

# Framing and Conflict: Aspiration Level Contingency, the Status Quo, and Current Theories of Risky Choice

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The effect of positive versus negative frames on risky choice was examined for a variety of scenarios and risks. Preferences in the positive domain were strong and mainly risk averse, with notable exceptions. Preferences in the negative domain, however, were marked by their inconsistency, shown both by an overwhelming lack of significant majority preferences and a surprisingly strong tendency of individual subjects to vacillate in their negatively framed choices across presentations. This finding is accounted for by a proposed *aspiration level contingency* in which aspiration levels are systematically set to be more difficult to achieve in the face of a perceived loss than a gain. The implications of the results, and the aspiration level contingency, are explored with respect to current theories of risky choice, including Kahneman and Tversky's (1979) prospect theory and Lopes's (1987, 1990) security-potential/aspiration theory.

When making choices, people are sensitive to the way in which the options are presented. The framing effect, initially described by Tversky and Kahneman (1981), exemplifies this sensitivity. They found that people's preferences among options were dependent on how those options were described. Different representations frequently elicited different preferences even though the objective outcomes remained the same from one representation to the next.

The most well-known example of the framing effect involves the "Asian disease problem," in which the outcomes of potential courses of action are described or framed positively in terms of lives saved or negatively in terms of lives lost, whereas the actual potential outcomes of the problem remain objectively the same in both cases. Tversky and Kahneman (1981) found that when the outcomes of the scenario were framed positively, a majority of their 152 subjects (72%) had *risk-averse* preferences, selecting a certain alternative over a risky alternative of equal expected value. In contrast, when the same outcomes were framed negatively, a majority of an independent group of 155 subjects (78%) had *risk-seeking* preferences, choosing the risky alternative over the certain one.

Tversky and Kahneman (1981, 1986; Kahneman & Tversky, 1984), as well as others, have demonstrated several ways in which decisions may be influenced by the framing of options. Framing effects have been demonstrated in the context of dominated alternatives, one- versus two-stage gambles,

"paying" versus "losing" effects, and effects due to changes in the "mental accounts" being considered (see also Bierman, 1989; Metzger & Krass, 1988; Slovic, Fischhoff, & Lichtenstein, 1982; Thaler, 1980, 1985; Thaler & Johnson, 1990). Perhaps the most interesting example of framing effects involves a valence manipulation in which the same outcomes are described in positive or in negative terms. The manipulation has much in common with the proverbial description of the same glass of water as half full or half empty. What seems remarkable is the fact that this seemingly superficial change in perspective can have a substantial impact on decision making.

## Prospect Theory and Framing Effects

Kahneman and Tversky (1979, 1984; Tversky & Kahneman, 1981, 1986) offer prospect theory as a potential explanation of framing effects. Prospect theory was designed as an alternative to more traditional expected utility theories of decision making under risk. According to prospect theory, risky decision making involves (a) an editing phase in which available options or prospects are coded to yield simplified mental representations, and (b) an evaluation phase in which subjective outcome values and probability weights are psychophysically determined for each prospect and are integrated into a single prospect value. The integration equation for each prospect is the weighted sum of each of the prospect's subjective outcome values. The final prospect values are compared so that the prospect with the highest value may be chosen.

Of the editing operations, the most important for explaining framing effects involving valence is the coding operation. This operation is responsible for describing each possible outcome relative to a psychologically neutral reference point. Outcomes above the reference point are perceived as gains, and outcomes below the reference point as losses.

Within the evaluation phase, the value function plays a critical role in explaining differences in behavior as a function of positive and negative frames. The psychophysical relationship between objective and subjective outcome values is char-

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acterized as an S-shaped function.<sup>1</sup> In general, the shape of this value function (in conjunction with the integration equation) implies that people will prefer a sure thing to a gamble of equal expected value (risk aversion) for gains but will prefer a gamble to an equivalent sure thing (risk seeking) for losses. Hence, when outcomes are framed positively, they will be coded as gains and, as a result, risk-averse choices are predicted. When outcomes are framed negatively, however, they will be coded as losses, resulting in risk-seeking choices. The value function is also steeper in the loss domain than in the gain domain. In consequence, "losses loom larger than gains," or a loss is perceived to be more aversive than an equivalent gain is pleasant.

The appeal of prospect theory as an explanation of framing effects has been widespread. The S-shaped value function has been implicated in a multitude of studies investigating the effects of positive and negative frames, not only in basic research but also in applied contexts, including negotiation (e.g., Bazerman, Magliozzi, & Neale, 1985; Neale, Huber, & Northcraft, 1987), industry (e.g., Qualls & Puto, 1989), national security (e.g., Kramer, 1989), social dilemmas (e.g., Brewer & Kramer, 1986; Fleishman, 1988), and health care (e.g., McNeil, Pauker, Sox, & Tversky, 1982; Meyerowitz & Chaiken, 1987). Moreover, practitioners in many areas are being warned of the potential impact of framing on their own or their clients' judgments (e.g., Bazerman, 1983; Burton & Babin, 1989; Travis, Phillippi, & Tonn, 1989).

### Risk Preferences and Framing

Several studies of framing effects amply demonstrate that changes in the representation of information can have potent effects on decision behavior. However, they are not as apt to demonstrate that these effects are due exclusively to changes from risk-averse preferences in the positive frame to risk-seeking preferences in the negative frame. In fact, in many of the applied studies, it is difficult to determine exactly how risk and risk-taking propensity should be defined or measured. Even in those studies in which the characterization of risk is relatively straightforward, results tend to differ substantially from one investigation to the next.

Framing studies in which the characterization of risk is clear-cut tend to use scenarios that are similar to, or have been modeled after, Tversky and Kahneman's (1981) Asian disease problem. Despite the structural similarity of the tasks across studies, however, results range from no difference between positive and negative frame choices to sizable differences in choice that vacillate not only in response to changes in frame but also to changes in other variables.

Fagley and Kruger (1986), for example, found no framing effects when they asked a large group of school psychologists to respond to a hypothetical scenario involving programs to prevent school dropouts. For half of the subjects, the program outcomes were framed in terms of the number of students staying in school, and for the other half in terms of the number of students dropping out of school. In both frame conditions, the majority of subjects (70% in the positive frame and 67% in the negative frame) made risk-averse choices, preferring the certain option to the risky option. The lack of a framing

effect is attributable to the fact that, contrary to predictions, subjects did not predominantly prefer the riskier option in the negative frame condition.

In subsequent work using a problem involving lives threatened by cancer, Fagley and Miller (1987) again found that a majority of subjects preferred the certain option in the positive frame in each of two studies. However, preferences for the certain option were also relatively strong in the negative frame, with a majority of subjects (master's of business administration students) in the first study and half of the subjects (college of education graduate students) in the second study preferring the certain option over the risk. Hence, positive frame results were generally consistent with predictions, but negative frame results were not supportive of predictions. Responses to risky choices in the negative frame were not predominantly risk seeking in either study.

Sometimes, framing effects will appear and disappear with various changes in scenarios. Levin (1990) found relatively strong framing effects for a problem involving lives threatened by acquired immune deficiency syndrome (AIDS) if the victims were hemophiliacs. The results were exactly those expected. Eighty percent of the subjects made the risk-averse choice in the positive frame, and 80% of another group of subjects made the risk-seeking choice in the negative frame. When the scenario was again presented but this time with the victims changed to homosexuals or drug users, no framing effect was found. Only half of the positive frame subjects chose the sure thing, and just less than half (40%) of the negative frame subjects chose the risk. In this version, a consensus in preference was not clearly evident for either frame. Levin concluded that factors such as the perceived desirability of particular social groups can mediate the impact of framing.

In another set of studies, Wagenaar, Keren, and Lichtenstein (1988) demonstrated that differences in the surface structure of a problem can have a profound impact on risk preferences. Although in the three studies they conducted only negatively framed scenarios were used, the degree of risk seeking changed drastically as various aspects of the scenario changed. The basic scenario, involving islanders exposed to a life-threatening disease, was adopted from a study by Ham-merton, Jones-Lee, and Abbott (1982) in which it was reported that only 17% of subjects made risk-seeking choices even though outcomes were framed in terms of probability of dying. In their first study, Wagenaar et al., found that expanding the story, providing more explicit outcome probability information, and clarifying the decision maker's role (islander or medical officer) led to differences in risk preferences,

<sup>1</sup> Prospect theory does not necessitate that all individuals in all situations have an S-shaped value function; functions of this shape are merely hypothesized to be among the most common. Nevertheless, it is the S-shape of the value function that is critical for the prediction of framing effects characterized by risk-averse preferences in the positive frame and risk-seeking preferences in the negative frame. Because Tversky and Kahneman (e.g., 1981, 1986) themselves regularly rely on the presence of an S-shaped value function to predict and explain framing effects, it seems reasonable to make the same general assumption in this context.

with the percentage of subjects choosing the risky option ranging from 39% to 63%.

In the second study, they found that preferences were affected by whether the uncertain outcomes were associated with action or inaction on the part of the decision maker. In general, risky outcomes tended to be more popular when they required taking action; however, the effect was mediated both by the decision maker's role and by the subject population (Dutch vs. American students). In all cases, agreement among subjects was weak. Between 42% and 68% of subjects chose the risky option across each of the conditions, indicating that subjects were relatively evenly split between risk-averse and risk-seeking preferences.

In the third and final study, Wagenaar et al. (1988) attempted to generalize their findings from the islanders problem to a problem involving children held hostage in a kindergarten. The change in context resulted in a dramatic change in preferences. Regardless of decision-maker role or the association of risky outcomes with action versus inaction, the vast majority of subjects (85% to 92%) preferred the risky option over the certain death of a child. As the authors point out:

It is abundantly clear that change of cover story affected the deep structure of the problem as it was analyzed by subjects. Even if we had proposed a theory that would account for all results obtained with the islander cover story, it is not clear how such a theory would predict these dramatically different results for the hostages problem. (p. 186)

They conclude that the prospect theory explanation of framing cannot account for these results because all proposed editing and evaluation operations are carried out on probabilities and outcomes, essentially independent of scenario context.

Besides the inconsistency in the presence and strength of framing effects across studies, an additional concern is the generality of the framing effect with respect to the individual. In the original presentation of the Asian disease problem, for example, different groups of subjects responded to the positive and negative frame versions. Although majority preferences were opposite across frames, it is not clear to what extent each individual may have succumbed to a framing effect. Moreover, within each frame, we can be assured that 28% of the positive frame subjects and 22% of the negative frame subjects were behaving in a fashion inconsistent with the prediction of risk aversion for gains and risk seeking for losses.

In one portion of a larger study, Frisch (in press) asked each of her subjects to respond to both the positively framed and negatively framed versions of the Asian disease problem. Although 59% of the 136 subjects made risk-averse choices in the positive frame and 62% made risk-seeking choices in the negative frame, the percentage of subjects who showed the expected pattern of preferences across *both* domains was only 29%. Hence, almost three fourths of the subjects showed an overall preference pattern that is inconsistent with the framing prediction based on prospect theory. Although the lack of framing effects at the level of the individual may be due in part to carryover effects, these were minimized by interspersing other problems between frame pairs. Regardless of potential carryover effects, these results suggest that group data may not accurately reflect the susceptibility of individuals

to the effects of frame and that framing effects for individuals may not be as common as is generally believed.

### Risk Aversion and Risk Seeking

Although studies of the framing effect routinely invoke the prospect theory prediction of risk-averse preferences in the positive frame and risk-seeking preferences in the negative frame, there is a noticeable absence of systematic assessments of the degree to which this prediction actually captures decision-making behavior. However, in studies in which monetary gambles replace the decision scenario and actual gains and losses replace positive and negative frames, there is evidence that preferences often do not conform to the prediction of risk aversion for gains and risk seeking for losses. Although there are cases in which the predicted pattern is observed, there are as many cases, if not more, in which the pattern is not observed.

For example, Hershey and Schoemaker (1980) examined preferences between two-outcome gambles and their certainty equivalents. They found that majority preferences could not be accurately predicted for either domain and that preference reversals from the gain to the loss domain were the exception rather than the rule. Although the option pairs varied widely in both amounts and probabilities, there were many cases in which no significant majority preferences were observed, especially among option pairs involving losses. Of the 25 option pairs presented in the first two experiments, there were significant majority preferences for only 15 of the 25 gain pairs. Of those 15, 12 represented a predominance of risk-averse choices and the other 3 represented a predominance of risk-seeking choices. For losses, only 10 of the 25 option pairs showed significant majority preferences, with 9 representing a risk-seeking majority and 1 a risk-averse majority. Overall, evidence of predominantly risk-averse preferences for gains and risk-seeking preferences for losses was weak and inconsistent.

In a study of multi-outcome lottery preferences for both gains and losses, Schneider and Lopes (1986) found that preferences varied across subjects and across lottery types. For those subjects who had been preselected for their risk-averse behavior in a task involving two-outcome gambles representing gains, multi-outcome lottery preferences were generally risk-averse for gains but were not consistently risk seeking for losses. In contrast, for those subjects preselected for their risk-seeking behavior in the same two-outcome task, multi-outcome lottery preferences were not consistent across the domain of gains but were generally risk-seeking for losses. For both groups of subjects, the combined prediction of risk-averse preferences for gains accompanied by risk-seeking preferences for losses was only supported for a small minority of pairs.

### Understanding Framing Effects for Risks

What all of this evidence seems to suggest is that risk preferences frequently do not exhibit the pattern of risk-averse preferences in the positive domain coupled with risk-seeking preferences in the negative domain. Although risk-averse pref-

Table 1  
*Decision Scenario Key*

Code/issue	Source	Description
AD: Asian disease	Adapted from Tversky & Kahneman, 1981	Threat to 600 human lives from disease
CA: Cancer	Adapted from Fagley & Miller, 1987	Threat to 1,200 human lives from cancer
PO: Poisoning	Adapted from Fischhoff, 1983	Threat to 3,000 human lives from poisoning
PE: Pesticide	Original	Threat to 1,200 endangered animal lives
PR: Preservation	Original	Threat to last 1,200 lives of one animal species
DO: Dropouts	Adapted from Fagley & Kruger, 1986	Threat of 900 students dropping out of high school
PC: Plant closing	Adapted from Bazerman, 1982	Threat to 600 jobs from plant closing
WO: Workers	Original	Threat to 600 potential jobs in a new factory
EQ: Equipment	Original	Threat to recovery of \$30,000 from forced sale

ferences are relatively common for positive options, risk-seeking preferences do not seem to be reliably associated with negative options. Given that the framing effect described by Tversky and Kahneman (e.g., 1981, 1986) has been explained on the basis of this relationship in risk preferences across domains, it becomes important to establish the prevalence of this particular pattern of preferences. Moreover, for those instances in which the predicted pattern is not found but framing effects are still evident, it becomes necessary to search for other contributing factors that may explain the observed change in preferences.

The purpose of this investigation is to examine the strength, generality, and form of framing effects across a variety of choices involving risk. To obtain a broad sampling of preferences, several scenarios are presented and options are widely varied both in terms of probability of occurrence and size of potential outcomes. The scenarios tap several topics including threats to human lives from disease or disaster, threats to endangered animal lives, threats to jobs, threats to students, and threats to financial investments. The options vary not only in the extremeness of probabilities and outcomes but also in the presence or absence of riskless components (i.e., risks in which all component outcomes are nonzero).

The study is designed to compare the size and direction of framing effects across different scenarios and options, focusing on the extent to which positive frame preferences are risk averse and negative frame preferences are risk seeking. To gain a more complete understanding of the prevalence of particular preference patterns, comparisons are conducted both at the level of group majority preferences and at the level of individuals' preferences. Strength of preference within each frame is examined in terms of the degree of consensus across subjects as a group and in terms of the level of consistency of each individual's choices over time. Throughout, preference patterns are identified and assessed in an effort to isolate those factors that may contribute to choice, either in concert or in opposition, as one moves from a positive to a negative frame.

## Method

### *Stimuli*

*Decision scenarios.* The stimuli included nine different decision scenarios.<sup>2</sup> The scenario types are listed in Table 1 and include variations of several previously published problems as well as several original problems. The topics of the scenarios included threats to human lives from new and existing diseases and from poisoning, threats to endangered animal lives, threats of students dropping out of high school, threats to new and existing jobs, and threats of monetary losses. Regardless of topic (or source), each scenario was structured using a systematic approach that ensured that each scenario outlined (a) the type, cause, and extent of threat; (b) the course of action used to generate potential solutions; (c) the information that it is only possible to implement a single option; and (d) the provision of an explicit role in choosing an option along with a clearly implied goal.

Each scenario was presented to subjects both visually and orally. Scenarios were visible on an overhead projector screen while the experimenter read the scenario aloud. The scenario remained visible throughout all relevant trials.

*Options.* Four basic options were created and edited for each frame and each scenario. All options had an expected value of one half of the total number threatened. The general pre-edited forms of these options are presented in Table 2 for the positive (and negative) frames. Although fractions are listed in Table 2, the actual options listed the specific number of lives, jobs, and so on, threatened. With the exception of the sure thing (ST), each option is coded according to the probability of the best outcome followed by the probability of the worst outcome regardless of frame.

<sup>2</sup> In actuality, the stimulus set contained a tenth scenario involving a threat to the recovery of \$600 from the purchase of an unused plane ticket. Because of the belated discovery of a typographical error present in one of the negative options associated with this scenario, all data regarding this stimulus were later omitted from the analysis. For ease of exposition, reference to the plane ticket scenario has been deleted throughout.

Table 2  
*Basic Options for the Positive (and Negative) Frame*

Code	Option
ST	1/2 will be saved (1/2 will be lost) for sure
25/75	25% chance that all will be saved (none will be lost) with 75% chance that 1/3 will be saved (2/3 will be lost)
50/50	50% chance that all will be saved (none will be lost) with 50% chance that none will be saved (all will be lost)
75/25	75% chance that 2/3 will be saved (1/3 will be lost) with 25% chance that none will be saved (all will be lost)

*Note.* Except for the sure thing (ST), options are coded with the probability of the best outcome listed first followed by the worst outcome, regardless of frame. Although the option outcomes are listed here in fraction form, they appeared as the actual number of lives, jobs, and so on, threatened within each scenario.

To establish the relative riskiness of each of the option types according to conventional standards, the expected utility of each option in each scenario was calculated and compared using a series of marginally decreasing power functions with exponents ranging from .1 (*ridiculously severe risk aversion*) to .99 (*virtual risk neutrality*). Because these functions are designed to capture the preferences of persons who are averse to taking risks (and given that the objective expected value of each of the four options was equal), the option with the largest or best expected utility (i.e., the most preferred) was deemed the least risky and the option with the worst expected utility (i.e., the least preferred) was deemed the most risky.

For all of the sampled utility functions, the ordering of the options from least to most risky is as follows: ST, 25/75, 75/25, and 50/50. Moreover, the size of the difference in utility between adjacent pairs always increases from ST versus 25/75 to 75/25 versus 50/50.

For the experiment, each of the four options was paired, resulting in six unique pairs for each frame. The options were always presented in pairs on a second overhead projector placed to the right of the projector displaying the current scenario. Pairs were presented in a random order, with the exception that no option appeared in three successive pairs. Within a pair, each option was as likely to appear at the top of the screen (labeled Option A) as at the bottom of the screen (labeled Option B).

### *Design and Procedure*

The design of the study was primarily within-subjects. Each subject viewed all nine scenarios in both the positive and negative frame conditions. The six unique pairs presented for each scenario were derived from the four options possible. For each pair, the subject's task was to select which of the two options he or she would prefer or recommend. An excerpt of a portion of the instructions follows:

You will be read several short passages describing various hypothetical situations for which a decision must be made. You will be presented with a pair of possible options to deal with the situation, only one of which may be chosen. For each pair of options, your job will be to select the option which you would prefer. . . . In all cases, you are to assume that the options are equally realistic, equally easy to carry out, etc. The only way in which they differ for our purposes is in the likelihood that particular outcomes will occur. . . . It is also very important that you understand that there are no right or wrong answers in this task. The purpose of the study is strictly to learn more about

how people respond to risky situations. . . . For each story, we will present 6 pairs of options. Each pair should be considered as if no others had been presented previously—that is, treat each pair of possible options as the only two available.

The experiment consisted of two sessions separated by exactly 1 week, one using positively framed options and the other using negatively framed options. Subjects were divided into two groups, such that one group experienced the positive frame condition in the first session and the negative frame condition in the second (pos-neg group), whereas the other group completed the experiment in the reverse order (neg-pos group).

In each session, subjects were presented each of the nine scenarios in random order twice. After the experimenter read a given scenario aloud, each of the six possible option pairs was presented for a period of 15 s, during which time subjects indicated which of the two options was preferred by circling the letter A (top option) or B (bottom option) on the answer sheet provided. When each of the six pairs was completed, the next scenario was introduced. When all nine scenarios had been completed, the entire procedure was repeated with no change in frame but a new random ordering of the scenarios and pairs. Subjects were informed that the second presentation was necessary to establish the degree of consistency in choices. Given subjects' familiarity with the scenarios and options, each pair was presented for only 10 s during the second presentation. Overall, subjects completed a total of 108 choices in each session (9 scenarios  $\times$  6 option pairs  $\times$  2 presentations).

Just before the first session, subjects were briefly reminded of ways to interpret the option percentages as fractions and as portions of a pie. Immediately before both the first and second sessions, subjects completed two practice trials to become familiarized with the answer sheet and experimental format. No feedback or further instruction was provided subsequent to the practice trials.

### *Subjects*

The subjects were 45 students enrolled in an undergraduate introductory psychology course. Subjects were divided into the two framing order groups on the basis of which day they signed up to participate. Twenty-five subjects (16 women and 9 men) participated as members of the pos-neg group and 20 subjects (16 women and 4 men) participated as members of the neg-pos group. Subjects volunteered to participate in the experiment for course credit.

### *Results*

The results are presented in three stages. The first stage of the analysis provides a comparison of group majority preferences following the initial exposure to only one of the two frame conditions. This analysis focuses on between-subjects framing effects and group differences in preference across scenarios and option pairs. The second stage of the analysis examines the preference patterns of subjects after they have experienced both frame conditions. The emphasis here is on changes in option popularity with changes in frame and scenario. The third and final stage provides an in-depth analysis of the relationship between positive-frame and negative-frame preferences for each of the subjects. This analysis documents the strength and frequency of particular preference patterns for each option pair, with special attention to the degree of consistency in choice.

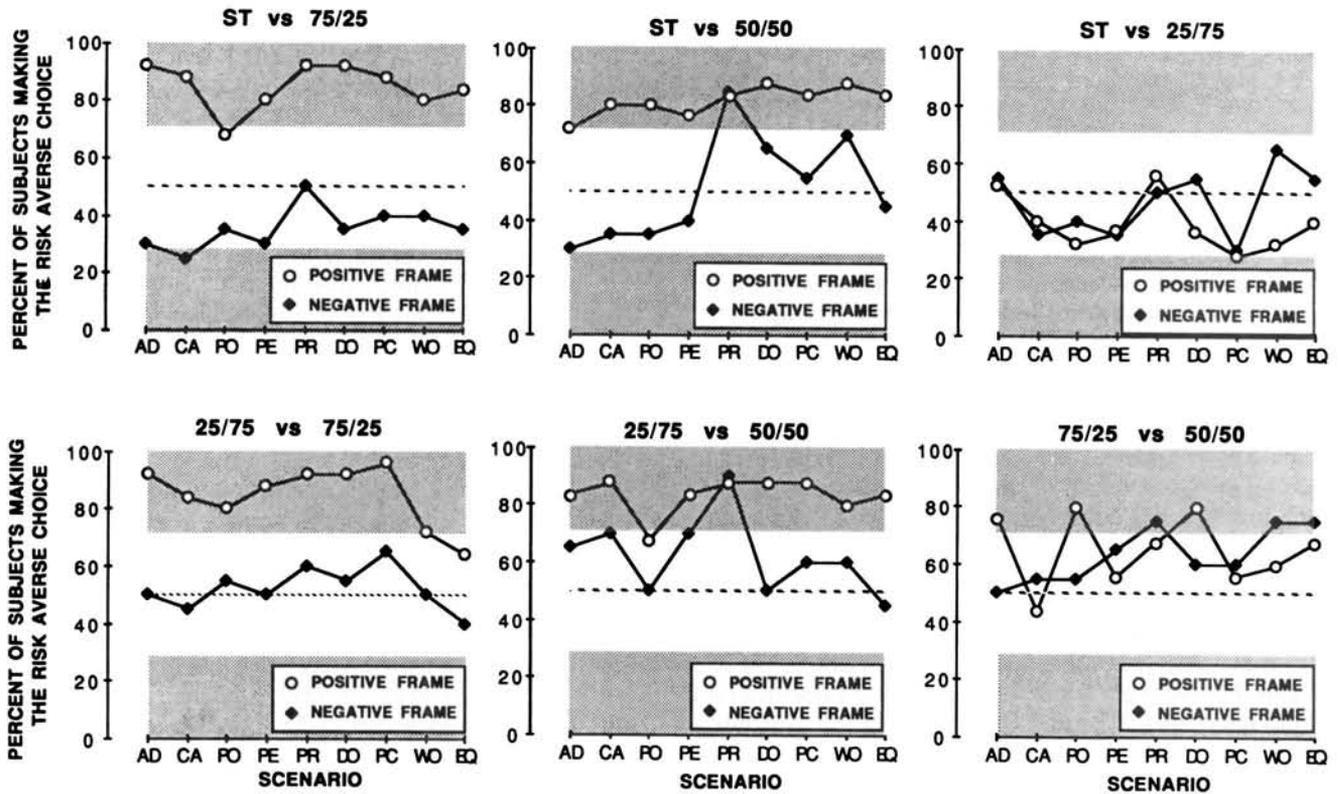


Figure 1. Group differences in risky choice for positive and negative frames across the six option pairs and nine scenarios. (Twenty-five subjects contributed data for the positive frame condition and 20 subjects for the negative frame condition. For each graph, the less risky option is listed on the left in the pair title. Points in the shaded regions represent significant majority preferences by binomial  $z$  test. The dotted line at 50% represents the point of maximum collective ambivalence. ST = sure thing; AD = Asian disease; CA = cancer; PO = poison; PE = pesticide; PR = preservation; DO = dropout; PC = plant closing; WO = workers; EQ = equipment. See Table 1 for a description of the scenarios.)

### Group-Framing Effects Across Scenarios and Option Pairs

The first analysis focuses on initial positive and negative frame preferences for each of the six unique pairs of options across each of the nine scenarios. The data for this analysis consist of the first set of choices made by each of the two groups of subjects. Hence, for each pair in each scenario, the positive frame results are determined by the percentage of the 25 pos-neg subjects in their first session who selected each option in the first of two presentations. The negative results represent the percentage of the 20 neg-pos subjects in their first session who selected each option in the first presentation. This between-subjects comparison of framing effects was performed to obtain a relatively pure measure of preferences in each frame, with less potential for carryover effects.

Figure 1 consists of six graphs, each depicting the results for one of the six pairs. The results for the three ST-risk pairs appear in the top row, and the results for the remaining three risk-risk pairs appear in the bottom row. The scenarios are ordered such that threats to human lives from disease (AD and CA) and disaster (PO) are listed first, followed by threats to animal lives (PE and PR), threats of student dropouts (DO), threats to jobs (PC and WO), and, finally, threats to

financial holdings (EQ). Each data point represents the percentage of subjects in each condition who made the risk-averse choice. In the pair titles above each graph, the risk-averse option is listed first (to the left) and corresponds to the ST in ST-risk pairs and the risk with the higher positive expected utility in the risk-risk pairs. The line at the 50% point indexes a state that can be described as maximum collective ambivalence, in which half of the subjects prefer one option and half prefer the other option. The shaded regions at the top and bottom of each graph represent a significant majority (by test of the binomial  $z$  with  $\alpha = .05$ ) of risk-averse and risk-seeking preferences, respectively.<sup>3</sup>

*Framing effects by pair.* A quick glance at Figure 1 makes it obvious that choices varied substantially both as a function

<sup>3</sup> Due to the difference in the number of subjects in each group ( $n = 25$  for the positive frame, and  $n = 20$  for the negative frame), there is a slight difference in the power to detect significant majority preferences across frames. The upper and lower 30% of the graph in the positive frame condition versus 28% in the negative frame condition represent a significant consensus. (The shaded regions in the graph comprise the upper and lower 29%.) It may be worth noting that use of the more lenient 30% criterion would not have increased the number of significant negative frame majority preferences.

of pair and of frame. Although more subtle, there also appear to be systematic differences in preferences across scenarios. Focusing on the more traditional ST-risk pairs in the top row, one cannot help but notice the striking differences in preference as the risk changes. Only when the ST is pitted against the 75/25 risk are there large framing effects across all scenarios. When the ST is paired with the 50/50 risk, sizable framing effects are only evident for pairs involving human or animal lives. When the ST is paired with the 25/75 risk, there is virtually no evidence of a framing effect and majority preferences in both domains tend to be risk seeking.

There seems to be a rough parallel in preferences for the risk-risk pairs presented in the bottom row. The results for the 25/75 versus 75/25 pair are similar to, but less pronounced than, the results for ST versus 75/25. The same kind of similarity is apparent between the top and bottom central graphs involving the 50/50 option, although scenarios involving lives are less differentiated. In the 75/25 versus 50/50 graph, there are few discernible differences in preference from the positive to the negative frame; a small majority in both frames prefers the 75/25 option.

*Relationship of frame to choice.* Table 3 statistically confirms the observed impressions of choice relationships across frame. For each option and scenario, Table 3 presents a Fisher exact test of association and a lambda coefficient. A significant Fisher exact test indicates that the proportion of subjects making the risk-averse choice in the positive frame condition differs reliably from the proportion making the risk-averse choice in the negative frame condition (although not necessarily that preferences switch from risk aversion to risk seeking). The lambda coefficient indicates the proportional reduction in the probability of error in predicting choice due to the a priori specification of frame. Lambda coefficients vary between .00 (indicated by a dash in Table 3) and 1.00; the larger the coefficient, the greater the increase in the ability to predict choice, given information about whether the scenario is framed positively or negatively.

For the ST versus 75/25 option pair, there is a significant relationship between choice and frame across all of the scenarios. Except for the PR scenario, this relationship substan-

tially increases the ability to predict choices, given frame. For the ST versus 50/50 option pair, relationships are only evident in about half of the scenarios, including those involving human lives and finances. Here again, predictability is enhanced by frame information. For the pairs involving animal extinction, students, and jobs, however, there is no discernible interdependence between choices and frame. For the 25/75 versus 75/25 pair, just over half of the Fisher exact tests reach significance; however, there is little, if any, increase in the ability to predict choice when frame information is available (i.e., regardless of the frame, a prediction of risk aversion is as good as or better than a prediction of risk seeking). Across the remaining option pairs, there is little evidence of systematic relationships between choices and frame. Overall, the table highlights the substantial differences in the presence of framing effects across pairs and scenarios. Framing effects occur consistently across all scenarios for only a single option pair and occur in a majority of scenarios for only two of the remaining five pairs.

It may seem tempting to conclude that framing effects generally decline as the difference in riskiness between the two available options decreases. However, this hypothesis is only partially supported. Recall that the options increase in riskiness from ST to 25/75, 75/25, and then 50/50. Although the data for the ST versus 25/75 option and the 75/25 versus 50/50 option appear to confirm that framing effects are least likely to occur for pairs adjacent in riskiness, the 25/75 versus 75/25 data seem to disconfirm this possibility. In addition, given that 50/50 is the riskiest of the options, one would expect framing effects to be larger and more consistent for the pairs involving 50/50 than for comparable pairs involving 75/25. However the data are clearly in contradiction to this hypothesis. Hence, differences in riskiness alone cannot adequately account for the differences in framing effects across pairs.

It is even more difficult to summarize the differences in framing effects across scenarios. Nevertheless, it does seem clear that the PR scenario was least likely to yield framing effects. This scenario involves a threat to the last 1,200 animals of a particular species. Regardless of frame, subjects were

Table 3  
Fisher Exact Tests and Lambda Coefficients for Choices, Given Frame

Test/ Option pair	Scenario								
	AD	CA	PO	PE	PR	DO	PC	WO	EQ
Fisher									
ST vs. 75/25	.000***	.000***	.038*	.001***	.002**	.000***	.001***	.012*	.002**
ST vs. 50/50	.007**	.005**	.005**	.031*	1.000	.083	.049*	.157	.010**
ST vs. 25/75	1.000	.767	.755	1.000	.769	.239	1.000	.038*	.377
25/75 vs. 75/25	.002**	.010**	.107	.008**	.014*	.006**	.015*	.216	.140
25/75 vs. 50/50	.176	.157	.241	.301	1.000	.008**	.041*	.191	.010**
75/25 vs. 50/50	.117	.554	.107	.760	.745	.191	1.000	.352	.745
Lambda									
ST vs. 75/25	.500	.556	.286	.421	—	.400	.267	.235	.353
ST vs. 50/50	.381	.333	.222	—	—	—	—	—	.133
ST vs. 25/75	—	—	—	—	—	.100	—	.286	.095
25/75 vs. 75/25	—	.133	—	—	—	—	—	—	.191
25/75 vs. 50/50	—	—	—	—	—	—	—	—	.133
75/25 vs. 50/50	—	.091	—	—	—	—	—	—	—

Note. ST = sure thing; AD = Asian disease; CA = cancer; PO = poisoning; PE = pesticide; PR = preservation; DO = dropouts; PC = plant closing; WO = workers; EQ = equipment. Dashes indicate  $\lambda = 0$ .  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

predominantly risk averse in their choices. It is easy to speculate that this particularly strong pattern of preferences results from the fact that total extinction is a particularly aversive outcome that is seen as unacceptable regardless of frame. Hence, avoiding the total depletion of a valued and nonrenewable resource may act as a highly salient goal that is relatively unaffected by positive and negative descriptive frames.

Elsewhere, especially in the negative frame, the threat of loss of human or animal lives seems to be responded to differently than threats involving jobs or school dropouts and, to a lesser extent, financial losses. It may be that framing effects are more likely to occur for more substantial threats (such as lives vs. school dropouts). Unfortunately, the differences observed here seem less than systematic and do not easily lend themselves to the prediction of scenario-relevant influences on framing effects.

In fact, the analysis of subject inconsistency levels across choices, which is presented in the upcoming final stage of the analysis, cautions against a premature attempt to precisely specify the influence of the nine scenarios on preferences. Some of the apparent differences in preference across scenarios seem more likely to reflect inconsistencies in choice than reliable changes in preference with changes in scenario. Hence, a realistic assessment of the systematic influence of scenario on choice must await not only a more exacting attempt to control and isolate the relevant components of scenarios but also a serious attempt to differentiate weak and vacillating preferences from strongly held preferences.

*Risk aversion and risk seeking.* To what extent are group risk preferences consistent with the prediction of risk aversion in the positive frame and risk seeking in the negative frame? Looking back to Figure 1, an examination of the shaded regions within each graph reveals that risk aversion in the positive domain is generally quite strong. For four of the pairs, a significant majority have risk-averse preferences for at least eight of the nine scenarios. For 75/25 versus 50/50, a significant majority have risk-averse preferences for only three of the nine scenarios, and for ST versus 25/75, majority preferences actually tend to be risk seeking, although a significant risk-seeking majority was only demonstrated for a single scenario.

The latter tendency toward risk seeking is not entirely a surprise, given that the positive option 25/75 has a riskless component (i.e., its worst outcome is better than zero). Other studies (e.g., Kahneman & Tversky, 1979; Schneider & Lopes, 1986) have also documented majority preferences for this type of risk over a sure thing. Nevertheless, with this one notable exception, majority preferences in the positive domain do tend to be risk averse as predicted.

Preferences within the negative domain, on the other hand, oscillate in a less than systematic fashion between risk-averse and risk-seeking majorities, and only rarely do majority preferences represent a significant consensus. In fact, of the 6 cases in 54 in which significant majority preferences can be identified, 5 involve a predominance of risk-averse choices. The only significant majority preference for the riskier option in a pair occurs for the ST versus 75/25 choice within the CA scenario. Hence, clear majority preferences in the negative domain are virtually never risk seeking, nor are they generally

risk averse. It seems, instead, that strong majority preferences in the negative domain frequently do not exist.

It is true that where the framing effect does occur in the present data, it virtually always involves a decrease in risk aversion as one moves from the positive to the negative frame. Yet, rarely, if ever, does the shift involve a strong tendency toward risk seeking in the negative domain. Moreover, the variability in framing effects across pairs and scenarios seems to have less to do with positive frame preferences (which, in at least four of the six pairs, can be counted on to be strongly risk averse) and more to do with vacillations in majority negative frame preferences.

### *Changes in Preference with Changes in Frame*

Given that the previous analysis included only the data from subjects' first exposure to a single frame condition, only between-subjects framing effects could be examined. The next analysis considers all of the data, aggregated over pairs, in an attempt to identify how changes in frame from one session to the next, along with changes in other variables, influence the preferences of the same individuals. The data for this analysis are the total number of times each option was chosen in each scenario and each frame, with a maximum of six (3 pairs  $\times$  2 presentations) and a minimum of zero. An analysis of variance (ANOVA) was conducted with the between-subjects variable of group (pos-neg vs. neg-pos) and the repeated measures of frame, option, and scenario.

The main effect for option was significant,  $F(3, 129) = 21.11$ ,  $MS_e = 35.35$ ,  $p < .001$ . Overall, the most popular option was 25/75, followed by ST, 75/25, and 50/50, respectively. However, these preferences were significantly affected by the frame, the scenario, and the group. These effects are complex, appearing in first-order and higher order interactions. Figure 2 presents a comprehensive view of these results. The graphs on the left illustrate the results for the pos-neg group, with the positive frame results from their first day of testing at the top of the figure and the negative frame results from their second session at the bottom. The graphs on the right show the results for the neg-pos group, with the negative results for Day 1 at the top and the positive results for Day 2 at the bottom of the figure.

There is a significant Frame  $\times$  Option interaction,  $F(3, 129) = 12.85$ ,  $MS_e = 13.65$ ,  $p < .001$ . As can be seen in Figure 2, the preference pattern for the positive frame (top left and bottom right) and negative frame (bottom left and top right) are ordinally similar, yet the pattern for both groups is much more distinct in the positive frame than in the negative frame. These results corroborate the findings from the previous analysis, in which majority preferences could be clearly identified in the positive domain but not in the negative domain.

The Scenario  $\times$  Option interaction was also significant,  $F(24, 1032) = 3.55$ ,  $MS_e = 1.19$ ,  $p < .001$ . Rather than indicating substantial differences in the preference ordering of the options, however, the interaction primarily shows that the strength of the overall preference pattern changed from one scenario to the next, that is, the preference ordering remained virtually identical across the nine scenarios, but the magnitude of the difference in popularity of one option relative to another varied across the scenarios. For all nine

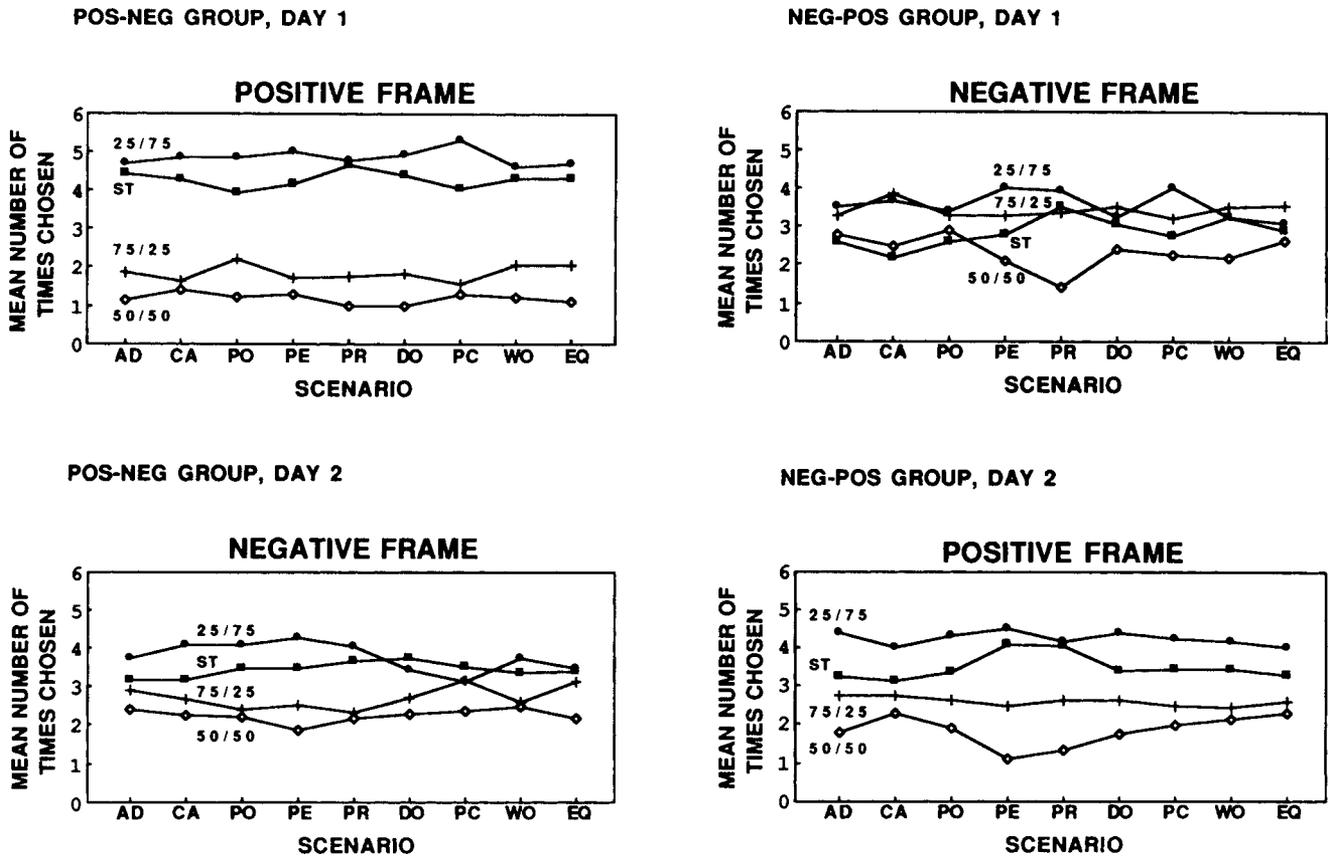


Figure 2. Option popularity in the positive and negative frames across each scenario for each group. (Data for the pos-neg group appear in the two graphs on the left, and data for the neg-pos group appear in the two graphs on the right. The options are labeled according to the probability of the best outcome and the worst outcome, respectively, with ST = sure thing. AD = Asian disease; CA = cancer; PO = poison; PE = pesticide; PR = preservation; DO = dropout; PC = plant closing; WO = workers; EQ = equipment. See Table 1 for a description of the scenarios.)

scenarios, 25/75 had the highest mean preference score, followed by the ST, then 75/25, with 50/50 having the lowest mean preference score. The preference ordering appears to be strongest for the two scenarios involving a threat to endangered animal lives (PE and PR) and weakest for the EQ scenario involving a financial threat, with the remaining types of scenarios falling in between.

The Group  $\times$  Option interaction only approached significance,  $F(3, 129) = 2.50$ ,  $MS_e = 35.35$ ,  $p < .07$ . Although it may seem tempting to interpret the marginal interaction, the group variable is involved in a significant higher order interaction, which I consider next.

Whereas none of the three-way interactions was significant, the four-way interaction of Group  $\times$  Frame  $\times$  Scenario  $\times$  Option depicted in Figure 2 was significant,  $F(24, 1032) = 1.68$ ,  $MS_e = 1.15$ ,  $p < .03$ . Although complex, the four-way interaction has a relatively straightforward interpretation. To begin, consider the two graphs at the top of the figure that represent responses on Day 1 of the experiment for the pos-neg group (left) and the neg-pos group (right). In essence, the top two graphs represent the between-subjects comparison of preferences for options when they are framed positively (left) versus when they are framed negatively (right). Notice the

stark contrast between the preference pattern in the positive domain and that in the negative domain. For positively framed options, preferences are distinct, strong, and stable across scenarios. Options 25/75 and ST are clearly preferred to options 75/25 and 50/50. The overall preference pattern for negatively framed options, if there is one, is far less obvious, in part because the preference ordering changes across scenarios and in part because preferences are relatively weak as demonstrated by the compression of mean preference scores about the 3.0 score—the score that occurs when subjects as a group are selecting and rejecting an option equally often.

The within-subjects comparison reveals the same basic effect of frame, although potentially diminished by carryover effects. Returning to Figure 2, the relevant comparisons here are those between the top and bottom graphs, for both the pos-neg group (left) and the neg-pos group (right). Starting first with the pos-neg group, it can be seen that preferences are much weaker in the negative frame than the positive frame. Moreover, the preference ordering is subject to change across scenarios in the negative frame but not in the positive frame. Thus, for the very same objective outcomes, subjects are clear and strong in their preferences when the options are

described positively, but those same subjects have weak and vacillating preferences when the options are framed negatively.

The data for the neg–pos group show a similar pattern. On Day 1, when options were framed negatively, preferences were weak and variable across scenarios. However, 1 week later, when the options were presented in a positive frame, these subjects' preferences became much clearer and more consistent across scenario. Although the differential effect of positive and negative frames can be clearly identified in both groups, either minor preexisting group differences or relatively small but noticeable carryover effects also exerted an influence on choice.

*Framing Effects and Conflict*

The final analysis focuses on the characteristics of the relationship between positive and negative frame preferences for each of the subjects individually. The analysis serves to identify not only clear-cut changes in preference from one frame to the other but also changes in the levels of choice agreement and consistency across frames. Both disagreement across different subjects and inconsistency on the part of individual subjects are examined as evidence of potential conflict in choice.

Recall that for each scenario and pair within a given frame, subjects were asked to report on their preferences twice. In each case, subjects could choose the less risky option on both presentations, they could choose the riskier option on both presentations, or they could be inconsistent in their choices, selecting each option once. Hence, for both the positive and negative frame, it is possible to ascertain whether subjects were consistently risk averse or risk seeking in their preferences for each pair or whether they were inconsistent in their choices. Moreover, it is then possible to compare preferences in one frame with preferences in the other frame. Just such a comparison is presented in Table 4.

*Preference patterns across frames.* Table 4 shows the percentage of subjects in the pos–neg group (left column) and neg–pos group (right column) with each of the nine (3 × 3) possible positive frame versus negative frame preference patterns, presented separately for each option pair. Because the proportions were generally similar across scenarios, each cell value actually represents the mean percentage of subjects having that preference pattern across the nine scenarios. Although not shown in Table 4, the standard deviations for each cell tend to be small, ranging from 0% to 12.1% for the pos–neg group and from 2.5% to 11.9% for the neg–pos group, with an average cell standard deviation of approximately 5% for both groups.

The cell at the upper left of each 3 × 3 table indicates the percentage of subjects who had risk-averse preferences in the positive frame condition coupled with risk-seeking preferences in the negative frame condition for each pair. If an S-shaped value function were prevalent among subjects, the percentage within this cell would be expected to be quite high. Notice, however, that less than 20% of the subjects fall into this category regardless of the group or pair being considered. Moreover, in no case is this the cell with the largest percentage

Table 4  
*Average Percentage of Pos–Neg and Neg–Pos Subjects With Each Positive Frame Versus Negative Frame Preference Pattern for Each Option Pair*

Negative frame	Positive frame							
	Pos–neg subjects				Neg–pos subjects			
	RA	In	RS	Total %	RA	In	RS	Total %
ST vs. 75/25								
RS	18	5	2	25	17	9	22	48
In	22	5	0	27	14	7	4	25
RA	42	6	0	48	24	1	2	27
Total	82	16	2	100	55	17	28	100
ST vs. 50/50								
RS	19	4	5	28	11	3	14	28
In	11	3	2	16	18	8	6	32
RA	49	6	1	56	33	3	5	41
Total	79	13	8	100	62	14	25	101
ST vs. 25/75								
RS	6	12	26	44	6	7	29	42
In	4	5	14	23	12	8	11	31
RA	13	9	10	32	12	8	8	28
Total	23	26	50	99	30	23	48	101
25/75 vs. 75/25								
RS	15	4	3	22	11	3	16	30
In	24	3	2	29	20	5	3	28
RA	43	4	1	48	35	5	2	42
Total	82	11	6	99	66	13	21	100
25/75 vs. 50/50								
RS	16	2	1	19	13	4	5	22
In	20	5	2	27	16	5	7	28
RA	46	7	2	55	40	6	4	50
Total	82	14	5	101	69	15	16	100
75/25 vs. 50/50								
RS	14	5	10	29	7	4	10	21
In	12	7	6	25	13	7	7	27
RA	33	9	4	46	33	12	6	51
Total	59	21	20	100	53	23	23	99

Note. ST = sure thing; RA = consistently risk averse; In = inconsistent; RS = consistently risk seeking.

of subjects. For five of the six pairs, the most frequent preference pattern involves risk-averse preferences in both the positive and negative frame conditions. For the ST versus 25/75 pair, the most common preference pattern involves risk-seeking preferences in both domains. Hence, it appears that subjects are more likely to maintain their preferences from one frame to the other than they are to change their preferences in accord with the proposed prospect theory value function.

The totals for each 3 × 3 table provide information about the predominance of preferences within each frame. In the positive frame, a majority of subjects show clear risk-averse preferences in five of the six pairs. This tendency is especially

strong for the pos-neg group (as seen previously in Figure 1). In both groups, however, roughly half of the subjects are clearly risk seeking in their preference of 25/75 over the ST. Overall, subjects show high levels of agreement in their positive frame preferences.

As seen earlier, preference patterns in the negative domain are not as strong as their positive frame counterparts. For four of the six pairs, approximately half of the subjects in both groups display risk-averse preferences, with the rest being about equally divided between risk-seeking and inconsistent preferences. The same pattern holds for ST versus 75/25 for the pos-neg group, however, the pattern is reversed for the neg-pos group such that half of the subjects are risk seeking. As in the positive frame, preferences for the ST versus 25/75 pair are most apt to be risk seeking for both groups. Overall, neither group displayed a strong majority of risk-seeking preferences for any of the negative frame pairs.

*Framing and inconsistency.* Table 5 summarizes the preference patterns and types of inconsistency found for each group and each option pair. The most striking finding is the lack of clear-cut framing effects. Regardless of the group or the option pair, less than 20% of the subjects showed a reliable change in preference with a change in frame (as shown in the Switch column). For most pairs across both groups, subjects were most likely to maintain the same preferences from one frame to the other. Nevertheless, there remains a large proportion of subjects for each pair whose preferences were inconsistent in one or both domains.

The three columns on the right in Table 5 represent a breakdown of the types of inconsistency displayed by subjects.

Notice that in almost all cases, the percentage of subjects who are inconsistent in the negative domain far exceeds the number who are inconsistent in the positive frame or in both frames. Indeed, inconsistency in the negative domain is generally twice as likely as inconsistency in the positive domain. In fact, subjects frequently have a greater likelihood of showing inconsistent preferences in the negative domain than risk-seeking preferences.

The generality of the preference patterns and inconsistency levels across option pairs and groups is nothing short of remarkable. To document the statistical significance of much of the information in Table 5, an ANOVA was conducted on the relevant consistency data. For each frame and pair, the data consisted of the number of times across the nine scenarios that each subject was consistent from the first to the second presentation.

As expected, the main effect for frame was highly significant,  $F(1, 43) = 26.62$ ,  $MS_e = 3.46$ ,  $p < .001$ . Subjects were substantially more consistent in their choices in the positive frame than in the negative frame. The subject's group, however, was not related to the observed consistency levels, either overall or in combination with frame (both  $F$ s  $< 1$ , with  $MS_e$ s = 11.72 and 3.46, respectively). This suggests that previous exposure to options framed from an opposing perspective has no effect on the level of consistency observed. Regardless, subjects are less consistent in negative frame choices.

Although there were no overall differences in consistency across pairs, there was a significant Frame  $\times$  Pair interaction,  $F(5, 215) = 2.28$ ,  $MS_e = 2.16$ ,  $p < .05$ . A simple-effects analysis of pair at each of the two frames revealed that

Table 5  
Summary of Positive Versus Negative Frame Preference Patterns by Group and Option Pair

Option pair	Preference pattern			Total %	Type of inconsistency		
	Switch	Same	Incons.		Pos	Neg	Both
Pos-neg group							
ST vs. 75/25	18	44	38	100	11	22	5
ST vs. 50/50	20	54	26	100	10	13	3
ST vs. 25/75	16	39	44	99	21	18	5
25/75 vs. 75/25	16	46	37	99	8	26	3
25/75 vs. 50/50	18	47	36	101	9	22	5
75/25 vs. 50/50	18	43	39	100	14	18	7
Mean	18	46	37	101	12	20	5
Neg-pos group							
ST vs. 75/25	19	46	35	100	10	18	7
ST vs. 50/50	16	47	38	100	6	24	8
ST vs. 25/75	14	41	46	99	15	23	8
25/75 vs. 75/25	13	51	36	99	8	23	5
25/75 vs. 50/50	17	45	38	101	10	23	5
75/25 vs. 50/50	13	43	43	100	16	20	7
Mean	15	46	39	101	11	22	7

*Note.* Preference patterns show the mean percentage of subjects whose preferences switched from one frame to the other (Switch), were the same in both frames (Same), or were inconsistent in at least one frame (Incons.). Inconsistency values indicate the mean percentage of subjects who were inconsistent in only the positive frame (Pos), only the negative frame (Neg), or in both frames (Both). ST = sure thing.

consistency did not significantly differ across pairs in the negative domain ( $F < 1$ ,  $MS_e = 3.02$ ), however, it did in the positive domain,  $F(5, 215) = 5.570$ ,  $MS_e = 1.62$ ,  $p < .001$ . Specifically, mean consistency levels for ST versus 75/25, ST versus 50/50, 25/75 versus 75/25, and 25/75 versus 50/50 were all approximately 86%. For ST versus 25/75 and 75/25 versus 50/50, in contrast, mean consistency levels were roughly 77%, barely higher than the combined 74% average for the negative pairs. Therefore, although average consistency is, in all cases, higher for positive pairs than for negative pairs, consistency levels are somewhat lower for those positive pairs that are close in popularity.

An inspection of individuals' data shows that the lower rate of consistency in the negative frame holds for the vast majority of subjects. Fully 80% of the subjects were more consistent in the positive frame than in the negative frame. In fact, almost three fourths of the subjects in both groups were highly consistent (i.e., consistent at least 80% of the time) in their choices for the positive frame, but only one third were highly consistent when the same choices were framed negatively.

This analysis supports the hypothesis that most subjects experience greater difficulty or internal conflict when making negatively framed choices as opposed to positively framed choices. Although there was also substantial disagreement between subjects in their negative frame preferences, these disagreements may not be based on strong differences of opinion. Given that very few subjects maintained high levels of consistency across their negative frame choices, the disagreements between subjects seem more apt to reflect variation due to inconsistency than to represent true discrepancies in firmly held preferences.

### Summary

Overall, framing effects were weak and unstable. The initial group comparison revealed the presence of framing effects reliably only for the ST versus 75/25 pair and occasionally for the ST versus 50/50 and 25/75 versus 75/25 pairs. The final analysis demonstrated that, for any given option pair, less than 20% of the subjects could be expected to reliably change their preferences with a change in frame. Although scenario did affect preferences, especially in the negative frame, its influence was generally subtle and difficult to interpret.

Majority preferences were much stronger and more consistent in the positive frame than in the negative frame. Although positive frame preferences were generally risk averse, the most popular option of all was the 25/75 risk. Hence, framing information positively may generally result in risk-averse preferences, but there is at least a subset of risks (those with riskless components) that may frequently be deemed superior to a comparable sure thing.

For negatively framed options, preferences were weak and inconsistent both within and across scenarios. This lack of clear-cut preferences was observed in the form of weak majority preferences and vacillating preferences at the level of the individual. Although it may be true that subjects are less likely to make risk-averse choices in the negative frame than in the positive frame, it is not true that subjects tend to be

risk seeking in the negative domain. Instead, they simply seem to be conflicted about which of the two options is preferable.

### Discussion

This assessment of the form and generality of framing effects leads to some very interesting yet potentially troublesome conclusions. The results suggest that although characteristics of the problem representation or frame undoubtedly have an influence on decision making, this influence cannot generally be characterized in terms of tendencies toward risk aversion or risk seeking. If anything, it seems that framing may be most systematically related to the consistency of choice.

Differences in the consistency of preferences as a function of frame are evident within every phase of the results. Subjects are strong and consistent in their preferences when the options are framed as gains but weak and inconsistent when the very same options are framed as losses. It appears that subjects are more likely to experience difficulty in selecting a course of action when the options are framed as losses rather than gains. The weak and unstable negative frame preferences found in many of the previously cited investigations (e.g., Fagley & Kruger, 1986; Fagley & Miller, 1987; Wagenaar et al., 1988) further corroborate this possibility.

Use of a negative frame draws attention to the unpleasant consequences of potential outcomes. This may have the effect of increasing the aversiveness of the decision task but perhaps also of heightening subjects' awareness of the presence of conflicting goals that cannot be reasonably satisfied regardless of which option is selected. A positive frame, on the other hand, by focusing attention on the desirable consequences of potential outcomes, may obscure the presence of conflicting goals and, as a result, may reduce the perceived need to make difficult tradeoffs. Before examining this possibility in detail, it is important first to consider how current theories of risky choice may contribute to our understanding of the observed results.

### *Risk Attitudes and Risky Choice*

Most current theories of risky choice rely heavily on the assumption that people have systematic and reliable risk attitudes. Expected utility theories frequently suggest that, because of a marginally decreasing subjective value or utility function, most individuals are predominantly risk averse both in attitude and behavior. Prospect theory holds that risk attitudes change as a function of the valence or sign of outcomes. Generally, people's attitude toward gains involves risk aversion and toward losses involves risk seeking. In either case, because responses to risk are viewed as attitudes that are the consequence of relatively immutable psychophysical processes, these attitudes should yield strong and consistent patterns of choice over the domains for which the attitudes apply, unless the options are so close to one another in subjective value that they yield indifference.<sup>4</sup>

<sup>4</sup> Although additional factors such as subjective decision weights may contribute to choice, there is no a priori reason to suspect that

The lack of consistency in choice in the negative frame relative to the positive frame is troublesome from this perspective. Inconsistent preferences are only to be anticipated when the perceived values of the available options are equivalent, implying that it would not matter to the perceiver which option is selected. Using an example from this study, this would suggest that subjects feel a strong commitment to a particular option when they are trying to save people's lives but that they do not care which option is selected when they are trying to keep those same people from dying. Surely, they do care which option is selected, but they experience greater difficulty in determining which of the two options is preferable. A psychological theory that cannot distinguish the experience of indifference from that of conflict seems equally unable to adequately capture the processing of difficult tradeoffs inherent in risky choice.

The inability to explain (or even acknowledge) conflict in choice is not the only problem raised by the results of this experiment. The very notion of risk attitudes seems suspect. Again, the evidence presented here clearly suggests that no strong majority preferences—let alone strong risk-seeking preferences—exist in the negative domain. Of the 54 negative frame choices made, only one indicated a significant majority tendency toward risk-seeking preferences (with five choices revealing a significant consensus toward risk aversion). Moreover, the examination of individual preference patterns demonstrated that only about 30% of the subjects could be expected to have risk-seeking preferences for any given pair of negative frame options.

On the other hand, majority preferences for a full two thirds of the choices in the positive domain favor the hypothesis of risk aversion. For five of the six positive frame pairs, an average of 70% of the subjects maintained risk-averse preferences. Although this appears to provide some support for the role of risk attitudes in the case of gains, it is less compelling when one recognizes that there is also evidence that risk seeking may predominate for some choices involving gains. These include, but may not be limited to, choices for which the risky option has a riskless component. This occurs when both potential outcomes of the risky option are positive, eliminating any chance of obtaining zero. It may be tempting to dismiss this preference for the riskier option as uninteresting, given that the option entails some sure positive outcome. However, to do so is to dismiss the fact that in some circumstances involving potential gains, many people would rather not be certain of the outcome ahead of time but would actually prefer an option for which the outcomes will be determined probabilistically.

Overall, then, in neither domain is there evidence for strong and stable risk attitudes. It should not be surprising to find, in addition, a general lack of any systematic relationship between risk preferences from the domain of gains to the domain of losses. Risky decision making in the negative domain is neither the antithesis nor the equal of decision

making in the positive domain; they are independent in outcome and perhaps in process. This lack of relationship is not only evident throughout this study but has also been noted in several other studies that have documented the general independence of choices in the gain and loss domains (e.g., Cohen, Jaffray, & Said, 1987; Hershey & Schoemaker, 1980; Schneider & Lopes, 1986).

The evidence suggests that risky choice is subject to a richer source of variation than just the psychophysical principles that relate objective quantities to subjective experience. Accepting the empirical fact that commodities such as money and other tangibles have decreasing marginal utility may be well-advised. Nevertheless, knowing the relationship between the subjective values of given potential outcomes may not be sufficient for predicting or understanding how the introduction of various amounts of risk will mediate choices about those entities.

Direct support for this position has been presented by Keller (1985) who demonstrated, first, that subjective value (i.e., utility) functions for riskless judgments were different from the subjective value functions for comparable risky judgments. Second, she showed that the risk attitudes of individual subjects varied qualitatively as the attribute to be judged (e.g., time, money, or grades) varied. Moreover, studies investigating the concept of risk have consistently demonstrated that preference judgments are distinct from risk judgments (e.g., Lopes, 1984; Luce & Weber, 1986; Payne, 1975). This implies that risky choice cannot be reduced to preferences determined predominantly by risk attitudes.

Indirect evidence of the shortcomings of weighted value theories comes from the apparent need and subsequent attempts to develop subjective probability or decision-weighting functions to describe how uncertainty influences choice (e.g., Edwards, 1962; Kahneman & Tversky, 1979; Karmarkar, 1978; Savage, 1954). Unfortunately, this type of function has not been shown to systematically increase the ability to predict choice (e.g., Hershey & Schoemaker, 1980; Schneider & Lopes, 1986). These essentially psychophysical solutions also functionally deny the affective and stress-inducing impact of risks, ignoring the difficulty of trading off between uncertainty and outcome.

### *Framing Effects from a Larger Perspective*

Framing effects are more than just the by-product of risky choice. In fact, framing effects are quite common in judgments and choices that do not even involve risk. For instance, Levin and Gaeth (1988) have demonstrated that consumers respond more favorably to ground beef when its characteristics are framed positively (75% lean) rather than negatively (25% fat). Maheswaran and Meyers-Levy (1990) have documented framing effects involving the persuasiveness of positively and negatively framed health-related messages. Huber, Neale, and Northcraft (1987) found that personnel selection decisions were influenced by whether the participants framed their task positively (applicants to accept for an interview) or negatively (applicants to reject for an interview). Finally, an in-depth series of negotiation studies have demonstrated that a positive frame, as opposed to a negative frame, generally

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these factors would affect consistency except inasmuch as they might influence the closeness of prospects' perceived overall values and, as a consequence, the possibility of indifference.

results in more successful performance, more concessionary behavior, and the completion of more transactions both for amateurs and for experts (Bazerman et al., 1985; Neale & Bazerman, 1985; Neale, Huber, & Northcraft, 1987; Neale & Northcraft, 1986).

In a related vein, the effect of actual changes in the valence of outcomes has been explored in numerous studies designed to test long-standing approach-avoidance theories of conflict (Lewin, 1938, 1951; Miller, 1944, 1959). It is interesting that the vast majority of these studies corroborate my finding that choices between two negative or undesirable options (avoidance-avoidance) create greater conflict than choices between two positive or desirable options (approach-approach).

As early as 1942, Barker demonstrated that subjects (boys, age 9-11) took longer to decide which of two aversive liquids (e.g., salt water vs. vinegar) they would rather drink than they did to choose between two desirable liquids (e.g., pineapple vs. orange juice). In what must have been the first study of framing, Barker (1946) later demonstrated that choices between negatively framed personal characteristics were more often uncertain than choices between virtually the same positively framed characteristics.

In a series of studies that followed Barker's lead, several investigators (e.g., Arkoff, 1957; Minor, Miller, & Ditrachs, 1968; Murray, 1975; Schill, 1966) demonstrated that making choices between obtaining mutually exclusive unfavorable personality characteristics took significantly longer and was judged as significantly more difficult than making choices between obtaining one of two favorable personality characteristics. Moreover, when an *undecided* response category was introduced into the task (Murray, 1975), subjects were much more likely to use it in negative avoidance-avoidance conflicts (42%) than in positive approach-approach conflicts (6%).

Using a pencil-and-paper maze task modeled after behavioral studies in rats, Smith and Epstein demonstrated that college students' speed of response was slower, with more errors and more response variability, when the choice involved an avoidance-avoidance conflict rather than an approach-approach conflict (Epstein & Smith, 1967; Smith & Epstein, 1967; Smith & Gehl, 1974). In another study, skin conductance measures suggested that arousal was higher just before a possible loss than before a possible gain (Losco & Epstein, 1977).

Oddly enough, studies within the approach-avoidance paradigm bring us full-circle back to an investigation of risky choice with Atthowe's (1960) psychophysical study of conflict in selecting gambles. He demonstrated not only that it took subjects longer to make their choices when gamble pairs had negative rather than positive expected values but also that most subjects tended to minimize the worst outcome and, in consequence, made predominantly risk-averse choices in both the positive and negative domains.

In combination, this evidence presents a remarkably strong case for the presence of exaggerated levels of conflict in negative as opposed to positive choice situations, whether or not risk is involved. Just as the Lewinian (1938) explanation of this difference in experienced conflict relies on assumptions concerning the interaction of unfulfilled needs and environmental forces, an understanding of the effects of framing on

risky choice requires an explicit recognition of both the motivational and situational factors that have a primary impact on the decision-making process.

### *An Alternative Approach to Risky Choice*

Although empirical investigations of conflict defined within the approach-avoidance tradition have become increasingly rare in recent years, the importance of motivational as well as situational factors in risky choice has not gone completely unnoticed. In her SP/A (security-potential/aspiration) theory, Lopes (1984, 1987, 1990) proposed that risky choice is primarily the consequence of motivational predispositions enacted within situational constraints. Rather than relying on risk attitudes, the theory posits that individuals can be dispositionally located on a motivational continuum between needs for security and needs for potential. Those who have relatively strong security needs (*security seekers*) are predominantly motivated to avoid relatively bad outcomes, whereas those who have relatively strong potential needs (*potential seekers*) are predominantly motivated to obtain relatively good outcomes. Both of these dispositions lead to the overweighting of some potential outcomes relative to others. Security seekers, who are hypothesized to represent the majority of people, tend to focus on and overweight the worst outcomes in choices, whereas potential seekers tend to focus on and overweight the best outcomes.

Behaviorally, security seekers will frequently act in a risk-averse fashion. Rather than reflecting an attitude toward risk per se, however, this behavior may reflect a general tendency to experience a stronger desire to avoid the worst outcome of the risk than to approach the best outcome of the risk. Hence, a sure thing of equal expected value may seem more appealing. Nevertheless, security seekers need not always behave in a risk-averse fashion. When the difference in worst outcomes across available options is small, security seekers may take a risk if it seems to offer a substantial advantage in terms of potential. (See Lopes, 1987, and Schneider & Lopes, 1986, for more detailed, empirically based accounts.)

The security-potential continuum is just one of two major factors proposed to influence risky choice. SP/A theory also holds that risky choice is affected by situationally constrained aspiration levels or goals. An aspiration level represents the smallest outcome that would be deemed satisfactory by the decision maker, given the current choice situation. Although the setting of aspiration levels may not be completely independent of the disposition of the individual, it is quite sensitive to situational constraints and immediate needs. Once set, the aspiration level leads to the relative overweighting of outcomes that would achieve or exceed that level.

In explaining the results of their study, Schneider and Lopes (1986) suggested that typical subjects (i.e., security seekers) had strong risk-averse preferences over a set of gain lotteries because security needs and aspiration levels favored the same selections. For the mirror-reflected loss lotteries, however, subjects sometimes chose the riskier option and sometimes chose the less risky option. Here, it was suggested that security needs and aspiration levels favored opposing selections and consequently led to conflict in choice. Risk-averse preferences

predominated when the worst possible outcomes of the riskier option were particularly large, but risk-seeking preferences predominated when there was virtually no possibility of achieving the aspiration level with the less risky option.

Although the SP/A theory account seems to map quite readily onto the major results of this study, there is one problematic consideration. In this experiment, the actual options did not differ from the positive to the negative conditions, as they did in Schneider and Lopes's experiment. Because options framed positively or negatively represent the same objective state of affairs, security (and potential) needs would not be expected to differ across frames because the worst (and best) outcomes remain the same. Hence, unless aspiration levels change systematically from one frame to the other, it is not clear how SP/A theory could accommodate the observed results.

### *The Aspiration Level Contingency*

It may be that goals or aspiration levels are contingent on one's perspective of the situation as positive or negative. Indeed, this possibility is supported by the popular notion that losses loom larger than gains, or that losses are more aversive than equivalent gains are attractive (e.g., Kahneman & Tversky, 1979; Kogan & Wallach, 1967; Slovic & Lichtenstein, 1968). This virtual truism implies that people have a stronger desire to minimize losses than to maximize gains. Hence, in setting goals, people may be more insistent on achieving small losses than they will be on achieving large gains. All in all, people may be willing to settle for less in the domain of gains than in the domain of losses.

However, even if losses do loom larger than gains and people do set more ambitious aspiration levels when negative outcomes are involved, the question remains as to why this happens. Although Kahneman and Tversky (1979) have suggested that losses are perceptually of a larger magnitude than objectively equivalent gains, there is also a more cognitive explanation that is worth considering.

The crux of this explanation is that (a) setting the aspiration level involves an anchoring and adjustment process, and (b) the status quo serves as the fundamental reference point, or anchor, in that process.<sup>5</sup> In particular, the claim is that aspiration levels are set relative to gaining nothing or losing nothing, depending on the frame. That is, *no change* is the benchmark against which aspiration levels are determined. To demonstrate how this can explain differences in aspiration levels across domains, consider the following example based on this study's variation of the Asian disease problem involving a threat to 600 lives.

If one assumes only that setting aspiration levels involves an anchoring and adjustment process wherein the status quo serves as the anchor, then one might expect that the aspiration level for both gains and losses involves an adjustment of approximately the same amount. Hence, the aspiration level of a hypothetical subject in the positive frame might be to save at least 200 people, and in the negative frame might be to avoid losing any more than 200 people. At first glance, the two aspiration levels have an intuitively appealing symmetry and may even appear to be equivalent. On second glance, it

becomes clear that saving at least 200 people is actually equivalent to losing no more than 400 people. In the same way, to avoid losing more than 200 people is to save at least 400 people.

Notice that the aspiration level in the positive frame is less than the expected value of 300 lives saved or lost, whereas the aspiration level in the negative frame is more than the expected value. Thus, the use of a straightforward, intuitively appealing, and superficially reasonable strategy for setting aspiration levels results in easy-to-achieve goals in the positive domain and hard-to-achieve goals in the negative domain. The consequence is an aspiration level contingency on domain.

### *SP/A Theory and the Aspiration Level Contingency*

The aspiration level contingency in conjunction with SP/A theory's need for security (being typically stronger than the need for potential) suggests one explanation for why preferences tend to be risk averse in the positive domain but conflicted in the negative domain. As a general case, aspiration levels less than the expected value favor risk-averse responses (i.e., obtaining the sure thing is satisfactory), and aspiration levels greater than the expected value favor risk-seeking responses (i.e., obtaining the sure thing is not good enough). As noted earlier, the need for security (i.e., for avoiding the worst outcome) favors risk-averse responding. Hence, with the low aspiration levels postulated in the positive domain, both the need for security and the modest aspiration level can be satisfied by selecting a sure thing. With high aspiration levels in the negative domain, however, conflict ensues as security needs favor a risk-averse choice but the stringent aspiration level favors a risk-seeking choice.

The results of this study can be used once again to illustrate how these two factors might interact in risky choice. In the positive frame, the aspiration level will typically be less than the expected value; again, using the Asian disease problem as an example, it might be set at saving at least 200 lives. Both the ST and 25/75 in the positive frame provide the means to achieve this modest aspiration level with certainty and are strongly preferred by subjects over 75/25 and 50/50.<sup>6</sup> In the negative domain, however, where the aspiration level is typi-

<sup>5</sup> Although the status quo has been implicated as a typical reference point for risky choice within prospect theory, it has not been deemed essential, or of fundamental importance, to the decision process or to cognitive representations of the decision task.

<sup>6</sup> This account is also consistent with the observed tendency to prefer the 25/75 risk over the sure thing (ST) in the positive domain. Although both of these options satisfy the proposed aspiration level of 200 lives saved, the 25/75 option may seem preferable due to its outcome characteristics. There is little difference in the security (worst outcomes) of 25/75 and the ST (200 vs. 300 lives saved), whereas the 25/75 option enjoys a substantial advantage over the ST in terms of potential. Specifically, the 25/75 option allows for the possibility that all of the people will be saved. Thus, whereas extreme security seekers might maintain a preference for the ST on the basis of the small improvement in worst outcome, moderate security seekers would be likely to prefer the 25/75 option.

cally greater than the expected value, the goal might be set at losing fewer than 200 lives (i.e., saving at least 400 lives). In this example, the more severe aspiration level cannot be met for certain by any of the options. As a result, conflict is expected, and observed, for virtually all pairs.

At first, the option that offers at least a chance of reaching the aspiration level might seem preferable, but then the realization that one could do substantially worse than in the other option may cause the riskier option to look less appealing, especially for individuals who are strongly security-oriented. The consequence is likely to be vacillation back and forth in a frustrating attempt to isolate "the lesser of two evils." Risk-seeking choices would be expected to occur whenever subjects decide they must maintain some chance of attaining the aspiration level, and risk-averse choices whenever subjects decide that their first priority is to avoid the maximum loss.<sup>7</sup>

### *Documenting the Aspiration Level Contingency*

Although there is, as yet, no direct evidence regarding the plausibility of the aspiration level contingency, there is at least one study that provides interesting preliminary support. Puto (1987) asked over 300 professional buyers to participate in a hypothetical decision task involving a choice between a risky versus a sure contract price from two competing suppliers. Along with many other results, Puto found that among buyers who initially set an easy-to-attain aspiration level, those who were then given a negatively framed sales message (i.e., "avoid losing an important cost advantage to your major competitors") shifted to a more difficult-to-attain final aspiration level than those who were given a different sales message. In the same way, buyers who initially set a difficult-to-attain aspiration level and were then given a positively framed sales message (i.e., "gain an important cost advantage over your major competitors") later shifted to a relatively easy-to-attain final aspiration level.

In addition to this preliminary support, the aspiration level contingency is appealing because it may contribute to the understanding of framing and conflict in choice, not only where risk is present but also where choices do not involve risk. For instance, in the Levin and Gaeth (1988) study of consumer choice, subjects' expectations regarding the presence of positive features in ground beef (% lean) may be relatively less demanding than their expectations for the lack of negative features (% fat). In a similar manner, in negotiations, where excess concessionary behavior is commonly attributed to low aspiration levels (Pruitt, 1981), it seems likely that the high level of concessionary behavior observed under positive framing (relative to negative framing) can also be attributed to relatively low aspiration levels (e.g., Neale & Bazerman, 1985).

It is obvious that much work needs to be done in the interest of empirically specifying individuals' aspiration levels within particular situations as well as documenting aspiration level contingencies on domain. Moreover, the cognitive processes responsible for the aspiration level contingency must be explored. The general process proposed here, staying close to the status quo through an anchoring and adjustment process for setting aspiration levels, suggests a natural and potentially

adaptive means of safeguarding against radical changes of lifestyle, especially in the negative direction.

### *The Status Quo as Frame*

Everything is relative, not the least of which are our cognitive representations of the events and decisions we encounter throughout our lives. It has long been known that cognitive representations tend to be categorical in nature and that they are organized in principled ways into structures generally referred to as schemata (see, e.g., Anderson, 1990; Fiske & Taylor, 1991; Rosch & Lloyd, 1978; Smith & Medin, 1981). The form of these schemata depends critically on our understanding and interpretation of the kinds of experiences we have had previously. Needless to say, the goals and aspirations we set are developed with reference to the organized and categorical structure of our knowledge.

Kahneman and Tversky (1984) have suggested that gains and losses are categorically distinct. This is obviously consistent with current theories of the nature of concepts. It seems reasonable to expect that the status quo is also categorically distinct. In fact, the concept of the status quo may be of special importance, not only because it is a prerequisite for establishing gain and loss categories but also because it may serve as the foundation for the construction of cognitive representations of choice and, specifically, of decision frame.

Consider, for example, what is implied by terms such as *save* and *lose* in the context of framing problems such as the Asian disease problem. If people need to be saved, it must be that the perceived given state of affairs presupposes their death. It is only for a status quo that accepts the deaths as imminent that the construct of *saving* has meaning. In much the same way, the construct of *losing* only has meaning when associated with a status quo that implies their unthreatened existence.

The framing of a decision problem is tantamount to a manipulation of the perceived status quo. A frame determines that which the decision maker assumes to be true or inevitable at the current point in time. The cognitive representation of the decision task is constructed or modified relative to the status quo that is adopted by, or imposed on, the decision maker. The frame influences the perception and representation of reality by implying what should be accepted as the current state of affairs.

A focus on the status quo as the reference point for interpreting and cognitively representing decision tasks emphasizes the role of perspectives, expectations, and assumptions in

<sup>7</sup> The primary purpose of this article is to bring the role of conflict to the attention of those interested in how frames may influence choice and to provide a possible explanation for why different frames may produce different levels of conflict. Nevertheless, it is also critical to consider the process by which conflicts in choice are resolved. Busemeyer and Townsend (1991; Townsend & Busemeyer, 1989) are currently refining an elegant quantitative model of the conflict resolution process inspired by Lewin's (1951) field theory. Meanwhile, Coombs and Avrunin (1988) have explored not only the quantitative characteristics of conflict situations in general but also have recommended a structure for evaluating methods of resolving conflict.

determining specific goals and behavior. It also highlights the danger of making unwarranted assumptions or of adopting overly rigid outlooks on events. Finally, it paves the way for understanding when people are likely to set easy or difficult goals, under what circumstances people will be more apt to agree or disagree with one another, and when people are likely to experience conflict.

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