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Communicating the Consequences of Early Detection: The Role of Evidence and Framing

Despite the enormous benefits of early-detection products, consumers are reluctant to use them. The authors explore this reluctance, testing alternative approaches to communicating the consequences of detection behaviors. The results suggest that anecdotal messages are more involving than statistical messages and that positive anecdotes (about gains from screening) are less persuasive than negative anecdotes (about the losses from failing to get screened); positive anecdotes appear to cause a "boomerang" effect. The authors discuss implications for promoting consumer risk-reduction behaviors.

In recent years, there has been a proliferation of new products that enable the early detection of disease, including new scanning devices for detecting osteoporosis, genetic tests for inherited breast cancer risk, and home testing kits for HIV and colon cancer (see, e.g., Ameghino 1998; Farhan 1996; Gavaghan 1998). Such products not only represent potential revenue streams for the firms that develop them but also provide a potential means for achieving two important but often incompatible societal goals: improving public health and simultaneously reducing health care costs (see, e.g., Elder et al. 1994; Reagan 1992). Many of the major killers in an industrialized society (e.g., high blood pressure, diabetes, cancer) are insidious diseases, doing much of their damage before the patient experiences symptoms. If such diseases can be detected early in their development, they can be treated much more effectively, saving both lives and money.

However, the success of early detection programs requires more than new technology. It also requires widespread consumer adoption of screening products, and gaining consumer adoption of these products is a major marketing challenge. Despite the many benefits of screening, consumers are often reluctant to participate in it (see, e.g., Andreasen 1995; Elder et al. 1994).

One source of this reluctance appears to be a general consumer ambivalence toward problem-detection products, ranging from home radon detection services (Weinstein and Lyon 1999) to drug testing kits marketed to worried parents (Snyder 1996). Consumers who do not believe that they are susceptible to a given problem may question the benefit of being tested for something they "know" they do not have. In contrast, consumers who are concerned about having an underlying problem may have anxiety about the test's outcome, making them reluctant to find out whether their fears are justified (see McCaul et al. 1996). Although the long-term benefits of early problem detection are often great, the short-term outcome may be bad news. And many people are ambivalent about seeking out bad news. While proverbial wisdom advises that "Forewarned is forearmed" and "Knowledge is power," it also advises that "Where ignorance is bliss, 'tis folly to be wise" and "So long as I know it not, it hurteth me not" (Simpson 1982).

Consumers' ambivalence about screening outcomes raises an important question for advocates of problem-detection products: In designing messages to persuade consumers to adopt such products, how should potential testing outcomes be portrayed? In this study, we examine how consumers' beliefs and attitudes toward screening are affected by two specific message-design factors: (1) whether screening consequences are communicated with anecdotal evidence or statistical evidence and (2) whether these consequences are framed in terms of potential losses or potential gains. Each of these two factors is discussed subsequently.

Conceptual Background

The Effects of Anecdotal Versus Statistical Evidence

When communicating the potential consequences of a behavior, promoters can employ either a specific illustrative anecdote or more general population statistics. For example, in communicating the benefits of wearing a seat belt, promoters could either tell the story of a specific person whose life was saved by wearing a seat belt or cite statistics on the lower accident fatality rates among passengers wearing seat belts. From an objective standpoint, statistics are generally more informative than anecdotes (because an isolated anecdote can be found to support almost any point of view). However, research suggests that audiences tend to be more interested in and influenced by anecdotal than statistical evidence

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(see e.g., Brosius and Bathelt 1994; Hogarth 1980; Taylor and Thompson 1982). In interpreting these findings, Hogarth (1980, p. 98) posits that "specific case data are ... encoded and remembered on several dimensions with a correspondingly rich set of meaningful associations" (see also Shedler and Manis 1986). In contrast, many subjects seem to "tune out" abstract generalizations, especially statistical generalizations. Brosius and Bathelt (1994, p. 50) note the "difficulties people have in processing ... percentages, probability, and so forth," and Taylor and Thompson (1982, p. 162) note subjects' tendency to "underuse ... statistical information."

Although anecdotal messages may be more involving than statistical messages, this does not necessarily mean that they are more persuasive. Petty and Cacioppo (1981) argue that involving messages can be either more or less persuasive than noninvolving messages, depending on the perceived strength of the arguments contained in these messages (see also Eagly and Chaiken 1993).

Framing the Consequences of Consumer Health Decisions

In promotions for any course of action, either the potential gains from pursuing it or the potential losses from not pursuing it can be emphasized. For example, an advertisement could emphasize either the money gained by mailing in a rebate or the money lost by not mailing it in. In a series of experiments involving hypothetical choice situations, Tversky and Kahneman (1981) find that people are more likely to pursue an action when it is framed as a means to avoid a loss rather than to achieve a gain. According to Tversky and Kahneman's "prospect theory," decision makers are motivated by both losses and gains but tend to give greater decision weight to potential losses (see also Kanouse 1984). This is especially true when the consequences of an action are delayed. Behavioral economists have found that the decision weight given to a consequence is "discounted as a function of the delay of its delivery" (Madden 2000, p. 16) and that future gains tend to be discounted more than future losses (see, e.g., Simpson and Vuchinich 2000).

Tversky and Kahneman's (1981) experiments show the effects of framing on hypothetical choices, typically between monetary bets or public policy options. However, Meyerowitz and Chaiken (1987) extend this research to the study of consumers' personal health behavior, specifically breast self-examination (BSE) behavior among female college students. Consistent with Tversky and Kahneman's hypothesis, these researchers find that subjects are more motivated to participate in BSE when messages stress the potential losses from not performing BSE rather than the potential gains from performing BSE.

However, when subsequent researchers have examined the effects of gain versus loss framing in the context of real consumer health decisions, the results have been mixed. Some studies have found loss framing more persuasive (e.g., Banks et al. 1995; Meyerowitz and Chaiken 1987), some have found gain framing more persuasive (e.g., Rothman et al. 1993), and still others have found no framing effects at all (e.g., Lauver and Rubin 1990). These mixed findings have prompted researchers to search for potential moderators of framing effects.

Message Involvement as a Moderator of Framing

Maheswaran and Meyers-Levy (1990, p. 361) suggest that framing effects are moderated by subjects' involvement with the framed message. Specifically, they posit that "negatively framed messages should be more persuasive than positively framed ones when issue involvement is high." To derive this hypothesis, the authors integrate Tversky and Kahneman's prospect theory with the cognitive response theory of persuasion (e.g., Petty and Cacioppo 1981): Prospect theory implies that loss-framed arguments will be perceived as stronger or more compelling than gain-framed messages. However, cognitive response theory posits that for subjects to be influenced by argument strength, they must first be sufficiently involved with message content to evaluate argument strength. Consistent with this hypothesis, Wright and Weitz (1977) find that women show a greater aversion to negative features of birth control devices when purchase is imminent (which increases motivation to process the information) than when purchase will take place in the distant future. In interpreting these and other findings, Wright (1981, pp. 279) argues that "overweighting [of negative information] may only occur when an audience member is sufficiently concerned over message content to bother generating reactions and integrating those into an overall impression, and to worry about making errors in this."

To test their involvement hypothesis, Maheswaran and Meyers-Levy (1990) conducted a 2×2 experiment in which college students were given information on cholesterol screening. Involvement was manipulated by telling subjects either (1) that heart disease can affect people 20 to 29 years of age (high involvement) or (2) that heart disease affects only the elderly (low involvement). Next, subjects were given cholesterol-screening messages, which were either gain framed (stressing the health benefits of screening) or loss framed (stressing the health risks of not being screened). As hypothesized, loss frames were more persuasive among high-involvement subjects. Maheswaran and Meyers-Levy (1990, p. 366) concluded "that negatively framed appeals can be highly persuasive … only if individuals who receive the appeal are sufficiently involved with the issue." In addition, the experiment indicated that among low-involvement subjects, gain framing was more persuasive than loss framing. In interpreting this finding, the authors posited that, though subjects who scrutinize gain-framed messages judge them to be weak arguments, less involved subjects simply view them as positive peripheral cues, which enhances persuasion among these subjects (see Petty, Cacioppo, and Schumann 1983).

Subsequent experiments have replicated the finding that loss-framed messages are more persuasive among message-involved subjects, though they have tended to find no effect of framing under low-involvement conditions. Rothman and colleagues (1993) examine how the effectiveness of alternatively framed messages to promote skin cancer screening is moderated by involvement. However, instead of manipulating involvement, the authors use subjects' sex as a surrogate for involvement. Citing evidence that "women as compared to men were more concerned about sun tanning and skin cancer and, therefore, were considered more involved with the health issue," they conclude that sex "was a reasonable

proxy for degree of issue involvement" (Rothman et al. 1993, p. 421). As predicted, loss-framed messages were more effective among women, whereas framing had little effect on men. Rothman and colleagues (1993, p. 420) conclude that "exposure to negatively framed information led women to be even more likely … to intend to obtain a skin exam."

Finally, Block and Keller (1995) examined the framing–involvement interaction, manipulating involvement by altering the perceived effectiveness of the target behavior. Gleicher and Petty (1992) found that when subjects were assured that a protective behavior was effective, they were less likely to scrutinize the subsequent arguments that support this behavior (perhaps fearing that such scrutiny would weaken their confidence in the protective behavior) than when they were told that the behavior's effectiveness was doubtful. On the basis of this research, Block and Keller (1995) hypothesized that messages advocating low-efficacy health behaviors would elicit greater message involvement than messages advocating high-efficacy behaviors, and therefore loss-framed messages would be more persuasive for low-efficacy behaviors. They tested these hypotheses in two experiments, the first involving a sexually transmitted disease and the second involving skin cancer. In both experiments, subjects in the low-efficacy conditions exhibited greater message involvement/processing, and among such subjects loss framing induced more favorable attitudes and intentions than did gain framing. However, among subjects exposed to the less involving (high-efficacy) message, framing had no effect. On the basis of these experimental results, Block and Keller (1995, p. 192) concluded that "when subjects process [messages] in-depth, negative frames are more persuasive than positive ones."

Behavior Type as a Moderator of Framing

In a recent review article on framing effects and consumer health behavior, Rothman and Salovey (1997) acknowledge that message involvement might play a role in moderating such effects. However, they suggest that an additional moderator might be at least as important as involvement: the type of health behavior being promoted. Rothman and Salovey note that in studies involving prevention behaviors (such as using sunscreen or infant car seats), gain-framed advocacies were often more persuasive than loss-framed behaviors. However, in studies involving disease-detection behaviors (such as screening for cancer or heart disease), loss framing is typically more persuasive.[1]

In interpreting this difference, Rothman and Salovey (1997) argue the following:

1. The relative effectiveness of gain and loss frames depends on how well each frame matches subjects' prior perceptions about the target behavior; in other words, "we must consider how framed information is integrated into prior perceptions" (p. 9).
2. Consumers tend to view detection behaviors in a negative light and thus are less receptive to messages that stress the benefits of these behaviors than to messages that stress the even greater risks/costs of failing to engage in these behaviors. Rothman and Salovey argue persuasively that consumers tend to perceive disease-screening behaviors as inherently unpleasant; some of the unpleasantness is fairly certain (e.g., cost, discomfort, embarrassment, inconvenience), whereas other aspects are less certain (e.g., the possibility of bad news about the patient's health).
3. Therefore, the best way to position screening is as the lesser of two evils—that is, to point out the even greater unpleasantness that can result from not screening and hope that in this context, consumers will view getting screened as the "least bad" option. This is what a loss-framed message does. A gain-framed message, in contrast, tries to motivate screening by stressing its benefits. According to Rothman and Salovey, this positioning runs counter to consumers' predominantly negative attitudes toward disease-detection behaviors. Therefore, a gain-framed screening advocacy is likely not to be persuasive.

The Potential for Boomerang Effects

Thus, Rothman and Salovey (1997) conclude that among message-involved subjects, gain-framed messages will be less persuasive than loss-framed messages. However, they do not pursue another implication of their reasoning, which has not been investigated in any previous study either: If gain-framed messages conflict with consumer perceptions of disease-detection behaviors, perhaps such messages are not only unpersuasive but counterpersuasive—that is, perhaps gain-framed messages create a boomerang effect, shifting consumer attitudes in the opposite direction from that intended by the advocacy. Similar to Rothman and Salovey (1997), Petty and Cacioppo (1981, p. 225) observe that when audiences "relate information in the message [to] pre-existing knowledge about the topic, ... they may either agree or disagree with the message." However, Petty and Cacioppo (1981, p. 225) go on to note that subjects' "antagonistic ... responses may be so much more persuasive than the arguments contained in the message that a position opposite to that advocated might be adopted."

Such boomerang effects have been discovered in a variety of persuasive contexts, including exposure to messages that are highly discrepant from subjects' prior attitudes (Dignan et al. 1985; Whittaker 1968), reactance against perceived strong persuasive intent (Snyder and Wicklund 1976), statements of facts already presumed to be true (Gruenfeld and Wyer 1992), and presentation of extremely counterstereotypical examples (Kunda and Oleson 1997). In addition, Sutton, Balch, and Lefebvre (1995) have speculated that efforts to educate consumers about cancer risk factors can sometimes decrease consumers' motivation to undergo cancer screening. However, no previous study has examined the potential role of a boomerang in message framing effects.

[1]These two categories of health behavior are defined as follows: *Prevention* (sometimes called "primary prevention") behaviors reduce the probability that a person will contract a disease. For example, in the context of HIV infection, the practice of "safe sex" (e.g., through the use of condoms) would be considered preventive behavior, because it reduces the probability that a person will become infected with HIV. In contrast, *detection* (sometimes called "secondary prevention") behaviors do not affect the chance of contracting a disease but simply enable a person to learn whether he or she has already contracted it. For example, getting a blood test for the presence of HIV would be considered a detection behavior; being tested for HIV does not reduce the probability of getting the infection, but it may allow for earlier and more effective treatment.

The present study is explicitly designed to search for boomerang effects. In addition to the treatment groups exposed to framed messages, the experiment includes a control group that was not exposed to any message. This enables us to determine whether gain-framed messages are merely less persuasive than loss-framed messages or whether gain-framed messages produce more negative attitudes toward the advocated behavior. As noted previously, several studies have found that involved subjects who are exposed to a loss-framed message have more positive attitudes toward the target behavior than involved subjects who are exposed to a gain-framed message, and researchers have attributed this difference to a proadvocacy attitude change created by the loss-framed message. Of the framing experiments discussed previously, only Meyerowitz and Chaiken's (1987) included a control group. These authors did not evaluate the possibility of a boomerang effect for gain-framed messages. However, an examination of their cell means reveals that compared with control subjects who saw no framed message, subjects exposed to a gain-framed message had more negative responses to the target behavior on three of the five dependent measures. Meyerowitz and Chaiken do not provide sufficient information to test for the statistical significance of these differences (and because n = 79, the power of such tests would be low). Nonetheless, their findings suggest the possibility of a boomerang effect for gain-framed messages.

Hypotheses

On the basis of the preceding discussion, we hypothesize the following consumer responses to messages advocating screening behaviors:

H_1: Among subjects exposed to (low-involvement) statistical messages, framing will have little effect on attitudes and beliefs toward the target behavior.

H_2: Among subjects exposed to the (high-involvement) anecdotal messages, gain framing will be less persuasive than loss framing. Compared with loss-framed messages, gain-framed messages will (a) be perceived as having less informational value, (b) be perceived as less persuasive (i.e., less likely to influence subjects' future behavior), (c) elicit more negative beliefs toward the detection behavior, and (d) elicit more negative attitudes toward the detection behavior.

H_3: Anecdotal/gain messages will create a boomerang effect. Compared with control subjects who are not exposed to any advocacy, subjects who are exposed to anecdotal/gain messages will (a) have more negative beliefs toward the detection behavior and (b) have more negative attitudes toward the detection behavior.

Method

Target Behavior and Population

We tested our hypotheses in the context of a specific screening behavior: mammography. Breast cancer is one of the leading causes of death among women, causing about 44,000 deaths annually in the United States alone (Roberts 1996). One of the most effective ways to reduce breast cancer deaths is to encourage women to have regular screening mammograms. Among women older than 50 years of age, clinical trials indicate that screening mammography can reduce the mortality rate of this disease by 30%–50% (Reynolds and Jackson 1991). However, despite the procedure's benefits, many women either do not have mammograms at all or have them less often than is recommended by the medical experts. For example, only about 25% of Medicare recipients follow the National Cancer Institute recommendation to have annual mammograms (Centers for Disease Control and Prevention 1995a). Research indicates that attitudinal factors, including ambivalence about potential test outcomes, play a central role in women's failure to get mammograms (for a review, see Fuller et al. 1992).

Experimental Design

The study employed a 2 (statistical or anecdotal evidence) × 2 (gain versus loss framing) between-subjects experimental design with a control group. Control subjects were given the same procedure and questionnaire as treatment subjects but saw no experimental advertisement. Each of 174 subjects was assigned randomly to one of the five experimental conditions: 117 to one of the four treatment conditions, and 57 to the no-advertisement control condition.

Subjects

A total of 174 women over the age of 50 years were recruited from social and volunteer organizations in a Midwestern metropolitan area. As noted previously, women over 50 are the primary target for annual mammograms. To encourage participation, organizations received $1 per subject and a chance to win $250 in a lottery. Subjects' ages ranged from 51 to 89 years, with a mean of 70. Subjects were 67% white, 27% married (23% divorced, 39% widowed, 10% never married, 1% other), and 90% high school graduates, and 81% reported "good" or "excellent" health. Thirty-six subjects reported that a family member had had breast cancer.

Compared with U.S. population averages for women over age 50, women in our sample had slightly greater levels of self-reported health and education and were considerably less likely to be currently married (see Centers for Disease Control and Prevention 1999). Therefore, caution should be used in generalizing our findings to all women over age 50. However, analysis of our data indicated that subjects' attitudes toward mammography and breast cancer and their responses to the experimental messages did not differ according to their self-reported health status, education, or marital status.

Experimental Stimuli

The stimuli were four black-and-white advertisements. Each had the headline "Why Should You Get a Mammogram?" and contained the same basic information on breast cancer and mammography, which was drawn from health education materials produced by the National Cancer Institute and the American Cancer Society. All advertisements provided a telephone number "For information on where to obtain a screening mammogram near you" and a picture of a telephone.

However, the advertisements differed in the type of evidence used (statistical or anecdotal) and whether the consequences of mammography were framed in terms of gains or losses. Specific statistics were based on the clinical research

finding that annual screening mammograms reduce a woman's chance of breast cancer death by 30%–50%. The statistical gain message used the more conservative figure: a 30% reduction in risk if a woman has a mammogram. The statistical loss message stated the equivalent risk increase: a 43% increase in risk if a woman fails to have a mammogram.[2] Initial versions of the messages were developed, pretested for ease of comprehension with ten women over 50, and revised. This resulted in the following four messages:

1. Statistical, gain: "Many women have no family history of breast cancer and have never felt any lump in their breast. But they follow the advice of the American Cancer Society and start having annual screening mammograms when they turn fifty. Because of this, doctors are able to detect their tumors at an early, treatable stage, and they are 30% less likely to die of breast cancer."
2. Statistical, loss: "Many women have no family history of breast cancer and have never felt any lump in their breast. So they don't follow the advice of the American Cancer Society to start having annual screening mammograms when they turn fifty. Because of this, doctors are not able to detect tumors at an early, treatable stage, and they are 43% more likely to die of breast cancer."
3. Anecdotal, gain: "No one in Sara Johnson's family had ever gotten breast cancer, and she had never felt any lump in her breast. But she followed the advice of the American Cancer Society and started having annual screening mammograms when she turned fifty. Because of this, doctors were able to detect her breast tumor at an early, treatable stage, and now Sara can look forward to a long life, watching her grandson, Jeffrey, grow up."
4. Anecdotal, loss: "No one in Sara Johnson's family had ever gotten breast cancer, and she had never felt any lump in her breast. So she didn't follow the advice of the American Cancer Society to start having annual screening mammograms when she turned fifty. Because of this, doctors were not able to detect her breast tumor at an early, treatable stage, and now Sara may miss out on a long life, watching her grandson, Jeffrey, grow up."

Subjects received a booklet containing four black-and-white advertisements: a randomly assigned mammography advertisement and three dummy advertisements (for vitamins, soap, and insurance); the latter were the same for all groups. The treatment advertisement was always the second advertisement in the booklet. The control subjects did not see a mammography advertisement; in its place was a fourth dummy advertisement.

Manipulation and Confounding Checks

To verify that the anecdotal messages were more involving than the statistical messages, we conducted a pretest. We recruited 96 women over the age of 50 years (none of whom participated in the main experiment) from local organizations. Each subject viewed one (randomly assigned) message for 30 seconds and then reported agreement with six statements: "I got involved in what the ad had to say," "The ad's message seemed relevant to me," "This ad really made me think," "This ad was thought-provoking," "The mammogram ad was very interesting," and "I felt strong emotions while reading this ad." These six items formed a summed scale with a coefficient alpha of .96. Analysis confirmed that the anecdotal messages were significantly more involving (mean = 33.52) than the statistical messages (mean = 25.11; $t = 6.81$, $p < .001$).

Rothman and Salovey (1997) suggest that framing effects are moderated not only by involvement but also by the perceived risk of the behavior that is being promoted. Therefore, it was important to establish that subjects in the two evidence conditions did not differ in their perceptions of the risk in getting a mammogram. Toward this end, we conducted a second pretest. We recruited 65 women over the age of 50 years (none of whom participated in either the previous pretest or the main study) from local organizations. Each subject viewed one of the (randomly assigned) target messages for 30 seconds and then reported her agreement (on a seven-point scale) with five statements: "Getting a mammogram is risky," "Mammograms can lead to bad results," "Mammograms have uncertain outcomes," "Getting a mammogram makes me feel anxious," and "Getting a mammogram would cause me to worry." (These statements were based on Rothman and Salovey's [1997] and Dowling and Staelin's [1994] conceptualizations of perceived risk.) The five items formed a summed scale with coefficient alpha of .77. Perceptions of behavioral risk did not differ between subjects exposed to anecdotal messages (mean = 12.5) and subjects exposed to statistical messages (mean = 11.97; $t = .33$, $p = .75$).

Procedure

We randomly distributed booklets among groups of women at each participating organization. (Such organizations are frequently the setting for the presentation of health-related information to older adults; see, e.g., List et al. 1999.) While pretesting the materials, we had found that some women in this age group had difficulty completing scales. We made several modifications to the questionnaire to help facilitate this process. First, we used a 13-point type size to increase readability. Second, the experimental procedure began with a warm-up exercise in which subjects completed Likert scales for statements about a local retailer, which were unrelated to the study topic. When the warm-up exercise was completed and subjects indicated that they understood how to complete numerical scales, the experiment began. All subjects (both treatment and control) received identical instructions:

> We are interested in your thoughts about some health topics and about some advertisements for mature women focusing on those health topics. In a moment, you will be asked to view four proposed advertisements. We will give you about 30 seconds to look at each ad carefully. Please do NOT look back at any ad after the examiner says STOP. Directly behind these ads is a questionnaire…. Due to the limited time, we will be asking different questions to different people.

No mention of breast cancer or mammograms was made before ad exposure. After ad exposure, subjects completed the questionnaire. Consistent with the cover story (that the

[2]These are equivalent because, for example, a .007 risk is 30% less than a .01 risk, but a .01 risk is 43% greater than a .007 risk. The 43% change in the statistical loss message may sound more dramatic than the 30% change in the statistical gain message, despite their mathematical equivalence. However, as we show, the two messages did not elicit significantly different attitudes toward screening mammography.

study focused on "health topics," and "we will be asking different questions to different people"), all questionnaires stated, "You have been chosen to answer questions about mammograms (breast cancer screening x-rays) and other health behaviors concerning breast cancer."

Measures

Beliefs about target behavior. Subjects reported agreement (on a seven-point Likert scale) with 16 belief statements about breast cancer and mammography. These health belief items were adapted from prior studies of mammography behavior (Stein et al. 1992). The 16 items were entered into a principal components analysis by means of a varimax rotation, which produced four interpretable, orthogonal factors with eigenvalues greater than 1.0. The first factor was labeled "mammography benefits" (e.g., mammography can detect a tumor when your doctor can't, mammography is effective in early detection of breast cancer, breast cancer can be cured if detected early). The second factor represented "mammography barriers" (e.g., mammograms are embarrassing, inconvenient, painful, cost too much). The third factor represented "perceived susceptibility to breast cancer" (e.g., more likely than average to get breast cancer, get breast cancer sometime in life). The fourth factor was labeled "risk factor knowledge" (e.g., can develop breast cancer without symptoms, can develop breast cancer without a family history of breast cancer).

Evaluation of the advertisement. Subjects rated the informational value of the mammogram advertisement on eight semantic differential scales (believable/not believable, realistic/not realistic, factual/not factual, good/bad, useful/not useful, appropriate/not appropriate, helpful/not helpful, and educational/not educational). These items were combined to form a summed scale with a coefficient alpha of .74.

In addition, each subject assessed the likelihood that the advertisement would influence her behavior. Subjects were asked, "If you saw this advertisement in a magazine, how likely would you be to go and get a screening breast mammogram?" Finally, subjects' overall attitude toward screening mammography was assessed by asking them to express their agreement or disagreement with the statement, "I think women my age should have a yearly mammogram."

Results

Effects of Framing Within Anecdotal Versus Statistical Messages

Our first analyses examined whether the impact of framing on subjects' beliefs and attitudes varied depending on the type of evidence (statistical versus anecdotal) in the message. We conducted 2 × 2 analyses of variance (ANOVAs), in which the factors were evidence (statistical versus anecdotal) and framing (gain versus loss). The dependent variables included subjects' evaluations of the advertisement's informational value, perceived behavioral influence of the advertisement, beliefs about the target behavior and disease (benefits, barriers, susceptibility, and risk factor knowledge), and overall attitude toward the target behavior. Cell means from these ANOVAs are presented in Table 1.

Effects on advertisement evaluations. Neither framing nor evidence had a main effect on subjects' evaluations of the advertisement's informational value. However, there was a significant interaction between framing and evidence ($F(1,87) = 10.08$, $p = .002$). To test our hypotheses regarding this interaction, we analyzed the simple effects of framing within each of the two evidence conditions (see, e.g., Keppel 1982, pp. 214–19). As hypothesized, loss-framed information was evaluated as having significantly more informational value among subjects who were exposed to the (more involving) anecdotal messages ($F(1,87) = 10.45$, $p < .01$), whereas framing had no significant effect among subjects who were exposed to the statistical messages ($F(1,88) = 2.51$, N.S.).

Effects on predicted behavior. Framing and evidence also had an interactive effect on subjects' predictions of their own mammography behavior ($F(1,103) = 10.87$, $p = .001$).

TABLE 1
Experimental Cell Means

	Statistical Advertisements		Anecdotal Advertisements		
Dependent Measures[a]	**Gain-Framed**	**Loss-Framed**	**Gain-Framed**	**Loss-Framed**	**No-Advertisement Control**
Perceived informational value of advertisement	5.55	5.23	5.10[b]	6.07	N.A.
Perceived likelihood of having a mammogram, after seeing advertisement	5.48	4.37	4.07[b]	5.54	N.A.
Overall attitude toward mammography for women older than 50 years	6.38	6.17	5.28[b, c]	6.71	6.14
Perceived barriers to mammography	–.17	.18	.34[b]	–.44	–.11
Perceived susceptibility to breast cancer	.10	–.10	–.34[c]	–.11	.23
Perceived benefits of mammography	–.28	–.08	–.10	–.11	.03
Risk factor knowledge	–.20	–.10	.09	.01	.10

[a]Higher numbers indicate higher perceived informational value of advertisement, greater perceived likelihood of getting a mammogram, more positive attitude toward mammography, higher perceived barriers and benefits to mammography, greater perceived susceptibility to breast cancer, and greater risk factor knowledge.
[b]The difference between anecdotal, gain-framed and anecdotal, loss-framed messages is statistically significant at $p < .01$.
[c]The difference between anecdotal, gain-framed message and no-message control is statistically significant at $p < .05$.

As hypothesized, loss framing was more persuasive among subjects who were exposed to the anecdotal presentation ($F(1,103) = 7.57$, $p < .01$). Within a statistical presentation, the subjects who were exposed to the gain message had a slightly higher mean, but this effect was not significant at $p < .05$ ($F(1,103) = 3.77$, $p = .06$).

Effects on overall attitude toward screening mammography. The analysis also revealed a significant interaction of framing and evidence type on subjects' overall attitude toward the target behavior ($F(1,108) = 7.19$, $p = .008$). Within anecdotal messages, loss framing produced more positive attitudes toward the target behavior ($F(1,108) = 11.14$, $p < .01$). Within statistical messages, framing had no effect on mammogram attitudes ($F(1,108) = .23$, N.S.).

Effects on mammogram beliefs. There were no effects of evidence or framing on subjects' beliefs about their susceptibility to breast cancer, the perceived benefits of mammography, or risk factor knowledge. However, there was an interactive effect of framing and evidence on perceptions of the mammogram barriers ($F(1,104) = 8.92$, $p = .004$). In anecdotal messages, loss framing produced lower perceived barriers to mammography ($F(1,104) = 8.65$, $p < .01$). In statistical messages, framing had no significant effect ($F(1,104) = 1.69$, N.S.).

Mediation Analysis

Thus, among subjects exposed to the high-involvement anecdotal messages, loss frames were significantly more effective than gain frames. To help interpret these findings, we conducted mediation analysis. This analysis followed James and Brett's (1984): If the effects of an antecedent (A) on an outcome (O) are completely mediated by a third variable (M), the three simple correlations (r_{ao}, r_{am}, and r_{mo}) should be statistically significant, but the correlation between the antecedent and the outcome should become nonsignificant when the mediator is controlled (i.e., $r_{ao.m}$ = N.S.).

We tested several mediational models, including one in which the impact of framing on predicted behavior was mediated by beliefs and attitudes toward the behavior:

framing ⇒ perceived barriers ⇒ attitude ⇒ predicted behavioral response

However, although each of the successive simple correlations implied by this model is statistically significant (e.g., $r_{framing.barriers}$, $r_{barriers.attitude}$, $r_{attitude.intention}$), the model does not stand up to mediational analysis. For example, the correlation between framing and predicted behavior remains significant, even after perceived barriers and attitude are controlled for. This indicates that the impact of framing on predicted behavior is not mediated by attitudes or perceived barriers.

In addition, when framing is controlled for, the correlation between attitude and predicted behavior becomes nonsignificant. According to Pedhazur (1982), this result suggests that framing either (1) mediates a causal relationship between attitude and predicted behavior or (2) jointly (and independently) influences both attitude and predicted behavior. Since framing was randomly manipulated, it is exogenous and cannot possibly mediate the relationship between two measured variables. Therefore, the remaining plausible explanation is the second: Framing jointly and independently influences both attitude toward the target behavior and predicted behavioral response to the advertisement; that is,

framing ⇒ attitude
⇓
predicted behavioral response

Further analysis indicates that the impact of framing on attitudes is completely mediated by beliefs about barriers to the target behavior. Consistent with James and Brett's (1984) criteria, all three simple correlations are statistically significant ($r_{frame,attitude} = .37$, $p < .01$; $r_{frame,barriers} = -.38$, $p < .01$; $r_{barriers,attitude} = -.41$, $p < .01$), but the impact of framing on mammogram attitudes becomes nonsignificant when perceived mammogram barriers are controlled ($r_{frame,attitude.barriers} = .22$, $p = .117$).

The mediation analysis also suggests that the effect of framing on predicted behavioral response is mediated by evaluations of the advertisement's informational value. All three simple correlations are significant ($r_{frame,behav} = .34$, $p = .011$; $r_{frame,adeval} = .44$, $p = .004$; $r_{adeval,behav} = .58$, $p < .001$), but the effect of framing on predicted behavior becomes nonsignificant when advertisement evaluation is controlled ($r_{frame,behav.adeval} = .23$, $p = .131$).

Comparing the Treatment Groups with the Control Group

As noted previously, when prior studies have found more positive attitudes among subjects who were exposed to loss-framed (versus gain-framed) messages, they have tended to conclude that the loss-framed messages elicited proadvocacy attitude change. However, in the absence of a no-message control group, such findings are open to another interpretation: that gain-framed messages cause counteradvocacy attitude change. To examine this issue, our experiment included a no-message control group.

We compared the attitudes and beliefs of subjects who were exposed to the four framed advocacy messages with the control subjects, who saw no advocacy at all. Table 1 shows the control and treatment groups' beliefs and attitudes toward mammography and breast cancer. Measures that referred specifically to the mammogram advertisement (e.g., advertisement evaluation) obviously were not applicable to the control group. We made significance tests using Dunnett's table of critical values for comparing treatment and control groups, where k (the total number of groups) equals 5 (see Winer, Brown, and Michels 1991, pp. 462, 977–78).

The control group comparisons produced several interesting findings. They revealed that the mammography attitudes and beliefs of subjects who were exposed to the low-involvement statistical advertisements were not significantly different from those of subjects who saw no mammogram message at all (all t-statistics less than 1). Thus, our findings not only suggest that framing has little effect on low-involvement subjects (as Block and Keller [1995] and Rothman et al. [1993] find) but also support Taylor and Thompson's (1982) finding that subjects tend not to rely on

statistical information when making judgments (see also Brosius and Bathelt 1994; Hogarth 1980).

Consistent with prior theory (e.g., Maheswaran and Meyers-Levy 1990; Wright and Weitz 1977), control-group comparisons suggest that highly involving framed information influenced subjects' attitudes and beliefs about the advocated behavior. However, the pattern of this influence departed somewhat from that predicted in prior framing research. As we hypothesized, subjects who were exposed to a highly involving gain-framed message had substantially more negative attitudes and beliefs toward mammography than subjects who were exposed to no message at all. Indeed, the counteradvocacy effects of the gain-framed message appear to be stronger than any proadvocacy effects of the loss-framed message. Women exposed to the anecdotal/gain message had significantly less favorable overall attitudes toward mammography than the control subjects did ($t = 2.26$, $p < .05$) and were significantly more likely to deny their susceptibility to breast cancer than the no-advertisement controls ($t = 2.48$, $p < .025$). In addition, the anecdotal/gain subjects seemed to perceive greater mammogram barriers than the no-advertisement controls, though this difference ($t = 1.88$) did not reach statistical significance at the .05 level, according to the fairly conservative Dunnett test.

Although subjects exposed to the anecdotal/loss message had higher mean attitudes toward mammography ($t = –1.48$) and lower perceived barriers to getting a mammogram ($t = 1.43$), these effects were weaker than the counteradvocacy effects of the gain message, and none of the loss/control comparisons reached statistical significance. Therefore, it is not clear that the loss message created proadvocacy attitude change, as prior framing researchers suggest. However, the gain messages created counteradvocacy attitude change.

Depth Interviews

To aid further in the interpretation of the experimental findings, we conducted depth interviews among members of the target audience. The use of depth interviews to interpret experimental findings dates back at least to Merton and Kendall's (1946) classic article on the focused interview. These authors note (p. 542) that "The primary purpose of the focused interview was to provide some basis for interpreting statistically significant effects of mass communication" in experimental studies. In particular, they advocate the use of depth interviews "to locate the source of ... 'boomerang effects' in film, radio, pamphlet and cartoon propaganda" (see also Gorden 1980).

Fourteen women, ranging in age from about 50 to 80 years, were recruited to participate in individual depth interviews. None of these women had participated in the original experiment. Each subject was asked to examine each advertisement (anecdotal gain-framed and anecdotal loss-framed) for approximately 30 seconds and then report any "thoughts or feelings" she had while reading that advertisement (see Merton and Kendall 1946, p. 550). The order of advertisement presentation was varied from one interview to the next. After subjects had reported their reactions to each advertisement, they were asked to report their feelings and experiences regarding mammography. Subjects' comments were audiotaped, professionally transcribed, and then organized according to recurring themes (see Leydon et al. 2000; Ritchie and Spencer 1994).

Responses to the gain-framed message. As might be expected, many subjects reported positive emotions after reading the upbeat, gain-framed messages. For example,

> "[I feel] happy. You felt positive after reading it, ... just a positive message."
>
> "It is positive and hopeful ... because she can look forward to a long life."
>
> "[I]t has a happy ending."
>
> "[I]t is giving her hope."
>
> "[I]t's warm inside and everything is wonderful."
>
> "It makes me feel better already."
>
> "[It] leads you to hope that things work out better. A positive outlook."

For many products, such positive feelings would be likely to enhance the persuasive power of an advertisement (see Monahan 1995). However, the elicitation of positive feelings is likely to have two effects that reduce subjects' motivation to use a disease-screening product. First, the elicitation of positive feelings may give subjects a false confidence that they are not vulnerable to the disease. Forest and colleagues (1979, p. 161) find that "People who are feeling good may exaggerate their sense of control over the environment and may feel less vulnerable." Consistent with this, the subjects in our experiment who were exposed to the anecdotal, gain-framed message perceived themselves to be significantly less susceptible to breast cancer ($p < .025$) than did the control subjects. In addition, several interviewees reported that the gain-framed message, though pleasant, was almost too reassuring—that it did not create a sense of urgency to get a mammogram and even fostered a sense of complacency:

> "It doesn't do anything to create a sense of urgency…. Again, going back to the sense of urgency. Unless I have something that I'm concerned about, why go through it? … Squashing your breasts…."
>
> "[I]t's not a threat. And if you are not concerned about it, you are not going to accept that threat as your own."
>
> "[T]here might be some women that the positive one would not have touched."
>
> "[S]he never felt a lump, so she didn't see any reason to do anything. And so in that case, you know, if it's not broke, don't fix it."
>
> "Well, I would probably think, well you know that is really something that I need to do, but maybe I'll do it next week."
>
> "I would probably never stop and look at this message because I would think 'oh, I know.'"
>
> "It didn't have the same emotional impact as [the loss-framed message]."

Second, the elicitation of positive feelings can make subjects less willing to engage in a task they perceive to be unpleasant. For example, both Forest and colleagues (1979) and Isen and Simmonds (1978) find that though elicitation of positive feelings generally makes subjects more likely to

engage in helping tasks, there is a notable exception: The elicitation of positive feelings makes subjects less likely to engage in a helping task that they perceive to be unpleasant. Forest and colleagues (1979, p. 168) conclude that "persons who are feeling good are concerned about preserving their mood and will avoid activities that they expect would destroy their good feelings." Citing this research, Monahan (1995, p. 93) speculates that "If people are generally negatively disposed to an idea (say, wearing a condom), inducing positive affect … may cause recipients of the message to denigrate the idea even further." Women clearly perceive mammography to be an "unpleasant task." When asked to discuss the procedure, subjects gave long and eloquent litanies of its short-term costs, including pain, expense, inconvenience, embarrassment, and fear.

> "The fear of it maybe being painful.... [Y]ou get caught up in everyday life and you just don't do the things you should."

> "[I]t is uncomfortable…. [I]f you've never done it before it is real scary…. [Y]ou don't know what is going to happen in there…. [T]hat's real scary, … just the idea that a stranger is going to have you lay your [breast] up [on] a plate and squash it…. [B]efore I had my first one, I was really frightened of what it was going to be like, … that and the expense if [you] don't have insurance."

> "A lot of insurance doesn't pay for them…. If I didn't understand the reason for them, I wouldn't get them either because they hurt…. A man had to have designed that machine…. [J]ust the denial kind of thing. Some women just don't want to know. If I pretend it's not there, it will go away."

> "They are uncomfortable…. And there are so many jokes about it [i.e., the pain]…. I think, ... am I somehow increasing my chances, you know, x-rays, radiation? … [Y]ou can never do it, at least not through my health plan. You can't do it at the same time you make your doctor's appointment. And so they give you a sheet and tell you to come back any time, but then there is like a line. I'm busy and I don't do it."

> "[Women] are fearful of it,… especially some women who don't go to the doctor regularly are fearful of just what it entails, the procedure itself. And [some] people who are afraid because they think they do have something and so it's better not to know you have something."

> "I think [women] hear that it hurts. They think it costs a lot of money for people who don't have access to it easily…. [I]ts not easy to get a mammogram actually…. I just think it's denial and inaccessibility and cost. And convenience. And it does hurt."

> "I think in general women don't [take] care of their health for themselves as much as for their family members. They are busy with work and looking after everybody else, and they put themselves last. That's the reason. Lack of information about what goes on in a mammogram. And there is some fear that it might be painful."

> "The pain…. You have to take time out of your day to go to the out clinic and get it all taken care of. Insurance doesn't cover it like it does other things."

> "They hurt, … [and] it is a scheduling issue…. [J]ust working it into your time and schedule, and you are looking at a time in women's lives when they are raising kids and working…. You don't have time to breathe. Much less, schedule a pancake squeeze."

> "I think the cost. Just other stories that they have heard about, that they hurt, … and some could even be embarrassed to have to go in to get a mammogram…. [Y]ou're supposed to go in yearly, and you get too busy and forget."

Responses to the loss-framed message. Subjects' reactions to the loss-framed message were, in many ways, the reverse of their responses to the gain-framed message. Whereas the gain-framed advertisement elicited positive feelings, the loss-framed message tended to elicit negative emotions, especially fear.

> "This one is more scary.... I guess this one would be like if you wanted to scare somebody, this one would probably do it."

> "Ooh, ... it's depressing. You know, they were not able to detect and Sara may miss out on a long life, watching her grandson. And that's just depressing. I was thinking, you know, she could. If you don't catch breast cancer, the chances are it gets into the bone."

> "I'm scared when I read this one."

> "That one is scary and I don't want to deal with it."

However, despite (or perhaps because of) the negative emotions elicited by the loss-framed message, many women found it compelling, especially in motivating an otherwise reluctant woman to take action:

> "Some people would have to have something … hit them in the face before they do anything about it."

> "[T]he fear of something happening I think maybe gets your attention and makes you start thinking that maybe this is something I need to do."

> "This one is like, wow, should they do it and look at all the negative things that are happening because she didn't do it."

> "[H]ow important it is to follow the advice to get a mammogram because she didn't and now she's not going to see her grandson grow up, and telling you ... the risk patients are not following the advice…. I would take it just a little more to heart because it's telling that she did not see her grandson grow up and telling you, you know, well when the other one said she did so things worked OK, then this one shows things are not OK so you might tend to go along with it."

> "That hit home a little more because ... she didn't get to see him grow up."

> "My reaction is how sad that she is not going to see her grandson…. How important mammograms are."

> "The person would miss out on a lot of her life because she didn't go get a mammogram…. They're fearful. And this kind of plays along with that."

> "[T]his could happen to you too. You know, if you think about it this could happen to you if you don't get your mammogram."

> "This [would affect people] because it seems more likely that Sara will die. And I think we all are afraid of death.... I guess I'll take care of it now."

> "[I]t has a little more shock value to it. I guess it maybe draws you up a little shorter. You know, if you figure you are not going to watch your grandson grow up, that kind of thing might catch my attention more than something that says everything is fine."

"I think it's a fear that a woman has of having breast cancer and having this example where she is missing out on family life. It just strikes you more than a happy life that turned out OK."

"[S]omething could have been prevented that wasn't because she didn't have the checkup. And the consequence is terrible. So, it just seems the consequence from that … is more striking than the good consequence of getting it…. I think the fear factor is working…. But I've known women who died of breast cancer, so maybe I can relate to that one."

"Because it's scary. It gives the idea that this can happen to you."

"That one hurts more. That one strikes home. You know, the thought of missing things in life…. That's what really struck me on that one…. Because that is more of a real threat. The idea that, OK, I have a lump, maybe I can get it treated. There is no sense of urgency in that. But … if you are going to miss something ... that makes it much more real."

Discussion

Although early-detection behaviors offer great potential benefits, consumers are often reluctant to engage in them. As a consequence, communication campaigns promoting these behaviors often meet with limited success. Our research examines how the persuasiveness of early-detection advocacies is affected by two message design factors: whether the consequences of screening are communicated through anecdotal or statistical evidence and whether these consequences are framed in terms of potential losses or potential gains.

As hypothesized, the effects of framing were moderated by the type of evidence employed in the persuasive messages. Among subjects exposed to the low-involvement statistical messages, framing had no significant attitudinal effect. However, among subjects exposed to high-involvement anecdotal messages, gain framing (compared with loss framing) elicited significantly more negative evaluations of both the advertisement and the advocated behavior. To this point, our findings are consistent with those of prior studies (e.g., Block and Keller 1995; Maheswaran and Meyers-Levy 1990; Wright 1981).

However, our experiment also produced some novel findings that may shed new light on the interpretation of message framing effects. When prior researchers have found that subjects exposed to loss-framed messages had more positive attitudes than subjects exposed to gain-framed messages, they have attributed this difference to proadvocacy attitude change created by the loss-framed messages. However, our experiment, employing a no-message control group, suggests a different interpretation. When we compared the attitudes and beliefs of our treatment groups with those of our control group, the results indicated that at least some of the effect of framing occurred because the anecdotal, gain-framed message had a negative effect on women's attitudes toward mammography. These data suggest that some framing effects may be due to a boomerang effect of the gain-framed message.

Why does this boomerang effect occur? Our data (from both the experiment and the depth interviews) show that consumers perceive screening to have many short-term negative consequences, and their perceptions of these negative consequences mediate the effects of framing on consumers' attitudes toward screening. Gain-framed messages are viewed as providing relatively weak arguments for getting screened, and these arguments do not provide consumers with a sufficient justification for enduring the short-term costs of the target behavior. In contrast, loss-framed messages are viewed as providing a more powerful argument for why consumers should endure the short-term discomfort of being screened.

Many health communicators favor gain-framed messages because they believe that such messages create a positive emotional response among the target audience (Backer, Rogers, and Sapory 1992; Monahan 1995). Consistent with this view, our interview subjects reported that the gain-framed message evoked pleasant emotions, including happiness and hopefulness. Ironically, however, the pleasantness of gain-framed messages may be one source of their weakness in promoting early detection. Previous research (e.g., Forest et al. 1979; Isen and Simmonds 1978) has found that after exposure to pleasant stimuli, subjects tend to perceive themselves to be less vulnerable and are less willing to engage in behaviors they perceive to be unpleasant. Consistent with this, subjects in our experiment who were exposed to the upbeat, gain-framed anecdotal message had both significantly more optimistic perceptions of their chances of getting breast cancer and significantly more negative attitudes toward getting a mammogram than did control subjects exposed to no mammogram message.

How do our findings compare with the "conventional wisdom" among designers of health communication campaigns? Backer, Rogers, and Sapory (1992) find that the majority of health communicators strongly favor the use of positive (gain-framed) messages. In summarizing these views, Backer, Rogers, and Sapory (1992, p. 30) state that health campaigns "are more effective if they emphasize positive behavior change rather than the negative consequences of current behavior. Arousing fear is rarely successful as a campaign strategy…. Campaigns are more effective if they emphasize current rewards rather than the avoidance of distant negative consequences."

Several of Backer, Rogers, and Sapory's (1992) respondents expressed concern that negatively framed appeals create a boomerang effect, reducing compliance with the message. For example, one respondent stated, "Unless fear appeals are done very cleverly, the evidence suggests that a negative reaction will be produced. The audience tends to discount the message or to behave counter to the message or simply to deny the message" (Backer, Rogers, and Sapory 1992, p. 54). In contrast, none of Backer, Rogers, and Sapory's respondents discussed circumstances under which gain-framed messages might be ineffective, much less cause a boomerang.

Further evidence regarding health marketers' attitudes toward gain versus loss framing can be obtained by examin-

ing the promotional materials they produce. We collected and content-analyzed 15 widely distributed promotional pieces that were designed to promote disease screening. These pieces encompassed several behaviors (including screening for breast cancer, colon cancer, and cervical cancer), sponsors (National Cancer Institute, American Cancer Society, a state health department, and a drug industry group), and media (print advertisements, pamphlets, media releases, Web sites, and slide shows). Of the 15 pieces, 14 contained only gain-framed arguments, and 1 included a combination of gain- and loss-framed arguments. Of 39 total framed statements, 37 were gain-framed, and 2 were loss-framed. Four of the messages were anecdotes about specific women who had gotten breast cancer, and all were gain-framed: Because of early detection, each of these women can look forward to healthy, productive lives.

Why do gain-framed arguments tend to dominate such campaigns? According to Latour and colleagues (Latour and Rotfeld 1997; Latour, Snipes, and Bliss 1996), there is a widespread wariness of negatively framed messages among marketing communication professionals, stemming, at least in part, from a misreading of the "fear appeal" literature. Although the modal finding of 50 years of research is that fear appeals are generally effective (see Hale and Dillard 1995; Latour and Rotfeld 1997; Petty and Cacioppo 1981), the one experiment every communication professional seems to remember (the "mainstay of textbooks," according to Latour and Rotfield 1997) is Janis and Feshbach's 1953 experiment, in which the ineffectiveness of a message that showed the dire consequences of poor dental care was attributed to "defensive avoidance." Among campaign designers afraid of such potential backlash to negative appeals, gain-framed appeals are apparently viewed as the safe alternative.

Areas for Further Research

Further research could build on the present study in several ways. First, it would be interesting to examine the long-term effects of evidence type and framing on consumer attitudes toward early detection, as well as their effects on actual screening behavior. Such behavioral follow-up would be somewhat challenging for mammograms, which are generally given (at most) annually or semiannually; however, it might be more feasible for screening behaviors that are performed more frequently (see Meyerowitz and Chaiken 1987).

Second, further research should examine the effects of message framing in increasingly naturalistic settings. For example, rather than provide subjects with a single forced exposure to a framed message, future experimenters should consider embedding framed messages unobtrusively among other media content to which consumers are exposed (e.g., a magazine, television program) as well as examining how repeated exposure may moderate the effects of framing (see Eagly and Chaiken 1993, pp. 286–87).

In addition, further research should continue to explore how framing effects are influenced by consumers' prior perceptions of the behavior being promoted. Of particular interest is the distinction, stressed by Rothman and Salovey (1997), between health behaviors aimed at detection versus prevention. Rothman and Salovey argue that consumers view detection behaviors in terms of their negative short-term consequences; therefore, they are especially receptive to loss-framed messages that advocate such behaviors. Our findings support that position. Our subjects associated mammography with a variety of unpleasant consequences (discomfort, inconvenience, embarrassment, and fear) that are shared by many screening behaviors, including tests for cancers of the colon, cervix, and prostate and HIV infection. In addition, our data indicated that the effect of message framing on attitudes toward the target behavior was mediated by consumers' perceptions of these negative consequences.

However, Rothman and Salovey's (1997) statements regarding prevention behaviors seem more debatable. They argue that consumers perceive prevention behaviors as having few negative consequences, and therefore consumers are more receptive to gain-framed appeals for these behaviors. For example, Rothman and Salovey (1997, p. 9) state that "In contrast to detection behaviors, the salient function of a preventive behavior is to provide a relatively certain, desirable outcome." But is this statement valid? The specific prevention studies Rothman and Salovey review focus on innocuous behaviors with few negative short-term consequences (e.g., using sunscreen or infant car seats). However, there are other prevention behaviors that consumers perceive as having substantial short-term costs. For example, many elderly people avoid having annual flu shots because they are afraid that the shot will hurt or make them sick (Centers for Disease Control and Prevention 1995b). Similarly, many women at risk of HIV infection fear the short-term consequences (especially the reactions of their partners) of insisting on the use of a condom (see, e.g., Darroch and Frost 1999). Further research should examine the relative effectiveness of loss- versus gain-framed messages in motivating prevention behaviors (e.g., vaccination, condom use, smoking cessation) that consumers perceive to entail significant short-term sacrifice.

Finally, further research should examine the extent to which the phenomena observed in this study apply not only to health-related behaviors but also to a much broader range of consumer behaviors. There are many situations in which consumers must decide whether to endure relatively certain immediate costs to avoid uncertain (but much more severe) future costs. For example, consumers may face this type of avoidance–avoidance conflict when deciding whether to purchase life or disability insurance or whether to perform expensive preventive home maintenance. In promoting such behaviors, should marketers employ the kind of gain-framed messages (e.g., "Thank God, Bill had life insurance") generally favored by marketing communicators (see LaTour and Rotfeld 1997), or is it possible that such messages are too reassuring to be effective? This would be a worthwhile avenue for further research.

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