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Shaping Perceptions to Motivate Healthy Behavior: The Role of Message Framing

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Health-relevant communications can be framed in terms of the benefits (gains) or costs (losses) associated with a particular behavior, and the framing of such persuasive messages influences health decision making. Although to ask people to consider a health issue in terms of associated costs is considered an effective way to motivate behavior, empirical findings are inconsistent. In evaluating the effectiveness of framed health messages, investigators must appreciate the context in which health-related decisions are made. The influence of framed information on decision making is contingent on people, first, internalizing the advocated frame and, then, on the degree to which performing a health behavior is perceived as risky. The relative effectiveness of gain-framed or loss-framed appeals depends, in part, on whether a behavior serves an illness-detecting or a health-affirming function. Finally, the authors discuss the cognitive and affective processes that may mediate the influence of framed information on judgment and behavior.

To the extent that people are motivated to seek health and avoid illness, healthy behaviors should be easy to promote. The opportunity to obtain a prostate examination, for instance, should be embraced with little hesitation when the costs of missed early detection are made salient. In fact, the impact of appeals that emphasize personal vulnerability is predicated on the assumption that people will adopt an available, effective behavior to reduce the likelihood of experiencing an unwanted outcome (e.g., Gerrard, Gibbons, & Bushman, 1996; Sutton, 1982; Weinstein, 1993; Weinstein, Rothman, & Nicolich, 1996). Although the particular effectiveness of fear- or vulnerability-based appeals has been inconsistent, the broader assumption that behavioral responses reflect the manner in which people conceptualize a health threat appears valid (Clark, 1994; Salovey, Rothman, & Rodin, in press; Skelton & Croyle, 1991). Actions are best understood in terms not of the objective features of a health issue but rather of the features that people attribute to the issue (e.g., Baumann & Leventhal, 1985; Cioffi, 1991b; Leventhal, Nerenz, & Steele, 1984; and Meyer, Leventhal, & Guttman, 1985; see Leventhal & Diefenbach, 1991, for a review). Given the importance of these perceptions, substantial effort is devoted to shape the public's views on health issues through information campaigns on public transportation, in newspapers and magazines, and on radio and television. The power of these campaigns is revealed in often contentious battles over what information should be presented to the public (e.g., Should information about AIDS emphasize safer sex or total abstinence?).

An intervention can render any aspect of a health issue salient. Are there particular advantages to emphasize one set of features over another? Does it matter whether an appeal to promote condoms emphasizes the benefits of protected sex or the costs of unprotected sex? People can be sensitive to whether a behavioral alternative is framed in terms of its associated costs (*loss* frame) or benefits (*gain* frame[1]), even when the two frames describe objectively equivalent situations (Tversky & Kahneman, 1981). To account for this shift in preferences, prospect theory proposes that people are more willing to accept risks when they evaluate options in terms of associated costs but act to avoid risks when the same options are described in terms of associated benefits (Tversky & Kahneman, 1981). For example, when people choose between two treatment programs framed in terms of the number of lives that will be lost, they risk the possibility of greater losses to avoid a certain loss (e.g., they prefer a program that provides a 33% chance of no patients dying and a 66% chance of all 600 patients dying to an alternative program in which 400 patients are sure to die). When the same programs are described in terms of the number of lives that will be saved, people become more conservative in their preferences. They forego the opportunity for greater gains, in exchange for an alternative that provides a certain gain (e.g., they prefer a program in which 200 patients are sure to be saved to an alternative program that provides a 33% chance of saving all 600 patients and a 66% chance of saving no one). Note that, although the frame shifts in the two scenarios from lives lost to lives saved,

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[1] The specific labels *loss* and *gain* frame are used throughout this article instead of the more general labels *negative* and *positive* frame.

the objective features of the proposed interventions remain constant.

Nearly all health-related information can be construed in terms of either benefits or costs. For example, a brochure to promote mammography screening could emphasize either the costs of a woman not obtaining a regular mammogram (e.g., "If you avoid getting a mammogram, you fail to take advantage of the best method for detecting breast cancer early") or the benefits of obtaining a regular mammogram (e.g., "If you get a mammogram, you take advantage of the best method for detecting breast cancer early"). Because health behaviors frequently involve substantial uncertainty and risk, the prediction that people are willing to take risks when confronted with information about potential losses has been considered particularly relevant to understand and promote health behavior (Meyerowitz & Chaiken, 1987; Wilson, Purdon, & Wallston, 1988).[2]

The assumption that people respond to gain- and loss-framed information differentially has been applied to issues ranging from decisions about (hypothetical) resource allocations for AIDS treatment (Levin & Chapman, 1993) to breast self-examination (BSE; Meyerowitz & Chaiken, 1987). In the context of simulated public health decisions, loss-framed descriptions have elicited preferences for the alternative, which provides an uncertain outcome (Frisch, 1993; Reyna & Brainerd, 1991; but also see Fagley & Miller, 1987). However, when applied to interventions designed to promote actual health behavior, the results have varied across studies. Increases in desired health behaviors have been observed after exposure to both gain-framed (e.g., Rothman, Salovey, Antone, Keough, & Martin, 1993) and loss-framed information (e.g., Banks et al., 1995; Meyerowitz & Chaiken, 1987). Furthermore, there have been noteworthy failures to find an advantage for either frame (e.g., Lauver & Rubin, 1990).

How can one make sense of these seemingly inconsistent findings? Prospect theory assumes that people respond predictably to potential gains and losses: They are risk *seeking* when confronted with information about losses but risk *averse* when confronted with information about gains (Tversky & Kahneman, 1981). However, prospect theory was derived based on preferences obtained from decision problems that specified the formal probabilities and expected values associated with each response option. In the application of message framing to the communication of health information, this level of control is frequently not possible, which could undermine any systematic test of the theory's predictions. The inconsistent pattern of findings might lead some investigators to conclude that the theoretical assumptions outlined in prospect theory cannot be applied to actual decisions about health behavior. Rather than reject the applicability of prospect theory to the formulation of health-relevant interventions, we propose that its basic assumptions can be operationalized and tested if careful attention is paid to the context in which a health issue is considered. In hypothetical decision problems like the one presented earlier, perceptions of behavioral alternatives are almost entirely a function of the framed descriptions (but see Fagley & Miller, 1987; Levin & Chapman, 1990; and Lopes, 1987). However, in actual health interventions, contextual factors have a greater opportunity to influence a person's response to information about gains or losses. Because people process health-relevant information actively, behavioral responses to framed information should be a function of both the framed message and pre-existing perceptions of the health issue (cf. Cioffi, 1991b; Clark, 1994; Leventhal & Diefenbach, 1991). In particular, experience with a health issue should influence one's receptivity to information about gains or losses and whether a behavior is perceived as risky or uncertain to adopt. Thus, to predict the impact of a health recommendation, we need to attend to the factors that mediate the relationship between framed messages and subsequent behavior. To study how framed messages operate in the context of actual health decisions should facilitate this type of analysis.

In this review, we focus on three issues. First, we consider how health recommendations are framed, focusing on the differences in how message framing is operationalized in formal decision problems and experiments in applied domains. Second, we examine the impact of message framing on health-relevant decisions. We consider findings from experiments in which investigators have used formal decision problems, followed by those who have examined either preferences for or the adoption of specific health behaviors. We propose that the relative effectiveness of a gain-framed or loss-framed message depends in part on whether the function of the advocated behavior is to maintain health, detect illness, or facilitate recovery from illness. Finally, we suggest that the persuasiveness of a framed recommendation relies on the extent to which the message is accepted or deflected by its recipient.

Message Framing Manipulation

Preference Reversals: An Illustration

The framing postulate of prospect theory states that information presented in terms of either gains or losses influences behavioral decisions differentially (Kahneman & Tversky, 1979, 1982, 1984; Tversky & Kahneman, 1981, 1992). People act to avoid risks when they consider gains or benefits (risk averse) but prefer taking risks when they consider losses or costs (risk seeking). Consequently, preferences for a risky alternative depend on whether that option is framed in terms of gains or losses. To illustrate this effect, we reconsider a problem alluded to earlier in which participants receive information about an epidemic that is expected to affect 600 individuals and the participants are asked to choose between two interventions to combat the disease (Tversky & Kahneman, 1981). Although each intervention provides the same expected value, one program offers a certain outcome, whereas the other offers an uncertain or risky outcome. In the gain-framed condition, the two interventions are described in terms of the number of lives that would be saved (e.g., If Program A is adopted, 200 people will be saved; if Program B is adopted, there is a $\frac{1}{3}$ probability that all 600 people will be saved and a $\frac{2}{3}$ probability that nobody will be saved). In the loss-framed condition, the interventions are presented in terms of the number of lives that would be lost (e.g., If Program C is adopted, 400 people will die; if Program D is

[2] Fear appeals similarly emphasize the potential costs or losses associated with a health issue. However, empirical tests of their effectiveness have not differentiated between preferences for risky or certain behavioral outcomes (Leventhal, 1970; Rogers, 1983; Sutton, 1982).

adopted, there is a 1/3 probability that nobody will die and a 2/3 probability that all 600 people will die). Although the same programs are presented in each condition, the frame alters the manner in which they are understood. When considering the interventions in terms of potential lives saved (Program A vs. Program B), participants consistently prefer Program A, which offers a certain gain. However, when the interventions are posed in terms of potential lives lost, participants reject the program that describes a certain loss in favor of Program D, which describes a risky outcome (Tversky & Kahneman, 1981).

Why do people's preferences depend on how the programs are framed? Figure 1 illustrates the value function thought to underlie the preference reversal (Tversky & Kahneman, 1981). The value function in the domain of losses is *convex*, that is, an increase in potential losses has a rapidly decreasing impact on the perceived value of the negative outcome. Because the subjective cost of losing 600 lives is not appreciably greater than losing 400 lives, people are willing to run the risk of a larger loss to try to avoid any losses. In the domain of gains, the shape of the value function is *concave*, which means that the satisfaction derived from any increase in potential gains is associated with relatively smaller increases in the perceived value of the positive outcome. However, in the domain of gains, the experience of this value function encourages risk aversion rather than risk seeking, which is observed in the domain of losses. People are satisfied with preserving a certain gain, as compared with an alternative that offers the chance of a larger gain but also the chance of gaining nothing (e.g., the subjective value of saving 600 lives is not sufficiently greater than the value of saving 200 lives to justify the risk of saving no one).

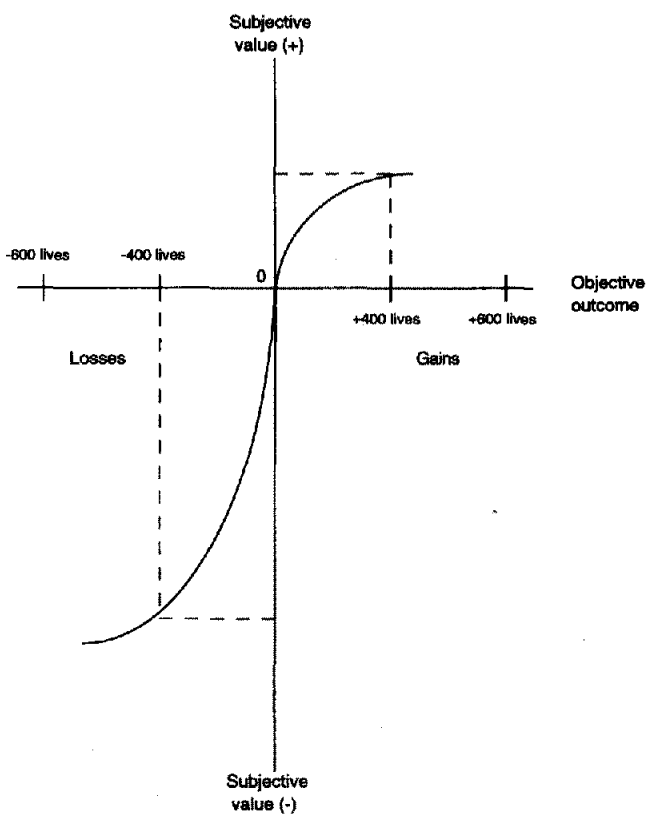

Figure 1. The prospect theory value function, with objective outcomes related to subjective values. Adapted with permission from "The Framing of Decisions and the Psychology of Choice," by A. Tversky and D. Kahneman, January 30, 1981, *Science, 211*, p. 454. Copyright 1981 American Association for the Advancement of Science.

Definitions and Frame Construction

The disease problem serves to illustrate how the concepts of *certainty, risk,* and *gain–loss* have been operationalized in formal tests of prospect theory. First, gain- and loss-framed messages are constructed by the description of an outcome in relation to a particular reference point. Second, the decision problem provides two response options that differ in the likelihood that an outcome is obtained. Thus, *risk* is formally defined as the likelihood or probability associated with the attainment of a particular outcome. Because the two response options are constructed to have the same expected value, they can be perceived to differ solely in terms of their relative risk. Tests of message framing with procedures that either replicate or mimic the disease problem have no difficulty operationalizing risk in this manner (e.g., Fagley & Miller, 1987, 1990; Levin & Chapman, 1990). However, when message frames are integrated into actual health recommendations, such as public service announcements, advertisements, or educational programs, to operationalize these underlying concepts is considerably more difficult. First, decisions generally do not involve the choice between two distinct options but rather focus on whether to adopt one recommended course of action. Second, the risk associated with a behavioral alternative usually cannot be defined in terms of the actual likelihood of a particular outcome. Instead, *risky* reflects the subjective perception that to perform a behavior may involve an unpleasant outcome. Although this conceptualization of risk is somewhat less precise than an operationalization that rests solely on probability, it is consistent with a review by Yates and Stone (1992) of the risk construct, who similarly emphasized the meaning of a potential loss to understand risk. For example, to perform a detection behavior such as BSE is perceived as risky because, by deciding to examine one's breasts, one "runs" the risk of receiving significant, unpleasant information. As we discuss later, the subjective perception of risk is often at odds with the objective benefits of the behavior.

In a health recommendation, gain- and loss-framed messages are constructed by the presentation of a specific outcome, such that it appears as a benefit or a cost in relation to a specific reference point. Although the expected value associated with particular gain- and loss-framed messages cannot be formally determined, great care is taken to construct messages whose content is formally equivalent.[3] The applicability of this form of framing manipulation is supported by the demonstration that framing effects on formal decision problems are obtained even in the absence of information about the probability, the expected

[3] This approach can be contrasted with studies in which investigators manipulate the actual information conveyed in the two messages—for example, to frame a health issue as an environmental or economic concern (Vaughn & Seifert, 1992).

value associated with an outcome, or both (Reyna & Brainerd, 1991; Tversky & Fox, 1995).

There are a number of ways to construct actual gain- or loss-framed health communications.[4] First, a health recommendation can focus on either outcomes associated with health-promoting behaviors (e.g., the use of condoms during sex) or outcomes associated with health-damaging behaviors (e.g., to have unprotected sex). To simplify the discussion, we focus primarily on messages that describe the consequences associated with either adopting or not adopting a health-promoting behavior (e.g., the use of condoms). Second, the consequences depicted in framed messages can differ in both their desirability and their likelihood (Brendl, Higgins, & Lemm, 1995; Petty & Wegener, 1991). Gain-framed messages can focus on attaining a desirable outcome or avoiding an undesirable outcome. For example, compare the message "If you get a mammogram, you are likely to find out that your breasts are healthy" with another message, "If you get a mammogram, you decrease the risk of an undetected, potentially life-threatening tumor." Similarly, loss-framed messages can emphasize attaining an undesirable outcome or avoiding a desirable outcome—both losses. For example, contrast "If you do not get a mammogram, you increase the risk of an undetected, potentially life-threatening tumor" with "If you do not get a mammogram, you will not know whether your breasts are healthy." Figure 2 summarizes the specific combinations of actions and consequences that can be used to develop gain- and loss-framed messages.

Given the different ways to instantiate gain- and loss-framed messages, the specific comparisons tested in any study vary. In an earlier article (Rothman et al., 1993), we differentiated between studies that used a same or different consequences manipulation.[5] A *different* consequences framing manipulation describes a behavioral option (e.g., to obtain a mammogram) as having either desirable or undesirable consequences, such as to find out that your breasts are healthy or you have a tumor. A gain-framed message emphasizes the desirable outcome associated with a woman having a mammogram, whereas the loss-framed message emphasizes the undesirable outcome associated with a woman performing the same behavior. A similar comparison could be made between messages that describe the absence of an undesirable outcome (gain frame) and the absence of a desirable outcome (loss frame). Because the application of different consequences framing is limited to issues that involve specific desirable and undesirable outcomes (e.g., lives lost vs. lives saved), this operationalization of framing is found primarily in hypothetical decision problems.

Comparisons between gain- and loss-framed messages that emphasize a single outcome use what we call a *same* consequences manipulation. In this case, the gain- and loss-frames emphasize whether one obtains or does not obtain a single, common outcome. The gain-framed message describes the desirable outcome associated with one having a mammogram (e.g., you know your breasts are healthy), whereas the loss-framed message describes the desirable outcome that one does not obtain by not having a mammogram (e.g., you do not know your breasts are healthy). Although the example involves a desirable outcome, an undesirable outcome could also be emphasized. In that case, to experience an undesirable outcome would be associated with not adopting the precaution (loss frame), whereas to avoid an undesirable outcome would be associated with taking the precaution (gain frame). Unlike different consequences framing, any health issue can be presented in a same consequences framing format.[6] Consequently, in nearly all of the research on framed health recommendations, investigators have operationalized framing in this way. Unless otherwise noted, for studies reviewed in this article, investigators used a same consequences framing manipulation.

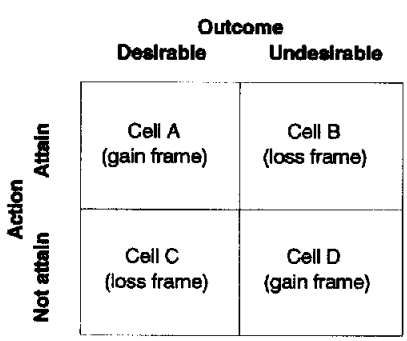

Figure 2. Constructed gain- and loss-framed appeals based on the action taken and desirability of the outcome.

Message Framing and Health-Relevant Judgment and Behavior

The influence of message framing on preferences in the health domain has been studied using two distinct methodologies. The first approach is formally based on Tversky and Kahneman's (1981) disease problem. In these scenarios, participants make public health decisions in the form of a preference between treatment programs that offer a risky or certain alternative. Because these decisions always involve hypothetical scenarios, the risk and the expected value associated with each program can be defined formally. The second approach applies message framing to personal health decisions, usually focusing on preferences and behavior in response to actual health recommendations that are gain or loss framed. Given the clear distinctions between the two approaches, we review their findings separately.

[4] In this article, we focus on studies that have used a framing manipulation, avoiding those studies that have used a reflection manipulation (see Fagley, 1993, for a discussion of these two distinct phenomena).

[5] Wilson et al. (1988) have also drawn attention to distinctions among frames, distinguishing between loss-framed messages that emphasize the undesirable consequences of performing a behavior (different consequences) and those that emphasize the absence of desirable outcomes when not performing the behavior (same consequences).

[6] One distinction between the two modes of framing is that a different consequences frame always describes the presence of an outcome, whereas a same consequences frame depicts either the presence or the absence of an outcome. Although people are thought to respond more efficiently to information about the presence rather than absence of features (Brendl et al., 1995; Cioffi, 1994; Nisbett & Ross, 1980), loss-framed messages that emphasize the absence of a desirable outcome have effectively promoted a variety of health behaviors (e.g., Banks et al., 1995; Meyerowitz & Chaiken, 1987).

Public Health Decisions

Decisions concerning public health policy often involve the development of treatment protocols and the allocation of resources. Using the disease problem as an illustration, Tversky and Kahneman (1981) demonstrated that to frame a decision in terms of gains or losses can alter participants' preferences dramatically: Participants prefer the riskier intervention when confronted with a problem that involves potential losses but prefer the intervention that provides a certain outcome when the problem is reframed in terms of potential gains. Although some investigators have questioned whether these effects are as robust as they initially appeared, this critique is based on people's preferences observed across a broad array of domains from international conflict to gambling to consumer behavior (Fagley, 1993; Kuhberger, 1995; Lopes, 1987). Our review of the literature focuses only on findings for health-relevant decisions.

The pattern of preferences originally obtained using the disease problem has been replicated in experiments in which investigators used Tversky and Kahneman's (1981) scenario (Fagley & Miller, 1990; Frisch, 1993; Kuhberger, 1995; Reyna & Brainerd, 1991) and conceptually related scenarios concerning AIDS (Levin & Chapman, 1990), nuclear accidents (van der Pligt & van Schie, 1990), natural gas explosions (Li & Adams, 1995), and cancer (Fagley & Miller, 1987, 1990; Kuhberger, 1995).[7] Furthermore, preference reversals have been demonstrated even when the same person receives both framing conditions (Frisch, 1993; Reyna & Brainerd, 1991; but also see Kuhberger, 1995). Although studies have found that preferences differ across the two framing conditions, analyses of preferences within frames have not always demonstrated risk aversion in the domain of gains and risk seeking in the domain of losses. In at least two cases, participants expressed a strong preference for the certain option when presented with gain-framed information but no preference between the two options when presented with loss-framed information (Fagley & Miller, 1987; Kuhberger, 1995).

Preference reversals have been obtained even when specific information about the outcomes, probabilities, or both associated with the treatment options has been removed (Reyna & Brainerd, 1991, Experiment 1). The same pattern of preferences was obtained, regardless of whether programs were described without providing specific outcomes (e.g., "⅓ chance some people will be saved, and ⅔ chance that nobody will be saved"), specific probabilities (e.g., "600 people will be saved, or nobody will be saved"), or either type of information (e.g., "Some people will be saved, or nobody will be saved"). These results suggest that people focus on the minimal level of information necessary to differentiate between potential options and do not necessarily focus on the specific expected value associated with an option (Reyna & Brainerd, 1991). Preferences for the two treatment programs have even been shown to reflect the frames participants spontaneously assign to the response options (Elliott & Archibald, 1989). Although participants were more likely to perceive the interventions in terms of lives saved, their preferences for the risky or certain option were contingent on whether the options were encoded in terms of lives lost or lives saved, respectively.

Even though the influence of message frames on hypothetical public health decisions is rather robust, it is sensitive to the particular type of information conveyed in the scenario. In scenarios such as the disease problem, investigators have observed that, whereas the risky option describes a desirable and an undesirable outcome explicitly (e.g., "600 people will be saved, or nobody will be saved"), the certain option describes, on the basis of the frame, only a desirable or an undesirable outcome explicitly (e.g., "200 people will be saved"; see Table 1 for a complete set of examples). In fact, when the certain option was reconstructed such that both the desirable and undesirable outcomes were rendered explicit (e.g., "200 people will be saved, and 400 people will not be saved"), participants' preferences did not vary between gain and loss frames (Kuhberger, 1995). This finding suggests that the influence of message framing on hypothetical public health decisions may depend on the relative salience of desirable and undesirable outcomes.

Reyna and Brainerd (1991, Experiment 2) also examined what happens to participants' preferences when the desirable or undesirable information is deleted from the risky option (see Table 1, third and fourth sections). When the undesirable outcome was not included in a description of the risky alternative, there was no significant preference for the risky or certain option in the gain-frame condition; both options described desirable outcomes ("200 people will be saved" and "⅓ chance 600 people will be saved"). In the loss-frame condition, the risky option was preferred by an overwhelming majority (81%) of the participants. However, in this case, the desirable outcome was salient in the risky option ("⅓ chance nobody will die"), whereas the undesirable outcome was salient in the certain option ("400 people will die"). Thus, risk seeking in this condition may reflect nothing more than the participants' preference for desirable over undesirable outcomes (i.e., loss aversion). Consistent with this analysis, to delete the desirable outcome from the description of the risky option produced a conceptually similar pattern of preferences. Participants presented with the loss-framed options showed a slight preference for the uncertain loss ("⅔ chance 600 people die") over the certain loss ("400 people will die"); but when presented with the gain-framed options, they expressed a strong preference for the salient, desirable outcome (certain gain: "200 people will be saved") over the salient, undesirable outcome (risky gain: "⅔ chance that nobody will be saved").

Finally, the certain option specified in the decision problem can be reconstructed such that the alternative outcome in each frame is rendered salient (Kuhberger, 1995). For example, the certain option in the loss-frame condition could be changed, so only the desirable outcome is salient (see Table 1, fourth section). When the programs were framed in terms of lives lost, participants preferred the option with a salient, desirable outcome (certain option: "200 people will not die"), whereas, in the gain-frame condition, they avoided the certain option be-

[7] In two studies, investigators reported that women were more sensitive than men to shifts in message frame, but they were unable to account for this finding (Fagley & Miller, 1990; Frisch, 1993, Experiment 2). The actual extent of this phenomenon is unclear, given that in most studies, investigators do not report gender differences, especially when a null finding is obtained. Only Miller and Fagley (1991) reported not observing a difference in the preferences expressed by men and women.

Table 1
Framing Options in a Public Health Decision: The Relative Salience of Desirable and Undesirable Consequences in the Hypothetical Disease Problem[a]

Frame	Consequence	Probability	Salient outcome	Expected preference
	Disease problem			
Gain	200 people will be saved	Certain	Desirable	Certain option
Gain	1/3 chance 600 people will be saved, and 2/3 chance nobody will be saved	Risky	Desirable and undesirable	
Loss	400 people will die	Certain	Undesirable	Risky option
Loss	2/3 chance 600 people will die, and 1/3 chance nobody will die	Risky	Undesirable and desirable	
	Disease problem completely described			
Gain	200 people will be saved, and 400 people will not be saved	Certain	Desirable and undesirable	None[b]
Gain	1/3 chance 600 people will be saved, and 2/3 chance nobody will be saved	Risky	Desirable and undesirable	
Loss	400 people will die, and 200 people will not die	Certain	Undesirable and desirable	None[b]
Loss	2/3 chance 600 people will die, and 1/3 chance nobody will die	Risky	Undesirable and desirable	
	Disease problem with the undesirable outcome deleted from the risky option			
Gain	200 people will be saved	Certain	Desirable	None, certain option[c]
Gain	1/3 chance 600 people will be saved	Risky	Desirable	
Loss	400 people will die	Certain	Undesirable	Risky option
Loss	1/3 chance nobody will die	Risky	Desirable	
	Disease problem with the desirable outcome deleted from the risky option			
Gain	200 people will be saved	Certain	Desirable	Certain option
Gain	2/3 chance nobody will be saved	Risky	Undesirable	
Loss	400 people will die	Certain	Undesirable	None, risky option[c]
Loss	2/3 chance 600 people will die	Risky	Undesirable	
	Disease problem with the alternative outcome inserted in the certain option			
Gain	400 will not be saved	Certain	Undesirable	Risky option
Gain	1/3 chance 600 people will be saved, and 2/3 chance nobody will be saved	Risky	Desirable and undesirable	
Loss	200 people will not die	Certain	Desirable	Certain option
Loss	2/3 chance 600 people will die, and 1/3 chance nobody will die	Risky	Undesirable and desirable	

[a] Examples compiled from those suggested by Reyna and Brainerd (1991) and Kuhberger (1995). [b] Under these conditions, no systematic preference between the two options is expected. [c] Under these conditions, either of these preference patterns could be observed.

cause it made the undesirable outcome salient ("400 people will not be saved"). It would appear that the relative salience of desirable and undesirable outcomes has a systematic influence on people's preferences in the public health domain (cf. Levin, 1987; Levin & Gaeth, 1988; Wilson, Kaplan, & Schneiderman, 1987). Furthermore, the probability associated with particular options may matter only when the options cannot be readily differentiated, based on the perceived desirability of their salient, associated outcomes.

Another factor that can shape perceptions of potential treatments is prior attitudes toward a specific disease or targeted population. In an intriguing series of experiments, Levin and Chapman (1990, 1993) demonstrated that beliefs about a disease influenced participants' decisions regarding treatments for leukemia and AIDS. Although preference reversals consistent with prior findings have been obtained for both of these diseases (Levin & Chapman, 1993, Experiment 1), the willingness to adopt a risky treatment when participants considered potential lives lost has not always been observed. For example, responses to framed information regarding AIDS policy decisions varied depending on the recipient of the treatment (Levin & Chapman, 1990, Experiment 1). When the targeted population was either described as patients with hemophilia or left unspecified, a traditional framing effect was observed; participants preferred the risky treatment when considering potential lives lost but chose the certain alternative when considering potential lives saved. However, there was no effect of message framing when the targeted population was described as gay or bisexual men or people who inject drugs. In this context, participants were insensitive to the gain or loss attributes associated with the treatment options when they allocated resources. An alternative procedure in which participants were asked to assign treatment programs to two target populations revealed a similar result (Levin & Chapman, 1990, Experiment 2). How the treatment outcome was framed influenced the program assigned to each community (patients with hemophilia or those who inject drugs). When participants considered the number of lives each program would save, the program that offered a certain outcome was assigned overwhelmingly to the patients with hemophilia. However, when participants considered the number of lives lost, their preferences reversed. The program that offered the certain option was now principally assigned to the patients who inject drugs. In

both conditions, the preferred option was consistently assigned by the participants to the less stigmatized group whose lives were perceived to be of greater value. In a conceptually related demonstration, van der Pligt and van Schie (1990) observed that, when the "victims" of an accident were identified as seals rather than humans, preference for the riskier response option was attenuated.

More general attitudes about a disease can also influence the effects of message framing (Levin & Chapman, 1993, Experiment 2). Participants were instructed to select one of two treatment strategies to combat AIDS and leukemia. One program provided a certain outcome for patients with leukemia but an uncertain outcome for those with AIDS; the other program provided the same outcomes but reversed the targeted populations assigned to them. When the participants considered the programs in terms of potential lives lost, they preferred the program that assigned the risky outcome to patients with leukemia and the certain outcome to patients with AIDS. However, once again, when the programs were framed in terms of potential lives saved, participants chose the other program (i.e., assigned the uncertain gain to patients with AIDS but the certain gain to patients with leukemia).

Across these experiments, the influence of message framing on treatment preferences was not independent of attitudes toward a disease or the targeted population. When AIDS was associated with stigmatized patient populations—perhaps because the patients are perceived to be responsible for their plight—framing effects were not observed. Similarly, when participants were forced to assign treatment programs to different patient populations, the preferred program was consistently assigned to the less stigmatized group (i.e., patients with hemophilia and AIDS or patients with leukemia). Although people generally prefer to take risks to avoid a sure loss, under certain conditions a loss may not be perceived as sufficiently aversive to motivate risk-seeking behavior (Levin & Chapman, 1990).

Participants' preferences within the domain of hypothetical public health decisions have proven to be sensitive to whether available alternatives are framed in terms of potential lives lost or potential lives saved. Although research solely on the effect of message framing has produced relatively consistent results, this approach tells little about the processes by which variously framed messages influence decision making. Investigators who have compared results systematically either across target populations (Levin & Chapman, 1990, 1993; van der Pligt & van Schie, 1990) or between modes of framing (Kuhberger, 1995; Reyna & Brainerd, 1991) point to a number of features of the decision context that guides preferences. In particular, the perceived desirability of the specified outcomes seems to be crucial to predict preference. Within the context of a hypothetical scenario, the relative salience of desirable and undesirable outcomes associated with different treatment options has a strong influence on decision making. Furthermore, the perceived degree of (un)desirability may be important too, as suggested by the variability in preferences for treatment programs across different target populations. In the final section of this article, we consider additional factors that may moderate the influence of message framing on participants' preferences for particular treatment programs.

Personal Health Decisions: The Function of Health Behavior

Given that message framing influences hypothetical public health decisions, can the same results be obtained for personal health decisions? When one is evaluating the influence of gain- and loss-framed health recommendations, attention must be given to the context in which the message is received. In most cases, the loss- or gain-framed message is not the only information about a health issue available, so we must consider how the framed information is integrated with prior perceptions. For example, a family history of breast cancer may predispose women to think about this disease in terms of potential costs or losses, thus facilitating their receptivity to a loss-framed message. Furthermore, they may perceive performing detection behaviors such as BSE as risky or unpleasant, worrying about the possibility of detecting a lump. Because people are more willing to take risks when they consider potential losses, this perception of BSE should render loss-framed messages about breast cancer especially effective.

Societal practices actively shape how people construe a health behavior (Kasl & Cobb, 1966; Leventhal et al., 1984). For example, the function of a screening behavior such as BSE could be to determine whether one is healthy or sick. Yet, women predominantly approach BSE from the latter perspective (Cioffi, 1991a). To the extent that women systematically conceive of BSE as an illness-detecting behavior, they should be more concerned about the possibility that the procedure might detect a cancerous tumor. Consequently, they should be more responsive to a loss-framed message about breast cancer, a prediction consistent with empirical findings (Meyerowitz & Chaiken, 1987). Conversely, women who conceive of BSE as a health-detecting, or perhaps health-affirming, behavior should be more responsive to a gain-framed message that emphasizes the potential health of their breasts. In broader terms, one's understanding of a medical procedure should influence one's perception that information about health versus illness is particularly informative and personally relevant (Cioffi, 1991a, 1991b, 1994).

Health behaviors can be thought of as to perform one of three functions: A behavior can *prevent* the onset of a health problem (e.g., condoms can prevent the spread of sexually transmitted diseases), it can *detect* the development of a health problem (e.g., mammography can detect a potentially cancerous tumor), or it can attempt to *cure or treat* an ongoing health problem (e.g., chemotherapy can shrink a cancerous growth). Although some health behaviors might serve multiple functions, thus blurring the distinctions among the categories, these classifications have helped conceptualize the primary function of certain behaviors. To distinguish between prevention- and detection-oriented health behaviors, in particular, has had important implications for predictions about risk assessment, treatment decisions, and the maintenance of behavior change (Fielding, 1978; Kasl & Cobb, 1966; Kirscht, 1983; Weinstein, 1988). The prediction that these behavior types have implications for framing effects is based on the observation that they specify whether taking action is perceived to involve some risk or uncertainty (Rothman et al., 1993). For example, to perform a detection behavior can be construed as risky (it could identify an illness), whereas to perform a prevention behavior can be construed as

a relatively safe alternative (it maintains one's healthy status). As such, we can formulate precise predictions concerning the relative influence of message frames on these health behaviors. We now turn to the effects of gain- and loss-framing on personal decisions about (a) detection behaviors, (b) prevention behaviors, and (c) recuperative behaviors.

Detection behaviors. In several studies, investigators have examined the role of message framing to promote illness-detection behaviors such as mammography or BSE. Detection behaviors are performed to provide information about the presence or absence of a potential undesirable health outcome. People are screened to determine if they have, for example, HIV, tuberculosis, or cancer but not typically to see if they are healthy. Statistics about a detection behavior are more likely to emphasize the frequency with which it detects a disease (e.g., 1 out of 10 mammograms reveal a suspicious growth) than the frequency with which it detects health (e.g., 9 out of 10 mammograms are negative). Because detection behaviors can inform people that they may be sick, to initiate the behavior can be considered a risky decision. For example, with BSE, one runs the risk of discovering a lump (J. A. Mayer & Solomon, 1992). In fact, to not perform BSE is associated with feeling the exam is too frightening (Kelly, 1979) and explicit concern about detecting a lump (Hill, Gardner, & Rassaby, 1985; Meyerowitz & Chaiken, 1987). Because detection behaviors provide critical, long-term benefits, it may seem paradoxical to think of them as risky. However, behaviors are frequently understood in terms of their short-term consequences (cf. Herrnstein, 1990; Weinstein, 1988), which in this case is the risk of a lump being found. Furthermore, a detection behavior only indirectly provides its long-term benefits. A detection behavior detects the illness or abnormal growth; long-term benefits are dependent on the effectiveness of subsequent medical procedures.[8] Thus, it is important to distinguish between the objective risk of illness associated with performing the behavior and the subjective assessment or construal of the behavior. To the extent that performing detection-oriented behaviors is perceived to involve risk, loss-framed messages should be more effective to promote them (Banks et al., 1995; Rothman et al., 1993).

Research on messages that promote detection behaviors has shown strong support for the advantage of loss framing. Compared with gain-framed messages, exposure to loss-framed messages increased participants' positive attitudes toward and engagement in BSE (Meyerowitz & Chaiken, 1987; Meyerowitz, Wilson, & Chaiken, 1991). In two studies, undergraduate women were given informational pamphlets about BSE, with statements that were either gain or loss framed. Framing effects were obtained on self-reported measures of BSE collected either 2 months (Meyerowitz et al., 1991) or 4 months (Meyerowitz & Chaiken, 1987) after the phamplet distribution. Banks et al. (1995) also observed that participants were more likely to obtain a mammogram within 1 year after exposure to a loss-framed, videotaped educational program. In this experiment, women who were previously not complying with prevailing National Cancer Institute mammography screening guidelines were shown either a gain- or loss-framed educational video about mammography, entitled *The Benefits of Mammography* or *The Risks of Neglecting Mammography*, respectively. The effectiveness of the loss-framed intervention was observed, even though the behavior was frequently performed long after the participants viewed the video.

Intentions and attitudes on blood–cholesterol screening and skin cancer examination have also been sensitive to message framing. College undergraduates who were led to believe that coronary heart disease was a problem even for people under 25 years of age expressed more positive attitudes and behavioral intentions after they read loss-framed information about the test (Maheswaran & Meyers-Levy, 1990).[9] Similarly, exposure to loss-framed brochures about skin cancer led undergraduates to express both more positive attitudes and stronger intentions to perform a skin cancer self-examination (Block & Keller, 1995).

Loss-framed messages are also effective to promote HIV testing (Kalichman & Coley, 1995). African American women in an urban clinic viewed one of three videos designed to promote HIV testing. Two videos provided standard information about HIV testing and AIDS, with the primary presenter either an African American man (ethnicity-matched condition) or an African American women (gender–ethnicity-matched condition). The third video was similarly matched for gender and ethnicity, but in addition it systematically framed information about HIV testing in terms of the potential costs and losses of not being tested. Although the gender–ethnicity-matched video and the loss-framed video were both equally effective to promote intentions to obtain HIV testing, the proportion of women who actually sought testing within 2 weeks after seeing the video revealed a strong, systematic advantage for the loss-framed video. Sixty-three percent of the women who viewed the loss-framed video were tested, compared with 23% of the women who viewed the gender–ethnicity-matched video and 0% of the women who viewed the ethnicity-matched video.

In only one study has an investigator examined a detection behavior using a different consequences framing format (Marteau, 1989). Hypothetical preferences for amniocentesis were measured after participants received framed information on the likelihood of either having a child with spina bifida (loss frame) or having an unaffected child (gain frame). The riskiness of amniocentesis was highlighted when the investigator mentioned that there was a 1% chance of the procedure resulting in miscarriage. Participants' exposure to information stating that there was a 20% chance that their child would develop spina bifida (loss frame) led to their greater preferences for amniocentesis. When the risk of having an affected child was set at either 1 or 5%, there was little participant preference for amniocentesis in either framing condition. The almost equal risk of having either an affected child or miscarriage due to the procedure may have led participants to avoid taking action (Ritov & Baron, 1990).

The prediction that loss-framed information is most effective

[8] This analysis suggests that procedures designed to detect medical conditions where treatment options are less effective should be perceived as particularly risky. To the extent that no treatment is available, the detection behavior may be perceived as too risky to undertake (cf. Leventhal, 1970). In fact, Lerman et al. (1991) observed that women who doubted that breast cancer could be cured were less likely to perform BSE.

[9] Students who believed that coronary heart disease was not a relevant health threat were more persuaded by gain-framed information. We return to this finding in *Modes of Processing*.

to promote detection behaviors rests on the assumption that these behaviors are perceived in terms of their ability to detect illness. People who differ in their understanding of a detection behavior should similarly differ in their sensitivity to loss-framed messages. For example, women who worry about the risk of finding a lump while conducting BSE should be particularly sensitive to a loss-framed appeal. However, women who do not worry about detecting an abnormality should be less affected by loss-framed messages; to the extent that women consider BSE a health-affirming behavior, a gain-framed message might actually be more persuasive. Meyerowitz et al. (1991) examined how such perceptions of BSE moderate the effects of framing. They found that loss-framed messages are effective only if the participant perceives the targeted behavior as risky. Exposure to a loss-framed pamphlet increased subsequent performance of BSE only among those women who considered BSE a risky behavior. Participants who did not perceive BSE as risky actually showed a somewhat higher rate of BSE after they read a gain-framed pamphlet. Similarly, exposure to loss-framed information about skin cancer heightened interest in participants to obtain a skin cancer detection exam only for those who, before viewing the informational presentation, were concerned about the chance of developing skin cancer (Rothman, Salovey, Pronin, Zullo, & Lefell, 1996). Additional work is needed to examine more precisely the relationship between participant's perceptions of a particular behavior or health issue and the persuasiveness of framed appeals. In particular, research in which investigators experimentally manipulate how a detection behavior is perceived (i.e., illness detecting vs. health affirming) would provide converging evidence for the explanatory framework offered.

Prevention behaviors. Prevention behaviors focus on averting the onset or development of a health problem. They provide people with the opportunity to maintain their present healthy status and to reduce their risk of future illness. In contrast to detection behaviors, the salient function of a prevention behavior is to provide a relatively certain, desirable outcome. For example, sunscreen can prevent the development of skin cancer. The regular use of sunscreen with a sun protection factor (SPF) of 15 or higher will maintain one's healthy status. Although there are a broad range of important barriers to the use of sunscreen (e.g., inconvenience and reduced tanning), the perceived risk associated with the performance of the behavior is not one of them. In fact, the choice not to use sunscreen is the risky option; with unprotected exposure to the sun, one risks developing skin cancer. Given that loss-framed information facilitates preferences for risky options, a loss frame might actually undermine sunscreen use. In general, to adopt a prevention behavior can be conceived of as a relatively safe behavioral alternative that maintains one's current healthy status. Because participants prefer less risky or more certain options when they are presented with gain-framed information, gain-framed information should promote prevention-oriented health behaviors effectively (Rothman et al., 1993).

In several studies, investigators have explored the influence of message framing on prevention behaviors, such as exercise, infant car seat use, and sunscreen application. For example, Robberson and Rogers (1988) examined the effectiveness of gain- and loss-framed messages to promote intentions to exercise among women who were not exercising regularly. Women read framed messages that focused on how physical exercise affects either health or self-esteem. Although framing had no systematic effect on the persuasiveness of the health-based appeals, when the women read the gain-framed, self-esteem appeal, it led to stronger intentions to exercise. In two studies, investigators have examined the parental use of infant car seats (Christophersen & Gyulay, 1981; Treiber, 1986). In one study, mothers who were exposed to arguments that emphasized the positive consequences of using a car seat increased their use of them over the next 6 months (Christophersen & Gyulay, 1981). Although this study did not include a loss-frame condition, the observed increase compared favorably with previous attempts to improve behavior with messages that emphasized the consequences of not using a car seat (a loss frame). In an extended replication of this study, mothers who received a combination of gain- and loss-framed information about car seats increased their subsequent use (Treiber, 1986). However, the gain-framed message was conveyed in a pamphlet, whereas the loss-framed message was in a film. Because of the substantial differences in format, the relative effectiveness of the two manipulations is hard to ascertain.

Rothman et al. (1993, Experiment 2) examined the influence of framing on intentions to use sunscreen with an appropriate SPF. College undergraduates read either a loss- or a gain-framed pamphlet on skin cancer and skin cancer prevention and subsequently were provided with an opportunity to request a free sample of sunscreen with an SPF of 2, 6, 8, or 15. Sunscreen effectively prevents the development of skin cancer but only when used with an SPF of 15 or higher. Consistent with predictions, women who previously read a gain-framed pamphlet were significantly more likely to request a sunscreen sample with an SPF of 15 than those who had read a loss-framed pamphlet. Because only a very small percentage of men in the sample even requested a free sample of sunscreen, no effect of message framing on SPF preferences could be detected in them. Block and Keller (1995, Experiment 2) also reported an advantage for gain-framed brochures about skin cancer to promote general interest in skin cancer-prevention behaviors, although the increase was not statistically significant.

Intentions to use condoms were examined in a study using a different consequences framing manipulation (Linville, Fischer, & Fischhoff, 1993). Students were informed that a particular brand of condoms had either a 90% success rate or a 10% failure rate and were asked (a) should the manufacturers of this condom be allowed to advertise it as an effective method to reduce the risk of AIDS and (b) whether they would use this condom. When the condom was described in terms of its success rate, students expressed more support for the advertisement as well as a greater intention to use them. A similar, albeit weaker, pattern was obtained when investigators used success rates of 95% and 99%.[10]

The relative effectiveness of gain-framed information should

[10] Although condom use may not pose a health risk, to ask a partner to use a condom can involve important social or sexual risks (e.g., the risk of insulting your partner or of unsatisfying sex). To the extent that people consider condom use a sexual behavior rather than a health behavior, a loss-framed message might be more effective.

be proportional to the degree that people perceive the behavior as an effective means to maintain health or safety. Although there have been no direct tests of how participants' perceptions of prevention behaviors might moderate the effectiveness of framed information, one study can provide some indirect evidence in support of this prediction. Block and Keller (1995, Experiment 1) manipulated information about the degree to which a set of behaviors could prevent infection of human papilloma virus (HPV). To the extent that the behaviors cannot reliably prevent an infection, to perform them should be perceived as risky rather than safe. Under these conditions, one would expect that loss-framed information might be more effective to promote interest in the behaviors. In fact, when behaviors to prevent infection of HPV were said to be only 20% effective, a loss-framed appeal generated greater interest in the behaviors. When the prevention behaviors were said to be 80% effective, no advantage for either frame was observed. Unexpectedly, behavioral intentions were consistently lower when the behavior was described as 80%, as opposed to 20%, effective.

Recuperative behaviors. The category of recuperative behaviors includes any intervention undertaken to correct or alleviate an existing health problem. In numerous studies, investigators have examined the influence of framing on participants' decisions concerning treatment options (e.g., Levin, Schnittjer, & Thee, 1988; Marteau, 1989; McNeil, Pauker, Sox, & Tversky, 1982; Wilson et al., 1987). Unlike most of the studies previously reviewed, these experiments primarily involve decisions with hypothetical outcomes. For example, McNeil et al. studied participants' preferences for therapies to treat a hypothetical case of lung cancer. The reliance on hypothetical outcomes can be attributed to the ethical challenge associated with the manipulation of the type of information presented to a patient actually needing treatment (but see Siminoff & Fettig, 1989).

We expect that the effect of framed information on decisions concerning recuperative behaviors should be similar to that obtained with prevention behaviors. To select a recuperative procedure such as surgery can be understood as a risk-averse or safer option, as compared with the option to not take any remedial action at all. The dominant function of a surgical procedure is to provide the patient with the opportunity to relieve a current health problem, thus resulting in longer life. Therefore, treatments such as surgery should be preferred by patients when presented in terms of the likelihood of survival (gain frame) than when presented in terms of the likelihood of mortality (loss frame). However, because these investigators have manipulated framing using a different consequences format, the framed options always differ in terms of whether a desirable (gain frame) or undesirable (loss frame) outcome is rendered salient. Recall that hypothetical public health decisions were quite sensitive to the desirability of the salient outcomes, a pattern of results consistent with the prediction that preferences for a particular procedure are determined by the salience of positive (or negative) attributes (Levin, 1987; Levin & Gaeth, 1988; Wilson et al., 1987). Thus, when investigators use a different consequences format, participants' preferences for the recuperative procedure after exposure to gain-framed information could reflect either perceptions of the behavior or the relative salience of a desirable outcome. However, a salience-based explanation cannot account for similar results when investigators use a same consequences format where the desirability of the outcome is held constant.

In a number of studies, investigators have examined the influence of framed information on participants' deciding whether or not to undergo surgery (Levin et al., 1988; Marteau, 1989; Wilson et al., 1987). Exposure to gain-framed information on the effectiveness of surgery (i.e., the likelihood of survival) has consistently led to greater participant preferences for this treatment option, regardless of whether they assume the role of the patient or the advisory role of a doctor or family member (Levin et al., 1988; Marteau, 1989). Framing can also influence evaluations of decisions that patients have already made about a risky treatment for a serious medical condition (Rybash & Roodin, 1989). When the patient decided to accept the treatment, participants supported the decision, regardless of how the procedure was framed. However, when the treatment was rejected, participants were more supportive of the patient's decision when the treatment was framed in terms of potential losses than when it was framed in terms of potential gains.

In some cases, participants choose between two different treatments rather than between action and inaction. McNeil et al. (1982) presented framed information that described the short- and long-term consequences associated with surgical and radiation treatments for lung cancer. Compared with the radiation treatment, surgery offered better long-term survival but at the expense of a heightened short-term risk of perioperative death. To the extent that people tend to focus on short-term consequences, surgery was the riskier of the two options. Contrary to what one might expect, exposure to information about the likelihood of dying (loss frame) led to a decrease in preferences for surgery. Only 58% of the patients chose surgery in this condition, compared with 75% in the gain-framed condition. The diminished preferences for surgery may reflect that the difference between some chance (10% with surgery) and no chance (0% with radiation) of perioperative death is particularly salient in the loss-framed condition. However, a similar pattern of results was obtained when the mortality rate associated with the two treatments differed in quantity (65% vs. 50%) rather than possibility (O'Connor et al., 1985). Across both studies, participants opted for the treatment that provided greater long-term benefits at the expense of higher short-term costs when it was gain framed. Finally, a group of medical residents similarly preferred the more aggressive (risky) treatment option when it was framed in terms of survival (Christensen, Heckerling, Mackesy, Bernstein, & Elstein, 1991; but also see Christensen, Heckerling, Mackesy-Amiti, Bernstein, & Elstein, 1995).

In one study, investigators examined the influence of framed information during actual doctor–patient interactions (Siminoff & Fettig, 1989). They predicted that patients presented with loss-framed information would be more likely to select an aggressive, nonstandard treatment. The information that doctors provided to patients concerning recommendations for adjuvant therapy for breast cancer was coded to differentiate between doctors who naturally framed the information in terms of gains and those who naturally framed the information in terms of losses. Individual doctors were found to have a consistent preference across patients for one form of information framing or the other. However, framing did not affect the type of treatment selected by patients. That the impact of information framing

was limited when assessed in the context of an actual treatment decision is consistent with other findings concerning decisions about following up tests for cervical or breast cancer (Lauver & Rubin, 1990; Lerman et al., 1992).

Summary. The relative effectiveness of gain- and loss-framed appeals depends on how participants think about a particular health behavior. By distinguishing among detection, prevention, and recuperative behaviors, we can organize the empirical literature concerning the effectiveness of gain- and loss-framed messages on personal health decisions. The tendency to perceive the function of detection behaviors as illness detecting facilitates the persuasiveness of loss-framed appeals, whereas the tendency to perceive prevention behaviors as health enhancing facilitates the effectiveness of gain-framed appeals. Recuperative behaviors appear to show a similar advantage for gain-framed information, but these findings are based solely on experiments with hypothetical treatment decisions. Because societal practices play a prominent role in shaping how health behaviors are perceived, the predicted effects of message framing can be reliably observed without one having to identify each person's perception of a particular behavior. This is not to suggest that an individual's experience does not shape how he or she perceives a particular behavior. For example, sexually active undergraduates who are generally optimistic about their risk of not being infected with HIV may perceive getting an HIV test as a health-affirming behavior, whereas people who exchange sex for money or drugs may be less optimistic about their risk and, consequently, perceive getting an HIV test as an illness-detecting behavior. Thus, gain-framed messages may be more appropriate when the former group is targeted for intervention, whereas loss-framed messages may be more effective with the latter group.

Up to this point, we have emphasized the advantage of distinguishing among the functions served by health behaviors but have done so at a rather broad, categorical level. The value of this classification scheme does not preclude other potentially meaningful differences between health behaviors. We suggest two for future consideration. First, behaviors can differ in the frequency with which they are performed. A single vaccination may be sufficient to combat tuberculosis, but sunscreen prevents skin cancer only if it is used repeatedly. Similarly, a test for the genetic mutation related to breast cancer need only be done once, whereas a mammogram should be repeated annually. Consistent with our earlier observations, Robbertson (1975) has suggested that fear appeals (i.e., loss frames) may not be effective to promote preventive behaviors that take concerted effort (e.g., the use of sunscreen). However, a loss frame might effectively promote a one-time preventive behavior (e.g., a vaccine).

Second, to initiate certain behaviors necessitates the acknowledgment that previous action or inaction was mistaken. Gibbons, McGovern, and Lando (1991) observed that participants who had successfully completed a smoking-cessation program recognized the benefits of quitting but did not change their perceptions of the dangers of smoking. This pattern of beliefs supports one's current behavior, while alleviating any regret felt over previous action. Similarly, a person who has not practiced safer sex may be reluctant to admit the dangers of having had unprotected sex. This defensiveness may impede the ease with which he or she can be persuaded to practice safer sex with loss-framed messages that describe the negative consequences of not using condoms. To emphasize the potential benefits of condom use may be a more effective way to circumvent his or her hesitation.

To Understand the Influence of Framed Messages: A Social Cognitive Account

The demonstration that participants are sensitive to the manner in which their decisions are framed has challenged dominant "expected utility" approaches to rational decision making (Payne, Bettman, & Johnson, 1992). Prospect theory (Tversky & Kahneman, 1981) offers a conceptual framework within which to understand shifts in preferences from risky to certain options as the decision frame changes from loss to gain. As long as one examines the influence of message frames within the context of decisions such as the hypothetical disease problem, one's theoretical analyses can focus on factors such as the magnitude of the relative outcomes and the probabilities associated with the risky alternative. However, in the application of message framing to actual health communication, there is considerably less control over the situations in which the framed messages are expected to exert their influence (Dunegan, 1993). These realities have led investigators to consider the process by which framed messages influence judgment and behavior, in particular factors that influence the likelihood that someone will accept or deflect the framed appeal. We propose that there are at least three important stages in the decision-making process during which the relative influence of gain- and loss-framed messages is determined. First, the amount of attention directed to the message influences the degree to which it is integrated into a mental representation of the issue. Second, people differ in their receptivity to the particular frame advocated by the message, based on both their experience and current situation. Third, the influence of a particular frame on actual behavior depends on the perceived function of the advocated behavior (i.e., prevention, detection, or recuperative). The likelihood that people respond to gain- and loss-framed health recommendations in a manner consistent with that proposed by prospect theory is dependent on each of these stages. Up to this point in our analysis, we have focused on issues relevant to the third stage of the decision-making process by emphasizing people's perceptions of the recommended behavior. We now take a broader look at how people process framed messages.

Modes of Processing

Obviously, people cannot respond to a framed message without first perceiving it. However, to merely perceive a message is not sufficient to motivate behavior change. Framing health information in terms of either gains or losses can influence behavior only if the framed information becomes integrated into a person's cognitive representation of the issue. Given that behavioral decisions are thought to reflect the consideration of relevant beliefs, a person's perception of an issue needs to reflect the particular position advocated by the framed appeal. The encoding and integration of the frame may be particularly crucial, given the often extended time between a health recommen-

dation and its behavioral consequences (e.g., Banks et al., 1995).

Persuasive appeals are processed in one of two modes: *systematically* (attention to the particular details of the message) or *heuristically* (attention to surface features of the message; Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986). The manner in which a framed message is processed significantly affects its ultimate influence. The cognitive assimilation of the frame provided by a particular appeal is likely contingent on the systematic processing of that appeal. For example, Wegener, Petty, and Klein (1994) found that the relative persuasiveness of gain- and loss-framed messages was limited to those participants who processed the messages systematically. A similar relationship between processing and framing effects has been reported by Takemura (1992, 1993; but also see 1994).

The systematic processing of messages is encouraged by a diverse set of contextual variables (Chaiken et al., 1989; Petty & Cacioppo, 1986). Involvement or interest in an issue, in particular, is thought to motivate systematic processing. Thus, it is not surprising that personal involvement with an issue moderates the effect of message framing on health behavior (Maheswaran & Meyers-Levy, 1990; Rothman et al., 1993). If a framed message's influence relies on it being systematically processed, the expected pattern of framing effects should be obtained when people are involved with the health issue. Because most health issues are at least moderately involving, investigators conducting empirical tests of framed health recommendations have generally not needed to consider this dimension. However, in two experiments, investigators have examined the influence of message frames on participants who differ in involvement. In one study, students who were concerned about heart disease expressed stronger intentions to obtain a blood–cholesterol test (i.e., a detection behavior) after reading a loss-framed appeal (Maheswaran & Meyers-Levy, 1990). In another study, investigators found that a gain-framed appeal motivated appropriate sunscreen requests (i.e., a prevention behavior) when presented to participants who were concerned about tanning and skin cancer (Rothman et al., 1993, Experiment 2). Thus, it would appear that the systematic processing of a framed message is a necessary precondition to observe the predicted advantage of gain framing for prevention behaviors and loss framing for detection behaviors. The observation that framing effects are stronger when the message is processed systematically is consistent with other demonstrations that increased motivation or accountability augments rather than reduces judgmental biases (Payne et al., 1992; Schwarz, 1994). Greater attention to a framed message does not necessarily result in the insight that the message provides but one of a multitude of perspectives on an issue.

Maheswaran and Meyers-Levy (1990) have proposed an alternative set of predictions concerning the role of issue involvement, suggesting that personal involvement with an issue influences the relative effectiveness of gain- and loss-framed messages. Their analysis rests on the assumption that negatively valenced information has greater weight when processed systematically; therefore, when one is highly involved with an issue, there is a consistent advantage for the use of loss-framed messages. However, this mechanism cannot account for participants' preference reversals obtained when there is little indication of different levels of involvement (e.g., the allocation of resources to treat patients with AIDS; Levin & Chapman, 1990), nor can it explain the observed advantage for gain-framed messages among highly involved individuals—for example, women who are considering skin cancer and sunscreen use (Rothman et al., 1993, Experiment 2).

Framing effects depend on issue involvement only to the extent that it motivates people to process framed information systematically. However, issue involvement is not the only motivator of systematic processing. For example, to receive unexpected information stimulates message processing (Baker & Petty, 1994; Maheswaran & Chaiken, 1991; Smith & Petty, 1996). Smith and Petty demonstrated that framing information in an unexpected fashion (e.g., a loss-framed message preceded by a gain-framed headline) leads to more systematic processing of the message. Within the health domain, to receive information about a new or unfamiliar health threat should elicit greater processing of the message. A person's mood can also facilitate systematic processing. Schwarz, Bless, and Bohner (1991) have demonstrated that participants in unpleasant moods are likely to process information systematically, whereas pleasant moods motivate heuristic information processing. To feel fear in situations where the opportunities for protection are unclear can elicit the systematic processing of incoming information (Gleicher & Petty, 1992), as can to perceive a situation as risky (Block & Keller, 1995). Based on these findings, one might predict that exposure to loss-framed as opposed to gain-framed appeals would more reliably elicit systematic processing (Dunegan, 1993).

If framed information needs to be processed systematically, why are gain-framed arguments more effective than loss-framed arguments to persuade participants who are weakly involved with an issue (e.g., Maheswaran & Meyers-Levy, 1990; Rothman et al., 1993, Experiment 1)? One explanation for these findings is that the advantage of gain-framed appeals may not reflect the actual adoption of the specified frame. Weak involvement with an issue may lead people to rely on simple cues associated with a message, such as the affective response it elicits (Maheswaran & Meyers-Levy, 1990; Petty & Wegener, 1991). In a number of studies, investigators have found that participants respond with positive feelings to gain-framed messages (e.g., Rothman et al., 1993). In situations where information is processed heuristically, the positive affect elicited by a gain-framed appeal may be ascribed to the behavior in question, thus resulting in greater compliance with the message regardless of its substantive content. Because this effect is predicted to be independent of the specific content of the framed appeal, it should be insensitive to the type of behavior promoted and its influence should not extend over a long delay. Although this analysis is consistent with the limited data available (Maheswaran & Meyers-Levy, 1990; Rothman et al., 1993, Experiment 1; but also see Experiment 2), additional research is needed to examine whether these effects are independent of the specific information provided in a framed recommendation.

Acceptance

Even though people may be motivated to process a framed appeal systematically, they may not be receptive to the frame advocated by the message. In considering the willingness to

accept the particular frame provided by an appeal, we focus on two general factors. First, an ongoing mood or chronic disposition may shape one's receptivity to a gain or loss frame. Second, prior knowledge and experience may restrict one's willingness to adopt a particular frame.

Because one's feelings can serve as information about one's current situation (Schwarz, 1990), one's mood may influence whether a situation is perceived in terms of losses or gains. Sad moods may confirm that potential losses are possible, whereas happy moods may underscore the salience of potential gains. Given that moods render mood-congruent information more accessible (Bower, 1981; Singer & Salovey, 1988), a particular mood may increase the likelihood that the current situation is perceived in mood-congruent terms. There has been little direct work concerning the influence of mood on sensitivity to framed appeals. Compared with participants in a neutral mood, those who felt happy ascribed greater costs to a potential loss (Isen, Nygren, & Ashby, 1988). However, mood had no effect on perceptions of potential gains. Wegener et al. (1994) demonstrated that the influence of mood on perceptions of likelihood mediates the relative persuasiveness of gain- and loss-framed arguments. Participants were more persuaded by gain-framed arguments when in a happy mood, but loss-framed arguments were more persuasive when they were in a sad mood.[11] The finding that mood states can influence perceptions of likelihood or risk is quite robust (Johnson & Tversky, 1983; J. D. Mayer, Gaschke, Braverman, & Evans, 1992; Salovey & Birnbaum, 1989). Although in these studies investigators manipulated participants' mood through a prior, unrelated task, a person may substantially influence his or her mood by merely thinking about a health concern. The extent to which an issue elicits negative or positive affect should influence responses to framed information. For example, the degree to which negatively framed information promotes detection behaviors may be augmented if people approach these behaviors with a sense of dread or apprehension (cf. Mano, 1994).

The degree to which someone holds a chronic optimistic or pessimistic outlook on life might also shape his or her willingness to adopt the perspective advocated by a gain- or loss-framed appeal (Scheier & Carver, 1985). An optimist would be more inclined to perceive a situation in terms of associated gains, whereas a pessimist would be more receptive to perceive a situation in terms of associated losses. Although there have been no direct tests of the moderating influence of optimism on the persuasiveness of framed messages, there is some indirect evidence that it influences receptivity to a particular frame. For example, pessimists and people with depression are more likely to perceive ambiguous feedback in a negative light, whereas optimists and people without depression are more likely to perceive the same ambiguous feedback in a positive light (McFarland & Miller, 1994).

The information presented in a health recommendation is understood within the context of an individual's experiences and knowledge. When a health issue is either new or unfamiliar, people have few preconceived notions about the issue, which should facilitate the adoption of the frame emphasized in a recommendation. To the extent that the perspective provided by the framed appeal is consistent with one's initial understanding, one should have little difficulty adopting the suggested frame. Persuasion is somewhat more complicated, however, when the frame does not match one's experiences. The unexpected perspective should elicit systematic processing of the message (Smith & Petty, 1996), but this does not necessarily imply that the advocated frame will be adopted. If the initial perspective is strong enough, it is possible that people might reframe a message that did not match their dominant view (cf. Huys, Evers-Kiebooms, & d'Ydewalle, 1990). However, the degree to which people effectively reframe messages and their subsequent impact on decision making has not been tested empirically.

Tykocinski, Chaiken, and Higgins (1994) demonstrated that, under certain conditions, appeals that do not match participants' experiences or concerns can be more effective. Based on predictions derived from self-discrepancy theory (Higgins, 1987), one can identify people who are concerned about the presence of negative outcomes (i.e., people with actual–ought discrepancies) and those who are concerned about the absence of positive outcomes (i.e., people with actual–ideal discrepancies). Tykocinski et al. proposed that, when a framed message matches a person's current concern, they can effectively counterargue, thus undermining the impact of the appeal. In fact, several studies have shown that participants actively counterargue messages that convey information about potential health risks that are seen as personally relevant (Kunda, 1990; Liberman & Chaiken, 1992). Because messages with frames that do not match one's current concerns are less likely to elicit counterargument, they should have a greater impact on one's preferences. Support for these predictions was obtained in a study of framed appeals designed to encourage college students to eat breakfast. Students concerned about the presence of negative outcomes expressed stronger intentions to eat breakfast after hearing about the benefits associated with eating a regular breakfast, whereas students concerned about the absence of positive outcomes expressed stronger intentions after hearing about the costs associated with not eating a regular breakfast. On a follow-up measure of behavior 2 weeks later, only those students who were expected to be persuaded by the gain-framed appeal reliably ate breakfast more often. The relationship between message frames and people's dominant psychological concerns is clearly an area for future study (see also Brendl et al., 1995).

Moving From Frames to Behavior

The ultimate goal of any framed message is to promote a particular behavior. As we have discussed earlier in this article, even when a frame has been processed and assimilated, its particular impact on behavior is contingent on perceptions of the behavior itself. We now turn to another factor that may be important to motivate people to translate their perception of a health concern into action. A broad array of theoretical perspectives suggest that beliefs concerning both the effectiveness of a behavior (*response efficacy*) and one's ability to perform that behavior successfully (*self-efficacy*) predict the likelihood of the health behavior being carried out (Bandura, 1977, 1986;

[11] This effect was limited to those participants who were high in need for cognition (Cacioppo & Petty, 1982). Again, the systematic processing of information appears to be an important precondition to obtain framing effects.

Salovey et al., in press). Efficacy beliefs may be particularly important when people act in response to a loss-framed appeal. Protection motivation theory suggests that people will respond appropriately to a health threat only if they perceive themselves and the behavior to be efficacious (Maddux & Rogers, 1983; cf. Leventhal, 1970). Similar beliefs may be necessary when people consider responding to a loss-framed appeal.

In only a handful of studies have investigators examined the potential mediating role of self-efficacy beliefs. Meyerowitz and Chaiken (1987) observed that women who received a loss-framed pamphlet advocating BSE subsequently held the strongest self-efficacy beliefs and that to hold strong efficacy beliefs partially mediated the influence of the loss frame on behavior. Similarly, self-efficacy moderated the effectiveness of smoking-cessation contracts (Wilson, Wallston, & King, 1990). Smokers enrolled in a smoking-cessation program signed contracts that were either gain framed (the positive consequences of reaching a goal were emphasized) or gain and loss framed (both the positive consequences of reaching a goal and the absence of those consequences if the goal was not reached were emphasized). Exposure to combination gain- and loss-framed contracts reduced participants' smoking but only for those smokers holding strong self-efficacy beliefs. Although Banks et al. (1995) did not find any relationship among self-efficacy, information frame, and behavior, this may have been due to restricted variability in women's perceived self-efficacy to obtain a mammogram. Finally, in a second study, investigators did not find an effect of perceived self-efficacy; however they did examine the persuasiveness of gain-framed messages, which may not depend on strong self-efficacy beliefs (Rothman et al., 1993, Experiment 2).

Are there situations in which framing has little influence on people's behavior? Even though the influence of framed health appeals has been observed across a broad range of health behaviors and health domains, there is some evidence to suggest that framing has a limited effect when participants have just received undesirable information about their health (Lauver & Rubin, 1990; Lerman et al., 1992). Lerman et al. examined the influence of mailing framed psychoeducational materials to women whose previous mammogram had been abnormal. Compared with a group of women who did not receive the materials, receipt of either of the framed packets equally increased the likelihood that a woman would obtain a mammogram during a 1-year follow-up period. Similarly, framing did not affect behavior after an abnormal Pap test (Lauver & Rubin, 1990). Women who recently had had an abnormal Pap were contacted to schedule a follow-up appointment. During the phone interview, they were exposed to framed messages concerning a colposcopy (the follow-up procedure). Attendance for the follow-up procedure was not influenced by the message frame. To interpret failures to reject the null hypothesis is always difficult. Given that these women had recently received relevant, negative information regarding their health status, it is possible that the ability of the framed message to shape their construal of the issue was quite limited. For example, the gain-frame message may have been reframed into a loss-frame message, thus undermining any differential effect of frame. Alternatively, the relatively high levels of follow-up behavior observed in both studies suggests that these women were sufficiently motivated to perform the subsequent procedure, which limited the opportunity to observe an effect of message frame (e.g., 74% of women in one sample returned for a follow-up appointment within 6 weeks of being contacted; Lauver & Rubin, 1990).

Two factors are crucial to test the prediction that people will take risks when a situation involves potential losses but will avoid risks when a situation involves potential gains. First, the issue under consideration must be perceived in terms of gains or losses. Second, to adopt a behavioral alternative must be perceived as either a risky or safe course of action. Although these factors are easily addressed when the decision involves a hypothetical public health issue, they can be somewhat more challenging when one examines behavioral responses to actual framed health communications. We believe that the apparent inconsistencies in the empirical literature are a clear sign that to successfully predict how people will respond to gain- and loss-framed appeals depends on one's ability to develop a better understanding of how framed information is processed. To further this goal, we have identified three points during the decision process that have implications for the effectiveness of a gain- or loss-framed appeal. First, the frame advocated by a particular message must be integrated into a person's representation of the health issue, so the message should be processed systematically. Second, the particular perspective advocated by the framed appeal must be adopted by the perceiver. The systematic processing of framed information does not guarantee that the frame is automatically accepted by the perceiver. An individual's knowledge and experiences with an issue can play important roles to determine whether a particular frame is accepted or deflected. Finally, even when a gain or loss frame has been adopted and integrated into an individual's representation, its expected influence on behavior cannot be determined without the investigator first identifying the degree to which the individual's adoption of the behavior in question is perceived to be risky.

Final Thoughts

Prospect theory provides a predictive account to describe how people respond to gain- and loss-framed information (Tversky & Kahneman, 1992). The assumption that people are risk seeking when they consider losses and risk averse when they consider gains is directly applicable to health-relevant decision making. Within the domain of public health decisions, this pattern of preferences generally has been observed. However, in several studies (e.g., Levin & Chapman, 1990, 1993), investigators have demonstrated instructively that features of the decision other than those generally considered can influence whether people choose to be risk seeking when they consider losses.

The application of message framing to actual health recommendations has proven to be more complex than the study of framed options in hypothetical decisions, thus necessitating that investigators examine the context in which these messages are delivered. To define the situation merely in terms of the presentation of gains or losses cannot account effectively for behavioral decisions. We have illustrated how aspects of health behaviors and the context in which they are considered can moderate the relative effectiveness of gain- and loss-framed appeals. In particular, it is essential to understand the extent to which the choice to adopt the recommended behavior is perceived as risky.

Although general categories of behaviors (e.g., detection behaviors vs. prevention behaviors) may represent relatively risky or safe behavioral alternatives, the degree to which a particular behavior is perceived to be illness detecting or health affirming should result in an advantage for loss- and gain-framed messages, respectively.

The observation that responses to gain- and loss-framed appeals are sensitive to the social context in which they are presented has resulted in a broader analysis of the cognitive and affective processes by which framed messages influence judgment and behavior. We have suggested that three important steps determine the ultimate influence of a framed health recommendation. First, the message needs to be processed in sufficient depth, so it can be integrated into an individual's mental representation of the health issue. Second, the frame advocated by the message needs to be accepted by the perceiver. Third, the frame motivates behavior only to the extent that a person's perception of the recommended behavior is appropriate for the adopted frame. Although we have reviewed empirical findings consistent with each hypothesized stage of processing, in no single study have investigators tested all aspects of the model. Clearly, empirical work is needed that considers these stages simultaneously within a health-promotion context. Even though in this article we have focused on decision making within the health domain, several of the factors that determine the persuasiveness of framed appeals in the health area could be applicable to other domains, perhaps, in particular, consumer preferences (e.g., Beggan, 1994; Levin & Gaeth, 1988; Neale, Huber, & Northcraft, 1987; Puto, 1987).

Initial attempts to apply message framing to the promotion of health behavior focused solely on whether a message presented information in terms of gains or losses. Rather than interpret the limited success of this approach as an indication that predictions derived from hypothetical decision problems cannot be extended to decisions concerning actual health behaviors, we have articulated a view of message framing that emphasizes the context in which framed information is considered. In applying the premise that people are risk averse when they consider potential gains and risk seeking when they consider potential losses, we need to understand how people decide whether a situation involves a gain or a loss and, furthermore, whether the adoption of a behavior is perceived as risky or safe. An analysis of the decision framework that emphasizes the processes through which framed information influences decision making and behavior should facilitate both the theoretical understanding of message framing effects and the successful application of message framing to health-promotion campaigns.

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