

Running head: GAIN-FRAMED AND LOSS-FRAMED PERSUASIVE MESSAGES

The Advantages of Compliance or the Disadvantages of Noncompliance?

A Meta-Analytic Review of the Relative Persuasive Effectiveness

of Gain-Framed and Loss-Framed Messages

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Abstract

A meta-analytic review of the relative persuasiveness of gain- and loss-framed messages (based on 165 effect sizes, $N = 50,780$) finds that loss-framed appeals are not generally more persuasive than gain-framed appeals. For encouraging disease prevention behaviors, gain-framed appeals are more persuasive than loss-framed appeals; for encouraging disease detection behaviors, gain- and loss-framed appeals do not differ significantly in persuasiveness. The relative persuasiveness of differently framed appeals seems little influenced by (a) whether the gain-framed appeals emphasize the attainment of desirable states or the avoidance of undesirable states or (b) whether the loss-framed appeals emphasize the attainment of undesirable states or the avoidance of desirable states.

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In a great many persuasive circumstances, persuaders have a choice about how to cast their discussion of the consequences of the policy or course of action that they recommend. On the one hand, the persuader can emphasize the desirable aspects of following the persuader's recommended course of action—the gains associated with compliance, the advantages of adopting the communicator's proposal, and so on. On the other hand, the persuader can underscore the undesirable aspects of not following the recommended policy—the disadvantages of failing to adopt the suggested course of action, the losses or undesirable outcomes associated with noncompliance, and so forth. That is, a message's contents can be framed in two basic ways, a positive (“gain”) frame that emphasizes the advantages of compliance or a negative (“loss”) frame that emphasizes the disadvantages of noncompliance.

Of course, a given message might contain both kinds of appeals. But, at least sometimes, one of these broad possibilities might enjoy some persuasive advantage over the other. This article provides a meta-analytic review of the research evidence bearing on the question of the relative persuasive effectiveness of gain-framed and loss-framed appeals.

As a clarification: The phrase “message framing” (and affiliated terms) has been used to capture a diverse lot of message variations. Our interest concerns specifically what is commonly called “gain-loss” persuasive message framing, the difference between appeals emphasizing the desirable consequences of compliance and appeals emphasizing the undesirable consequences of noncompliance. This contrast differs from variations in the framing of news stories (e.g., Gamson, 1992; Gamson & Modigliani, 1989; Iyengar, 1991); for instance, a story about a Ku

Klux Klan rally might be framed as a free speech question or as a disruption of public order (Nelson, Clawson, & Oxley, 1997). Our focal contrast also differs from the contrast between outcomes phrased in terms of desirable effects and those phrased in parallel terms of undesirable effects; for example, a medical procedure can be described as having either a “90% survival rate” or a “10% mortality rate” (see, e.g., Levin, Schnittjer, & Thee, 1988). For some reviews of these and other kinds of “framing” research, see Druckman (2001), Elliott and Hayward (1998), Levin, Schneider, and Gaeth (1998), Mintz and Redd (2003), Moxey, O’Connell, McGettigan, and Henry (2003), and Wicks (2005).

Background: Positive-Negative Asymmetries and Decision Framing

One reason for suspecting some difference in persuasiveness between gain-framed and loss-framed messages is provided by research indicating asymmetries between positive and negative information such that negative information is more powerful than positive information. One such asymmetry is that negative information generally has a disproportionate impact on decisions compared to otherwise-equivalent positive information (Rozin & Royzman, 2001). A second is that negative stimuli are preferentially detected; that is, negative stimuli are detected at lower levels of input or exposure than are positive stimuli (Dijksterhuis & Aarts, 2003). A third is that negative events evoke stronger and more rapid reactions (of various sorts) than do positive events (Taylor, 1991). Taken together, these findings indicate that negative information is more potent than positive information—which suggests that loss-framed messages might be more persuasive than gain-framed messages.

A second reason for suspecting different effects from gain- and loss-framed messages comes from research findings concerning (what can be called) decision framing. In these studies, participants indicate a preference between two decision options. One of the options (the less

risky one) is described as having certain outcomes; the other (more risky) option is described as having equivalent probabilistic outcomes. For instance, in Tversky and Kahneman's (1981) classic research circumstance, participants were asked to imagine that the U.S. is preparing for the outbreak of a disease that is expected to kill 600 people if nothing is done, with two alternative courses of action proposed. If option A (the less risky option) is chosen, 200 people will be saved; if option B (the riskier choice) is selected, there is a one-third chance that 600 will be saved and a two-thirds chance that no one will be saved.

The general research question in this area of work is what influences the choice between more- and less-risky options. One factor that has been extensively studied is the "framing" of the options, that is, whether the description of the options emphasizes the gains or the losses associated with each. In the previous paragraph, the outcomes were expressed in terms of lives saved, but equivalent outcomes could be expressed in terms of deaths: If option C is chosen, 400 people will die, and if option D is chosen, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

In Tversky and Kahneman's (1981) research, faced with the choice between option A and option B, participants strongly preferred the less-risky option A—but given the substantively-identical choice between option C and option D, participants strongly preferred the more-risky option D. That is, participants were more likely to prefer a risky (vs. less-risky) option when it was presented in a way that emphasized avoiding possible losses than when it was presented in a way that emphasized obtaining possible gains. An extensive body of research has sought to identify limits to this effect, factors that influence the size of the effect, and so forth (e.g., Bless, Betsch, & Franzen, 1998; Levin & Chapman, 1993; Li, 1998; for some review discussions, see Kuhberger, Schulte-Mecklenbeck, & Perner, 1999; McGettigan, Sly, O'Connell, Hill, & Henry,

1999). But for present purposes, the relevant points are that otherwise-equivalent gains and losses appear to not always be psychologically equivalent and that losses appear to have some motivating power that equivalent gains do not.

For two reasons, however, decision framing research does not speak directly to the question of the effects of different ways of framing persuasive messages. First, the format of decision framing research does not involve the presentation of any persuasive message. Participants choose between two decision alternatives; they receive no arguments or appeals supporting a particular choice, and nothing in the experimental materials advocates a particular alternative. Second, the outcome variable of interest in decision framing research is characteristically not persuasion but rather the likelihood of choosing a relatively risky option. Students of persuasion will want to know how alternative appeals influence acceptance of an advocated view or action, quite apart from the action's riskiness.

Although research on positive-negative asymmetries and decision framing does not directly address questions of persuasive message effects, these findings naturally give rise to a hypothesis concerning persuasive messages, namely, that appeals emphasizing potential losses will be more persuasive than appeals emphasizing potential gains. Given that people are more willing to take a risk to avoid (or minimize) losses than to obtain gains, and given that negative information seems more powerful than parallel positive information, one might expect that, broadly speaking, it will be more persuasive to focus on potential losses from noncompliance than on potential gains from compliance.

Gain-Loss Message Framing Research: Previous Reviews and Possible Moderators

Previous Reviews

A great deal of research has been directed specifically at exploring the possibility that gain-framed and loss-framed messages might be differentially persuasive. The extant review discussions of this research have not been comprehensive. Wilson, Purdon, and Wallston (1988) discussed eight research reports. Kuhberger's (1998) meta-analysis examined 13 "message compliance" studies, and the outcome variable of interest was not persuasiveness but rather inclination toward risky options. Edwards, Elwyn, Covey, Matthews, and Pill (2001) reviewed seven studies, reflecting their interest in clinical settings and consequent narrow inclusion criteria. Salovey, Schneider, and Apanovitch (2002) focused on 12 experiments associated with Salovey's research program and briefly discussed about another dozen research reports. The current review is based on 165 cases (effect sizes), which suggests that previous reviews have been remarkably selective in their coverage of the literature.

Moreover, earlier reviews have not always carefully screened the studies discussed. For example, in discussing the relative effectiveness of gain- and loss-framed messages, Salovey et al. (2002, p. 393) cited publications by Kalichman and Coley (1995), Marteau (1989), McNeil, Pauker, Sox, and Tversky (1982), Treiber (1986), and Wilson, Kaplan, and Schneiderman (1987), but none of these studies contrasted gain-framed and loss-framed persuasive messages. Kalichman and Coley compared a loss-framed message against one with unframed information; Marteau and McNeil et al. compared preferences for medical procedures expressed in terms of the probability of living or the probability of dying; Treiber compared a gain-framed appeal against a combined gain-and-loss-framed appeal; Wilson et al. presented participants with differently-described decision options, not persuasive messages.

Even so, previous reviews do suggest two broad research questions meriting examination. First, is there an overall difference in persuasiveness between gain-framed and loss-framed

messages? Research on decision framing and positive-negative asymmetries might lead one to anticipate that loss-framed messages will generally be more persuasive than gain-framed messages.

Second, what factors moderate the relative effectiveness of gain- and loss-framed appeals? Even if one appeal framing enjoys some general persuasive advantage, it may also be the case that the size (or direction) of that difference changes depending on other factors. A very large number of such factors have been suggested, though the available research evidence seems modest for most. For example, only limited evidence concerns such suggested moderators as mood (Keller, Lipkus, & Rimer, 2003) and ambivalence (Broemer, 2002). But two particular possible moderating factors deserve some special attention.

Possible Moderators

Disease detection vs. disease prevention behaviors. Perhaps the most well-known proposed moderating factor, at least in the realm of health behavior, is whether the advocated action is a disease detection behavior (such as a skin cancer examination) or a disease prevention behavior (such as using sunscreen). Several studies have seemed to suggest that loss-framed messages will be more persuasive than gain-framed messages for detection behaviors, whereas gain-framed messages will be more persuasive than loss-framed messages for prevention behaviors (for discussion, see Rothman & Salovey, 1997; Salovey et al., 2002).

Such differential persuasiveness of gain- and loss-framed appeals has been seen to be predicted and explained by Kahneman and Tversky's (1979) prospect theory, and specifically by the finding that "choices involving gains are often risk averse and choices involving losses are often risk taking" (Tversky & Kahneman, 1981, p. 453). That is, as indicated by the results of decision framing research, persons are more likely to undertake risky (uncertain) behaviors when

potential losses are salient but prefer risk-averse choices when gains are prominent. This principle is taken to explain the differential persuasiveness of gain- and loss-framed appeals by virtue of differences in the uncertainty associated with detection and prevention behaviors. Specifically, “the perceived uncertainty or risk (e.g., of finding an abnormality) associated with detection behaviors leads us to predict that loss-framed messages should be more persuasive in promoting them. However, prevention behaviors might not be perceived as risky at all,” which implies that “gain-framed messages may be more likely to facilitate performing prevention behaviors” (Salovey et al., 2002, p. 394).

Desirable or undesirable kernel states. A second possible moderator is the specific phrasing of the gain- and loss-framed appeals. As noted by various commentators (e.g., Dillard & Marshall, 2003; Rothman & Salovey, 1997; Wilson et al., 1988), gain- and loss-framed appeals can each take two forms, with the resulting four possibilities represented in a 2x2 array in which the contrasts are (a) whether the outcome described is a desirable or an undesirable one and (b) whether the outcome is described as one that is attained (acquired, achieved, made more likely) or avoided (averted, not realized, made less likely). That is, a gain-framed appeal might take the form, “If you perform the advocated action, desirable outcome X will be obtained,” or the form, “If you perform the advocated action, undesirable outcome Y will be avoided.” A loss-framed appeal might take the form, “If you do not perform the advocated action, desirable outcome X will be avoided,” or the form, “If you do not perform the advocated action, undesirable outcome Y will be obtained.”

It is not yet clear whether these variations influence the relative effectiveness of gain- and loss-framed messages. Devos-Comby and Salovey’s (2002) review suggested that “empirical

work has not generally shown differences between the two ways of operationalizing loss or gain” (p. 292), but cited only two studies.

However, coding messages for this moderator encounters a potential difficulty. Although the 2x2 array described above (desirable vs. undesirable outcome, attained vs. avoided outcome) is a useful abstract representation of possible gain-loss message variations, it does not always map easily onto concrete appeals. Consider, for example, an appeal such as, “If you take your hypertension medication, you will reduce the risk of heart disease.” This appeal plainly focuses on the desirable consequences of compliance (i.e., is gain-framed), but it might be interpreted as suggesting either (a) compliance will produce a desirable outcome (the desirable outcome of reducing the risk of heart disease) or (b) compliance will avert—reduce the likelihood of—an undesirable outcome (the undesirable outcome of heart disease). Obviously, having some systematic way of handling such cases will be crucial to unraveling message framing variations.

Our analysis sorts out such cases by focusing on the message’s explicit linguistic representation of the kernel state of the consequence under discussion. The kernel state is the basic, root state mentioned in the message’s description of the consequence. For instance, in the case of “If you take your hypertension medication, you will reduce the risk of heart disease,” the kernel state is “heart disease,” which is plainly an undesirable state. Thus, we treat that appeal as one that emphasizes the desirable consequences of compliance by discussing an undesirable kernel state (“heart disease”) that will be avoided. By comparison, “If you take your hypertension medication, you will increase your chances of having a healthy heart” is an appeal describing a desirable kernel state (“healthy heart”) that will be attained by compliance. Similarly, complex appeals such as “if you don’t follow this recommended diet, you’ll fail to do what you can to reduce the risk of heart disease” and “if you don’t follow this recommended diet,

you'll fail to do what you can to have a healthy heart" can be seen to be loss-framed appeals (i.e., appeals focused on the consequences of noncompliance) with, respectively, undesirable ("heart disease") and desirable ("healthy heart") kernel states.

This approach permits examination of the possibility that any difference in the relative persuasiveness of gain- and loss-framed appeals might depend on whether the appeals refer to desirable or undesirable kernel states. In particular, any differences in persuasiveness between gain-framed and loss-framed appeals might be accentuated when the gain-framed appeal has desirable kernel states (e.g., "healthy skin"), when the loss-framed appeal has undesirable kernel states (e.g., "skin cancer"), or when both circumstances obtain; conversely, any such differences might be minimized if the gain-framed appeal has undesirable kernel states, if the loss-framed appeal has desirable kernel states, or if both conditions obtain.¹

Method

Identification of Relevant Investigations

Literature search. Relevant research reports were located through personal knowledge of the literature, examination of previous reviews and textbooks, and inspection of reference lists in previously-located reports. Additionally, articles were identified through computerized database searches through at least May, 2005 of ABI-INFORM, CINAHL (Cumulative Index of Nursing and Allied Health Literature), Current Contents, Dissertation Abstracts, EBSCO, ERIC (Educational Resources Information Center), Linguistics and Language Behavior Abstracts, MEDLINE, PsycINFO, and PsycINFO-Historic, using various appropriate combinations of terms such as *framing, framed, frame, appeal, message, persuasion, persuasive, gain, positive, positively, benefit, loss, negative, negatively, threat, and valence*.

Inclusion criteria. Studies selected had to meet three criteria. First, the study had to compare gain-framed and loss-framed persuasive messages. A gain-framed message emphasizes the desirable consequences of compliance with the advocated view; a loss-framed message emphasizes the undesirable consequences of noncompliance. Excluded by this criterion were studies that compared a gain-framed appeal with a combined gain-and-loss frame (Treiber, 1986; Wilson, Wallston, & King, 1990), studies that compared one framing form with unframed information (Abood, Coster, Mullis, & Black, 2002; Kalichman & Coley, 1995), studies that confounded a gain-loss framing manipulation with other manipulations (e.g., Gonzales, Aronson, & Costanzo, 1988), and studies of decision framing, that is, studies in which participants chose between differently-described alternatives without any particular alternative being advocated (e.g., Fagley & Miller, 1997; Levin & Chapman, 1993; Paese, Bieser, & Tubbs, 1993; Quattrone & Tversky, 1988; Smith & Levin, 1996; Tversky & Kahneman, 1981).

In general, this criterion was applied so as to exclude imperfect realizations of the message contrast of interest. For example, for greater comparability, we excluded studies in which something like a gain-loss framing variation was accomplished through visual materials. Isen and Noonberg (1979) and Pancer, Deforest, Rogers, and Schmirler (1979) varied charitable appeals by having accompanying pictures depict either a needy child or a child who had received assistance (see also Cunningham, Steinberg, & Grev, 1980, Experiment 2; Gore et al., 1998).² Similarly, we excluded manipulations that did not straightforwardly involve descriptions of the consequences of performing or not performing the recommended action. For instance, Blanton, Stuart, and VandenEijnden (2001) contrasted a “negatively framed communication that emphasized the undesirable attributes of people who made unhealthy decisions” and a “positively framed communication that emphasized the desirable attributes of people who made

healthy decisions” (p. 848; similarly, see Blanton, VandenEijnden, et al., 2001; Stuart & Blanton, 2003). For examples of various other (excluded) imperfect realizations, see Cameron and Leventhal (1995), Christophersen and Gyulay (1981), Gibson (1962), Gierl, Helm, and Satzinger (2000), Hart (1972), Kirscht, Haefner, and Eveland (1975), Krishnamurthy, Carter, and Blair (2001), Lehmann (1970), Melvin (1995), Orth, Oppenheim, and Firbasova (in press), and Van Den Heuvel (1982) .

Second, the advantages and disadvantages discussed in the messages—the outcomes of following or not following the communicator’s views—had to be outcomes not under the control of the communicator. Studies of the use of promises and threats (as when a parent promises a child rewards for good behavior or threatens punishment for misbehavior) were excluded by this criterion, as were any studies in which the outcomes were under the communicator’s control, independent of whether the message variation was labeled as a difference between promises and threats (e.g., Kishor & Godfrey, 1999; Perry, Bussey, & Freiberg, 1981; Weimann, 1982).³

Third, appropriate quantitative data relevant to persuasive effects (e.g., attitude change, intention, or behavior) had to be available; where it was not provided in the report, we made efforts to obtain information from authors. Excluded by this criterion were studies of effects on other outcome variables, including judgments of expected persuasiveness (Montazeri & McEwen, 1997; Ohme, 2001) and perceived vulnerability (e.g., Meyer & Delhomme, 2000), and studies for which appropriate quantitative information could not be obtained (e.g., Burroughs, 1997; Devos-Comby, McCarthy, Ferris, & Salovey, 2002; Giles, 2002; Gnepa, 2001; Horgen & Brownell, 2002; Mann, Sherman, & Updegraff, 2004; Martin & Marshall, 1999; Martinez, 1999; McCroskey & Wright, 1971; Merrill, 2003; Miller et al., 1999; Rothman, Salovey, Antone,

Keough, & Martin, 1993; Salmon, Loken, & Finnegan, 1985; Umphrey, 2001; Wegener, Petty, & Klein, 1994; Yalch & Dempsey, 1978).⁴

Outcome Variable and Effect Size Measure

Outcome variable. The outcome variable was persuasion, as assessed through attitude change, postcommunication agreement, behavioral intention, behavior, and the like. When multiple indices of persuasion (e.g., assessments of attitude and of intention) were available, we averaged the effects to yield a single summary. Most studies reported only immediate (short-term) effects; where both immediate and delayed effect size information was available (e.g., Jones, Sinclair, & Courneya, 2003), only immediate effects were included to maximize comparability across studies.

Effect size measure. Every comparison between a gain-framed message and its loss-framed counterpart was summarized using r as the effect size measure. Differences indicating greater persuasion with gain-framed messages were given a positive sign.

When correlations were averaged (e.g., across several indices of persuasive effect), we computed the average using the r -to- z -to- r transformation procedure, weighted by n . Wherever possible, multiple-factor designs were analyzed by reconstituting the analysis such that individual-difference factors (but not, e.g., other experimental manipulations) were put back into the error term (following the suggestion of Johnson, 1989).⁵

Moderating Factors

Message topic. Cases were classified by message topic, with six broad topical categories distinguished: disease detection behaviors (e.g., skin cancer examinations), disease prevention behaviors (e.g., minimizing sun exposure), other health-related behaviors (e.g., acquiring hearing aids), sociopolitical subjects (public policy matters such as needle exchange programs),

advertising of consumer products and services (e.g., ads for life insurance or detergent), and other (i.e., otherwise unclassified, e.g., taxpayer compliance or recycling participation).⁶

Kernel state phrasing. The kernel states in each appeal were identified; as discussed above, a kernel state is the basic, root state mentioned in the message's description of the consequence under discussion. We coded each appeal as containing exclusively desirable kernel states (e.g., "healthy heart," "attractive skin"), exclusively undesirable kernel states (e.g., "heart disease," "skin cancer"), a combination of desirable and undesirable kernel states, or as indeterminate with respect to kernel-state phrasing (as when insufficient detail was available about the messages).

Unit of Analysis

The unit of analysis was the message pair, that is, the pair composed of a gain-framed message and its loss-framed counterpart. We recorded a measure of effect size for each distinguishable message pair found in the body of studies. Usually, a given message pair was used only in a single investigation, so only one effect size estimate was associated with the pair. But some message pairs were used in more than one study, with the result that several effect size estimates could be associated with that message pair. These multiple estimates were averaged to yield a single summary estimate before inclusion in the analysis. Such accumulation occurred in the following cases. Data from Broemer (2002, Study 1) and Broemer (2004, Study 1) were combined and reported as Broemer (2004) Study 1 combined; data from Experiment 1 and Experiment 2 in Keller et al. (2003) were combined and reported as Keller et al. (2003); data from Experiments 1, 4A, and 5 in Lee and Aaker (2004) were combined and reported as Lee and Aaker (2004) grape juice promotion and grape juice prevention; data from Meyerowitz and Chaiken (1987) and Lalor (1990) were combined and reported as Meyerowitz and Chaiken

(1987) combined; data from Shiv (1996), Shiv, Britton, and Payne (2004), and Shiv, Edell, and Payne (1997) were combined and reported as Shiv airline on-time, airline on-time and amenities, and detergent.

Whenever a study included more than one message pair and reported data separately for each pair, each pair was treated as providing a separate effect size estimate (e.g., Knapp, 1989; van Assema, Martens, Ruiter, & Brug, 2001). Some studies included more than one message pair but did not report results in ways that permitted computing separate effect sizes for each pair (e.g., Bower & Taylor, 2003; Gardner & Wilhelm, 1987; Hessling, 1996; Steward, Schneider, Pizarro, & Salovey, 2003); we computed a single effect size in such cases, with the consequence that the present analysis underrepresents the amount of message-to-message effect variability in these data.

In some cases, the same primary data served as the basis for multiple reports (e.g., both a dissertation and a subsequent publication). When a given investigation was reported in more than one outlet, it was treated as a single study and analyzed accordingly. The same research was reported (in whole or in part) in: Allen (1969), Dembroski (1969), Evans, Rozelle, Lasater, Dembroski, and Allen (1970), Lasater (1969), and Rozelle, Evans, Lasater, Dembroski, and Allen (1973), recorded under Evans et al. (1970); Berger and Smith (1997) and Smith and Berger (1996), recorded under the former; Berger and Smith (1998), Smith (1996), Smith and Berger (1998), and Smith and Wortzel (1997), recorded under Smith (1996); Finney (2001) and Finney and Iannotti (2002), recorded under the former; Hasseldine (1997) and Hasseldine and Hite (2003), recorded under the former; Knapp (1989) and Knapp (1991), recorded under the former; Lalor (1990) and Lalor and Hailey (1990), with, as noted above, results reported under Meyerowitz and Chaiken (1987) combined; Lawatsch (1987) and Lawatsch (1990), recorded

under the former; Levin, Gaeth, Evangelista, Albaum, and Schreiber (1999) and Levin, Gaeth, Evangelista, Albaum, and Schreiber (2001), recorded under the latter; Looker (1983) and Looker and Shannon (1984), recorded under the former; Mundorf et al. (2000) and Schneider, Salovey, Pallonen, et al. (2001), recorded under the latter; Robberson (1985) and Robberson and Rogers (1988), recorded under the former; Shiv (1996) and Shiv et al. (1997), recorded under Shiv
 airline on time and Shiv detergent.

Meta-Analytic Procedures

The individual correlations (effect sizes) were initially transformed to Fisher's z s; the z s were analyzed using random-effects procedures (Borenstein & Rothstein, 1999; Hedges & Vevea, 1998; Shadish & Haddock, 1994), with results then transformed back to r . A random-effects analysis was employed in preference to a fixed-effects analysis because of an interest in generalizing across messages (for some discussion, see Erez, Bloom, & Wells, 1996; Hedges & Vevea, 1998; Jackson, 1992, p. 123; National Research Council, 1992; Raudenbush, 1994; Shadish & Haddock, 1994).

Results

As a preliminary observation, it might be underscored that the present review has a rather broader evidentiary base than previous reviews. For example, some studies included here have apparently never been cited in any previous review discussion of persuasive message framing effects (e.g., Looker & Shannon, 1984; Ramirez, 1977).

Overall Effects

Effect sizes were available for 165 cases, with a total of 50,780 participants.⁷ Details for each included case are contained in Table 1. Across all 165 cases, the random-effects weighted mean correlation was .016. The limits of the 95% confidence interval for this mean were -.004

and .035, indicating no significant persuasive advantage for one framing form over the other ($p = .11$). This analysis, however, included one case with a very large sample size (Berger & Smith, 1997; $N = 18,144$); this single study contributed approximately 36% of the total N . A re-analysis excluding this case yielded a mean r of .016 ($k = 164$), which was also not significantly different from zero ($p = .13$); the 95% confidence interval limits were -.005 and .038.

Moderating Factors

Table 2 provides a summary of the results concerning the effects of the main moderating variables considered individually.

Disease prevention vs. disease detection. For messages advocating disease prevention behaviors, gain-framed messages enjoyed a significant persuasive advantage over loss-framed messages (mean $r = .046$). For messages advocating disease detection behaviors, gain- and loss-framed messages did not significantly differ (mean $r = -.027$).

Phrasing of kernel states in gain-framed appeals. As indicated in Table 2, gain- and loss-framed appeals did not dependably differ in persuasiveness when the gain-framed appeal was phrased in terms of desirable kernel states (mean $r = .022$), undesirable kernel states (mean $r = -.006$), or a combination of desirable and undesirable kernel states (mean $r = -.002$). The 95% confidence intervals for these three means overlap substantially; these data contain no indication that the relative persuasiveness of gain- and loss-framed appeals varies as a consequence of the phrasing of the kernel states in gain-framed appeals.

Phrasing of kernel states in loss-framed appeals. As indicated in Table 2, gain- and loss-framed appeals did not dependably differ in persuasiveness when the loss-framed appeal was phrased in terms of undesirable kernel states (mean $r = -.012$), desirable kernel states (mean $r = .098$), or a combination of desirable and undesirable kernel states (mean $r = .007$). The 95%

confidence intervals for these three means overlap substantially; these data contain no indication that the relative persuasiveness of gain- and loss-framed appeals varies as a consequence of the phrasing of the kernel states in loss-framed appeals.

Gain-framed and loss-framed kernel states considered jointly. As depicted in Table 3, in the 17 cases in which the gain-framed appeal referred to desirable kernel states and the loss-framed appeal referred to undesirable kernel states, gain- and loss-framed appeals did not significantly differ in persuasiveness (mean $r = -.007$). No study examined appeals in which the gain-framed appeal referred to undesirable kernel states and the loss-framed appeal referred to desirable kernel states.

Discussion

Overall Effects

Gain-framed and loss-framed appeals do not generally differ in persuasiveness. Despite the apparent psychological nonequivalence of gains and losses (as indicated by decision framing research) and despite various asymmetries between positive and negative information and events (e.g., the preferential detection of negative stimuli), loss-framed appeals are not in general more persuasive than gain-framed appeals. In fact, no subset of cases analyzed here displayed a significant advantage for loss-framed appeals over gain-framed appeals.

This result may illustrate the dangers of relying on generalizations about psychological states and processes as a basis for principles of persuasive message design. Good evidence indicates that negative information commonly has a greater impact on decisions than positive information does, that negative stimuli are preferentially detected, that negative events evoke stronger psychological reactions than do positive events, and so forth. It stands to reason that loss-framed appeals would, in general, have more persuasive impact than gain-framed appeals—

but they do not. (An equally natural supposition might be that negative political campaign advertising would be significantly more persuasive than positive advertising—but it is not. See Allen & Burrell, 2002; Lau, Sigelman, Heldman, & Babbitt, 1999.) Translating psychological generalizations into corresponding principles of communication may be more challenging than commonly supposed.

In considering how to explain these results, we wish to draw attention to a little-emphasized aspect of the contrast between gain-framed and loss-framed appeals. The feature most commonly emphasized in distinguishing these two appeal types is the valence of the outcome discussed—positive outcomes (“gains”) in gain-framed appeals, negative outcomes (“losses”) in loss-framed appeals. But another element distinguishes these two appeal types: Gain-framed appeals focus on the consequences of *compliance*, whereas loss-framed appeals focus on the consequences of *noncompliance*. (It is important to not be misled by the common labeling of these appeal types. Instead of being called “gain-framed” and “loss-framed” appeals, these might with equal appropriateness have been termed “compliance-focused” and “noncompliance-focused” appeals.)

A number of research findings offer some indirect support for supposing that focusing the audience’s attention on action (compliance, the desired behavior) might enhance persuasion. For instance, imagining the hypothetical performance of a behavior can increase behavioral intentions and the likelihood of subsequent behavioral performance (e.g., Gregory, Cialdini, & Carpenter, 1982; Sherman & Anderson, 1987). Engaging in behavioral self-prediction (that is, predicting whether one will engage in a behavior) can make subsequent behavioral performance more likely (the “self-prophesy” effect; see, e.g., Spangenberg & Greenwald, 1999; Spangenberg, Sprott, Grohmann, & Smith, 2003). Persuasive messages that provide a more

specific description of the advocated action have been found to be more effective than those providing a general description or no description at all (for reviews, see O’Keefe, 1997, 2002). Having people specify when and where they would perform a given behavior has been found to make people more likely (compared to a no-treatment control group with equivalently positive intentions) to perform the behavior (the effect of “implementation intention” interventions; e.g., Gollwitzer & Brandstatter, 1997; Sheeran & Orbell, 2000; Sheeran & Silverman, 2003).

In short, a variety of evidence suggests that focusing the audience’s attention on the desired behavior may enhance persuasion. Hence, rather than focusing people’s attention on what will happen if they keep doing what they’re doing, it might be more persuasive to instead focus their attention on what will happen if they change their behavior; that is, compliance-focused appeals could have some persuasive advantage over noncompliance-focused appeals, just because of their subtly greater focus on the advocated action. However, any such advantage could presumably be easily neutralized by whatever persuasive advantage was conferred on noncompliance-focused appeals by virtue of those appeals’ drawing attention to undesirable outcomes (with all of the impact attendant to negative states). On balance, then, one might expect rather little difference in general between gain-framed and loss-framed appeals—which is precisely the result obtained here.

Obviously, the contrast between gain- and loss-framed appeals necessarily confounds (a) a contrast between a focus on the consequences of compliance and a focus on the consequences of noncompliance and (b) a contrast between discussion of desirable consequences and discussion of undesirable consequences. This confounding occurs because the relevant communicative function is persuasion. Persuasive appeals naturally take two broad forms, either “compliance produces desirable outcomes” or “noncompliance produces undesirable outcomes.”

As a general rule, a persuader will not assert “compliance produces undesirable outcomes” or “noncompliance produces desirable outcomes.” But this means that it is impossible to disentangle the two different potential contributions to any observed gain-loss persuasive message framing effects—the contribution of having the message being compliance- or noncompliance-focused and the contribution of having the message discuss desirable or undesirable outcomes.

Moderating Factors

Phrasing of kernel states. It seems plausible to suppose that any differences in persuasiveness between gain-framed and loss-framed appeals might be accentuated when the gain-framed appeal has desirable kernel states (e.g., “healthy skin”), when the loss-framed appeal has undesirable kernel states (e.g., “skin cancer”), or when both circumstances obtain; similar reasoning underlies the supposition that any such differences might be minimized if the gain-framed appeal has undesirable kernel states, if the loss-framed appeal has desirable kernel states, or if both conditions obtain. But these variations in the phrasing of appeals make no detectable difference to the relative effectiveness of gain- and loss-framed messages.

For two reasons, however, the research evidence on this matter is not as extensive as one might like. First, many research reports did not provide sufficiently detailed descriptions of the appeals, thus preventing coding of this moderator. Second, not all possible combinations of gain- and loss-appeal kernel phrasing are well-represented in the literature. Still, the research evidence to date gives little reason to suspect that the phrasing of kernel states makes much difference to the relative persuasiveness of gain- and loss-framed appeals.

Disease prevention vs. disease detection. As hypothesized by various commentators (e.g., Salovey et al., 2002), when the message advocated a disease prevention behavior, gain-framed

appeals were significantly more persuasive than loss-framed appeals. For disease prevention behaviors, then, these results offer a straightforward practical implication concerning the design of effective persuasive messages, namely, gain-framed appeals should be preferred over loss-framed appeals. The observed mean effect size ($r = .046$) is not large in absolute terms, but it is characteristic of the effect magnitudes commonly observed in persuasion effects research.⁸

Contrary to expectation, when the message advocated a disease detection behavior, gain- and loss-framed appeals did not significantly differ in persuasiveness. This result casts doubt on the need for the explanatory mechanism most often invoked to explain putative gain-loss message framing differences, namely, differences in the riskiness of detection and prevention behaviors. As discussed above, the suggestion has been that the uncertainty (riskiness) of detection behaviors makes loss-framed messages more persuasive, whereas the lack of risk associated with prevention behaviors makes gain-framed appeals more persuasive (e.g., Salovey et al., 2002). But this explanation is offered to account for a phenomenon that turns out not to be genuine: Disease detection behaviors are not in fact more successfully influenced by loss-framed appeals than by gain-framed appeals.

To be sure, the effects of gain-loss message framing variations appear not to be parallel for disease prevention behaviors and for disease detection behaviors. But understanding this non-parallelism requires a perspective broader than just these two topics of advocacy. In general, gain-framed and loss-framed appeals do not significantly differ in persuasiveness—not for disease detection behaviors, other health-related topics, sociopolitical questions, or consumer advertising. Only for disease prevention behaviors and “other” topics (a motley collection encompassing such topics as recycling participation, taxpayer compliance, job advertising, and college course selection) does any dependable difference in persuasiveness appear.⁹ Thus, the

relevant question is not “why are the results different for disease prevention behaviors and disease detection behaviors?” but rather “why are the results for disease prevention behaviors different from almost everything else?”

Two broad possibilities suggest themselves. Something may be distinctive about the realm of disease prevention that makes gain-framed appeals on this subject especially successful, or something may be distinctive about how the gain-loss appeal variation has been realized in disease-prevention studies that yields the observed effects.

The distinctiveness of disease prevention behaviors? If the observed effect is to be explained as a consequence of something distinctive about disease prevention behaviors, the key task obviously becomes identifying that distinctive feature. As previously discussed, one suggestion has been that disease prevention behaviors are relatively low-risk behaviors and hence (following prospect-theory reasoning) are likely to be more successfully influenced through gain-framed appeals than loss-framed appeals.

This explanation is unlikely to be very satisfactory. Although it has become common to describe disease prevention behaviors as relatively less risky (especially in contrast to putatively more risky disease detection behaviors), it is not plain that this characterization is well-grounded. One potential source of confusion here is the word “risk” and its variants (e.g., “risky”). Colloquially, something that is “risky” is dangerous. In that colloquial sense, it might make sense to think of prevention behaviors as relatively not risky (it’s hard to see how eating more fruits and vegetables might be dangerous) and to think of detection behaviors as relatively risky (a danger-filled outcome is possible, namely, discovering an abnormal condition).

But prospect theory’s sense of “risk” refers to uncertainty about outcomes, regardless of the dangerousness or valence of the events; a decision option is “risky” when its outcomes are

uncertain, even if the outcomes are desirable ones (Kahneman & Tversky, 1979). Understood in this way, disease detection behaviors and disease prevention behaviors might be seen as not differentially “risky,” that is, not especially different with respect to the certainty of their consequences. People might easily think many disease prevention behaviors are “risky,” that is, uncertain (“If I exercise regularly, I might or might not still have a heart attack”), and the perceived uncertainty associated with such behaviors may not differ from that associated with disease detection behaviors (“If I have a mammogram, it might or might not show that I have breast cancer”). In any event, an assumption that disease prevention behavior outcomes are relatively certain (low-risk) and disease detection behavior outcomes are relatively uncertain (high-risk) is problematic.

Hence, appealing to the putatively low-risk character of prevention behaviors is not a satisfactory basis for explaining the observed persuasive advantage of gain-framed appeals over loss-framed appeals in that domain. Indeed, no suitable differentiating factor seems on the horizon. However, the present results do place some constraints on any explanation of this sort. Notice that gain- and loss-framed appeals do not differ significantly in persuasiveness in (for example) consumer advertising messages. The implication of this result is that any putatively distinctive feature of disease prevention behaviors (that is, any such feature that is appealed to as a basis for explaining why gain-framed appeals are more successful in that domain than are loss-framed appeals) must presumably be one that distinguishes such behaviors both from disease detection behaviors and from consumer behaviors.

The distinctiveness of experimental realizations? A second possible account of why gain-framed appeals are more persuasive than loss-framed appeals in the realm of disease prevention is that there is something distinctive about the experimental realizations of gain-loss appeal

variations in disease-prevention studies. For example, it might have been the case that in disease-prevention studies, the phrasing of the kernel states was such as to maximize the comparative effectiveness of gain-framed appeals. But, as indicated earlier, no particular way of phrasing the kernel states makes much difference to the relative persuasiveness of gain- and loss-framed appeals.

Unfortunately, the brevity of the usual message descriptions in research reports constrains exploration of many such possibilities. For example, messages might vary in the strength or “dose” of the framing manipulation. Imagine, for instance, one study in which the messages in the gain-loss message pair had identical contents for 90% of the message (that is, the framing variations consisted of 10% of the message) and another study in which only 40% of the contents overlapped (that is, the framing variations consisted of 60% of the message). It might be that such dosing variations systematically influence the appearance of differences in the relative persuasiveness of gain- and loss-framed appeals, but without fuller access to message contents, no post hoc examination of such hypotheses is possible.

Caveats and Limitations

As with any literature review, the conclusions here are necessarily constrained by the state of the research literature. For instance, one might have liked to have known whether any differential persuasiveness of gain- and loss-framed appeals is attenuated in a circumstance in which the gain-framed appeal referred to undesirable kernel states and the loss-framed appeal referred to desirable kernel states, but we found no studies that exemplified such a comparison. And, as with any review, different findings might have emerged if different analytic decisions had been made. For instance, imperfect experimental realizations of the message contrast could

have been included, or different sorts of outcomes might have been distinguished. Of course, nothing forecloses the pursuit of such analytic possibilities in the future.

It might be noticed that, because message texts were unavailable, a number of cases could not be coded for the phrasing of kernel states (nor for various other potential moderators, such as the “dose” of the framing manipulation). If one supposes that the particulars of the concrete realizations of abstract message types might potentially have some systematic influence on observed effects, it will be important that the research community have access to the messages. The common publication practice has been to provide brief descriptions of the message manipulations, descriptions sufficient to provide assurance that the desired message contrast was indeed realized. We believe that, in the long run, providing more extensive descriptions (ideally, access to complete messages) will better serve the research community’s ends.

Even acknowledging these limitations, however, it seems plain that the persuasive effects of gain- and loss-framed appeals are rather more complex than commonly supposed. For instance, although previous reviews have commonly asserted that gain- and loss-framed appeals differ in persuasiveness for messages advocating disease detection behaviors, our more extensive examination of the existing research literature failed to find confirming evidence. Results such as these suggest a cautionary note of broad relevance: Selective or piecemeal literature reviews can too easily endorse appealing but misleading conclusions. General claims about message effects want correspondingly general evidence—evidence of precisely the sort that broad, systematic research reviews can provide.

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Footnotes

¹In experimental realizations of gain-loss message framing variations, an interest in experimental control can make some confounding inevitable. If messages are matched with respect to either the attained-avoided contrast or the desirable-undesirable kernel state contrast, then the gain-loss message variation will be confounded with the other contrast. That is, if both messages are phrased in terms of avoided states (e.g., “compliance reduces the chances of skin cancer” and “noncompliance reduces the chances of healthy skin”), then the gain-loss contrast will be confounded with the desirable-undesirable kernel state contrast, because the gain-framed appeal will have an undesirable kernel state (“skin cancer”) and the loss-framed appeal will have a desirable kernel state (“healthy skin”); if appeals are matched with respect to the valence of the kernel states (e.g., “compliance reduces the chances of skin cancer” and “noncompliance increases the chances of skin cancer”), then the gain-loss contrast will be confounded with the attained-avoided contrast.

²Without taking sides on the question of the argumentative status of nonlinguistic entities (see, e.g., Birdsell & Groarke, 1996; Blair, 1996, 2004; Fleming, 1996), we note that, at a minimum, visual materials are not exemplary instances of arguments (see O’Keefe, 1982, pp. 14-15).

³Promises, like gain-framed messages, emphasize some desirable outcome of compliance; threats, like loss-framed messages, emphasize some undesirable outcome of noncompliance. But, conventionally understood, the outcomes invoked in promises and threats are ones under the control of the influencing agent (and so, for example, the effectiveness of promises and threats may turn in large part on the receiver’s beliefs about such things as the

communicator's willingness to carry out the pledged future act). This aspect of promises and threats makes those message forms sufficiently distinctive that they are put aside here.

⁴A reader wondered whether the inability to include these insufficient-information cases makes for a conservative picture of overall effects. Any discussion of this question is necessarily speculative, but two considerations suggest that our reported results are unlikely to differ much from what might have been obtained had information been available about these cases. First, these cases commonly either had smaller samples (e.g., $N = 52$ for Burroughs, 1997; $N = 63$ for Mann et al., 2004) or had statistically nonsignificant overall differences between framing conditions (e.g., Giles, 2002; Gnepa, 2001; Horgen & Brownell, 2002; Martin & Marshall, 1999; Martinez, 1999; Miller et al., 1999; Wegener et al., 1994) even with larger samples (e.g., for Devos-Comby et al., 2002, N was approximately 500; for McCroskey & Wright, 1971, $N = 176$; for Merrill, 2003, $N = 165$). That is, generally speaking, the effect sizes in these studies either must have been relatively small or were based on small samples; the implication is that the mean effects we report here are unlikely to have been dramatically larger if we had been able to include these cases (i.e., our estimates are not notably conservative). Second, the number of analyzed cases (165) is relatively large compared to the number of unavailable cases. Taken together, these two considerations suggest that the unavailability of information about these cases is likely to have had little effect on the general picture presented here.

⁵We did not adjust effect sizes for unreliability, range restriction, or other such factors. We share Rosenthal's (1991, p. 25) view that "the proper goal of a meta-analysis . . . is to teach us better what *is*, not what might some day be in the best of all possible worlds when all our independent and dependent variables are perfectly measured, perfectly valid, perfectly continuous, and perfectly unrestricted in range."

⁶As noted by Salovey and Wegener (2003, p. 61), some health-related behaviors might plausibly be described as either (or both) a disease-detection behavior and a disease-prevention behavior. For example, Pap tests and colonoscopies provide both early detection of cancer and prevention of cancer (by virtue of the opportunity for identification and removal of precancerous abnormalities). In such cases, persuaders might invoke either appeals emphasizing the disease-detection aspects of the advocated action or appeals underscoring the disease-prevention aspects. One potentially useful way of analyzing such “dual-function” behaviors would be to distinguish cases based on whether the appeals used to underwrite the recommended action stressed detection or prevention. But because so few studies of such dual-function behaviors are available, we classified such behaviors as “other health-related behaviors.”

⁷These are, overwhelmingly, independent effect sizes. As described earlier, if a study contained multiple relevant outcomes (dependent variables), effect sizes were initially computed separately for each outcome and then averaged to yield a summary estimate of persuasive effect for that study. Thus, each of the 165 effect sizes is based on a distinct human sample (with the exception of the two effects associated with Sheer’s, 1995, within-subject design) and on a distinct manipulation (message pair).

⁸As examples from other meta-analytic reviews (with effects expressed as the absolute value of an n -weighted mean r , computed using the $r-z-r$ transformation procedure, using the individual effect sizes reported in each meta-analysis): The mean effect on request compliance of the door-in-the-face strategy is .08 (O’Keefe & Hale, 1998) and that of the foot-in-the-door strategy is .11 (Dillard, Hunter, & Burgoon, 1984). The mean persuasive effect associated with variations in language intensity is .02 (Hamilton & Hunter, 1998) and that of rhetorical questions is .05 (Gayle, Preiss, & Allen, 1998). The mean difference in persuasive effects between one-

sided messages and refutational two-sided messages is .07 and that between one-sided messages and nonrefutational two-sided messages is .03 (O'Keefe, 1999).

⁹The significant effect for “other” topics becomes just barely nonsignificant if the single study with a very large sample (Berger & Smith, 1997) is excluded: mean $r = .071$ ($k = 18$), $p = .051$; the 95% confidence interval limits were $-.000$ ($-.0002$) and $.142$.

Table 1

Cases Analyzed

Study	r	N	Codings ^a
Al-Jarboa (1996)	-.078	120	5/3/3
Apanovitch et al. (2003)	.064	425	1/3/3
Arora (1998) library	.088	141	5/3/3
Arora (1998) resort	.095	141	5/1/2
Arora (2000)	-.157	210	1/3/1
Arora & Arora (2004)	.088	267	2/2/4
Banks et al. (1995)	-.011	133	1/3/1
Benz Scott (2000) immediate	-.067	194	2/3/3
Benz Scott (2000) future	.011	193	2/3/3
Berger & Smith (1997)	.016	18,144	6/1/1
Block (1993) self-exam	-.222	57	1/2/1
Block (1993) sun exposure	.174	58	2/2/1
Block & Keller (1995) Study 1	-.077	94	3/2/1
Bono Santos & Rodriguez Torronteras (1991)	.067	86	2/1/1
Bower & Taylor (2003)	-.206	208	3/3/1
Brenes (1999)	.016	142	1/4/4
Broemer (2002) Study 2	-.079	120	2/3/3
Broemer (2002) Study 3	-.036	80	2/2/1
Broemer (2004) Study 1 combined	-.104	140	2/2/1
Broemer (2004) Study 2	.167	60	1/3/3

Broemer (2004) Study 3	.196	144	2/2/1
Brondino (1997)	.040	98	2/3/1
Brug et al. (2003) Study 2	.039	149	2/4/4
Brug et al. (2003) Study 3	-.061	92	2/4/4
Cesario et al. (2004) prevention	-.169	53	2/3/3
Cesario et al. (2004) promotion	.115	53	2/1/2
C. Chang (2002)	.168	160	5/1/2
C. T. Chang (2003) mouthrinse	.302	51	2/4/4
C. T. Chang (2003) disclosing gum	-.043	52	1/4/4
C. T. Chang (2003) rinse tablets	.620	49	2/4/4
C. T. Chang (2003) disclosing strips	.698	50	1/4/4
Chebat et al. (1998) ATMs	.290	56	5/4/3
Chebat et al. (1998) student loans	-.102	56	5/4/3
Cothran, Schneider, & Salovey (1998)	-.085	218	1/4/4
Cox & Cox (2001) anecdotal	-.306	55	1/3/3
Cox & Cox (2001) statistical	.046	55	1/2/1
Davis (1995)	.108	218	6/3/3
Detweiler et al. (1999)	.115	217	2/3/3
Dibble (1998)	.032	283	6/3/1
Evans et al. (1970)	.239	234	2/1/1
Ferguson et al. (2003) Study 4	.295	65	2/3/3
Ferguson et al. (2003) Study 5 noise	.009	188	2/3/3
Ferguson et al. (2003) Study 5 handling	.000	263	2/3/3

Ferguson et al. (2003) Study 6 consequences	-.161	49	2/3/3
Ferguson et al. (2003) Study 6 solutions	-.066	49	2/3/3
Finney (2001)	-.044	628	1/2/1
Fischer & Nabi (2001) sunscreen	-.191	79	2/3/1
Fischer & Nabi (2001) skin exam	.144	87	1/3/1
Ganzach & Karsahi (1995) check	-.318	117	5/3/3
Ganzach & Karsahi (1995) cash	-.161	123	5/3/3
Ganzach et al. (1997) Study 2	-.230	144	5/3/3
Ganzach et al. (1997) Study 3	-.150	175	5/1/1
Gardner & Wilhelm (1987)	.167	203	5/4/4
Gintner et al. (1987)	.051	177	1/4/4
Grantham & Irani (2004)	.101	274	6/4/4
Greenlee (1997)	.107	134	2/3/3
Hashimoto (2002)	-.013	166	2/2/1
Hasseldine (1997) legal sanctions	.023	196	6/2/1
Hasseldine (1997) conscience	.000	201	6/3/3
Hessling (1996)	.121	273	2/2/3
Hoffner & Ye (2004)	.000	154	2/1/1
Homer & Yoon (1992)	.034	239	2/1/3
Hsiao (2002) exercise-prevention	.546	49	2/3/3
Hsiao (2002) exercise-detection	-.378	51	2/3/3
Hsiao (2002) testing-prevention	-.300	46	1/3/3
Hsiao (2002) testing-detection	.308	46	1/3/3

Jayanti (2001)	.007	69	2/4/4
Jones et al. (2003)	.048	192	2/3/3
Keller et al. (2003)	-.024	162	1/3/3
Knapp (1989) health	.046	38	2/3/1
Knapp (1989) social	-.084	40	2/1/1
Lauver & Rubin (1990)	-.060	116	1/1/2
Lawatsch (1987)	.071	72	2/1/3
Lee & Aaker (2004) grape juice promotion	.188	204	5/1/2
Lee & Aaker (2004) grape juice prevention	-.199	173	5/2/1
Lee & Aaker (2004) Experiment 2 promotion	.055	85	2/1/2
Lee & Aaker (2004) Experiment 2 prevention	-.173	78	2/3/3
Lee & Aaker (2004) Experiment 3 high risk	-.312	45	2/3/3
Lee & Aaker (2004) Experiment 3 low risk	.382	36	2/3/3
Lee et al. (2000) self-exam	-.106	137	1/1/2
Lee et al. (2000) sunscreen/clothing	.119	132	2/2/1
Lemieux et al. (1994) vivid high fear	.039	51	2/4/4
Lemieux et al. (1994) pallid high fear	.132	50	2/4/4
Lemieux et al. (1994) vivid low fear	.070	50	2/4/4
Lemieux et al. (1994) pallid low fear	.019	50	2/4/4
Lerman et al. (1992)	-.011	203	1/4/4
Levin et al. (2001)	-.127	224	2/2/1
Levin et al. (2002)	.021	102	2/2/1
Littlejohn (1997) Experiment 1	-.019	240	6/3/3

Littlejohn (1997) Experiment 2	.010	388	6/1/3
Looker (1983)	.006	227	2/1/1
Lord (1994)	-.003	120	6/3/3
Lowenherz (1991)	.006	83	2/4/4
Maheswaran & Meyers-Levy (1990)	.023	98	1/3/3
Martin & Lawson (1998)	-.049	177	6/1/1
McArdle (1972)	-.080	80	3/1/1
McCall & Ginis (2004)	.311	29	2/3/3
McCaul et al. (2002)	-.012	6,522	2/2/1
McKee et al. (2004)	.067	271	2/3/3
Meyerowitz & Chaiken (1987) combined	-.219	91	1/3/3
Meyers-Levy & Maheswaran (2004)	.270	147	2/3/3
Millar & Millar (2000)	.079	277	2/3/3
Mitchell (2001)	-.010	125	3/4/4
Myers et al. (1991)	-.035	2,201	1/4/4
Oshikawa (1965) Abel	-.117	123	5/1/3
Oshikawa (1965) Baker	.141	119	5/1/3
Pedley (1986)	-.309	20	2/3/3
Phelan (2003)	.000	60	1/4/4
Powell & Miller (1967)	-.208	126	6/1/1
Radecki (1997)	-.012	385	6/4/4
Ramirez (1977)	.030	116	2/4/4
Reese (1997)	.168	40	3/3/1

Richardson et al. (2004)	-.233	382	2/4/4
Rivers et al. (2005) detection	-.016	238	3/4/4
Rivers et al. (2005) prevention	.000	242	3/4/4
Robberson (1985) health	-.190	24	2/3/3
Robberson (1985) self-esteem	.537	24	2/1/3
Robertson & Welbourne (2000) positive scenario	-.024	80	2/4/4
Robertson & Welbourne (2000) negative scenario	.001	80	2/4/4
Rothman et al. (1999) Experiment 1 detection	-.349	40	1/3/3
Rothman et al. (1999) Experiment 1 prevention	.052	40	2/3/3
Rothman et al. (1999) Experiment 2 detection	-.305	60	1/2/1
Rothman et al. (1999) Experiment 2 prevention	.182	60	2/2/1
Ruiter et al. (2003)	-.099	110	1/4/4
Schmitt (2004)	-.055	150	1/4/4
Schneider, Salovey, Apanovitch, et al. (2001)multicultural	-.138	264	1/4/4
Schneider, Salovey, Apanovitch, et al. (2001)targeted	.047	264	1/4/4
Schneider, Salovey, Pallonen, et al. (2001)	.186	437	2/4/3
Sen, Gurhan-Canli, & Morwitz (2000)	.208	147	6/4/4
Shannon & Rowan (1987)	.031	138	2/4/4
Sheer (1995) threat-L	.093	205	2/3/2
Sheer (1995) threat-S	.178	205	2/3/2
Shiv airline on-time	.089	161	5/3/1
Shiv airline on-time and amenities	-.066	310	5/3/1
Shiv detergent	-.117	380	5/1/1

Simmering (1993) non-social	-.030	78	2/3/1
Simmering (1993) social	.027	77	2/1/3
Smith (1996)	.050	390	5/1/1
Smith & Petty (1996) Experiment 1 strong	-.185	32	6/4/4
Smith & Petty (1996) Experiment 1 weak	.356	28	6/4/4
Steward (2002) Study 1 education	-.083	91	4/3/3
Steward (2002) Study 1 exchange	-.163	89	4/3/3
Steward (2002) Study 2	-.064	244	4/1/3
Steward et al. (2003)	.013	853	2/3/3
Thorsteinson & Highhouse (2003) Experiment 1	.587	69	6/1/2
Thorsteinson & Highhouse (2003) Experiment 2	.453	100	6/4/4
Thorsteinson et al. (1999) Experiment 1	.025	94	6/1/2
Turner (2004)	.021	246	3/4/4
Tykocinski et al. (1994)	.029	39	3/4/4
Umphrey (2003)	.085	128	1/3/3
van Assema et al. (2001) low-fat	.035	75	2/3/1
van Assema et al. (2001) fruit & vegetable	.068	66	2/3/1
Vasilias (1999)	-.007	270	2/3/1
Wenburg (1969)	.013	532	6/3/1
Wheatley & Oshikawa (1970)	-.022	154	5/1/3
Wilkin (2004) condom	.150	118	2/4/4
Wilkin (2004) Pap	-.039	118	3/4/4
Williams et al. (2001)	-.089	307	1/4/4

Yalch & MacLachlan (1977)	.098	184	5/1/1
Yates (1982) solar-isolated	-.056	58	5/1/1
Yates (1982) solar-integrated	.159	57	5/1/1
Yates (1982) insulation-isolated	-.141	30	5/1/1
Yates (1982) insulation-integrated	-.193	26	5/1/1
Ying (2001) concrete	-.021	140	1/3/3
Ying (2001) abstract	.069	140	1/3/3

^aThe coding judgments, in order, are: topic category (1 = disease detection, 2 = disease prevention, 3 = other health, 4 = sociopolitical, 5 = consumer advertising, 6 = other); gain kernel-state language (1 = desirable states, 2 = undesirable states, 3 = both desirable and undesirable states, 4 = indeterminate); loss kernel-state language (1 = undesirable states, 2 = desirable states, 3 = both desirable and undesirable states, 4 = indeterminate).

Table 2

Summary of Results

	<i>k</i>	<i>N</i>	<i>r</i>	mean 95% CI	<i>Q</i> (<i>df</i>)
All cases	165	50,780	.016	-.004, .035	465.7 (164)**
health					
disease prevention	74	16,255	.046	.015, .078	193.1(73)**
disease detection	34	7,112	-.027	-.072, .018	89.6(33)**
other	10	1,430	-.038	-.092, .016	9.4(9)
sociopolitical	3	424	-.089	-.183, .007	.6(2)
consumer advertising	25	3,805	-.013	-.074, .049	77.0 (24)**
other topics	19	21,754	.060	.006, .114	71.2(18)**
gain kernel language					
desirable	36	23,277	.022	-.018, .063	98.7(35)**
undesirable	19	9,431	-.006	-.055, .042	39.6(18)*
both desirable and undesirable	65	9,540	-.002	-.036, .033	156.2(64)**
indeterminate	45	8,532	.052	.005, .098	166.5(44)**
loss kernel language					
undesirable	49	31,917	-.012	-.039, .014	92.8(48)**
desirable	12	1,679	.098	-.009, .202	48.0(11)**

both desirable and undesirable	61	8,934	.007	-.031, .044	164.7(60)**
indeterminate	43	8,250	.046	-.001, .092	149.1(42)**

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

Table 3

Joint Gain and Loss Kernel Phrasing

Gain kernel phrasing	Loss kernel phrasing			
	desirable	undesirable	combination	indeterminate
desirable				
mean r	.091	-.007	.020	
95% CI	-.042, .221	-.059, .045	-.053, .093	
k	10	17	9	0
N	1,269	20,568	1,440	
$Q(df)$	45.7(9)***	36.6(16)**	13.2(8)	
undesirable				
mean r		-.025		
95% CI		-.076, .026		
k	0	17	1	1
N		8,891		
$Q(df)$		31.9(16)*		
combination				
mean r	.136	-.008	-.010	
95% CI	.039, .230	-.057, .041	-.054, .034	
k	2	15	48	0
N	410	2,458	6,672	
$Q(df)$.8(1)	18.1(14)	129.8(47)***	

indeterminate

mean r			.139	.045
95% CI			-.062, .329	-.003, .092
k	0	0	3	42
N			549	7,983
$Q(df)$			5.0(2)	147.2(41)***

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