

Social Cues and Verbal Framing in Risky Choice

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ABSTRACT

We examined how people use social and verbal cues of differing priorities in making social decisions. In Experiment 1, formally identical life–death choice problems were presented in different hypothetical group contexts and were phrased in either a positive or negative frame. The risk-seeking choice became more dominant as the number of kin in an endangered group increased. Framing effects occurred only in a heterogeneous group context where the lives at risk were a mixture of kin and strangers. No framing effect was found when the same problem was presented in the context of a homogeneous group consisting of either all kin or all strangers. We viewed the framing effects to be a sign of indecisive risk preference due to the differential effects of a kinship cue and a stranger cue on choice. In Experiment 2, we presented the life–death problem in two artificial group contexts involving either 6 billion human lives or 6 billion extraterrestrial lives. A framing effect was found only in the human context. Two pre-conditions of framing effects appear to be social unfamiliarity of a decision problem and aspiration level of a decision maker. In Experiment 3, we analyzed the direction of the framing effect by balancing the framing. The direction of the framing effect depended on the baseline level of risk preference determined by a specific decision context. Copyright © 2001 John Wiley & Sons, Ltd.

KEY WORDS risky choice; framing effect; balanced framing; decision cues; social context; kinship; group homogeneity; minimum requirement; aspiration level

INTRODUCTION

We investigated how people use social and verbal cues inherent in a life–death problem when making risky choices. First, we tested how social cues about kinship and group composition affect a decision maker's risk preference. Second, previous findings have revealed that framing effects occurred only in large, anonymous group contexts with 600 or 6000 hypothetical lives at risk but disappeared in small group contexts with 60 or 6 lives involved (e.g. Wang, 1996a,b; Wang and Johnston, 1995). Therefore

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we examined the question of whether the observed framing effect was due to the large, anonymous group context or to the large numbers of people involved in the choice problems. Third, by employing a balanced framing procedure, we could measure baseline risk preference. This empirically measured subjective reference point allowed us to compare the effects of positive and negative frames to a baseline control. Finally, greater experimental control was achieved by examining our participants individually instead of in a group or classroom setting.

A classic example of how verbal framing affects risk preference in a choice problem is the Asian disease problem. Using this problem, Tversky and Kahneman (1981) demonstrated a reversal in risk preference as a result of how the same choice outcomes were phrased or framed. In the Asian disease problem, 600 anonymous people were described as having been infected by a fatal Asian disease. There were two alternative treatment plans available; one would ensure the survival of one third of 600 lives (i.e. 200 lives for certain), and the other would lead to a one-third probability of saving all 600 lives with a two-thirds probability of losing all 600 lives. Given a binary choice, 72% of their participants preferred the sure option over the gamble of the same expected value when the choice outcomes were framed positively in terms of the number of lives saved by each of the treatment plans. However, when the same outcomes were framed negatively in terms of lives lost, 78% of the participants in another sample preferred the gamble to the sure option. This reversal in risk preference is a well-known example of framing effects.

Framing effects are often explained using Kahneman and Tversky's prospect theory (1979; Tversky and Kahneman, 1992). According to prospect theory, people encode possible choice options as gains and losses, and tend to be risk averse when choosing among prospects perceived as gains, but risk seeking when choosing among prospects seen as losses. The framing of the choices thus exerts its effects indirectly by influencing the way a decision maker views the choice prospects. Therefore, in a positive frame, zero or no lives saved would be used as a reference point so that the decision maker perceives non-zero outcomes as a gain. In contrast, a negative frame would elevate the reference point to zero lives lost so that the decision maker perceives the same outcomes as a loss.

Inspired by Kahneman and Tversky's work, some later studies examined the relationship between verbal framing and other variables in decision problems. Converging evidence suggests that the occurrence of a framing effect depends on many task, content, and context variables inherent in choice problems, which themselves may involve distinct psychological mechanisms (e.g. Fagley and Miller, 1987; Highhouse and Paese, 1996; Levin *et al.*, 1985; Miller and Fagley, 1991; Petrinovich and O'Neill, 1996; Petrinovich, O'Neill, and Jorgensen, 1993; Roszkowski and Snelbecker, 1990; Schneider, 1992; Shoorman *et al.*, 1994; for recent reviews, see Kühberger, 1998 and Levin, Schneider, and Gaeth, 1998).

Some recent studies (e.g. Fagley and Miller, 1997; Jou, Shanteau, and Harris, 1996; Wang, 1996b) have found that people are overall more risk seeking when dealing with human life problems than with money problems of the same probability structure. Fagley and Miller (1997) pointed out that this phenomenon cannot be explained by prospect theory, which predicts an interaction between framing and task arena (i.e. money versus human life). The S-shaped value function of prospect theory implies that the greater the expected utility at risk, the more risk averse the response. If one assumes that saving a single life has greater value than saving a dollar, one would expect more risk-averse choices when a decision problem involves human life; rather than money. Specifically, under positive framing, where outcomes are framed as gains, one would expect to see more risk-averse choices in human life arena than in the money arena, and expect the reverse under negative framing. Even though human lives presumably have greater utility than dollars, participants in the positive framing condition made riskier choices regarding human life rather than money.

Wang's (1996a,b) studies have further demonstrated that within the human life arena, risk-seeking preference is much stronger in a small group or kinship context than in a large group context.

Regardless of framing condition, the participants were unambiguously risk seeking in a small group or kinship context for the sake of the survival of the group as a whole.

We assume that when making hypothetical life–death decisions, people assign priority to socially and ecologically valid cues, such as kinship. Secondary cues, such as hedonic framing of choice outcomes, would be more effective when the use of the cues having higher priorities does not lead to an unambiguous decision. From this viewpoint, framing effects can be considered to be a sign of indecisive risk preference, particularly in socially unfamiliar and naive situations (see also Wang, 1996b). Therefore, framing effects will be most likely to appear when a decision maker is ambiguous or ambivalent about how much risk should be taken.

Recently, other investigators have tested this hypothesis. Zickar and Highhouse (1998) introduced a well-established statistical algorithm, called the *Item Response Function* (IRF) to examine empirical data of risky choice against theoretical predictions of different hypotheses (e.g. Schneider, 1992; Frisch, 1993; Wang, 1996b). A latent construct, *theta*, was used to represent individual preference for risk. Of particular interest to the present discussion is that the IRFs provide a useful tool to explore how individual differences in risk preference determine whether one's choice will be affected by verbal framing of the choice options. If a framing effect is an index of weak or indecisive risk preference, it should be most evident in the moderate region of preference for risk (i.e. *theta* near zero) rather than in extreme regions of preference for risk (i.e. regions where *theta* values are either low or high). The results from Zickar and Highhouse's (1998) study support this prediction. Individuals who were extreme in preference for risk were not influenced much by the framing of a choice item, and framing effects were strongest for the participants whose risk preference was rather indecisive.

In the present studies, we hypothesized that framing effects occur as a result of indecisive preference for risks and thus can be used as an experimental probe to detect indecisive risk preference caused by the lack of or conflict between decision cues. We presented a life–death problem in three different social group contexts: a stranger group, a kin group, and a heterogeneous group in which the hypothetical lives at stake were described as a mixture of strangers and kin of the decision maker. In addition to these social cues, three types of verbal framing cue were also incorporated into different versions of the problem. The three types of verbal framing included positive framing of the expected choice outcomes in terms of lives saved, negative framing of the same choice outcomes in terms of lives lost, and balanced framing in which the same choice outcomes were presented in one hedonic frame first, and then in the opposite hedonic frame.

EXPERIMENT 1

Hypothesis 1: Group composition effect

The three social group contexts (i.e. kinship, stranger, and a mixture of kin and strangers) and two types of verbal framing (positive framing and negative framing) were built into life–death problems. The number of lives at risk in each hypothetical group context was six. These manipulations of social and verbal cues were deliberately arranged to test how the participants' risk preference would vary as a result of the presence and absence of these cues in different combinations. The main predictions are the following.

First, the kinship cue is expected to be dominant in determining an unambiguous risk-seeking preference, and the verbal framing cue with a lower priority would have little effect. The priority of a kinship cue over other social cues in making risky decisions in hypothetical dilemmas has been well demonstrated in recent studies (e.g. Burnstein, Crandall and Kitayama, 1994; Petrinovich and O'Neill, 1996; Petrinovich *et al.*, 1993).

An adaptive choice strategy can be either risk seeking or risk averse, depending on the goal of a

decision maker. Given a sure thing and a gamble of equal expected value, one should choose the gamble if the sure option falls below his or her minimum requirement. In contrast, one should choose the sure thing to avoid a potentially disastrous outcome if the sure option is expected to be better than the minimum requirement of a decision maker. In a kinship context, the members are highly interdependent and function as a unit rather than as independent individuals. Such functional relationships between kin members should increase the minimum requirement for group survival and make a partial survival of a certain percentage of group members harder to accept (see also Wang, 1996a, for more discussion). Thus, we predict that the 'we all live or die together' risk-seeking attitude would be strongest when the hypothetical lives at risk are described as six kin of the decision maker.

Related to the concept of minimum requirement is its psychological translation of aspiration level. Lopes (1987) was among the first advocating the view that instead of maximizing expected utility, decision makers often strive to maximize the probability of meeting a goal or aspiration level. Lopes' two-factor model focuses on the interactions between dispositional (individual) motives toward security or potential and the immediate needs and opportunities affecting aspiration level. The current discussion of minimum requirements, however, places more emphasis on the relationship between the setting of an aspiration level (minimum requirement) across individuals and its social and ecological determinants.

Second, in a stranger-group context, the individual survival is less dependent upon the group's survival as a whole. Thus, when the endangered lives are all strangers, the risk-seeking choice preference would be weakened and shifted toward the risk-averse direction due to a lower minimum requirement for group survival. There would be two distinguishable risk preference patterns in the two homogeneous group contexts: risk-seeking preference in a kinship context and less risk-seeking or risk-neutral preference in a stranger context.

A large body of research on social perception of group identities suggests that people often classify each other into mental categories of we-group (in-group) and they-group (out-group) according to rather artificial differences in the absence of strong social cues (see Brewer and Miller, 1996, for a review). It appears that 'anonymous strangers' are often perceived as a distinct social category, independent of other non-kin categories, such as friends, personal enemies, or criminals who may be also anonymous. We predicted that, in the homogeneous group contexts, either the stranger cue or the kinship cue would activate unambiguous risk preference, and therefore, there should be no framing effect in the six-kin and six-stranger group contexts.

Third, framing effects were expected when the six hypothetical lives were a mixture of kin members and strangers. In such a mixed, heterogeneous group, the demarcation between kin group and stranger group would be ambiguous. A conflict between the risk strategies elicited separately by these two cues may result in an indecisive risk preference since the kinship cue demands risk-seeking choice, but the stranger cue weakens such a preference. The context of heterogeneous groups would then activate two different value functions, one for kin and one for strangers. The value function for kin is expected to be more convex and steeper than a slightly convex function for strangers, under both framing conditions. In the face of cue conflict, a decision maker would be indecisive and rely more on secondary cues available, such as verbal cues of outcome framing.

Threshold number three

A more specific question following the above predictions concerns the degree of heterogeneity at which a framing effect would occur, or the degree of homogeneity at which a framing effect would disappear. We predicted that the risk-seeking potential would increase as the number of kin in a mixed group increases. As the number of kin in a mixed group reaches a threshold number, the participants would become unambiguously risk seeking. That threshold number, in this experiment, should be three. In

the situation where the mixed group consists of three kin and three strangers, the sure outcome could only save two lives, given the one-third survival rate used in this study. This means that if the sure outcome is chosen, one of the three kin members would die for certain. This sure loss of at least one kin would greatly shift the participants' choice to risk-seeking. Note that the 'threshold number three' is only true in the context where the average survival rate for the six lives at risk is one-third. If the expected survival rate is 0.5 (3/6), for instance, the threshold number then might be four instead of three. By and large, the threshold number should depend on whether the sure option necessitates the sure loss of any kin.

However, when a group of six lives are at risk, and this group is made up of one or two kin, this might create a unique heterogeneous group situation where neither a risk-seeking nor risk-averse strategy would dominate. As a result of this indecisive preference, the verbal framing of the choice outcomes would become more powerful.

Method

Design

Ten different versions of a life–death decision problem involving a small group of six hypothetical endangered lives were used. The independent variables in Experiment 1 were hypothetical social group contexts (kin group, stranger group, and mixed heterogeneous group), and outcome framing (S: positive framing in terms of lives saved versus L: negative framing in terms of lives lost). The social group context was manipulated by the number of kin in each endangered group. This number had five different levels (0, 1, 2, 3, 6 kin) in a six-person group.

Using a between-subjects design, each participant responded to only one version of the life–death problem. The notations for the 10 experimental groups are S0-6, L0-6, S1-5, L1-5, S2-4, L2-4, S3-3, L3-3, S6-0, L6-0, with the letters S and L representing framing conditions and the two numbers corresponding to the number of kin and the number of strangers involved in a hypothetical six-person group, respectively. For instance, S2-4 represents the experimental group receiving life–death problem involving 2 kin and 4 strangers with the choice options framed positively.

To illustrate how the independent variables were incorporated into the choice problems, examples of questions are presented below. Each item in parentheses represents the corresponding manipulation used for each of the 10 experimental groups.

- **Positive framing:** Imagine that (*6 people/6 people including one of your parents/6 people including both your parents/6 people including your parents and one of your brothers or sisters/6 members of your family including your parents, brothers and sisters*) are infected by a fatal disease. Without treatment they will die. Two alternative medical plans to treat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the plans are as follows:
 - If plan A is adopted, 2 people will be saved.
 - If plan B is adopted, there is a one-third probability that all 6 people will be saved and two-thirds probability that none of them will be saved.
- **Negative framing:** The same cover story was used except that the choice options were framed in terms of lives lost:
 - If plan A is adopted, 4 people will die.
 - If plan B is adopted, there is a one-third probability that none of them will die and two-thirds probability that all 6 people will die.

Participants

Five hundred undergraduate students (mean age = 20.01 years) from the University of Liège participated. Each group consisted of 50 participants (25 women and 25 men).

Procedure

Each participant was tested individually. The participants were instructed to read the problem (written in French) and then to indicate their preferred option, either the sure outcome (Plan A) or the gamble (Plan B). The choice was made anonymously with no time pressure.

To achieve a higher level of experimental control, we used an equal number of males and females and tested these participants individually, rather than in a class or group setting, as is usually done in paper–pencil studies of risky choice. The individual testing was used to check the validity of some previous results obtained using participants tested in group settings (e.g. Wang, 1996a,b).

Results

An initial multiple comparison revealed a significant difference in participants' choices across the 10 experimental groups ($\chi^2(9) = 24.16, p = 0.0041$). No gender effect in overall risk preference was found. Descriptive data are presented in Exhibit 1.

A chi-square analysis was conducted for each of the five pairs of framing groups:

- (1) There was no framing effect in the two six-stranger (S0-6 and L0-6) groups. The percentage of risk-seeking choices was 56% under positive framing and 60% under negative framing.
- (2) Compared with the two six-stranger groups, the participants in the two six-kin groups (S6-0 and L6-0) were overall more risk seeking irrespective of the framing of choice options. The percentage of risk-seeking choices was 70% in both framing conditions.
- (3) This kinship-specific pattern of no framing effect plus risk-seeking preference was also observed in

Exhibit 1. Choice frequencies and percentages for experimental groups in Experiment 1

Experiment group	Choice frequency(percentage)		Framing effect
	Sure outcome	Gamble	
S0-6	22 (44%)	28 (56%)	No
L0-6	20 (40%)	30 (60%)	
S1-5	28 (56%)	22 (44%)	Yes
L1-5	12 (24%)	38 (76%)	
S2-4	26 (52%)	24 (48%)	Yes
L2-4	13 (26%)	37 (74%)	
S3-3	17 (34%)	33 (66%)	No
L3-3	14 (28%)	36 (72%)	
S6-0	15 (30%)	35 (70%)	No
L6-0	15 (30%)	35 (70%)	

Note: S and L present the types of framing of choice outcomes. S — positive framing in terms of lives saved; L — negative framing in terms of lives lost. The two numbers following S or L represent the number of hypothetical kin and strangers at risk, respectively.

the two three-kin groups (S3-3 and L3-3) where the number of kin in the six-person group was three (the threshold number). The percentage of risk-seeking choice was 66% under positive framing and 72% under negative framing.

- (4) Consistent with our predictions, framing effects only appeared in the one-kin condition ($\chi^2(1) = 10.67, p = 0.0011$) and in the two-kin condition ($\chi^2(1) = 7.10, p = 0.0077$).
- (5) The risk-seeking choice, across framing conditions, increased from 58% in the six-stranger (no-kin) context to 70% in the six-kin (all-kin) context. In the two no-kin conditions, the choice percentages were not significantly different from the 50–50 risk neutral point. However, in the three-kin conditions, the choice percentages were significantly higher than the 50–50 point for both the S3-3 groups ($\chi^2(1) = 5.12, p = 0.05$) and the L3-3 group ($\chi^2(1) = 9.68, p = 0.001$). In the all-kin conditions, the choice percentages were the same and were significantly higher than 50% ($\chi^2(1) = 8.0, p = 0.001$).
- (6) To explore a possible gender difference in the effect of framing on choice, we conducted separate chi-square analyses for men and women in the two heterogeneous group contexts that contained framing effects. In both cases, framing significantly affected the choice made by women but not by men. Women exhibited a framing effect in the one-kin- and five-stranger context ($\chi^2(1) = 9.74, p = 0.0018$), as well as in the two-kin- and four-stranger context ($\chi^2(1) = 8.68, p = 0.0032$). This finding is consistent with a previously reported gender difference in framing effects (e.g. Fagley and Miller, 1997), indicating that women have a higher sensitivity to verbal cues than men.

Note that the six-stranger problem was identical to the Asian disease problem (Tversky and Kahneman, 1981) except that the number of lives at risk was reduced from six hundred to six. Consistent with our previous findings of group size effects (Wang, 1996a,b), framing effects disappeared when the group size (the total number of human lives at risk) was within a two-digit number.

The results of Experiment 1 revealed that the social group context in which a decision problem was presented largely determined the participants' risk preference. A nearly risk-neutral preference under both framing conditions was found in all the all-stranger context. In contrast, when the endangered six-person group consisted of more than three kin, a risk-seeking pattern was predominant regardless of the framing of choice outcomes. However, in the heterogeneous group contexts in which the six endangered lives included more strangers than kin, the participants became significantly more sensitive to the verbal cue of outcome framing. These findings are consistent with the proposed cue priority/cue conflict hypothesis. According to this hypothesis, the participants would be indecisive in their risk preference due to the heterogeneity of the target groups. The verbal cue of outcome framing then would take priority when the social cues of stranger and kinship conflict.

EXPERIMENT 2

Hypothesis 2: Framing effect — a large group but not a large number effect

Previous studies (Wang, 1996a,b) suggest that group size serves as another effective social cue in decision making. It has been shown that framing effects only occurred in large group contexts involving either 600 or 6000 anonymous lives but disappeared when the participants' decision dealt with the fate of smaller groups involving either 6 or 60 persons.

Wang (1996a) argued that the above findings suggest that the framing effects occurred due to a large social context (e.g. a group of 6000 anonymous people) rather a large number (e.g. 6000 lives or 6 million dollars) used in a choice problem. This is because (1) the risk preference patterns and the observed framing effects were virtually identical in the two large group contexts involving 600 and 6000 anonymous lives, and (2) the framing effect disappeared in both smaller group contexts involving

6 and 60 lives. These findings revealed a categorical change in social perception of groups, rather than a linear change in sensitivity to increasing or decreasing numbers. For example, under positive framing, the number of risk-seeking choices increased when the decision context changed from large groups to smaller groups. However, although the number of lives differed by factor of 10, no difference in risk preference was found either between the two large group contexts involving 600 and 6000 lives or between the two smaller group contexts involving 6 and 60 lives.

Alternatively, the framing effect found in the large group contexts may be a non-linear, large number effect. In other words, when the number of lives in the endangered group reaches a certain large value, a framing effect would occur independent of social perception of the type, kind, and nature of groups.

To test the above vital hypotheses (the large group versus the large number hypothesis), we used the same large number of endangered lives in two drastically different social group contexts. According to the assumption that framing effects tend to occur when the problem context is unfamiliar and ambiguous, we selected two artificial conditions in which the entire species of 6 billion lives was at risk. However, one condition involved human lives and the other extraterrestrial (ET) lives. If framing effects occur in both contexts, the large number hypothesis would be supported. In contrast, if a framing effect appears and disappears depending on social group context, the large group hypothesis would be further corroborated.

In the two artificial contexts, we have no reason to expect any well-evolved mental adaptations or fine-tuned developmental mechanisms to deal with the risks. Thus, a framing effect may occur in such artificial contexts due to the lack of strong decision cues.

However, the social ambiguity created by a large group context may not be sufficient enough to elicit a framing effect. The participants should care more about human lives than alien (ET) lives. Framing effects may be aspiration-dependent phenomena. The low aspiration level in the alien context may lead to indifference in risk preference under both framing conditions.

Method

Design

In Experiment 2, four new versions of the life–death decision problem (2 frames \times 2 social group contexts) were used. In one group context, 6 billion human lives were at risk whereas in the other group context the 6 billion alien lives were at stake.

Participants

Two hundred volunteer undergraduates at the University of Liège participated in the experiment (mean age = 20.2 years). Each of the four experimental groups consisted of 50 participants (25 women and 25 men).

Procedure and materials

The procedure was identical to that used in Experiment 1. The cover story given to the two framing groups receiving the human life problem began with the sentence: ‘Imagine that the entire human population on the earth (i.e. approximately 6 billion people) is infected by a fatal disease.’ The participants in the other two framing groups receiving the ET life problem were given a cover story beginning with the sentence: ‘Imagine that the entire extraterrestrial (ET) population on a planet (i.e. approximately 6 billion lives) is infected by a fatal disease’.

Exhibit 2. Choice frequencies and percentages for experimental groups in Experiment 2

Experiment group	Choice frequency (percentage)		Framing effect
	Sure outcome	Gamble	
S-Human	32 (64%)	18 (36%)	Yes
L-Human	17 (34%)	33 (66%)	
S-ET	24 (48%)	26 (52%)	No
L-ET	24 (48%)	26 (52%)	

Note: S — positive framing in terms of lives saved; L — negative framing in terms of lives lost; Human — 6 billion human lives at risk; ET — 6 billion extraterrestrial lives at risk.

The survival rate used in all four versions of the life–death problem was one-third. The choice options were framed either in terms of the number of lives saved or in terms of lives lost.

Results

Exhibit 2 presents the choice frequency data tabulated across group contexts and framing conditions. A significant framing effect was found in the human context ($\chi^2(1) = 9.004, p = 0.0027$) but not in the alien context. Clearly, the large number, 6 billion, alone was not sufficient to induce a framing effect. In the alien context, the participants were clearly risk neutral in both frames.

No gender difference in risk preference was found. The framing effect in the human context was significant for both men ($\chi^2(1) = 5.19, p = 0.0227$) and women ($\chi^2(1) = 3.95, p = 0.0470$).

Presumably, the participants were concerned about human lives, but did not know what they should do. In such a novel situation involving 6 billion human lives, the participants were reasonably indecisive about how much risk should be taken. The result suggests that framing effects reflect a dilemma in social decision making.

The absence of a framing effect in the alien context suggests that the sensitivity of the participants to the verbal framing cue was social content-and-context dependent. Thus, a triggering factor of framing effects appears to be the aspiration level of a decision maker.

In addition, the presence of a framing effect in the context involving 6 billion human lives and the absence of a framing effect in the context involving six human lives (see Experiment 1) demonstrated the effects of another social cue, group size, on risky choice (see also Wang, 1996a,b). It is both evolutionarily novel and developmentally unfamiliar to make decisions for a large anonymous group of human lives. We thus should not expect any intuitive risk strategies to be activated in these social contexts.

EXPERIMENT 3

Hypothesis 3: The direction of framing effects in different social group contexts

In Experiment 3, the direction of framing effects was at issue. An interesting question concerning the framing effects reported in Experiments 1 and 2 is about their direction. Are both frames or is only one affecting the choice of the participants? Is the dynamic different between the framing effect that was observed in the large group context involving six billion human lives and that found in the small group context involving 1 kin and 5 strangers?

It is unclear whether the framing effect found in Experiment 1 was caused by both the positive frame and the negative frame or was due to only one of the frames. To further examine this issue of directionality of framing effects in different social contexts, we introduced a balanced framing in Experiment 3. The effects of the hedonically opposite frames may be neutralized by providing a balanced frame in which both positive and negative frames are presented side by side (e.g. '2 people will be saved. In other words, four people will die'). The need for using a balanced or mixed frame in studies of risky choice has also been recognized by other researchers (e.g. Zickar and Highhouse, 1998).

A balanced framing allows us to identify a baseline level of risk preference. The choice data obtained in a balanced frame could provide an objective measure of the existing risk preference in a given social context against risk preference in the same social context, but under either a positive or negative framing.

Wang (1996b) proposed that a framing effect is unidirectional when only one frame is effective. The frame, either positive or negative, can strengthen the existing risk preference largely determined by social context. For instance, a negative frame may amplify risk-seeking preference, and a positive frame may augment risk-averse preference, but not vice versa. With a biased risk-seeking baseline preference, the counter-directional effect of a positive frame may be overwhelmed. Similarly, when the existing preference is clearly risk averse, the effect of a negative frame would be diminished.

Alternatively, from a cue-use with priority viewpoint, a weaker and redundant cue should have little effect in determining risk preference when a more dominant cue is present. Therefore the effect of verbal framing should be counteractive of the risk preference determined by social cues, rather than synergistic or additive of the existing risk preference. For example, if the participants are risk seeking in a balanced frame, the redundant negative frame should have little effect. In contrast, a positive frame facilitating risk aversion should have a more noticeable effect by keeping the choice preference from being too radically risk seeking. The two rival hypotheses of framing effects (counteractive framing versus synergistic framing) were tested in Experiment 3.

Method

Design

In Experiment 3, two new versions of the life–death decision problem were used. In one experimental group denoted SL1-5, the life–death problem was presented in a small group context with one kin and five strangers at risk. In the other experimental group denoted SL6Billion, the life–death problem was presented in a larger group context where 6 billion human lives were at stake. Balanced framing was used in both experimental groups.

Participants

One hundred undergraduate students from the University of Liège participated in the experiment (mean age = 19.70 years). Each experimental group consisted of 50 participants (25 women and 25 men). The participants were tested individually.

Procedure and materials

The procedure was identical to that used in Experiments 1 and 2. The choice options in the SL1-5 group was framed as follows:

- If plan A is adopted, 2 people will be saved. In other words, 4 people will die.

- If plan B is adopted, there is a one-third probability that all 6 people will be saved and two-thirds probability that all of them will die.

The choice options in the SL6Billion group was framed as follows:

- If plan A is adopted, 2 billion people will be saved. In other words, 4 billion people will die.
- If plan B is adopted, there is a one-third probability that all 6 billion people will be saved and a two-thirds probability that all of them will die.

For half of the participants in each experimental group the choice outcomes were framed positively first, and then negatively (as illustrated in the examples above), and for the other half of the participants, the negative frame was used first followed by the positive frame.

Results

Exhibit 3 presents the choice preference data found in the two experimental groups. A chi-square analysis showed that participants in the SL1-5 group were significantly more risk seeking than the participants in the SL6Billion group ($\chi^2(1) = 6.895, p = 0.009$). This difference reflects a social context effect. No gender difference in responses was found in either the SL1-5 group or the SL6Billion group. The presentation order of the balanced framing (the positive frame first versus the negative frame first) had no effect on participants' risk preference.

Exhibit 4 pools the data from all three experiments and illustrates the directionality of framing

Exhibit 3. Choice frequencies and percentages for experimental groups in Experiment 3

Experiment group	Choice frequency (percentage)	
	Sure outcome	Gamble
SL1-5	15 (30%)	35 (70%)
SL6Billion	28 (56%)	22 (44%)

Note: SL1-5: Balanced framing group with 6 lives (one kin and 5 strangers) at risk. SL6Billion: Balanced framing group with 6 billion human lives at risk.

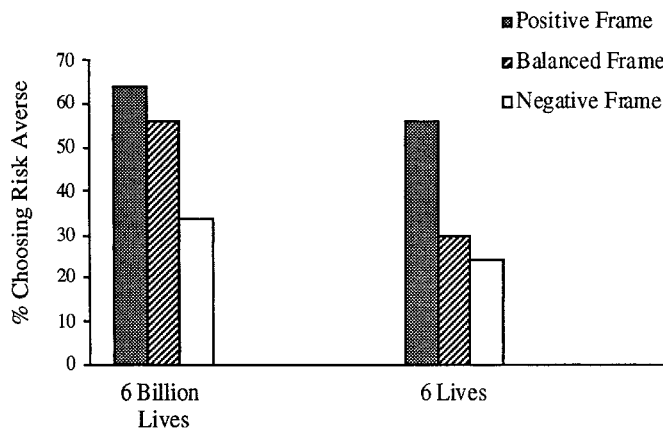


Exhibit 4. Percent of risk-averse choices in the positive, balanced, and negative frames across two hypothetical group contests (i.e. large group with 6 billion human lives and small group with one kin and five strangers)

effects. The choice distribution from the SL1-5 (balanced framing) group was compared with those from the S1-5 and the L1-5 groups in Experiment 1, and the choice distribution from the SL6Billion (balanced framing) group was compared with those from the S6Billion and L6Billion groups in Experiment 3.

In small six-live contexts, no significant choice difference was found between the negative framing group (L1-5) and the balanced framing group (SL1-5). However, the participants in the positive framing (S1-5) group were significantly less risk seeking than those in the balanced framing group, $\chi^2(1) = 6.90, p = 0.0086$.

A reverse pattern was found in large group contexts involving 6 billion lives. No difference in risk preference was found between the positive framing group (S6Billion) and the balanced framing group (SL6Billion). However, the participants in the negative framing group (L6Billion) were significantly more risk seeking than those in the balanced framing group, $\chi^2(1) = 4.89, p = 0.027$.

In the small group context, only the positive framing had a significant effect on choice and the direction of the framing effect was risk-averse. In contrast, in the large group context only the negative framing had a significant effect, and the direction of the effect was risk seeking.

GENERAL DISCUSSION

Cue use in decision making under risk

Cues used in decision making, as Brunswik (1940) pointed out, are selected with priority and substituted for each other. According to Brunswik, individual decision cues are incomplete predictors for uncertain outcomes, but collectively sufficient to determine one's risky choices.

We assume that when making risky decisions in social contexts, people rely on multiple cues, each of which has a priority. Valid social cues, such as kinship, have pre-determined high priorities and can activate task-specific risk preference. In the presence of such dominant decision cues, weaker cues (e.g. semantic or hedonic framing of choice options) would have only small fine-tuning effects on risk preference. This theoretical position was strengthened by the finding that in pure kinship context the participants were risk seeking regardless of framing of the choice outcomes.

The framing effects found in Experiment 1 have shown three distinguishable risk-preference patterns. The risk preference of the participants was (1) clearly risk seeking under both framing conditions in a kinship context, (2) not significantly different from risk-neutral point under both framing conditions in a stranger-group context, and (3) risk averse under positive framing and risk seeking under negative framing in the heterogeneous group contexts where more than half of the endangered lives were strangers. When social cues embedded in a choice problem have the opposite directional effects on risk preference, one is forced to search for more cues that can be used to reach a final choice. When the kinship cue and stranger cue were in conflict in a heterogeneous group situation, one might resort to the hedonic tone of framing. As a result, the decision maker chooses the sure outcome under positive framing, but the gamble under negative framing.

Kinship cue fosters a risk-seeking preference. This was evident in the finding that the participants became more risk seeking when the number of kin in an endangered six-person group increased. The small face-to-face kinship context should be indicative of a higher interdependence among group members and elevate one's aspiration to save all.

The results of Experiment 1 suggest that decision makers search, select, and use social and verbal cues to determine the risk preference. People care more about one group than the other and prioritize social cues (e.g. kinship, group size, group composition) over verbal framing cues in making their risky decisions.

The social context-dependent risky choices observed in the present study using individual testing are

consistent with the previous results obtained from group paper-and-pencil test (see Wang, 1996a,b). This finding suggests that (1) both individual testing and group testing tap into the same underlying 'construct' of interest (i.e. construct validity); and (2) the participants' reactions to the social and verbal cues in the life–death choice problems are intuitive across both testing conditions.

Directionality of framing effects

Using a balanced frame, we were able to separate the effect of social context on risk preference from that of verbal framing. No difference in risk preference was found between the negative framing condition and the balanced framing condition in the small group (one kin and five strangers) context. The framing effect appears to be caused primarily by the positive frame in which the participants were more risk averse than those were in the balanced framing group. This was in clear contrast to the direction of the framing effect found in a large group context where only the negative frame had a significant effect. These findings suggest that the direction of framing effects is dependent upon the social context in which the choice problem is presented.

In addition, these results support the counteractive framing (cue-use without redundancy) hypothesis, but not the synergistic framing (cue augmentation) hypothesis. The positive frame was more effective when the baseline preference was risk seeking whereas the negative frame was more effective when the baseline preference was risk-averse. This unidirectional framing effect may be a result of constraints placed by the baseline preference. There was more room to show a positive (risk-averse) framing effect when the baseline preference was risk seeking, and there was more room to show a negative (risk-seeking) framing effect when the baseline preference was risk averse.

When the context-determined risk preference in a large group context was already risk averse, the positive frame did not significantly augment this existing preference; the counter-directional negative frame had a significant effect. On the other hand, when the baseline risk preference in the small group context was already risk seeking, the negative frame did not augment this existing preference; the counter-directional positive frame had a significant effect.

Framing effects in social dilemmas

The presence and absence of framing effects reflect the priority of the framing cue used in decision making. When a decision has to be made in an ecologically and socially unfamiliar situation, decision cues with both high validity and high priority would not be available. In such an ambiguous situation, a decision maker may resort to secondary cues that are available, such as framing of choice outcomes. Unlike dealing with family members and local friends, deciding the fate of the entire human population would be an unprecedented task. We do not expect that any evolutionarily evolved or socially learned decision strategies would be available in such a situation. As a result, a decision maker may choose either to be risk averse or to be risk seeking, depending on which frame is used to carry the risk information.

Therefore, the framing effect found in Experiment 2 occurred not because the number of lives was too large for the participants to handle, but because the social group context was too large and unfamiliar for the participants to come up with an intuitive decision. The choice problem then became a social dilemma for the participants were ambivalent rather than unequivocal or indifferent in their risk preference. In such a social dilemma, the two statistically equivalent choice options (the sure thing and the gamble) were in conflict; and the verbal framing cues could be used to solve the conflict. In contrast, the number of the lives involved in the alien context was equally large, but the participants did not view it as a social dilemma and treated the two choice options indifferently. It is clear that the participants were unambiguously risk neutral and immune to any effects of framing.

Both the alien and human contexts are artificial and lack higher priority social cues. A framing effect, however, only occurred in the human context. It can be argued that a second triggering factor of a framing effect is the emotional involvement or aspiration level of a decision maker. The framing of choice outcomes consists of both semantic and hedonic components. The encoding of the semantic meaning of frames (words) should be automatic and independent of the hypothetical context in which a decision problem occurs. However, the hedonic component of a frame may be effective only when it is presented in an emotional-provoking context. Thus, whether an encoded frame will have an impact on risky choice would depend on the aspiration level of a decision maker. It appears that the seemingly irrational framing effect is a mundane-life-dependent phenomenon that is likely to occur in an emotion-provoking rather than an emotion-blank context.

However, it is worth noting that the two scenarios used in Experiment 2 are bizarre and far from reality. Making a decision about the entire human population's fate might change the character of a decision problem qualitatively. Particularly, in the alien condition, participants may not have cared enough to think about this question seriously. The 50–50 risk-neutral pattern in the alien condition thus may be a result of the lack of serious consideration given to the problem by the participants. This potential problem should be addressed and examined further in future studies.

A second condition in which social dilemmas may occur involves cue conflict. In Experiment 1, the hypothetical heterogeneous groups consisted of two kinds of social beings: kin and strangers. Thus, the kinship cue and stranger cue may be in conflict if neither of them is dominant. Only in such situations with more strangers than kin in a six-person group were framing effects caused by secondary verbal cues observed.

Our findings show that framing effects are a behavioral result of cue use in making social decisions. Their occurrence depends on the nature of a decision problem and the task-specific goal of a decision maker. These findings cannot be accounted for by prospect theory, which is social content-and-context free. Recent meta-analyses of framing effects (e.g. Kühberger, 1998; Levin *et al.*, 1998) share a similar conclusion that the presence and absence of framing phenomena demonstrated in the previous studies over the last two decades 'cannot be understood adequately within purely formal models such as prospect theory, but require additional cognitive and motivational constructs' (Levin *et al.*, 1998, p. 197).

Framing effects are not only interesting in their own right, but can also be used as an experimental probe to detect indecisive risk-preference and the underlying interactions between different social cues in decision making. Framing effects indicate a dilemma in risk preference for lack of dominating social cues in a decision situation.

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