A New Look at Framing Effects: Distribution of Effect Sizes, Individual Differences, and Independence of Types of Effects

Article *in* Organizational Behavior and Human Decision Processes · May 2002

DOI: 10.1006/obhd.2001.2983 · Source: RePEc

CITATIONS
361

READS
4,416

4 authors, including:

Irwin P Levin
University of Iowa
155 PUBLICATIONS **8,672** CITATIONS

SEE PROFILE

Gary J. Gaeth
University of Iowa
64 PUBLICATIONS **4,736** CITATIONS

SEE PROFILE

Marco Lauriola
Sapienza University of Rome
112 PUBLICATIONS **2,032** CITATIONS

SEE PROFILE

A New Look at Framing Effects:

Distribution of Effect Sizes, Individual Differences, and Independence of Types of Effects

Irwin P. Levin

Gary J. Gaeth

Judy Schreiber

University of Iowa

Marco Lauriola

University of Rome

Correspondence should be addressed to Irwin Levin at Department of Psychology, The University of Iowa, 11 Seashore E, Iowa City, IA 52242-1407, USA. This research was supported by National Science Foundation grant SES-0001316 awarded to the first author.

Abstract

Levin, Schneider and Gaeth (1998) identified three distinct types of framing effects in the literature: attribute-framing effects, goal-framing effects, risky choice-framing effects. While most previous framing studies used between-subjects manipulations of frame, the present study used two sessions, spaced one week apart, to give each of 102 participants both framing conditions and all three types of framing. Using the difference between the score for the positive framing condition and the negative framing condition as the unit of analysis for each type of framing effect, the following were found: 1) reliable framing effects for attribute framing and risky choice framing, but not for goal framing; 2) distributions of individual framing effects showing that the aggregate-level effects were representative of individuals even though some individuals showed no framing effects; 3) no significant interdependencies between the three categories of framing effects; 4) individual differences in reaction to the task scenarios related to various of the "Big Five" personality traits as well as the Faith in Intuition scale. The use of within-subject designs to assess individual differences in decision making phenomena such as framing effects and other biases and heuristics is recommended for future research.

Key terms: information framing, individual differences

A New Look at Framing Effects:

Distribution of Effect Sizes, Individual Differences, and Independence of Types of Effects

"All frames are not created equal." That was the theme of a recent paper in which it was proposed that there are at least three types of framing effects that are distinguishable in terms of their operational definitions, their typical results, and the likely underlying processes (Levin, Schneider, & Gaeth, 1998). That paper summarized a number of earlier studies in which objectively equivalent information resulted in different judgments and decisions depending on the way in which the information was labeled or "framed." But what was affected and how it was affected differed across studies: more favorable evaluations of objects or events when a key attribute was labeled in positive rather negative terms, greater persuasive effects in achieving a desired goal when a message was framed in terms of potential losses rather than potential gains, and more risky choices made to avoid unfavorable outcomes than to achieve favorable ones. These three types of framing are called attribute framing, goal framing, and risky choice framing, respectively.

Of course, earlier studies varied from each other in a number of ways besides the classification into the three types of framing. Decision domain (e.g., monetary vs. health-related), decision importance or salience, and the decision maker's experience, level of involvement, and expertise all varied from study to study and sometimes made comparisons difficult and tenuous. Papers by Fagley and Miller (1990, 1997), Frisch (1993), Highhouse and Paese (1996), Kühberger (1995, 1998), Rothman and Salovey (1997), and van Schie and van der Pligt (1995) all point to the influence of such task and subject variables.

The present study is the first to provide an empirical test of Levin et al.'s (1998) typology in which all three types of framing effects are examined and related to each other using the same

subjects in a related series of tasks. Subjects are given an attribute-framing task, patterned after Levin and Gaeth (1988), where they rate ground beef that is either labeled "80% lean" or "20% fat"; a goal-framing task, patterned after Meyerowitz and Chaiken (1987), where they indicate the extent to which they would recommend reducing or eliminating red meat from the diet after reading a message that either stresses the positive consequences of doing so or the negative consequences of failing to do so; and a risky choice-framing task, patterned after Tversky and Kahneman (1981), where they express their preference between two programs differing in risk level for reducing cholesterol that are described in terms of either positive or negative outcomes.

There are other unique aspects of the present methodology. We use a within-subjects rather than the typical between-subjects design for manipulating frame. There have been other framing studies which used within-subjects designs (e.g., Frisch, 1993; Levin, Johnson, & Davis, 1987; Stanovich & West, 1998a) to test the robustness of a particular effect and the reasons for it. The present goals are somewhat different. By providing each subject with both versions of each framing task, we are able to use the difference score as the unit of analysis for examining each type of framing effect separately and for relating the different types to each other. (As will be described shortly, this requires special procedural considerations such as using two experimental sessions separated by one week, and employing "filler" tasks to mask the purpose of the study.)

Using a within-subjects framing manipulation and employing the difference score between positive and negative conditions as the unit of analysis for each type of framing, permits new ways of looking at framing effects. To the best of our knowledge, we are the first to look at the distribution of individual framing effects. This is important because a significant framing effect in the typical between-subjects design could be due to a large effect for a subgroup of

subjects but no effect for others, possibly even a majority of others. Conversely, a nonsignificant effect could be due to the existence of two subgroups who are influenced in opposite ways. We will be able to determine if previously reported aggregate-level framing effects are representative of effects for individual decision makers.

Levin et al. (1998) came to the conclusion, based on analysis of the literature, that the three types of framing effects represent different processes. Thus, they should be mutually independent. We can now test the independence assumption directly by correlating responses between each pair of framing types. Finally, the ability to measure framing effects for each individual subject allows us to look for personal traits that distinguish between those individuals who do and do not exhibit a particular type of framing effect. We provide an exploratory analysis of this possibility by relating individual subjects' framing effects to their scores on the Big Five Personality Inventory (Digman, 1990) and the Rational-Experiential Inventory (Epstein et al., 1996).

The three types of framing effects are reviewed briefly below, as well as the hypotheses for the present study.

Attribute-framing effects. Attribute-framing effects occur when evaluations of an object or event are more favorable if a key attribute is framed in positive rather than negative terms such as % lean rather than % fat of a food product, % correct rather than % incorrect on a test, and success rate rather than failure rate of a medical procedure. Table 3 of Levin et al. (1998) shows this to be a reliable phenomenon. According to Levin and Gaeth (1988), positive labels tend to evoke positive associations while negative labels tend to evoke negative associations. When these associations are then mapped onto bipolar response scales, positive labels lead to

more favorable responses than negative labels. We thus predict that this "valence consistent shift" will occur when we manipulate % lean/% fat of ground beef in the present study.

Goal-framing effects. Goal-framing effects occur when a persuasive message has different appeal depending on whether it stresses the positive consequences of performing an act to achieve a particular goal or the negative consequences of not performing the act. For example, Meyerowitz and Chaiken (1987) showed that women were more apt to engage in breast self-examination (BSE) when presented with information stressing the negative consequences of not engaging in BSE than when presented with information stressing the positive consequences of engaging in BSE. The observation that the negative message is more persuasive has been linked to "loss aversion," a phenomenon whereby most people are more motivated to avoid a loss than to achieve a gain of the same magnitude. However, Table 4 of Levin et al. (1998) shows that evidence for this effect is less than for the other types of framing effects. (See also Rothman & Salovey, 1997, for possible moderating factors.) Thus, we present as somewhat tentative the hypothesis that a message describing the negative consequences of not reducing the intake of red meat will be more persuasive than a message describing the positive consequences of reducing the intake of red meat.

Risky choice-framing effects. Risky choice-framing effects occur when willingness to take a risk (e.g., elect a medical procedure with variable potential outcomes) depends on whether the potential outcomes are positively framed (e.g., in terms of success rate) or negatively framed (e.g., in terms of failure rate). Typically, as in Tversky and Kahneman's (1981) "Asian disease task," people are more willing to take risks with negatively framed outcomes than with positively framed outcomes. That is, they are more apt to take risks to avoid a loss than to achieve a gain. As is shown in Table 2 of Levin et al. (1998) and by Kühberger (1998), this "risky shift" has

been demonstrated many times, especially when the procedures followed closely those used by Tversky and Kahneman. This effect is explained in part by prospect theory's psychophysical value function, which is concave in the domain of gains and convex in the domain of losses (Kahneman & Tversky, 1979). The present risky choice-framing task does not deal with saving/losing lives as did Tversky and Kahneman's, but it does deal with success/failure rates in treating a serious medical problem. Hence, we hypothesize that in choosing between risky and riskless options for treating high levels of cholesterol, our subjects will be more apt to select the risky option in the negative or "failure" condition than in the positive or "success" condition.

To briefly summarize our hypotheses, we predict that each of the framing effects revealed in comparisons across studies will be replicated in the present study where each subject receives each of the three different types of framing task in each of two sessions, and receives a different version of each task in each session. Furthermore, based on Levin et al.'s (1998) typology, we predict that the three different framing effects will be independent of each other. That is, the direction and magnitude of the framing effect in one task will be uncorrelated with the direction and magnitude of the framing effect in the other tasks. Finally, we will examine whether the distribution of individual framing effects reveals that aggregate-level results are representative of framing effects at the level of the individual judge or decision maker, and we will look for evidence that individual differences in framing effects are linked to stable personal characteristics.

We performed a preliminary study to provide initial tests of our hypotheses and the soundness of our procedures; then the main study with larger sample size and slightly modified methods. We will briefly describe the preliminary study and then describe the main study in more detail.

The primary goal of the preliminary study was to test the usefulness of the within-subject design for answering the questions of interest. Using a sample of 43 undergraduate Business students and the same basic methods used in the main study, subjects were given each of the three framing tasks on two separate sessions, where the framing condition for each task varied across the sessions. One concern was that subjects would recall responses from session to session and try to appear consistent, thus attenuating framing effects. To reduce this possibility, we spaced the two sessions one week apart and included "filler" tasks.

The basic findings were as follows: (1) statistically significant attribute framing effects and risky choice framing effects, but not goal framing effects; (2) unimodal distributions of framing effects for individual subjects; (3) minimal interdependency between framing effects of each type; (4) marginally significant evidence that several of the "Big Five" personality traits as well as "Faith in Intuition" are predictive of the magnitude of framing effects.

Because two out of the three framing effects were found (and the remaining one was the least reliable in previous research), we felt justified in retaining the basic within-subject manipulation of framing condition. However, several procedural modifications were made from the preliminary study to the main study. For example, whereas a discrete choice was required in the original risky choice task, a continuous measure of preference was used in the main study which allows for "no preference" as well as varying levels of preference for each option. This provides greater response variability for uncovering possible predictors of the magnitude of framing effects. We added a behavioral intentions measure to the usual rating scales used in the attribute framing task.

Most importantly, the larger sample size (N = 102) provided more power for testing the reliability of framing effects, detecting interdependencies between framing types and detecting

personal characteristics predictive of individual differences in each type of framing effect, and greater reliability in describing the distributions of individual framing effects.

In addition to the preliminary study, there is other research suggesting that different personal characteristics may be associated with different reactions to positively framed and negatively framed stimuli. While not dealing specifically with judgment and decision making, research by Rusting and Larsen (1998; see also review by Rusting, 1998) shows that scales of extroversion and neuroticism (part of the Big Five) are predictive of reactions to positive and negative stimuli. For example, in recalling a list of words of mixed valence, extraverts were more likely than introverts to recall positive words. Neuroticism was correlated with interpretations of ambiguous emotional concepts. For example, a word fragment like ANG_ _ could be completed as "angry" or as "angel," but those scoring high on neuroticism were more likely to use a negative word. In a recent study of risky decision making, Lauriola and Levin (2001) found that scores on various scales of the Big Five Personality Inventory were related to risk taking but that risk taking to achieve gains and risk taking to avoid losses had different predictors. Nevertheless, these results do not necessarily mean that persons with certain traits will be differentially responsive to objectively equivalent positive and negative framing conditions. The present study is uniquely designed to study at the individual subject level the differential reaction to different framing conditions.

Method

A 3 x 2 within-subjects design was used where each of 102 subjects (students in introductory Marketing classes at the University of Iowa) received each of the two versions of each of the three framing tasks. For each task subjects received one framing condition on the first session and the other condition on the second session, one week later. For example, if, on

the first session, a subject received the positive version of the attribute framing task, the negative version of the goal framing task, and the positive version of the risky choice framing task, then that subject received the negative version of the attribute framing task, the positive version of the goal framing task, and the negative version of the risky choice framing task on the second session. There are eight such combinations; each subject was randomly assigned to one of them.

The three framing tasks are described below.

Attribute Framing

Participants were told to assume that they were inviting a special friend to dinner and that they were making their favorite lasagna dish with ground beef. In the positive condition participants were told that the beef was "80% lean" and in the negative condition participants were told that the beef was "20% fat." In each condition participants were asked to evaluate the beef on the following 7-point bipolar scales: fat-lean, greasy-greaseless, low quality-high quality, and bad tasting-good tasting. After completing the rating scales, subjects were asked, "In addition, if you went to the store to purchase the ground beef, what would you be willing to spend for a one-pound package?" To anchor the scale, subjects were told that recent prices in the local area range from $1.50 to $2.50.

Goal Framing

Participants were told to imagine that one of their parents was considering eliminating or reducing the amount of red meat in their diet.[1] They were then shown an excerpt from an article describing the effects of eating red meat. In the positive condition participants were told: "If your parent discontinues eating red meat, he or she will be able to reduce the level of cholesterol in their blood. Thus, he or she will significantly decrease the likelihood of the early onset of heart disease." In the negative condition participants were told: "If your parent continues eating

red meat he or she will not be able to reduce the level of cholesterol in their blood. Thus, he or she will fail to significantly decrease the likelihood of the early onset of heart disease." In each condition participants were asked to rate how likely they are to recommend that their parent eliminate red meat from their diet, and to rate how likely they are to recommend that their parent reduce by at least 1/3 the amount of red meat in their diet, each on a scale of 1 to 7 labeled "Definitely would NOT recommend" at the low end and "Definitely would recommend" at the high end.

Risky Choice Framing

Participants were asked to imagine that one of their parents was diagnosed as having dangerously high levels of cholesterol. They were told that two programs have been developed for treating high levels of cholesterol. In the positive condition participants were given the following descriptions: "If Program A is adopted, 1/3 of the persons treated will succeed in reducing their cholesterol. If Program B is adopted, there is a 1/3 chance that all of the persons treated will succeed in reducing their cholesterol and a 2/3 chance that none of the persons treated will succeed in reducing their cholesterol." In the negative condition participants were given the following descriptions: "If Program A is adopted, 2/3 of the persons treated will fail to reduce their cholesterol. If Program B is adopted, there is a 1/3 chance that none of the persons treated will fail to reduce their cholesterol and a 2/3 chance that all of the persons will fail to reduce their cholesterol." In each condition participants were asked to complete a rating on a 7-point scale labeled "Definitely would recommend A" at one end and "Definitely would recommend B" at the other end. Responses were scored 1-7 where higher numbers represent greater preference for the risky option.

Note that for each task, the positive and the negative framing conditions are objectively equivalent, and that the two options in the risky decision making task have equal expected value. In addition, subjects were given "filler" tasks consisting of ratings of consumer durables and recent pleasurable or unpleasurable activities, where slightly different versions were given on different days so as to avoid having the framing tasks stand out as being the only ones to vary across sessions. Individual differences measures were included (different ones each day), consisting of the following: The Big Five Personality Inventory (Openness to Experience, Conscientiousness, Extraversion-Introversion, Agreeableness, Neuroticism; Digman, 1990), the Rational-Experiential Inventory or REI (Need for Cognition, Faith in Intuition; Epstein et al., 1996), and a set of demographic questions. Table 1 presents the intercorrelations between these various measures.

The three framing tasks were always presented in the sequence of attribute-framing task, goal-framing task and risky choice-framing task because this seemed to be the most natural sequence (rating beef on various dimensions, considering the health consequences of consuming beef, choosing between programs for dealing with the health consequences). These tasks, however, were interspersed between the filler tasks and individual difference surveys. While the complete package of tasks took about 30-40 min. to complete, the framing tasks constituted only about 5 min. of that time, thus masking their importance and minimizing the chances that subjects would remember their responses to them and try to achieve consistency from session to session.

Results

Aggregate Results

Table 2 shows the mean values of the various scales used in each task, displayed both separately for the positive and negative condition within each task and for the positive minus negative difference scores along with their associated significance tests. Included are the composite (average) measure for the four rating scales used in the attribute framing task (α = .84, .84, and .85, respectively for the positive condition, the negative condition, and the difference scores), and the composite (average) measure for the two scales used in the goal framing task (α = .64, .56, and .67, respectively for the positive condition, the negative condition, and the difference scores).

For attribute framing, difference scores, as predicted, were significantly greater than zero for all four of the separate scales and for the composite of all four scales. The mean difference on the composite (average) score was 0.63 on a 7-point scale. These findings replicate those of the preliminary study, as well as those of many other studies of attribute framing showing that responses are more favorable when a key attribute is framed in positive terms (in this case, % lean) rather than in negative terms (% fat). The added question of willingness to spend is of interest in its own right because it is the only measure of behavioral intent. Like the other measures, responses were significantly higher in the positive condition than in the negative condition. In fact, in the absence of any actual changes in attributes, the subjects, on average, would spend 8.2 cents more for a one-pound package of ground beef when it is labeled "80% lean" than when it is labeled "20% fat."

For goal framing, the difference between framing conditions did not approach statistical significance for either scale or the combined scales. This is the same result observed in the preliminary study even though the cover story was modified slightly to make the scenario more

meaningful to college students, and reflects the lack of systematic effects observed in the literature.

For risky choice framing, the predicted effect of more risk taking in the negative frame than in the positive frame was large and statistically significant. The mean difference was 1.09 on a 7-point scale. In addition to the rating data shown in Table 2, we classified responses in terms of preference for the risky or the riskless option where ratings of 1-3 represent preference for the riskless option, 4 represents no preference, and 5-7 represent preference for the risky option. As shown in Table 3, when responses are classified in this manner, 56 of the subjects preferred the riskless option in the positive condition compared to only 10 of the subjects preferring the risky option. By contrast, 26 of the subjects preferred the riskless option in the negative condition compared to 38 of the subjects preferring the risky option. This replicates not only the preliminary study but many other studies reporting a preference reversal or preference shift across framing conditions when using variations of Tversky and Kahneman's (1981) "Asian disease task."

Distributions of Individual Framing Effects

Figure 1 gives the distribution of effect sizes over individual decision makers. The distributions are all unimodal.

For attribute framing, the modal composite difference score was 0.5. Thirty subjects had composite differences scores between -.25 and +.25, showing virtually no framing effect. However, of those subjects showing a composite difference score equal to or greater than 1.0 in magnitude, 39 were in the positive direction while only 3 were in the negative direction. The distribution of difference scores for willingness to spend shows that most subjects (59) did not

exhibit a framing effect, but of those who did, 32 were in the positive direction while only 11 were in the negative direction.

For goal framing, the modal composite difference score was 0. Of those showing nonzero scores, the numbers were approximately evenly split between those with difference scores in the predicted negative direction (40) and those with difference scores in the positive direction (35). Sixty subjects had composite difference scores between -.5 and +.5.

For risky choice framing, the modal difference score on the rating scale was 0. However, of those subjects showing nonzero effects, a majority of about 5:1 were in the predicted direction of greater preference for the risky option in the negative condition than in the positive condition. When rating responses were converted into the discrete categories of preference for the risky option, neutral, or preference for the riskless option, and were cross-classified according to framing condition (Table 3), the two largest subgroups of subjects were those who were neutral in both conditions (26) and those who preferred the riskless option in the positive condition and the risky option in the negative condition (25). Only 2 subjects preferred the risky option in the positive condition and the riskless option in the negative condition. Thus, of those subjects who reversed their preferences across framing condition, the vast majority showed the predicted reversal of risk aversion with positively framed options and risk seeking with negatively framed options. Nevertheless, a substantial subgroup were indifferent between the two options in both conditions.

Assessing the Independence of Effects

The most direct test of independence using the difference score as a measure of effect size and direction for each subject in each task is to compute the correlation between difference scores for each pair of tasks. A nonsignificant correlation supports the independence

assumption. The correlations were .19 between attribute and goal framing, .19 between attribute and risky choice framing, and .10 between goal framing and risky choice framing. The first two approached statistical significance ($p < .10$) but none of the correlations explains as much as 4% of the variance when trying to predict one framing effect from another. Furthermore, the correlation between attribute and goal framing and the correlation between attribute and risky choice framing are in the opposite direction as one would predict if subjects exhibiting the expected positive effect with attribute framing also exhibited the expected negative effect with goal framing or risky choice framing.

The difference score technique combines different component sources of potential shared variance. The following additional analysis is in keeping with Campbell and Fiske's (1959) suggestion for separating features of the stimuli corresponding to the trait or phenomenon being measured and the method being employed. These correspond in the present case to variance due to framing type and variance due to manipulation of valence within each type. In order to separate these, we considered each framing condition (valence) within each task to form six separate task-valence combinations and then computed the correlations between them. The resulting correlation matrix is shown in Table 4. The correlations in this table reflect both variance due to task (framing type) and variance due to framing condition or valence within each framing type. For both attribute framing and goal framing, the correlation between the positive and negative valence conditions was large and positive. This represents the dependence between repetitions of the same task in opposite valence conditions and shows that subjects exhibited consistency in using the same rating scales for each version of these tasks. For risky choice framing the correlation was small and nonsignificant. This reflects the fact that the risky choice framing effect was manifest in a reversal of preferences across valence conditions, with some

subjects showing such a reversal and some not. In this analysis, correlations between tasks within each valence condition represent tests of the independence assumption. None of these six correlations approached statistical significance.

Individual Differences

The search for personal traits that predict responses to our framing tasks involves several steps. First, we defined two separate criterion variables for each type of framing effect. The most direct way to test whether particular personal traits predict susceptibility to framing is to define the criterion as an individual's difference score between the two framing conditions for a particular type of framing. This is of primary interest in the present research. It is also of interest, however, to determine which personal traits predict overall response to each framing scenario. For example, it would be of interest to determine what types of individuals are most responsive to the message contained in the goal framing scenario or what types of individuals are most likely to prefer the risky option in the risky choice task, regardless of framing condition. For this, we use the average response across framing conditions as the criterion variable.

Because a number of the traits used in the present study correlate with each other (see Table 1), we conducted a series of sequential regression analyses of the following type for each combination of framing task and criterion variable: gender was entered first; the complete set of Big Five factors and both scales of the Rational-Experiential Inventory were entered next; then, to increase statistical power, the factors with the smallest beta-weights were deleted and the analysis was repeated. (See also Lauriola & Levin, 2001). Table 5 summarizes those analyses resulting in a significant value of R^2. Because gender was never a significant factor, it does not show up in any of the final analyses. (However, consistent with earlier literature, there was a

tendency approaching statistical significance for males to make more risky choices than females.)

Attribute framing. Several factors were predictive of difference scores reflecting the magnitude of the attribute framing effect for the composite ratings. A subset of two of the Big Five traits, Conscientiousness and Agreeableness, predict individual differences in the attribute framing effect. Conscientiousness is negatively related to the attribute framing effect and Agreeableness is positively related. Within the two components of the Rational-Experiential Inventory, Faith in Intuition is negatively related to the attribute framing effect, meaning that persons who score higher in Faith in Intuition are less likely to show the effect.

None of the potential predictors or sets of predictors were significantly related to the average composite rating score when scores were combined across framing conditions. For the willingness-to-pay scale, there were no significant predictors for either difference scores or average scores.

Goal framing. None of the predictors or sets of predictors were significantly related to the composite difference scores for goal framing. However, several factors were predictive of the scores averaged over framing conditions. A subset of two of the Big Five traits, Conscientiousness and Agreeableness, was significant in the regression analysis. Both these factors are positively related to average score, meaning that subjects scoring high on Conscientiousness and subjects scoring high on Agreeableness had higher rated likelihood of recommending that their parent eliminate or reduce consumption of red meat. Subjects scoring high on Faith in Intuition, likewise, were more responsive to the message in the goal framing scenario.

Risky choice framing. When the magnitude of the risky choice framing effect, as measured by the difference between preference ratings in the positive and negative conditions, was examined as a function of the predictor variables, a subset of the Big Five approached significance ($p = .056$). When preference ratings were converted into the categories of preference for the risky option (scored 2), no preference (scored 1), and preference for the riskless option (scored 0), the same subset was significantly related to preferences. Subjects scoring high on Neuroticism, subjects scoring low on Openness, subjects scoring high on Conscientiousness, and subjects scoring low on Agreeableness were more apt to show the expected preference reversal.

A subset of the Big Five and Faith in Intuition predicted ratings averaged over the two framing conditions. Subjects scoring low on Extroversion, subjects scoring high on Openness, subjects scoring low on Conscientiousness, and subjects scoring high on Faith in Intuition were more likely to prefer the risky option.

In summary, personal traits were predictive of the magnitude of framing effects in the case of attribute framing and risky choice framing. Inspection of Table 5 reveals that a subset of personality traits, Conscientiousness and Agreeableness, was predictive of both types of effects. However, because the predicted attribute framing effect is expressed as a positive difference score and the predicted risky choice framing effect is expressed as a negative difference score, this subset of traits has opposite effects on attribute and risky choice framing. Persons who score low on Conscientiousness and persons who score high on Agreeableness are more apt to show the predicted attribute framing effect of more favorable ratings in the positive condition than in the negative condition, but they are less apt to show the predicted risky choice framing effect of greater preference for the risky option in the negative condition than in the positive condition. In

general, the different set of results for each task reinforces the conclusion from the preceding section that the three types of framing effects are independent of each other.

Discussion

The most basic contributions of this study come from estimating effect size for each individual subject for each type of framing effect. Results can be classified into tests of reliability, tests of independence, and tests of individual differences. Each will be discussed in turn.

At the aggregate level, statistically significant effects were found for both attribute framing and risky choice framing tasks. More favorable evaluations when a key attribute (in this case, %lean/% fat) was labeled in positive rather than negative terms, and greater preference for the risky option when outcomes were expressed as losses rather than as gains (in this case, failure rate/success rate), replicate many previous studies that fall into these respective categories (Levin et al., 1998, Tables 2 and 3). The new contribution here is that these effects occurred in a within-subjects design, with the distribution of individual-level effects in each case supporting the reliability of the effect but also showing that a number of subjects were "normatively correct" in showing no framing effect. Furthermore, we added a behavioral intentions measure (amount willing to spend) of attribute framing which also showed the predicted effect, and we showed that the risky choice framing effect occurred with both discrete choices (preliminary study) and preference ratings (main study).

The goal framing effect failed to materialize in either the preliminary study or the main study, despite the increased sample size in the main study and the change in cover story to make the scenario apply to choices for the students' parents rather than the students themselves. The lack of a statistically significant goal framing effect is not too surprising, given the variability of

results for previous studies in this category (Levin et al., 1998, Table 4). An examination of the distribution of individual goal-framing effects clearly rules out the possibility that the nonsignificant aggregate result was due to a bimodal distribution where some subjects show a large effect in one direction and other subjects show a large effect in the other direction. The negatively framed message regarding the consequences of failing to curtail the consumption of red meat may lack the immediacy and force of Meyerowitz and Chaiken's (1987) negatively framed message concerning the consequences of failing to perform breast self-examinations.

The direct tests of dependency between framing types as well as the different pattern of significant predictors of each type of framing support Levin et al.'s (1998) conclusion that the three types of framing are governed by different processes and are thus independent of each other. Levin et al.' s conclusion was based on logical and theoretical arguments. The present study provides empirical support.

Some interesting patterns emerged in the search for reliable predictors of the magnitude of the various types of framing effects and the average response to the different scenarios. Because of the exploratory nature of this study and because some of the predictors are correlated with each other, we will not attempt to explain each individual predictor but some of our results can be shown to be consistent with earlier research. Most prior research on individual differences in decision making have focused on risky decision making. For example, Lauriola and Levin (2001) showed that persons scoring high on Neuroticism were both more apt than others to take risks in the domain of losses and less apt than others to take risks in the domain of gains, a finding completely compatible with the present finding that persons scoring high on Neuroticism showed the largest risky choice framing effect. Another finding common to both

the Lauriola and Levin study and the present one is the positive relation between openness and risk taking.

Some factors, however, were conspicuous in the absence of their effects. For example, neither gender was more susceptible to framing effects than the other. Whereas its companion measure of thinking style, Faith in Intuition, entered into some significant relations (eg., it was positively related to risk taking), Need for Cognition entered into no significant relations. While NFC has been associated with more effortful processing of and search for information leading to a decision (Levin, Huneke, & Jasper, 2000), evidence for its role in framing has been sparse (Smith & Levin, 1998). A recent study by Le Boeuf and Shafir (2000) found that framing effects of various sorts were not impacted by effortful thought, whether manipulated by eliciting justification of choice or as measured by participants' NFC scores. These authors conclude that the decision maker adopts the frame presented in the statement of the problem and that there is little reason to believe that deeper thinking will allow one to escape that frame. The current study supports this conclusion concerning Need for Cognition.

Research in judgment and decision making, as in many other areas, has benefited from establishing reliable phenomena that transcend individual differences that are typically treated as "error variance." The present study as well as recent research by Stanovich and his colleagues (summarized in Stanovich, 1999) illustrate that even more can be learned by going beyond aggregate level results and examining individual differences in the effects being examined.[2] At least some of the variance in the observed framing effects could be accounted for and predicted by a priori measures of stable personal characteristics. Use of within-subject designs in conjunction with measurement of personal characteristics that might logically be related to the effects under investigation was useful for studying framing effects and appears promising for

other effects as well, such as endowment effects, sunk cost effects, expectancy effects and anchoring and adjustment.

References

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. Psychological Bulletin, 56, 81-105.

Digman, J. M. (1990). Personality structure: Emergence of the five factor model. Annual Review of Psychology, 41, 417-440.

Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996). Individual differences in intuitive-experiential and analytical-rational thinking styles. Journal of Personality and Social Psychology, 71, 390-405.

Fagley, N. S., & Miller, P. M. (1990). The effect of framing on choice: Interactions with risk-taking propensity, cognitive style, and sex. Personality and Social Psychology Bulletin, 16, 496-510.

Fagley, N. S., & Miller, P. M. (1997). Framing effects and arenas of choice: Your money or your life? Organizational Behavior and Human Decision Processes, 71, 355-373.

Frisch, D. (1993). Reasons for framing effects. Organizational Behavior and Human Decision Processes, 54, 399-429.

Highhouse, S., & Paese, P. W. (1996). Problem domain and prospect frame: Choice under opportunity versus threat. Personality and Social Psychology Bulletin, 22, 124-132.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. Econometrica, 47, 263-291.

Kühberger, A. (1995). The framing of decisions: A new look at old problems. Organizational Behavior and Human Decision Processes, 62, 230-240.

Kühberger, A. (1998). The influence of framing on risky decisions. Organizational Behavior and Human Decision Processes, 75, 23-55.

Lauriola, M., & Levin, I. P. (in press). Personality traits and risky decision making in a controlled experimental task: An exploratory study. Personality and Individual Differences.

Le Boeuf, R. A., & Shafir, E. (November 2000). Deep thoughts and shallow frames: Effortful thinking and susceptibility to framing effects. Poster presented at the Annual Meeting of the Psychonomic Society, New Orleans, LA.

Levin, I. P., & Gaeth, G. J. (1988). Framing of attribute information before and after consuming the product. Journal of Consumer Research, 15, 374-378.

Levin, I. P., Huneke, M. E., & Jasper, J. D. (2000). Information processing at successive stages of decision making: Need for cognition and inclusion-exclusion effects. Organizational Behavior and Human Decision Processes.

Levin, I. P., Johnson, R. D., & Davis, M. L. (1987). How information frame influences risky decisions: Between-subjects and within-subject comparisons. Journal of Economic Psychology, 8, 43-54.

Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: A typology and critical analysis of framing effects. Organizational Behavior and Human Decision Processes, 76, 149-188.

Meyerowitz, B. E., & Chaiken, S. (1987). The effect of message framing on breast self-examination attitudes, intentions, and behavior. Journal of Personality and Social Psychology, 52, 500-510.

Rothman, A. J., & Salovey, P. (1997). Shaping perceptions to motivate health behavior: The role of message framing. Psychological Bulletin, 121, 3-19.

Rusting, C. L. (1998). Personality, mood, and cognitive processing of emotional information: Three conceptual frameworks. Psychological Bulletin, 124, 165-196.

Rusting, C. L., & Larsen, R. J. (1998). Personality and cognitive processing of affective information. Personality and Social Psychology Bulletin, 24, 200-213.

Smith, S. M., & Levin, I. P. (1996). Need for cognition and choice framing effects. Journal of Behavioral Decision Making, 9, 283-290.

Stanovich, K. E. (1999). Who is rational? Studies of individual differences in reasoning. Mahwah, NJ: Lawrence Erlbaum Associates.

Stanovich, K. E., & West, R. F. (1998a). Individual differences in framing and conjunction effects. Thinking and Reasoning, 4, 289-317.

Stanovich, K. E., & West, R. F. (1998b). Individual differences in rational thought. Journal of Experimental Psychology: General, 127, 161-188.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. Science, 211, 453-458.

Van Schie, E. C. M., & Van der Plight, J. (1995). Influencing risk preference in decision making: The effects of framing and salience. Organizational Behavior and Human Decision Processes, 63, 264-275.

Footnotes

[1]In the preliminary study subjects were asked to imagine that they themselves were considering eliminating or reducing the consumption of red meat. Because not many college students are actually concerned about cholesterol, we thought that this aspect of the scenarios may have contributed to the lack of a goal framing effect; thus, the change to parents for the main study.

[2]Stanovich (1999; Stanovich & West, 1998b), in keeping with the present point of view, also emphasizes that individual differences can be more than mere error variance. Stanovich and colleagues focus more on individual differences in cognitive capacity and thinking dispositions; the present study focuses more on individual differences in stable personality traits related to responsiveness to positively and negatively framed stimuli.

List of Figures

Figure 1. Distribution of effect size for each type of framing.

Panel A. Attribute framing

Panel B. Goal framing

Panel C. Risky choice framing

Table 1 -- Intercorrelations between Individual Difference Measures

	Big Five					REI		
	Openness to New Experience	Consciencious	Extroversion	Agreeable	Neuroticism (see note below)	Need for Cognition	Faith in Intuition	Gender (F=0, M=1)
Openness	1.000	**0.264	**0.476	*0.197	**0.257	**0.441	*0.235	0.019
Consciencious		1.000	0.156	**0.442	**0.304	0.029	**0.276	*-0.250
Extroversion			1.000	**0.285	**0.417	0.194	0.148	-0.092
Agreeable				1.000	**0.591	-0.127	-0.017	-0.084
Neuroticism					1.000	0.023	0.123	0.015
Need for Cogn.						1.000	*0.201	0.096
Faith in Intuit.							1.000	-0.180
Gender (F=0,M=1)								1.000

**** Correlation is significant at the 0.01 level (2-tailed).**
*** Correlation is significant at the 0.05 level (2-tailed).**

Note: All of the individual differences measures, except for Neuroticism, read such that higher scores imply higher levels of the individual difference as labeled. For Neuroticism, higher scores imply a higher level of emotional stability.

Table 2 -- Mean Responses, Standard Deviations and Tests of Significance

	Positive Condition		Negative Condition		Differences (Pos. - Neg.)		Test Difference = 0		
Attribute Framing	**Mean**	**Std Dev.**	**Mean**	**Std Dev.**	**Mean**	**Std Dev.**	**t Statistic**	**df**	**Sign. (2-tail)**
Fat/Lean	4.47	1.60	3.60	1.57	0.87	1.76	5.02	101	0.000
Greasy/Greasless	4.02	1.32	3.32	1.32	0.70	1.47	4.77	101	0.000
Low Quality/High Quality	4.50	1.49	3.86	1.45	0.64	1.52	4.23	101	0.000
Bad Taste/Good Taste	5.16	1.21	4.84	1.38	0.31	1.50	2.12	101	0.037
Average Attribute Score	4.54	1.17	3.91	1.18	0.63	1.24	5.14	101	0.000
Willingness to spend ($)	1.93	0.37	1.84	0.37	0.08	0.29	2.88	101	0.005
Goal Framing	**Mean**	**Std Dev.**	**Mean**	**Std Dev.**	**Mean**	**Std Dev.**	**t Statistic**	**df**	**Sign. (2-tail)**
Eliminate	5.11	1.46	5.02	1.48	0.09	1.59	0.56	101	0.576
Reduce by 1/3	6.08	1.05	6.10	1.25	-0.02	1.30	-0.15	101	0.880
Average Goal Score	5.59	1.09	5.56	1.14	0.03	1.22	0.29	101	0.776
Risky Choice Framing	**Mean**	**Std Dev.**	**Mean**	**Std Dev.**	**Mean**	**Std Dev.**	**t Statistic**	**df**	**Sign. (2-tail)**
Rating Score	3.12	1.36	4.21	1.49	-1.09	2.07	-5.30	101	0.000

Scales:

Attribute scores were from a 1-to-7 Likert scale, where a higher score implies a more positive rating.

Goal scores were from a 1-to-7 Likert scale, where a higher score implies more likely to eliminate or reduce red meat from the diet.

Risky Choice scores were from a 1-to-7 Likert scale, where a higher score implies a more risky choice.

Difference Score Predictions:

Attribute difference scores are predicted to be positive.

Goal difference scores are predicted to be negative.

Risky Choice difference scores are predicted to be negative.

Figure 1 -- Distributions

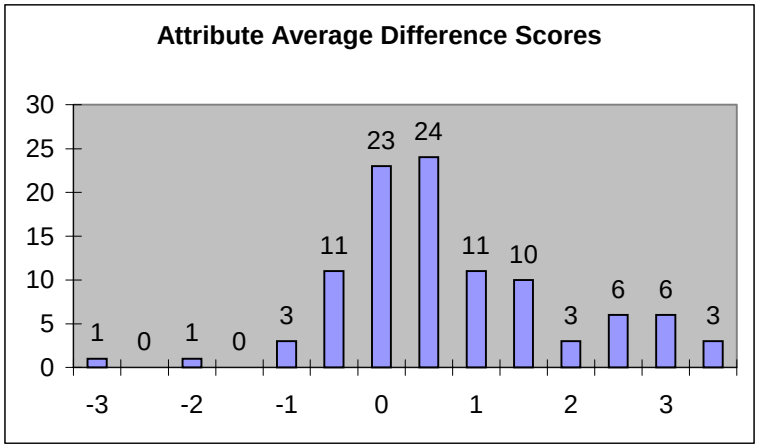

Figure 1 - A

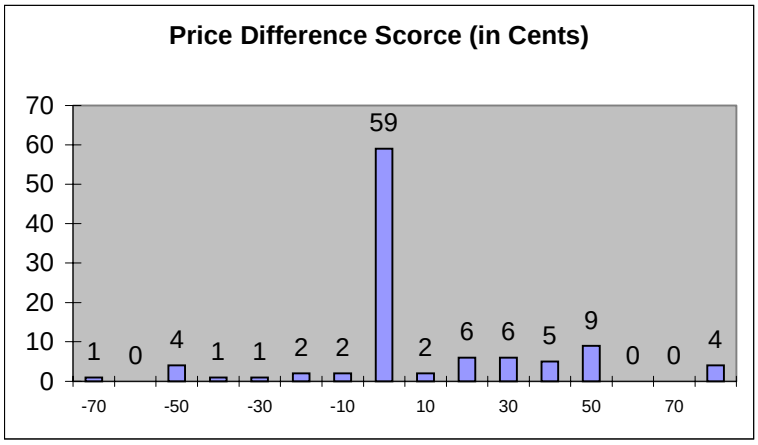

Figure 1 - B

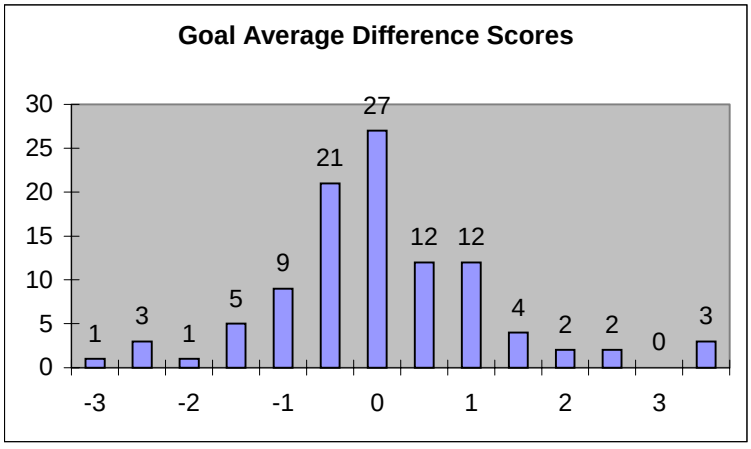

Figure 1 - C

Figure 1 -- Distributions (continued)

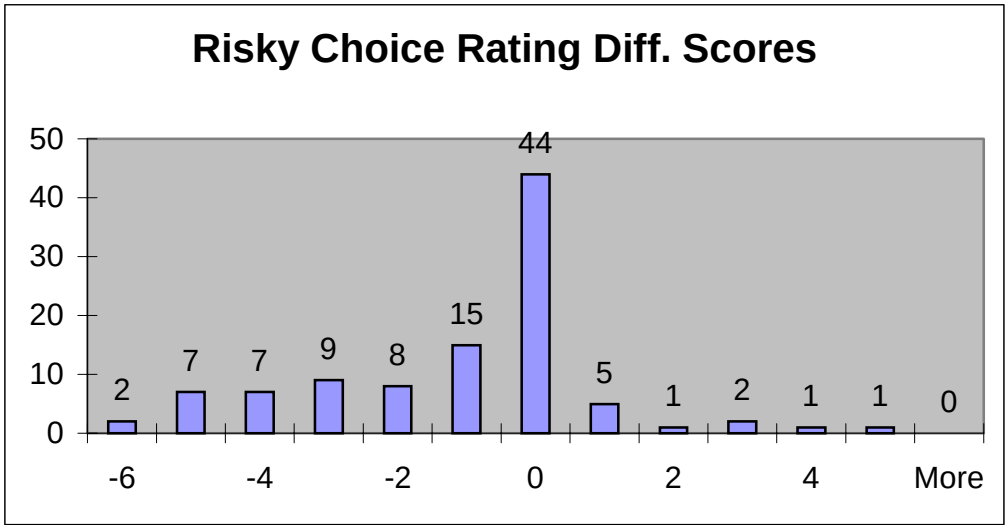

Figure 1 -- D

Joint Frequencies of Choice in Positive and Negative Conditions
Risky Choice Framing

Positive Condition	Negative Condition: Riskless	Indifferent	Risky	Subtotals
Riskless	20	11	25	56
Indifferent	4	26	6	36
Risky	2	1	7	10
Subtotals	26	38	38	102

Figure 1 -- E

Table 3 -- Correlations of Framing Types

	Attribute Ave. Pos.	Attribute Ave. Neg.	Goal Ave. Pos.	Goal Ave. Neg.	Risky Ch. Pos.	Risky Ch. Neg.
Attribute Ave. Pos.	1.000	**0.442	0.011	-0.043	-0.059	-0.077
Attribute Ave. Neg.		1.000	-0.133	0.035	-0.121	0.142
Goal Ave. Pos.			1.000	**0.409	0.029	-0.006
Goal Ave. Neg.				1.000	-0.081	0.039
Risky Ch. Pos.					1.000	-0.056
Risky Ch. Neg,						1.000

**** Correlation is significant at the 0.01 level (2-tailed).**

*** Correlation is significant at the 0.05 level (2-tailed).**

Table 4 -- t Statistics and R^2 for Individual Differences' Analysis

		Big Five					
		Open to New Experience	Consciencious	Extroversion	Agreeable	Neuroticism (see note below)	Overall R^2
Attribute Framing	Difference Score	--	-2.577	--	2.064	--	7.2%
	Average Score	--	--	--	--	--	--
Goal Framing	Difference Score	--	--	--	--	--	--
	Average Score	2.083	3.067	--	--	--	15.7%
Risky Choice Framing	Difference Score	2.606	-2.324	--	2.206	-2.445	13.4%
	Average Score	2.281	--	-2.369	--	--	6.9%

		REI		
		Need for Cognition	Faith in Intuition	Overall R^2
Attribute Framing	Difference Score	--	-2.078	4.1%
	Average Score	--	--	--
Goal Framing	Difference Score	--	--	--
	Average Score	--	2.712	6.9%
Risky Choice Framing	Difference Score	--	--	--
	Average Score	--	--	--

Note: All of the individual differences measures, except for Neuroticism, read such that higher scores imply higher levels of the individual difference as labeled. For Neuroticism, higher scores imply a higher level of emotional stability.