HIV among study participants. Over 51% of the sample reported having had an STD in the past. Of the 68% of participants who reported having had vaginal sex in the past 30 days, only 37% reported using a condom at all during that period, and even fewer, 21%, had used a condom the last time they had intercourse. The number of unprotected sex acts does not necessarily reflect accurately an individual's risk of infection, however, as the risk of an individual's partner(s) must also be taken into account. We looked at participants' estimates of the likelihood that their lifetime partners had common risk factors and found that the majority of people endorsed two of the risk factors: a history of STD and imprisonment. Furthermore, some women endorsed items regarding men having sex with men and injection drug use.

Table 1
Means and Standard Deviations Across Conditions for Self-Reported Variables

Variable	<i>n</i>	<i>M</i> (range) or %	<i>SD</i>
Baseline intentions	480	3.11	1.25
Postvideo intentions	473	3.65	1.02
Perceived certainty	471	1.66	0.39
Objective risk			
Unprotected sex acts in past 30 days	480	7.08 (0–300)	19.12
STD history	480	51.2%	
IDU history	479	5.0%	
Number of partners			
Past 30 days	480	0.84 (0–20) 4.6% > 1	1.17
Past year	480	3.17 (1–602) 27.7% > 1	28.92
Lifetime	479	14.22 (1–999) 29.4% > 9	67.12
Partner risk ^a			
Had an STD	477	2.19 54.7% > 1	1.37
Injected drugs	478	1.60 24.1% > 1	1.23
Been in prison	477	3.04 71.3% > 1	1.62
Had sex with men	474	1.33 15.6% > 1	0.90

Note. STD = sexually transmitted disease; IDU = injection drug use.

^a Items regarding partner risk were rated on 5-point scale ranging from 1 = *not at all likely* to 5 = *very likely*.

When we examined the relationship between objective and perceived certainty of HIV-testing outcome, participants' personal and partner risk perceptions were only mildly correlated with objective measures of risk and estimates of partner risk factors. As the correlation matrix in Table 2 indicates, the largest correlation, between perceived certainty and STD history, was only $r(480) = .15, p < .01$.

Effects of Message Framing on Self-Reported HIV-Testing Behavior

Cumulatively, 36.2% of the participants who provided follow-up information 6 months after watching the video reported that they had been tested for HIV. Two of these individuals

indicated that their test result was positive. The logistic regression analysis for self-reported HIV testing is presented in Table 3. After we controlled for reported HIV-testing behavior prior to the experiment, and baseline and postvideo intentions to be tested, the message framing by certainty interaction still reliably predicted self-reported HIV testing behavior, and model fit was adequate (Nagelkerke $R^2 = .27$). There was a significant gain-frame advantage among women who viewed HIV testing as a behavior with a certain outcome: 38% of these participants who saw a gain-framed video reported being tested, compared with 26% who saw a loss-framed video, $\chi^2(1, N = 281) = 4.84, p < .05$. Participants who viewed HIV testing as a risky behavior with uncertain outcomes, however, were not differentially affected by the framed

Table 2
Correlations Among Objective and Perceived Risk Indices

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Perceived certainty	—										
2. Sexual behavior index	-.06	—									
3. STD history	.15**	-.02	—								
4. IDU history	.07	.07	.15**	—							
5. Lifetime partners	.10*	.01	.13**	.21**	—						
6. Partners in last year	.10*	-.02	.07	-.01	.21**	—					
7. Partner in last 30 days	.11*	.09	.11*	.07	.53**	.26**	—				
8. Likelihood partner had an STD	.14**	-.01	.45**	.11*	.11*	.00	.06	—			
9. Likelihood partner injected drugs	.05	.01	.11*	.35**	.15**	.00	.03	.27**	—		
10. Likelihood partner was imprisoned	.09	.03	.23**	.13**	.08	.04	.02	.29**	.23**	—	
11. Likelihood partner had sex with men	.10*	.01	.11*	.10*	.30**	.05	.18**	.20**	.27**	.20**	—

Note. *N* = 480. STD = sexually transmitted disease; IDU = injection drug use.

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

Table 3
*Hierarchical Logistic Regression Model Predicting Self-Reported HIV Testing Behavior
 Cumulatively Within 6 Months After Message Exposure*

Predictor variable	<i>b</i>	<i>SE</i>	Odds ratio	95% confidence interval	$\Delta\chi^2$
Step 1					36.54*** ^a
Previous HIV testing	0.20***	0.04	1.22	1.13, 1.32	
Step 2					26.02*** ^a
Previous HIV testing	0.14***	0.04	1.15	1.07, 1.24	
Baseline intentions	0.49***	0.10	1.63	1.33, 1.98	
Step 3					9.41*** ^a
Previous HIV testing	0.15***	0.04	1.16	1.08, 1.25	
Baseline intentions	0.18	0.14	1.20	0.92, 1.56	
Postvideo intentions	0.59*	0.20	1.81	1.22, 2.69	
Step 4					7.98* ^b
Previous HIV testing	0.16***	0.04	1.17	1.09, 1.27	
Baseline intentions	0.15	0.14	1.16	0.89, 1.53	
Postvideo intentions	0.61**	0.21	1.85	1.23, 2.76	
Certainty	0.88*	0.35	2.41	1.22, 4.76	
Message framing	0.63*	0.29	1.87	1.07, 3.28	
Framing \times Certainty	-1.05*	0.47	0.35	0.14, 0.88	
Final model					79.95*** ^c

Note. For all chi-squares, $N = 419$.

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

^a $df = 1$. ^b $df = 3$. ^c $df = 6$.

messages, although the trend was in the direction of greater effectiveness for the loss-framed message: 40% of these participants who saw a gain-framed video reported being tested, compared with 47% who saw a loss-framed video, $\chi^2(1, N = 144) = 0.78, p > .10$.

We conducted additional analyses to determine whether the framing effects were mediated by change in intentions from baseline to after the video, but this hypothesis was not supported. Although change in intentions following the video significantly predicted self-reported testing behavior, we were not able to demonstrate that the framing manipulation predicted change in intentions or that the relationship between framing and outcome was attenuated when intentions were removed from the model.

Discussion

As predicted, we found that among those women who viewed HIV testing as having a certain outcome (with a low risk of testing positive), gain-framed messages better encouraged self-reported HIV testing than loss-framed messages; among those who viewed HIV testing as having an uncertain outcome (with some risk of testing positive), the two messages did not result in significantly different testing rates, although now the loss-framed video showed a bit of an advantage over the gain-framed video. In addition, we found participants to be at relatively high risk for HIV infection on the basis of their self-reported risk factors, with over half reporting a history of STDs and many estimating that their partners have one or more risk factors for HIV infection. These findings underscore the need for effective prevention and early detection programs in this population of low-income women.

This experiment provides important evidence corroborating the predictions made by Rothman and Salovey (1997) regarding the moderation of framing effects by underlying perceptions of out-

come certainty of health behaviors, as anticipated by prospect theory (Kahneman & Tversky, 1982; Tversky & Kahneman, 1981). Perceptions of HIV risk or certainty differ from perceptions of breast cancer risk, for example, in that individuals may predict the outcome of a detection test with greater confidence (whether merited or not) on the basis of relevant self-knowledge (such as their own or their partners' behavioral histories). Differences in perceptions of the riskiness of being tested for HIV naturally follow, with those who consider themselves at risk being more uncertain of their HIV status, and those who do not consider their behavior risky perceiving the test as an opportunity to confirm their present health status. Whether an individual's estimated likelihood of testing positive is accurate is not especially relevant, as it is the perception of risk or certainty that moderates framing effects rather than objective risk. Indeed, we found that perceived certainty of the behavior and objective risk estimates were only weakly correlated. As such, it is important to tailor a persuasive message to an individual's perception of certainty.

The study benefited from a strong basis in theory and a large multicultural, community sample, but it still suffered important limitations. First, we obtained only self-reported information regarding HIV testing and risk factors (e.g., STD history) and did not assess potential social desirability biases. For this reason, we may have underestimated participants' risks for infection and overestimated their testing or prevention behaviors. Although we do not expect systematic biases in self-report (i.e., underreporting or overreporting) across framing conditions, future investigations should include checks for social desirability biases and confirmatory evidence of the behavioral outcome, if possible.

Second, although we found a significant interaction between message framing and certainty, it was asymmetrical, such that we did not find a strong loss-framed advantage among women who

perceived HIV testing as a relatively risky behavior with an uncertain outcome. HIV testing was especially high among women who perceived some likelihood that they would test positive (44% overall). Perhaps their increased perception of risk and uncertainty created a ceiling that diminished the effects of message framing.

Another important limitation was the omission of an unframed control condition with which we could compare the framed versions of the video. We elected not to include a control condition because many, if not most, public health appeals are framed, albeit unsystematically and sometimes inconsistently. Thus, framed messages better approximate realistic health education materials. In addition, our primary hypothesis concerned an interaction that specified which framed message would perform better for particular individuals, rather than which frame would perform better relative to an unframed, information-only control. Inclusion of an unframed control would help us to determine whether the results of the framing by certainty interaction reflected unusually effective messages in some conditions or unusually ineffective messages in others.

Similarly, although we were able to demonstrate differential persuasion by message frame under certain conditions, we were not able to explain the mechanism driving this differential effect. We have not, as yet, identified key mediators of framing effects. In this study, change in intentions does not appear to have mediated the framing effects. Follow-up studies should test competing models of health behavior decision-making to identify mechanisms behind the framing by certainty interaction identified in the current study and should include additional measures of persuasive information processing (Petty & Wegener, 1991).

Although we did not investigate the utility of tailored communication strategies directly in this study, we recognize that much research has been conducted in this area. Indeed, some researchers have emphasized that the same message is not similarly effective for individuals within a specialized target population but that messages must be tailored to match individual psychological characteristics (Kreuter, Farrell, Olevitch, & Brennan, 2000; Strecher, 1999). For example, the transtheoretical model proposes that different kinds of messages may be required for individuals at different stages in the behavior change continuum (Prochaska et al., 1992; Prochaska, Redding, Harlow, Rossi, & Velicer, 1994). Undoubtedly, tailoring to individual differences and targeting messages to specific group characteristics are important components in health communication. The videos created for this experiment were based on information obtained from HIV educators and interviews with the target population and hence were specifically targeted to low-income women living in New Haven, Connecticut. Perhaps other kinds of more individualized tailoring might have enhanced the effectiveness of these framed messages further.

The findings from this experiment have implications not only for HIV counseling and testing services but also for researchers and community organizations that aim to promote healthy behaviors more generally. First, these results demonstrate the continuing need for prevention and early detection interventions for low-income women, who are disproportionately affected by the HIV epidemic. Second, this experiment suggests that message framing may be an effective tool for enhancing the effectiveness of persuasive messages promoting HIV testing. Message framing is a technique that has the potential to reach both large and small audiences through various levels of intervention (i.e., individual,

group, or community). Above all, gain-framed messages provide a way to persuade individuals who may underestimate their risk for HIV and those who view HIV testing as a behavior that serves to confirm their healthy status. Conversely, loss-framed messages may be useful in motivating individuals already concerned about their HIV risk. Such framed messages promoting HIV testing have the potential to connect people to life-preserving health care and to inform people of ways to reduce the transmission of the virus.

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