Social-Organizational Knowledge and Managerial Decision-Making

X.T. Wang
and
Katherine Xin

Postal Addresses:
Dr. X.T. Wang
Psychology Department
University of South Dakota
Vermillion, SD 57069-2390
USA
Tel: (605) 677-5183
E-Mail: xtwang@usd.edu

Dr. Katherine Xin,
Department of Management of Organizations
School of Business and Management
Hong Kong University of Science and Technology
Clear Water Bay, Kowloon
Hong Kong

TEL: 805-2358-7754
Email: mnkxin@ust.hk

Academic track

ABSTRACT

In this paper we examine the role of social and organizational knowledge in managerial decision-making. In a series of experiments, we examined the following questions.

(1) How are some implicit organizational variables such as the size of a group and the composition of a group related to risk perception and risky decisions? From a Darwinian perspective, humans have lived in small, nomadic, hunter-gatherers' groups throughout almost the entire evolutionary time. In making decisions at risk, the size of the group thus may serve as a cue signalling the structure and functions of a social group (e.g., kinship, reciprocity, interdependence among group members). To investigate the effects of these organizational variables, Wang (1996a, 1996b, 2001) used a well-known example of irrational decisions, framing effects (Tversky & Kahneman, 1981), as an empirical probe. Framing effects, characterized by an irrational reversal in risk preference due to different ways of presenting / framing the same choice outcomes, appeared only in large group contexts but disappeared in small group and kinship group contexts. Evolutionarily recurrent small group contexts (less than 1000 people) eliminated irrational reversal in risk preference.

(2) Would risky choices between a sure option and a gamble of equal expected value vary as a function of the types of information provided in a decision problem? In contrast to verbal framing (e.g., presenting the same choice outcomes as if they are gains or as if they are losses), situational information about the real status of an organization should have independent reflection effects on risky choice. This so called reflection effect has been repeatedly shown in the literature, where people tend to be risk averse in gain situations but risk seeking in loss situations. Using a 2 x 2 experimental design (positive framing vs. negative framing x gain vs. loss), we were able to dissociate the two effects, showing that the two types of information affected managerial decisions independently.

(3) Would organizational learning help managers to focus on the genuine information about the status quo of an organization more than the as-if information of verbal framing? In particular, we examined whether Chinese senior executives and business school freshmen reacted differently to the two types of information, which were the opportunity-threat framing (describing the same outcomes either in terms of success rate or in terms of failure rate) and the situational information concerning an organization (i.e., either in a gain or in a loss situation). When asked to make a managerial choice between a sure option and a gamble of equal expected value, the choice preference of the student participants was significantly affected by the opportunity-threat framing. In contrast, the executive participants were not affected by the framing information but slightly altered their choice preference according to the gain-loss information.

In addition, given a hypothetical life-death decision problem in a between-subjects experiment, the executives showed a higher sensitivity than the student counterparts to a hidden relational variable (i.e., the composition of a small group at stake as to how many of the endangered individuals were strangers and how many of them had a close relationship with the decision maker). When the relational value of the endangered group was higher, the executives became more risk taking in order to save everyone while the student participants showed no choice difference to the relational manipulation.

In sum, intuitive knowledge about kinship and reciprocity in social groups influences reasoning and decision making in modern organizations. Organizational experiences help managers to become immune to the as-if information of verbal framing and focus more on the valid information concerning the status quo of an organization.

Social-Organizational Knowledge and Managerial Decision-Making

X.T. Wang
and
Katherine Xin

1. Bounded Rationality: Implicit Organizational Knowledge Bounded by Organizational Structure

When making managerial decisions, to what extent are the decisions influenced by instinctive social and organizational knowledge as opposed to normative principles of rational decision-making? The answers to this question are at least partially embodied in the concept of bounded rationality. Bounded rationality, according to Herbert Simon (1956, 1990) consists of two interlocking components: the limitations of the mind, and the structure of the environments in which the mind operates.

The first component implies that humans 'must use approximate methods to handle most tasks' (Simon, 1990, p. 6). This means that information searches should include heuristics that largely obviate redundancy and determine when it should end, as well as simple decision rules that make use of the valid information available. Simon's second component of bounded rationality has been largely ignored in the contemporary literature of human judgment. While we have gained a great deal of knowledge about human computational capacities over the last several decades, we have learned relatively little about how the structure of task environments has shaped our decision rationality.

Only until recently have important developments taken place in exploring how decision mechanisms are adaptively matched to the particular structure of information in the environments in which they are applied. In a 1999 book, *Simple Heuristics That Make Us Smart*, Gigerenzer, Todd and ABC research group made a compelling case for using simple heuristics in probability judgment and decision-making under uncertainty. The research program reported in the book takes a synthetic approach that combines the Brunswikian tradition of vicarious functioning and Simon's bounded rationality and satisficing (i.e., satisfying and sufficing as opposed to optimizing) heuristics. According to Brunswik (1940), cues used in decision-making are selected with priority and substituted for each other. Individual decision cues are incomplete predictors of uncertain outcomes, but are collectively sufficient for making accurate judgments and decisions. The central argument for the simple heuristics approach is that the environments in which we evolved and in which we now live

have certain regularities, and that decision-making mechanisms take advantage of these environmental regularities.

This view stands in sharp contrast to the vision of unbounded rationality, which often assumes generalized all-purpose mechanisms based on the laws of logic and probability. The lofty goals and strict standards of unbounded rationality require the use of complex decision-making machinery to process all available information, without regard for costs or limitations in time, processing power, or knowledge.

A growing body of evidence shows that humans do indeed make decisions in an ecologically rational manner, using as little information as possible and tailoring their information and option search to the structures available in the environment. It has been found that simple heuristics that use only a single piece of information to make a choice between two alternatives rival the performance of much more complex and information-hungry methods such as multiple linear regression (Gigerenzer & Goldstein, 1996). Experts have been also shown to base their judgments on surprisingly few pieces of information (Shanteau, 1992).

One of the simplest kinds of heuristic is the *recognition heuristic*: When choosing between two options (according to some criterion), if one is recognized and the other is not, then select the recognized one. The recognition heuristic exploits information implicit in the failure to recognize something, and thus can be considered to be an ignorance-based heuristic. Goldstein and Gigerenzer (1999) have provided experimental evidence that people do use the recognition heuristic. The authors assume that because we hear about large cities more often than small cities, using recognition to decide which of two cities is larger will often yield the correct answer in cases where one city is recognized and the other is not. Employing the recognition heuristic can thus lead to a surprising less-is-more effect, in which less knowledge can lead to more accurate decisions than does a greater amount of knowledge. For instance, in one of their experiments, Americans scored a median 71% correct on their own cities. On the less-familiar German cities, the median was a surprising 73% correct. An intermediate amount of (recognition) knowledge about a set of objects can yield the highest proportion of correct answers, because it allows the recognition heuristic to be used more frequently.

Another class of simple heuristics for one-reason decision-making is the *Take The Best* heuristic, which knows not only the signs of cues but also which cues are better than others, and terminates the search if one object has a positive cue value and the other does not. A tournament between the one-reason decision heuristics and some well-known statistical benchmark models (such as Bayes theorem and multiple regression) is conducted in 20 real task environments (Czerlinski, Gigerenzer, & Goldstein, 1999). The tasks range from

predicting attractiveness of famous men and women based on cues such as name recognition and the nationality of the selected men and women, to predicting high school dropout rate based on cues such as the percentage of low income students and SAT scores, to predicting mortality rates in 20 US cities,…….. house prices, car accident rates, and degrees of environmental pollution. The performance of these one-reason decision-making heuristics comes within a few percentage points of the accuracy of those benchmark models and can be even better than these computationally more complex models when uncertainty is high and knowledge about the world is incomplete.

According to Gigerenzer et al. (1999), the effectiveness of a heuristic is determined by its fit to the task environment, its ecological validity. Evolution did not shape the mind to be context-free and rational in general, but rather to be well adapted to its environment.

By the same token, organizational knowledge is often implicit and embedded in specific cues. From this perspective, organizational knowledge should reflect enduring features of organizational environments rather than abstract logical principles of unbounded rationality. To solve managerial problems we often cannot get every piece of relevant information about an organization. Often times, we need to rely on information at hand and select and use the most crucial cues available in problem space. One such organizational cue is the size of a group. Group size is an implicit cue about the organizational and relational structures of the group.

In the following section, we intend to illustrate how decision makers utilize such a parsimonious cue about the structures of social and ecological environments in making choices at risk.

2. Group Size: A Universal Variable Containing Structural and Relational Information

Evolutionary Psychology of Group Size

For over 95% of hominid evolution, humans lived in small social groups organized mainly by kinship and reciprocity relationships. The size of these primitive human groups rarely exceeded 100 people (see Knauft, 1991; Lee & DeVore, 1968, Reynolds, 1973). Such evolutionarily prolonged circumstances may have shaped human decision mechanisms to be sensitive to the risk distributions in groups and the relational structure and size of a group.

Group size is also the pivotal point of social structure at which civilizations made most significant changes. According to Reynolds (1973) the most significant social revolution is marked by the change from small agricultural or pastoral communities to large populations of many thousands of people whose economic, social and political center is the city. This

happened first around three or four thousand years BC and spread more widely over the last 200 years. However, a dramatic change on the relatively brief historical time scale does not produce significant changes in psychological designs that have been shaped by enduring selection pressure on an evolutionary time scale.

The prolonged evolutionary experience in small face-to-face groups would have shaped the human mental mechanisms to be sensitive to variables characteristic of small group living in human evolution. For example, compared to large groups, members in small groups are often more interdependent. Therefore in a small group situation people may be more willing to share a risk in order to pursue a fair and positive common outcome for every group member. In contrast, when a formally identical choice problem is stripped of the information about its social context, or is presented in a naive context, the risk preference may become rather ambiguous and erratic.

However, in contrast, standard economic models are built upon an assumption of material self-interest where agents maximize individual outcomes without regard for the effects on others without any consideration of social and ecological constraints. Taking an evolutionary approach, Burnham (in press) developed a model of interpersonal preferences on the basis of genetic relatedness between a decision maker and decision recipient. What is of particular interest for the present discussion is that altruistic or selfish decisions are parameterized by the genetic relationship between individuals and by the population size (the total number of people involved in a decisional situation). While being able to predict a variety of behaviors that are considered paradoxical within the standard economic framework, the model demonstrates that for interactions between "average" individuals, the standard economic assumption is the limiting case of the genetic model as the population/group becomes arbitrarily large. Thus, a reproductive fitness-based model of decision-making approaches to a standard economic model of self-interest maximization as the group size increases.

Decision Frames and Empirical Tests of Group Size Effects

To examine how risk strategies and decision rationality are affected by the size of a group we used a life-death decision paradigm originally developed by Kahneman and Tversky in their study of framing effects, a widely cited example of human irrationality (Tversky & Kahneman, 1981).

The framing effects were demonstrated using the "Asian disease problem". In the cover story of the problem, the participants of the experiment were asked to imagine that "*the US is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people.*

Two alternative programs to combat the disease have been proposed." The outcomes of the programs were then framed (phrased) differently. In the "positive framing" the subjects were told, "*if Plan A is adopted, 200 people will be saved. If Plan B is adopted, there is a one-third probability that all 600 people will be saved, and two-thirds probability that none of them will be saved*". Given a binary choice between the two alternative plans, the majority of participants (72%) were risk averse, preferring the sure outcome (Plan A) over its risky gamble equivalent (Plan B). However, when the same outcomes were "negatively framed" in terms of lives lost ("*If Plan A is adopted, 400 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 600 people will die.*"), the majority of the participants (78%) were risk taking. They favored the gamble over the sure outcome.

This framing effect is considered to be a cognitive illusion because it appears to violate the invariance principle of expected utility theory, which requires a rational decision maker to have a consistent preference order among identical choice prospects independent of the way the prospects are presented or framed.

What causes this irrational reversal in risk preference in the aforementioned framing phenomenon? Would the task environment be a precondition for the presence of a framing effect? In the original Asian disease problem, Tversky & Kahneman (1981) did not identify the 600 people whose lives were at stake. For a domain-general, normative model of decision-making, "decorative" information about the context and content of a problem should not be of great theoretical interest. However, what would happen if contextual and content variables inform us about some enduring features in the decision-maker's ecological and social environments? What would happen if the number of the lives at risk were 6 rather than 600?

In a series of studies (Wang, 1996a, 1996b, Wang, Simons & Brédart, 2001), Wang and his colleagues examined the appearance and disappearance of framing effects as the size of the group (the total number of lives at stake) was systematically manipulated. The same life-death problem was framed either in terms of lives-saved or in terms of lives lost. The size of the group ranged from 6, 60, 600, 6000, to 6 billion. Each participant received only one version of the life-death problem.

The results from these experiments were summarized in Table 1.

Table 1: Group Size Effects in Making Risky Choice Regarding Human Lives: Percentages of the Participants Choosing the Gamble Option.

American Sample 1				
	Group Size=6000	Group Size=600	Group Size=60	Group Size=6
Positive Frame	40.9% (n=44)	40.0% (n=50)	67.5% (n=40)	64.0% (n=50)
Negative Frame	61.4% (n=44)	68.0% (n=50)	65.0% (n=40)	70.0% (n=50)
Framing Effects	Yes	Yes	No	No
American Sample 2				
	Group Size=6000	Group Size=600	Group Size=60	Group Size=6
Positive Frame	38.7% (n=31)	41.9% (n=31)	57.6% (n=33)	66.7% (n=30)
Negative Frame	66.7% (n=30)	76.5% (n=34)	66.7% (n=30)	75.8% (n=33)
Framing Effects	Yes	Yes	No	No
Chinese Sample				
	Group Size=6000	Group Size=600	Group Size=60	Group Size=6
Positive Frame	50.0% (n=40)	62.5% (n=40)	62.5% (n=40)	62.5% (n=40)
Negative Frame	80.0% (n=40)	60.0% (n=40)	67.5% (n=40)	70.0% (n=40)
Framing Effects	Yes	No	No	No
Belgian Sample				
	Group Size=6 billion		Group Size=6	
Positive Frame	36.0% (n=50)		70.0% (n=50)	
Negative Frame	66.0% (n=50)		70.0% (n=50)	
Framing Effects	Yes		No	

The results have consistently shown how framing effects wax and wane in response to changing size of the patient group. The framing effect (i.e., the irrational reversal in risk preference) was evident, but it occurred only when the problem was presented in a large group context involving 600 lives or more. The framing effect was absent when the size of the endangered group was within a two-digit number, and the majority of the participants unambiguously favored the gamble option under both the saving- and losing-lives framing conditions. These results suggest that the small size of a social group evokes a sense of joint venture and signals a higher interdependence between group members as would have been typical of small-group living. In contrast, risk preference of a decision maker becomes ambiguous and erratic when the group contexts are large and anonymous.

Group Size Effects in Managerial Decisions

It appears that the size of a social group including different kinds of organizations, serves as a useful and parsimonious cue for structural and relational features of the task environment. The size of an organization may also prompt the social relationships between the members in an organization, their degree of interdependence, investment amount and strategies of the organization, risk-management styles, dominance and affiliation hierarchies, relations with other organizations, and common social contracts endorsed in business transactions and reciprocity. The implicit organizational knowledge prompted by the size of a firm should then influence the risk perception and risk preference in making managerial decisions.

Recently, Rieskamp and Hoffrage (1999) conducted an experiment in which they investigated people's decision strategies used in estimating the performance of companies. From four publicly held companies, participants had to select the one with the highest yearly profit. Each set of companies was selected from a sample of 70 real companies, forming the environment. Six company variables that had a high validity score were used as cues. The ecological validity of a cue was defined as the proportion of right inferences given on the basis of the cue value. The six variables (and their validities) were: the amount of investments (.78), the amount of the company's share capital (.68), the number of employees (.64), the recognition rate (.50), the share price on the stock market at the end of the reference year (.48), and the dividend for the share (.37). In this task, a validity of .25 reflects chance performance. Note that company size is a very useful cue for making inferences about the performance of the company. If one makes his or her estimate about the performance (yearly profit) ranking of four companies based solely on the company size, s/he would be correct 68 percent of the time on average.

The study (Rieskamp & Hoffrage, 1999) also found that given available organizational knowledge (the values of six cues for each company), decision-makers often use a fast and frugal strategy. That is, instead of searching and calculating for each alternative the sum of the cue values multiplied by the corresponding cue weights (validities) and selecting the alternative with the highest score, as suggested by an ordinary decision strategy, such as Franklin's rule, people often focus on one cue with the highest validity and select the alternative with the highest cue value. If more than one alternative has the same highest cue value, then for these alternatives the cue with the second highest validity is considered, and so on.

In a recent study, we examined whether the size of an organization would influence risky choice in a managerial context. Ninety-three American university students participated in

the study for extra course credit. The participants were instructed to "imagine that you are appointed as the vice-president after your predecessor left the position. You have to respond to some letters and memos immediately before you leave for an important meeting in another city. Thus, you have no time to get more information. The following is one of the letters that need immediate attention."

The letter quoted below was written by the president of the company.

> "This is with reference to the LSL case I mentioned in my letter of February 27th. As I indicated, the LSL has threatened to sue our company for patent violation. The case has not yet been filed in court, since LSL is waiting to hear our response to its offer to settle out of court. LSL people have proposed that we pay them in cash. As you know, the amount they ask is 1/3 of our expected revenue, which means we'll lose 1/3 of our annual income.
>
> If we do not agree to this proposal, LSL will file a lawsuit, which would, if we lose the case, probably involve a loss of our entire revenue. On the other hand, if we win in court, we will not incur any expenses. Our corporate lawyer and our outside law firm agree that we have a 2/3 chance of winning the case and a 1/3 chance of losing the case.
>
> We have been given one week from today to respond to LSL's settlement offer; we have to make a decision now. Please let me know your suggestion as soon as possible."

Note the framing of the expected outcomes was balanced. There were two versions of the letter and the expected loss in the second version was two-thirds instead of one-third of the annual revenue.

After reading the letter, each participant was asked to assume that the company has a total of either 10 or 1050 employees (a between subjects variable). The participant was then asked to indicate which plan he or she would prefer: Settling the case out of court or engaging in a lawsuit.

Following the first choice, the participant was asked to indicate again which plan he or she would prefer if the expected loss was not one-third of the annual revenue but two-thirds of the annual revenue. The amount of the expected loss thus was a within-subject variable. Forty-seven participants received the scenario with the one-third expected loss in annual revenue followed by the two-thirds loss scenario and forty-six participants received the scenarios with the reversed order.

Finally, each participant was asked to assume the alternative size of the company and to indicate whether they would still stay with the original choices or switch to the other option at each level of the expected losses (one-third and two-thirds of the annual revenue).

The results showed that (1) the percentage of the participants choosing the risk-seeking option at the expected loss of one-third of the annual revenue (67.7%) was significantly higher than that at the expected loss of two-thirds of the annual revenue (46.2%) in both the large and small companies, $F(1, 92) = 9.97$, $p = .002$.

(2) More than half of the participants (58.7%) switched at least in one of the scenarios as the size of the company changed ($p < .011$).

The participants' risk preference varied as a function of not only the expected payoffs but also the size of the company.

3. Types of Information: Framing Effects vs. Reflection Effects

Would risky choices between a sure option and a gamble of equal expected value vary as a function of the types of information provided in a decision problem?

In contrast to verbal framing (e.g., presenting the same choice outcomes as if they are gains or as if they are losses), reflection effects refer to the findings that people tend to be more risk averse in gain situations than in loss situations, and vice versa (e.g., Tversky & Kahneman, 1981; Fagley, 1993; March, 1988).

The two types of information we are interested in are the verbal information in the case of framing effects and the situational information in the case of reflection effects. Framing effects as described earlier involve an irrational reversal in risk preference as a result of how the same choice information is described or framed. For example, when the Asian disease problem is presented under the positive (saving-lives) frame, people were more risk-averse. However, it is only an as-if situation. Although the outcome is positively framed as-if it is a gain, the real situation is still negative (i.e., on average two-thirds of the patients would be killed by the disease).

Reflection effects and framing effects are conceptually distinct. First, the former is situational (i.e., whether a situation is good or bad), but the latter is informational (i.e., how information is presented). Secondly, the reversal in risk preference found in framing effects is a violation of the invariance axiom of normative rationality. In contrast, reflection effects are not a violation of any kind of normative utility axiom but a variation in risk preference that is sensitive to gain-loss situations.

Kahneman and Tversky's (1979) prospect theory predicts that people are more risk seeking in losses than in gains. However, in management and organizational studies, risky choice was often examined in the context of threats or opportunities. As Sitkin and Pablo (1992) pointed out, the common proposition in the management literature that people and organizations are more risk seeking for opportunities than for threats, seemingly contradicts the proposition derived from prospect theory.

Highhouse and Yüce (1996) argued that the constructs of 'opportunity' and 'threat' in the management literature are distinct from Kahneman and Tversky's 'gain domain' and 'loss domain'. They demonstrated that when the positive framing addresses opportunities and the negative framing emphasizes threats, reversed framing effects occur, where the participants were risk seeking under the positive opportunity-frame but risk averse under the negative threat-frame. However, a problem in their study is that the gain-loss variable was confounded with the task variable. That is, the gain situation involves a joint-venture task but the loss situation involves a lawsuit problem.

To avoid this confound, Wang and Xie (2001) conducted a 2 (opportunity framing vs. threat framing) by 2 (gain vs. loss situation) between-subjects experiment in the same task (i.e., joint-venture) context.

A second issue examined in this study is the effects of both opportunity-threat framing and gain-loss information on the risk perception of the decision maker. Highhouse and Yüce (1996) suggest that the gain-loss information influences decision–making perspectives whereas the opportunity-threat framing affects risk perception. However, in their study (Experiment 2) only the effects of framing but not the gain-loss information on risk perception was tested. Wang and Xie (2001) proposed that both gain-loss situation and opportunity-threat framing would affect risky choice by means of their effects on risk perception. Studies by Weber and others suggest that risk perception is the final causal link to the observed risk preference of the decision maker (e.g., Weber & Milliman, 1997).

Participants were 142 student volunteers (78 men and 64 women) recruited from two universities in Beijing, China. The joint-venture problem used in this study was modified from the one originally developed by MacCrimmon and Wehrung (1986) for a risk in-basket exercise (pp. 307-312). The participants were asked to imagine themselves in the role of a newly appointed vice-president of a corporation. The instructions emphasized that the vice-president must make the decision alone, given only the information available.

The scenario presented participants with correspondence from the head of a special team assigned to investigate the prospects of a project in a Chinese business context. The

dilemma concerned whether to pursue the project individually or as a joint venture. In accordance with the 2 x 2 (gain and lose situations x opportunity and threat frames) design, there were four Chinese versions of the joint-venture scenario.

The gain situation and opportunity frame version (i.e., the ATCgo version) read as follows:

> "Our new analysis indicates that, if we choose to compete with ATC, capturing a large market share would give us an after-tax return on investment of 22%, while capturing a small market share would give us a return of 10%. We estimate that our chance of getting a large market share is high. We have a 1 in 3 chance of getting a large market share. If we were to team up with ATC on the terms proposed, our return would be 14% after tax, with the same total investment."

The gain situation and threat frame version (i.e., the ATCgt version) read the same as the above, except the expected outcomes were framed as "… We estimate that our chance of getting a small market share is high. We have a 2 in 3 chance of getting a small market share. …"

The loss situation and opportunity frame version (i.e., the ATClo version) read as follows:

> "Our new analysis indicates that, if we choose to compete with ATC, capturing a large market share would reduce our expected loss in investment to 10%, while capturing a small market share would lead to a 22% loss in investment. We estimate that our chance of getting a large market share is high. We have a 1 in 3 chance of getting a large market share. If we were to team up with ATC on the terms proposed, our loss rate in investment would be 14 percent."

The loss situation and threat frame version (i.e., the ATClt version) read the same as the above, except the expected outcomes were framed as "… We estimate that our chance of getting a small market share is high. We have a 2 in 3 chance of getting a small market share. …"

Participants were asked to choose between the sure option and the gamble. Each participant also received a measure designed to assess the perceived opportunities and threats. The measures were adopted from the opportunity-threat perception scale used in Highhouse and Yüce study (1996), developed on the basis of Jackson and Dutton's (1988) empirical investigation of the terms associated most often with threats and opportunities. The measure contained five threat-items and five opportunity-items. The opportunity-related items included "Positive", "May gain and unlikely to lose", "Success is likely", "You have control", and

"Opportunity". The threat-related items included "Negative", "May lose and unlikely to gain", "Personal loss involved", "Your actions constrained", and "Threat".

Participants were asked to indicate the degree to which each item was descriptive of the decision problem, on a seven-point scale that ranged from (1) "Not appropriate at all" to (7) "Completely appropriate".

The frequency and percentage data of risk preference are presented in Table 2.

Table 2. Percentage of Participants Choosing the Risky Option.

Joint-Venture (ATC) Problems		
	Opportunity Framing	**Threat Framing**
Gain	25/36=69.4%	23/33=69.7%
Loss	22/37=59.5%	11/36=30.6%

Analysis of variance for the risk preference data from the four ATC groups showed a significant main effect of gain-loss manipulation (a reflection effect), $F(1, 141) = 9.466$, $p = .003$. The opportunity-threat framing showed a partial effect: The framing had a significant effect on risk preference only in the loss situation, $F(1, 72) = 6.537$, $p = .013$; but the overall effect of the framing was not significant, $F(1, 141) = 3.22$, $p = .075$.

This pattern of results (i.e., a main effect of the gain-loss situation and a partial effect of opportunity-threat framing with no interaction effect between the two) suggests that the two types of information (gain-loss situation and opportunity-threat framing) separately influence the risk-preference of the decision maker.

The participants were inclined to take risk in gain situations and under opportunity framing. This finding is opposite to the predictions from Kahneman and Tversky's (1979) prospect theory. March and Shapira (1992; March, 1988; Shapira, 1995) however, proposed an alternative model of variable risk preference which predicts that when the amount of gains accumulates, the risk attitude of the decision maker may change from risk averse to risk seeking. In other words, the higher the distance from the status quo to a survival baseline, the higher risk an organization or individual can afford to take.

We argue that the subjectively perceived distance between a minimum requirement and the status quo is mediated by risk perception. In gains, people may perceive risks more as opportunities than threats and thus become more risk seeking. The scores of opportunity-perception confirmed this prediction. The participants saw greater opportunities in gain

scenarios than in loss scenarios, F (1, 141) = 13.54, p = .000. When the perception of opportunities was higher in gains and lower in losses, so did the risk-seeking choice of the participants.

4. Organizational Learning in Information Search and Selection

Our final question concerns the effects of organizational learning experience on the way the situational (gain-loss) and verbal framing information are treated in making risky choice. Would organizational learning help managers to focus on the genuine information about the status quo of an organization more than the as-if information of verbal framing?

In a recent study, we presented both the joint-venture and the lawsuit scenarios (in Chinese) to two samples of the participants: 127 Chinese senior executives from a variety of industries recruited from executive MBA courses and 172 first year Chinse students in a Business and Management School in Hong Kong.

For both the lawsuit scenario (see the example in section 2) and the joint-venture scenario (see the examples in section 3), there were an opportunity-framing version and a threat-framing version. As a between-subjects experiment, we had four groups of the participants. Each participant was asked to make a choice between the sure options and the gamble option of the same expected value. The results are shown in Table 3.

Table 3. Frequencies and percentages of the student and executive participants choosing the risky option across framing conditions and scenarios.

Participant	**Scenario**	**Risky Choice Frequency and Percentage**		**Framing Effect**
		Opportunity Frame	**Threat Frame**	
Student	Joint-venture	15/42 = 35.7%	31/42 = 73.8%	Yes
Student	Lawsuit	17/42 = 40.5%	41/46 = 89.1%	Yes
Executive	Joint-venture	11/34 = 32.4%	5/29 = 17.2%	No
Executive	Lawsuit	11/33 = 33.3%	13/31 = 41.9%	No

There were two significant differences in the participants' choices between the student and executive samples. First, the students were clearly susceptible to the verbal framing in both the Joint-venture scenario (χ^2 (1) = 12.3, p = .0005) and the lawsuit scenario (χ^2 (1) = 23.1, p < .0001). However, the executive participants were immune to the framing manipulation, showing no significant difference in risk preference across framing conditions.

Second, the overall choice preference of the executive participants was significantly more risk averse than the student counterpart in both scenarios. The overall percentage of the executive participants choosing the risk averse option was 68.5% whereas the percentage for the student participants was 39.5%, χ^2 (1) = 24.6, $p < .0001$.

Organizational learning experience decreased the erratic choice behavior due to manipulative presentation of the same information under either positive or negative framing.

5. Conclusions

Social and organizational structures provide implicit knowledge and cues for human agents to make fast and frugal decisions. Human decision rationality is neither omniscient nor omnipotent but adaptive in utilizing parsimonious environmental cues to make decisions at risk and under uncertainty. Decision cues are searched and selected with priorities according to their validities. In situations where the valid cues are lacking, people may become prone to less valid information, as illustrated in the framing effects found in large anonymous group contexts.

In making managerial decisions, different types of information (e.g., framing of outcomes and gain-loss situations) contribute to the final risky choice by their separate effects on risk perception. Organizational learning experience makes senior executives less susceptible to the cognitive illusion created by framing the same outcomes as either gains or losses.

References

Brunswik, E. (1940). Thing constancy as measured by correlation coefficients. Psychological Review 47, 69-78.

Burnham, T. (in press). Altruism and spite in a selfish gene model of endogenous preferences. Journal of Bioeconomics.

Czerlinski, J., Gigerenzer, G., & Goldstein, D. (1999). How good are simple heuristics? In G. Gigerenzer, P.M. Todd & the ABC Research Group, Simple heuristics that make us smart (pp. 97-118). New York: Oxford University Press.

Fagley, N. S. (1993). A note concerning reflection effects versus framing effects. Psychological Bulletin, 113, 451-452.

Goldstein, D. & Gigerenzer, G. (1999). The recognition heuristic: How ignorance makes us smart. In G. Gigerenzer, P.M. Todd & the ABC Research Group, Simple heuristics that make us smart (pp. 37-58). New York: Oxford University Press.

Gigerenzer, G., Todd, P.M., & the ABC Research Group. (1999). Simple heuristics that make us smart. New York: Oxford University Press.

Highhouse, S., & Yüce, P. (1996). Perspectives, perception, and risk-taking behavior. Organizational Behavior and Human Decision Processes, 65, 159-167.

Jackson, S. E. & Dutton, J. E. (1988). Discerning threats and opportunities. Administrative Science Quarterly, 33, 370-387.

Kahneman, D., & Tversky, A. (1979). Prospect theory. Econometrica, 47, 263-292.

Knauft, B. M. (1991). Violence and sociality in human evolution. Current Anthropology, 32, 391-428.

Lee, R. B., & DeVore, I. (Eds.) (1968). Man the hunter. Chicago: Aldine.

MacCrimmon, K. R., & Wehrung, D. A. (1986). Taking risks: The management of uncertainty. New York: Free Press.

March, J. G. (1988). Variable risk preferences and adaptive aspirations. Journal of Economic Behavior and Organization, 9, 5-24.

March, J. G., & Shapira, Z. (1992). Variable risk preferences and the focus of attention. Psychological Review, 99, 172-183.

Reynolds, V. (1973). Ethology of social change. In C. Renfrew (Ed.), The explanation of culture change: Models in prehistory (pp. 467-480). Pittsburgh: University of Pittsburgh Press.

Rieskamp, J. & Hoffrage, U. (1999). When do people use simple heuristics, and how can we tell? In G. Gigerenzer, P.M. Todd & the ABC Research Group, Simple heuristics that make us smart (pp. 141-168). New York: Oxford University Press.

Sitkin, S. B., & Pablo, A. L. (1992). Reconceptualizing the determinants of risk behavior. Academy of Management Review, 17, 9-38.

Simon, H. A. (1956). Rational choice and the structure of the environment. Psychological Review, 63, 129-138.

Simon, H. A. (1990). A mechanism for social selection and successful altruism. Science, 250, 1665-1668.

Shanteau, J. (1992). How much information does an expert use? Is it relevant? Acta Psychologica, 81, 75-86.

Shapira, Z. (1995). Risk taking: A managerial perspective. New York: Russell Sage Foundation.

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

Wang, X.T. (1996a). Domain-specific rationality in human choices: Violations of utility axioms and social contexts. Cognition, 60, 31-63.

Wang, X.T. (1996b). Framing effects: Dynamics and task domains. Organizational Behavior and Human Decision Processes, 68, 145-157.

Wang, X.T., Simons, F., & Brédart, S. (2001). Social cues and verbal framing in risky choice. Journal of Behavioral Decision Making, 14, 1-15.

Wang, X.T. & Xie, X.F. (2001). Risk-taking in cultural and organizational contexts: Information framing and achievement motives. Paper presented at the Academy of Management meeting, Washington, D.C.

Weber, E. U., & Milliman, R. (1997). Perceived risk attitudes: Relating risk perception to risky choice. Management Science, 43, 122-143.

Acknowledgment

This study was partially supported by Grant SBR-9876527 from the National Science Foundation and by Grant 99-55 EE-GLO.04 from the James McDonnell Foundation to the first author.