

Cross-National Differences in Risk Preference and Lay Predictions

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ABSTRACT

This research explores whether there are systematic cross-national differences in choice-inferred risk preferences between Americans and Chinese. Study 1 found (a) that the Chinese were significantly more risk seeking than the Americans, yet (b) that both nationals predicted exactly the opposite — that the Americans would be more risk seeking. Study 2 compared Americans' and Chinese risk preferences in investment, medical and academic decisions, and found that Chinese were more risk seeking than Americans only in the investment domain and not in the other domains. These results are explained in terms of a 'cushion hypothesis', which suggests people in a collectivist society, such as China, are more likely to receive financial help if they are in need (i.e. they could be 'cushioned' if they fell), and consequently, they are less risk averse than those in an individualistic society such as the USA. Copyright © 1999 John Wiley & Sons, Ltd.

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The presence research investigates whether there are systematic cross-national differences in risk preference. This topic is of both theoretical and practical significance. Theoretically, answers to this question can help determine whether research results about risk preference, which are predominantly generated in the USA, are of universal validity. In recent years, researchers have come to discover systematic cross-national differences in many fundamental psychological effects, such as the construal of the self (Markus and Kitayama, 1991), the fundamental attribution error (Morris and Peng, 1994), the need for control (Sethi and Lepper, in press), to name just a few. However, little is known about whether people in different nations differ in risk preferences. At a practical level, this research can potentially help people involved in foreign affairs and international business more accurately predict the risk preference, hence the choices, of their counterparts in other countries. This subject is timely in an era of economic globalization, when we are in greater need to interact with and understand the preferences of peoples in other countries than ever before.

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To study cross-national differences in risk preference, we focused on two countries: the United States and the People's Republic of China. In many respects, including political system and traditional cultural values, these two countries stand at opposite ends of the continuum. At the same time, both of these nations have significant impact on today's world economy and international affairs. Business and governmental interactions between the two nations have been increasing rapidly in recent years (e.g. Warner, 1995). Thus, knowledge of any differences in risk preference between members of these two nations is of great value.

The present research is inspired by previous work that compared Chinese (and other Asians) with Americans (and other Westerners) in probabilistic thinking (e.g. Phillips and Wright, 1977; Wright and Phillips, 1979, 1980; Wright, Phillips and Wisudha, 1983) and confidence judgments (e.g. Lee *et al.*, 1995; Yates, Lee and Shinotsuka, 1996; Yates, Lee and Bush, 1997; Yates *et al.*, 1989; see Yates and Lee, 1995, for a review). These authors established robust cross-national differences in very basic judgment and decision-making tasks. For example, Wright *et al.* (1983) reported that the British have a more finely differentiated view of probability than Malaysians. Yates and his associates found that Chinese and several other Asian nationals are more overconfident about their answers to general knowledge questions and other judgments than Americans. These differences are often contrary to lay expectations (e.g. Yates *et al.*, 1996), and they cannot be attributed just to differences in response styles (e.g. Yates *et al.*, 1997).

Extending these pioneering studies, our current research explores possible cross-national difference in another basic judgment- and decision-making area — risk preference. To the best of our knowledge, there is little empirical research comparing risk preference between Americans and Chinese. There are, nevertheless, some indirect indications that Americans may be more risk-seeking. Hong (1978) reported that, compared with Taiwanese, Americans were more likely to advise *others* to choose a risky option (e.g. an insecure job whose future can be very prosperous) over a safer alternative (e.g. a job with a secure but undistinguished future). Douglas and Wildavsky (1982, p. 10) looked at risk preference from a cultural perspective and distinguished between societies whose cultural values, perceptions, and attitudes are shaped by either a market environment or a hierarchical bureaucratic environment. Societies in which an individualistic market orientation predominates (such as the United States) are described as appreciative of uncertainties as providing opportunities and thus more risk-taking. More hierarchical and bureaucratic societies (such as China) are described as deciding more by standard operating procedures and consequently as more cautious and risk-averse.

Before we report the details of our studies, let us mention how we define and measure risk preference. Risk and risk preference are complex constructs. Brachinger and Weber (1998), Luce and Weber (1995), and Yates and Stone (1992) provide reviews of the different ways in which risk has been conceptualized and modeled. There also are several alternative conceptualizations about the relationship between the riskiness of choice options *per se* and the choices people make or the prices they pay for such options (Bromiley and Curley, 1992; Fischhoff, 1992; Sarin and Weber, 1993; Weber and Milliman, 1997). While these distinctions are important and deserve further attention, they are not addressed directly in the research reported here. In the two studies reported below, we do not attempt to distinguish between different models of the process by which risky decisions may be made. Instead, we focus only on the outcome of a specific subset of risky decisions, namely people's preference for options with a sure payoff (e.g. winning \$400) over options with a probabilistic payoff (e.g. winning either \$2000 or nothing with equal probabilities). Thus we use the term 'risk preference' in a theoretically neutral way to simply describe patterns of observed choice in such decision situations. It should also be mentioned that, throughout this article, we will use the term 'more risk-seeking' to describe both 'more risk-seeking' and 'less risk-averse'.

As discussed above, risk preference in this study is strictly inferred through choices. This operational definition of risk preference is the same as that used in many theories of choice under risk such as prospect theory. There are, of course, other ways to measure risk preference. For example, one can ask respondents to decide about the probability of success they would require to choose a qualitatively described risky option over a qualitatively described safe options, e.g. an insecure job with a potentially bright future versus a secure job. However, such verbal descriptions are inherently vague and may be interpreted differently by peoples from different countries. Alternatively, one can elicit respondents' certainty equivalent for a risky option and therefrom infer their risk preferences. However, previous research suggests that judged certainty equivalents do not always agree with choice-determined ones (Bostic, Herrnstein and Luce, 1990). We believe that risk preferences revealed in choices are more ecologically valid. In most real-world decisions, the decision maker is called upon to make choices rather than to state a certainty equivalent.

STUDY 1

The main purpose of this study is to compare risk preferences between Americans and Chinese and to see whether there is a systematic difference. A secondary purpose of this study is to examine the *predictions* of people in one country for the risk preferences of people in the other country, and to see whether their predictions are in accordance with reality.

We are not aware of any empirical studies that have examined cross-national predictions of risk preference. Below we delineate several possibilities. One hypothesis is derived from the risk-as-value notion (Brown, 1965; Clark, Crockett and Archer, 1971; Lamm, Trommsdorff and Rost-Schaude, 1972; Wallach and Wing, 1968). According to this notion, people tend to perceive others as less willing to take risks than themselves, because people consider risk-taking as an admirable characteristic (e.g. Shapira, 1995, p. 54) and they perceive themselves as more likely to possess this desirable characteristic than others (e.g. Svenson, 1978; Weinstein, 1979). To the extent that people may consider their compatriots as an extended 'self' and foreigners as 'others', the risk-as-value hypothesis implies that one will consider people in another country less risk-seeking than one's compatriots.

Recently, Hsee and Weber (1997) found that when the target of prediction was abstract (e.g. 'the average student'), students tended to predict the target to be more risk-neutral than themselves. This bias disappeared if the target of prediction was concrete (e.g. a specific individual). It was speculated that this bias occurred because people had difficulty imagining what abstract people would feel when faced with risky choices, and resorted to the default — risk neutrality — to predict their risk preference. Hsee and Weber (1997) called this explanation the 'risk-as-feelings hypothesis'. Extrapolating from this hypothesis and assuming that members of another country are seen as more 'abstract' than members of one's own country, one would expect that both Americans and Chinese will predict members in the other country to be more risk-neutral than members in their own country.

Yet another prediction comes from the hypothesis that one relies on stereotypes about people in a country to predict their risk preference. Americans as portrayed in many movies (particularly Westerns) and sports events are stereotypically adventurous, aggressive and risk-seeking. Chinese found in the media — whether produced in China or in the USA — are not usually associated with this risk-seeking image. In other words, the stereotypical image of Americans is more risk-seeking than that of Chinese, and these stereotypes are pervasive in both the USA and China. If people base their predictions on stereotypes, then both nationals would predict Americans to be more risk-seeking.

Method

Materials

The questionnaire used in this study consisted of three parts. One elicited respondents' own choices. The two other parts assessed their *prediction* of the choices of others — either other Americans or other Chinese.

First, let us consider the part assessing one's own choices. This included four sets of questions. They constituted a 2 (domain: gain and loss) \times 2 (outcome size: large and small) design. In the gain condition, the questions were preceded by the following instructions.

Suppose that *you* bought a lottery ticket a week ago. You are now informed that you have won and have been given two options of how to receive the money.

Participants then read two sets of questions. The first contained large outcome size questions and the second set contained small outcome size questions. Each set included seven questions. The options in these questions are as follows.

Set	Question	Sure option	Risky option
1	1	receive \$400 for sure	flip a coin; receive \$2000 if H or \$0 if T
1	2	receive \$600 for sure	flip a coin; receive \$2000 if H or \$0 if T
1	3	receive \$800 for sure	flip a coin; receive \$2000 if H or \$0 if T
1	4	receive \$1000 for sure	flip a coin; receive \$2000 if H or \$0 if T
1	5	receive \$1200 for sure	flip a coin; receive \$2000 if H or \$0 if T
1	6	receive \$1400 for sure	flip a coin; receive \$2000 if H or \$0 if T
1	7	receive \$1600 for sure	flip a coin; receive \$2000 if H or \$0 if T
2	1	receive \$20 for sure	flip a coin; receive \$100 if H or \$0 if T
2	2	receive \$30 for sure	flip a coin; receive \$100 if H or \$0 if T
2	3	receive \$40 for sure	flip a coin; receive \$100 if H or \$0 if T
2	4	receive \$50 for sure	flip a coin; receive \$100 if H or \$0 if T
2	5	receive \$60 for sure	flip a coin; receive \$100 if H or \$0 if T
2	6	receive \$70 for sure	flip a coin; receive \$100 if H or \$0 if T
2	7	receive \$80 for sure	flip a coin; receive \$100 if H or \$0 if T

These questions were printed in a random order, except that the first set always preceded the second set.

In the loss condition, the questions were preceded by the following instructions.

Suppose that *you* violated a traffic rule and hurt somebody a week ago. You are now informed that you will be fined and have been given two options of how to pay the fine.

Participants then made choices in the same two sets of questions as listed above, except the word 'receive' was replaced by 'pay'.

Let us now turn to the other two parts of the questionnaire that elicited respondents' *prediction* of other Chinese or other Americans' choices. The instructions in these parts were identical to those in the first part, except that respondents were told that the event described in the opening instructions was about someone in the USA or someone in mainland China, and asked to predict which option that person would choose in each of the 14 questions (scenarios). In addition, for the Chinese conditions, the outcome values were in yuans (¥) instead of in US dollars (\$). Participants were asked to assume that ¥1 was worth as much to someone in China as \$1 to someone in the USA, and then to predict that person's choice in each question, assuming that he or she was like most college students in China.

The three parts of the questionnaire were printed on separate pages of a booklet, and were arranged in random order.* Every participant completed all the three parts and all the questions therein.

The Chinese translation. The English questionnaire was translated into Chinese by the method of back translation (Brislin, 1970). The Chinese translation was identical to the English version with the following exceptions: First, the word 'US' in the English version was replaced by 'China' in the Chinese translation, and vice versa. Second, whenever the \$ sign was used in the English version, it was replaced with the ¥ sign in the Chinese translation, and vice versa.†

Participants and procedures

Participants in the study were 99 students from the University of Chicago and 110 students from Shanghai Chengjian University in China. The American participants were paid \$5.00 and the Chinese participants were paid ¥5.00 each.

Results and discussion

Calculation of the Risk Preference Index

Each respondent was assigned a Risk Preference (RP) Index based on his or her choices in each set of questions. The RP Index, which can range from 1 (most risk-averse) to 8 (most risk-seeking), is defined as follows. In the gain conditions, if a participant chose the sure option in all the seven questions, her RP Index was defined as 1 (most risk-averse). If she chose the risky option in all of the seven questions, her RP Index was defined as 8 (most risk-seeking). If she chose the risk option in Question 1 through Question $i-1$, and chose the sure option in Question i through Question 7, her RP Index was defined as i . The reverse rule was applied to the loss condition. Respondents whose choice pattern across the seven questions was inconsistent (e.g. choosing a small sure gain over a risky gain but choosing the risky gain over a larger sure gain) were assigned a missing value as their RP Index.‡

Below we first report the results of the own-choice part, and then the results of the two prediction parts.

Differences in risk preference

Were there cross-national differences in risk preference between Americans and Chinese? The answer is yes. Contrary to our expectations based on indirect evidence in the literature, the Chinese were significantly more risk-seeking than the Americans!

Exhibit 1 reports the results in detail, with separate entries for the different domains and different outcome-size conditions. We performed a 2 (nationality-of-subjects: Americans versus Chinese) \times 2 (domain: gain versus loss) \times 2 (outcome-size: large versus small) analysis of variance on these data. It

* Order was not found to have a significant effect and so we will not discuss this factor further.

† We deliberately used a 1:1 conversion rate between the US dollar and the Chinese yuan rather than the actual exchange rate. From informal interviews with American college students in Chicago and Chinese college students in Shanghai, we found that the average monthly expenditure of an American college student was about \$300 and that of a Chinese college student was about ¥300, excluding tuition and rent, which in China are usually provided gratuitously by the government. Thus, we assume that \$1 to an American college student in Chicago was of the same psychological value as ¥1 to a Chinese college student in Shanghai.

‡ Of the American subjects, five in the gain/large set, one in the gain/small set, eight in the loss/large set, and six in the loss/small set exhibited contradictory choices in risk preferences and were assigned missing RP indices. Of the Chinese subjects, 12 in the gain/large set, 11 in the gain/small set, 17 in the loss/large set and 20 in the loss/small set exhibited contradictory choices and were assigned missing RP indices.

Exhibit 1. American and Chinese participants' own risk preferences in Study 1

Domain	Outcome size	Nationality of subjects	
		Americans	Chinese
Gain	Large	2.49	3.55
	Small	3.91	5.08
Loss	Large	3.64	4.48
	Small	3.59	3.80
Column means for the two nationals:		3.41	4.23

Note: The numbers in the table are RP Indices; they can range from 1 (most risk-averse) to 8 (most risk-seeking).

yielded a highly significant effect for Nationality-of-subjects ($F(1, 160) = 26.57, p < 0.001$). The ANOVA also revealed a significant main effect for Outcome-size ($F(1, 160) = 38.91, p < 0.001$) and a significant Domain \times Outcome-size interaction ($F(1, 160) = 74.31, p < 0.001$). In the gain condition respondents were *less* risk-seeking when the outcome values were large than when they were small and in the loss condition subjects were *more* risk-seeking.

Predictions of risk preference

What did Americans and Chinese predict the risk preference of people of the other country and in their own country would be? As Exhibit 2 shows, their predictions were in direct opposition to the reality. Both American and Chinese participants predicted that the Americans would be more risk-seeking than the Chinese!

A 2 (nationality-of-target: Americans versus Chinese) \times 2 (nationality-of-subject: American versus Chinese) \times 2 (domain: gain versus loss) \times 2 (outcome-size: large versus small) ANOVA yielded a significant main effect for nationality-of-target ($F(1, 91) = 17.81, p < 0.001$); both American and Chinese respondents predicted American students to be significantly more risk-seeking than Chinese students. The ANOVA also revealed a significant main effect for nationality-of-subjects ($F(1, 91) = 8.56, p < 0.01$), indicating that the American respondents predicted others (whether Americans or Chinese) to be less risk-seeking than did the Chinese. There was also a significant

Exhibit 2. American and Chinese participants' predictions of Americans' and Chinese's risk preferences in Study 1

Nationality of subjects	Domain	Outcome size	Nationality of target	
			Americans	Chinese
Americans	Gain	Large	3.45	3.05
		Small	4.60	4.09
	Loss	Large	4.46	3.87
		Small	4.23	3.59
Chinese	Gain	Large	4.91	3.81
		Small	5.58	5.01
	Loss	Large	5.28	4.67
		Small	4.36	3.63
Column means for the two target groups:			4.60	3.97

Outcome-size effect ($F(1, 91) = 5.50, p < 0.05$) and a significant Domain \times Outcome-size interaction effect ($F(1, 91) = 89.58, p < 0.001$). This time the prediction was consistent with what we found in the risk preference part — that in the gain domain subjects were less risk-seeking when the outcome sizes were large than when they were small and in the loss domain subjects were more risk-seeking.

To see exactly how much the predictions diverged from reality, we assumed that subjects' responses in the own-choice part were representative of the 'real' risk preference of most college students in their respective country and compared respondents' predictions with this 'reality'. Specifically, we compared American respondents' predictions for Chinese college students with Chinese respondents' RP Indices in the own-choice part of the questionnaire, and found that the Americans *underestimated* the Chinese propensity to seek risk in both the gain condition ($F(1, 175) = 15.62, p < 0.001$) and the loss condition ($F(1, 173) = 2.83, p < 0.1$). Similarly, we compared Chinese respondents' predictions for Americans with American respondents' RP Indices in the own-choice part, and found that the Chinese *overestimated* the Americans' propensity to seek risk in both the gain condition ($F(1, 148) = 90.85, p < 0.001$), and the loss condition ($F(1, 140) = 10.44, p < 0.001$).

EXPLANATIONS

Study 1 yielded two noteworthy findings: (a) the Chinese were significantly more risk-seeking than the Americans, and (b) both the Americans and the Chinese predicted the opposite. In the following section we first provide some explanations for the second finding, and then focus on the first finding.

Explaining the incorrect lay predictions

Why did both the Americans and the Chinese predict the Americans to be more risk-seeking? Earlier, we proposed several hypotheses about how one makes cross-national predictions of risk preference — the risk-as-value hypothesis, the risk-as-feelings hypothesis, and the stereotype hypothesis. Our results did not fully support either of the first two hypotheses. The data of the Chinese students, who predicted the Americans to be more risk-seeking, contradicted the risk-as-value hypothesis, which expects exactly the opposite. (It is possible that the Chinese considered risk-aversion rather than risk-seeking a virtue, and regarded themselves as more virtuous (more risk-averse) than the Americans. This explanation has two problems. First, there is no empirical evidence that the Chinese value risk aversion more than do the Americans. Second, if the Chinese indeed valued risk aversion more than the Americans, then why were they not more risk-averse than the Americans in their actual choices?)

Like the risk-as-value hypothesis, the risk-as-feelings hypothesis was not fully supported by our data, either. The risk-as-feelings hypothesis expects both the Chinese and the Americans to predict members of the other country to be more risk neutral. However, while the predictions of the Chinese respondents were consistent with this hypothesis, the predictions of the American respondents were not.

The only hypothesis that received unequivocal support from our results is the one that assumes that people use stereotypes to make cross-national predictions of risk-preference. As mentioned earlier, the stereotypes hold that Americans are risk-seeking and Chinese are not. Cross-national predictions by both Americans and Chinese reflected these stereotypes. Note, also, that the RP Indices in the Americans' condition submitted by the Chinese students were greater than those submitted by the American students; in other words, the Chinese students considered Americans to be more risk-seeking than did the American students. Conversely, the RP Indices in the Chinese condition submitted by the American students were smaller than those submitted by the Chinese students; in other words, the American students considered the Chinese to be more risk-averse than did the Chinese students. As additional support for the stereotype hypothesis, these results suggest that one relies more on

stereotypes when one predicts the risk preference of someone in another country than when one predicts the risk preference of someone in one's own country. When one predicts the risk preference of people in one's own country, one can consider somebody one knows — such as a friend or a classmate — as a reference; when one predicts the risk preference of people in another country, one has no other basis for the prediction than the stereotypical image of people in that country.

Explaining the cross-national difference in risk preference: the “cushion hypothesis”

Let us now turn to our main finding — that the Chinese respondents exhibited a greater risk-seeking tendency than the Americans. To account for this rather surprising finding, we offer several possible explanations. First, given the previous literature that Asian nationals were less well calibrated in their probabilistic thinking than Westerners (e.g. Wright *et al.*, 1983), it is possible that the Chinese interpreted the probabilities in the risky questions differently from the Americans, and therefore made different choices. Second, in Study 1, we used a 1:1 conversion rate between the US dollar and the Chinese yuan. Even though we tried to use the real purchase power as a guidance to determine the conversion rate, it is still possible that ¥1 may have appeared less valuable to a Chinese student than \$1 to an American student. Thus, the differential risk preference between the two nations may have simply been a result of differential risk preference due to outcome sizes.

While the first two explanations suggest that the observed national difference in risk preference was merely a result of some measurement artifact, our third explanation focuses on differences in cultural values and social structures between the two countries. A major distinction between the American and the Chinese societies is that the former is individualistic and the latter collectivist (Hofstede, 1980; Triandis, 1993). Individualism emphasizes personal freedom and independence; collectivism, on the other hand, endorses social relatedness and interdependence with others in one's family, community or other social groups. Compared with Americans, more Chinese live in extended families and have close contact with a large number of relatives. If they are in need, the Chinese can turn to this social network for support. By support, we do not mean verbal and emotional consolation, which one can get from virtually any kind of friend. Instead, we mean substantive material and financial assistance, which one can usually receive only from family members and close friends. Because the Chinese have a larger close social network to count on when they need such financial support, the adverse outcome of a risky financial option may — objectively and subjectively — be less severe to Chinese than to Americans. As a consequence, the Chinese perceive the risks in the same uncertain option as less risky and hence appear to be more risk-seeking than the Americans. We dub the above explanation the ‘cushion hypothesis’ because our explanation suggests that the close social network in Chinese society serves as a ‘cushion’ that would hold its members in case they ‘fell’. The cushion hypothesis follows from Weber and Milliman's (1997) results who found that apparent differences in risk preferences as inferred from choices can arise from differences in people's *perception* of risks rather than from differences in attitudes *per se* (see Weber and Milliman for a detailed discussion of the confounding between differences in risk perception and risk attitude in the conventional definition of risk preference).

STUDY 2

In this study we sought to extend the findings of Study 1 in several directions. First, while the outcome values in Study 1 were monetary amounts, the outcome values in Study 2 were return rates on investments. This avoided the dollar-to-yuan conversion problem. Second, Study 2 tested risk preferences not only in a financial decision-making context but also in two other contexts that we will refer to

as 'essay' and 'medicine'. In the essay context, respondents were asked to decide whether to write a term paper on a conservative topic or on a provocative topic. In the medicine context, respondents chose between medicines with either a specified effectiveness or a probabilistic effectiveness. We added the latter two contexts in order to see whether the national difference in risk preference observed in Study 1 was related to the cushion hypothesis or simply a measurement artifact. If the difference was simply a measurement artifact (e.g. some general response bias or due to differential interpretations of probability by Chinese and Americans), then this difference would persist in all of the three contexts in Study 2. On the other hand, if the cushion hypothesis contributed to the effect, then the cross-national difference in risk preference would occur only in the investment context, and not in the other two contexts. The social network 'cushion' in Chinese society gives the Chinese an advantage over the Americans only in a financial decision context, and not in the other contexts. Friends and family can provide substantive support if one encounters financial difficulties, but they cannot easily render substantive help if one receives a poor score on an essay or if one takes the wrong medicine. While emotional support may help to alleviate the negative impact of a bad outcome as the result of a risky choice, it does not serve the same risk-reduction function as the material collective network support does.

To further test the cushion hypothesis, we included a number of questions to the study that assessed the size and quality of respondents' social network. Respondents were asked with how many people they lived or had frequent contact, how many of them the respondent could ask for financial support, and how many of them the respondent could ask for emotional support. Based on the cushion hypothesis, we expected (1) that, compared to the Americans, the Chinese had more people in their social network they could ask for support, (2) that this difference was limited to financial support and not applicable to emotional support, and (3) the national difference in financial support mediated the effect of nationality on risk preference.

Method

Materials

The questionnaire for this study consisted of three parts — investment, essay and medicine. In the investment questionnaire, respondents were asked to imagine the following scenario:

You have some savings. Suppose that there are only two investment options:

A: Buy a particular stock: Its return rate will vary.

B: Put the money in a savings account: Its return rate is fixed.

(Return rate refers to annual return rate here. For example, a return rate of 4% means that for every \$100 you invest, you will get \$4 extra after a year.)

From either option, you can withdraw your money at any time without penalties. Suppose that these are the only investment options available, and that you can choose only one of the two, not both. Assume also that if you want to buy the stock, you must buy it now. If you miss this chance, you can't buy it later.

Each scenario below describes the return rates of the two options. Read each scenario carefully and circle the option you would choose in that scenario.

- Scenario 1: Stock: either 0% or 8% with equal probabilities
Savings: exactly 2%
- Scenario 2: Stock: either 0% or 8% with equal probabilities
Savings: exactly 4%
- Scenario 3: Stock: either 0% or 8% with equal probabilities
Savings: exactly 6%

The essay questionnaire read as follows:

You are taking an important business course now. Your final grade for this course will depend heavily on an essay paper that will be due next week. Scores on the paper can range anywhere from 0 to 100.

You are debating whether to write on a conservative topic or on a provocative topic. If you choose the conservative topic, you know how much your professor will like it and what score you will receive. If you choose the provocative topic, you don't know how much your professor will like it and don't know what score you will get.

Each scenario below describes your estimates of what score you will get on the paper if you write on the conservative topic or on the provocative topic. Read each scenario carefully and circle the topic you would choose in that scenario.

- Scenario 1: Provocative topic: either 60 or 100 with equal probabilities
 Conservative topic: exactly 70
- Scenario 2: Provocative topic: either 60 or 100 with equal probabilities
 Conservative topic: exactly 80
- Scenario 3: Provocative topic: either 60 or 100 with equal probabilities
 Conservative topic: exactly 90

The medicine questionnaire described the following scenario:

You are experiencing a severe headache. After a thorough examination, your doctor told you that it is not serious, will automatically go away and will not cause any permanent damages. However, it will take 10 days before it goes away if you don't take any medicine.

There are two imported drugs on the market that can help reduce the duration of your headache: Drug A and Drug B. Both drugs are free with your doctor's prescription.

Each scenario below describes the number of days by which each drug will reduce the duration of your headache. Read each scenario carefully and circle the drug you would take in that scenario.

- Scenario 1: Drug A: reduce by either 0 or 8 days with equal probabilities
 Drug B: reduce by exactly 2 days
- Scenario 2: Drug A: reduce by either 0 or 8 days with equal probabilities
 Drug B: reduce by exactly 4 days
- Scenario 3: Drug A: reduce by either 0 or 8 days with equal probabilities
 Drug B: reduce by exactly 6 days

Participants completed all three questionnaires in the order described above. After that, they answered a series of other questions, among which were the following, designed to test the cushion hypothesis:

With how many members of your family (parents, grandparents, siblings, aunts, uncles, cousins, children, etc.) do you live? _____

Except for the ones you live with, with how many members of your family do you maintain contact (visiting, calling, or writing to them at least *once a month*)? _____

How many of those *could* you approach if you needed financial help or material support? _____

How many of those *could* you approach if you needed emotional or psychological support? _____

For ease of discussion, in the rest of the paper we will refer to responses to the above questions respectively as #Live, #Contact, #Help-\$, and #Help-Ψ.

Participants and procedure

Participants in the study were 66 students from the Ohio State University in the US and 65 students from Shanghai Jiaotong University in China. They were recruited from various undergraduate classes and were not paid. The American students completed the English version of the questionnaire and the Chinese students completed a Chinese version of the questionnaire, which was back-translated from the English, as described in Study 1.

Results and discussion*Calculation of the Risk Preference Index*

The Risk Preference (RP) Index was calculated in the same way as in Study 1. Because in this study each version had only three questions, the RP Index ranged only from 1 (most risk-averse) to 4 (most risk-seeking).^{*} Below we first report the results concerning the cross-national differences in risk preference, and then the results of the social-network questions.

Differences in risk preference

As the first row of Exhibit 3 shows, there is a significant difference in risk preference between the American and the Chinese in the investment context. Replicating the finding of Study 1, the Chinese, again, were more risk-seeking than the Americans. This finding cannot be explained by a dollar–yuan conversion argument, because neither dollars nor yuans were mentioned in the study.

The cross-national difference observed in the investment context virtually vanished in the essay and the medicine context. Thus, the cross-national difference in the investment context cannot be easily attributed to a general response bias or to the Chinese inability to think probabilistically. Probability information was used in all the three contexts, yet the Chinese differed from the Americans only in the investment context. The data are most consistent with the cushion hypothesis, suggesting that the Chinese could afford to take more financial risks because their social network would lend them support in case they need it.

Social-network questions

Respondents' answers to the social-network questions provided further evidence for the cushion hypothesis. As Exhibit 4 shows, the Chinese respondents lived and kept close contact with more people

Exhibit 3. American and Chinese participants' risk preference in Study 2

Context	Nationality of subjects		Difference
	Americans	Chinese	
Investment	2.26	2.63	$t(128) = 2.97, p < 0.01$
Essay	2.34	2.42	$t(125) = 0.67, n.s.$
Medicine	2.36	2.36	$t(117) = 0.01, n.s.$

Note. The numbers in the table are RP Indices; they can range from 1 (most risk-averse) to 4 (most risk-seeking).

^{*} Of the American sample, none in the investment context, one in the essay context and eight in the medicine context exhibited contradictory choices and were assigned missing RP indices. Of the Chinese sample, one in the investment context, three in the essay context and four in the medicine context exhibited contradictory choices and were assigned missing RP indices.

Exhibit 4. Results of subsequent questions in Study 2

Questions	Nationality of subjects		Difference
	Americans	Chinese	
#Live	2.65	3.51	$t(128) = 1.83, p < 0.1$
#Contact	5.08	7.34	$t(119) = 2.48, p < 0.05$
#Help-\$	3.41	6.47	$t(125) = 5.34, p < 0.001$
#Help-Ψ	3.26	3.38	$t(126) = 0.31, n.s.$

than the Americans. More importantly, the Chinese reported significantly more people they could approach if they needed financial support than the Americans. However, there are no significant differences between the two groups of respondents in terms of emotional and psychological support. These results are highly consistent with our finding that the Chinese are more risk-seeking than the Americans only in the investment context, and not in the essay or the medicine contexts. In the latter contexts, one can only receive emotional and psychological consolation from others.

The data we collected also allowed us to run a mediation analysis to see whether the financial help factor (#Help-\$) was indeed responsible for the national difference in risk preference. If the cushion hypothesis holds, then the originally significant effect of Nationality on RP Index should be reduced (if not eliminated) once #Help-\$ was included. To test this claim, we first ran a simple regression analysis to assess the effect of Nationality alone on risk preference. Then we added #Help-\$ to the model. The result confirmed our prediction: When only Nationality was included, it was significant ($t(1) = 2.97, p < 0.01$). When #Help-\$ was added, Nationality became insignificant ($t(1) = 1.76, n.s.$), while #Help-\$ was significant ($t(1) = 2.20, p < 0.05$).

GENERAL DISCUSSION

The main purpose of this research was to examine whether systematic cross-national differences in risk preference exist. Our two studies established a rather robust effect in the context of financial decisions: the Chinese are more risk-seeking than the Americans. To account for this effect, we proposed the cushion hypothesis.

A common problem of cross-cultural research is the difficulty to determine unequivocally the cause of an observed cross-national difference, because many factors are naturally confounded. In order to test a given hypothesis, one needs to run many experiments from different angles, in the hope that these experiments will provide converging evidence for the hypothesis. Weber and Hsee (1998a) likened this process to the creation of a mosaic. Each constituent tile of the mosaic may not be recognizable in and by itself, but in combination and with a bit of distance the tiles create a clear image.

Study 2 was part of this mosaic-building effort. Its various tests lent converging support to the cushion hypothesis. Recently, we have conducted several other studies that have contributed 'tiles' to the emerging mosaic. As mentioned earlier, a key prediction of the cushion hypothesis is that differences in observed risk preference are a result of differences in risk perception (see Weber and Milliman, 1997, for a more detailed discussion of the relationship between risk perception and risk preference). This proposition was supported in a recent experiment reported in Weber and Hsee (1998b). American and Chinese students were asked to rate the riskiness of a series of uncertain financial prospects. In general, the American respondents perceived the same uncertain outcomes as significantly riskier than the Chinese. These differences in risk perception (both between and within the two samples) were

systematically related to differences in risk preference. Individuals who perceived the risk of an option to be smaller were willing to pay a higher price for this option, all other things being equal.

Another piece of evidence for the cushion hypothesis comes from a recent study by Weber, Hsee and Sokolowska (1998) that compared American and Chinese proverbs. The cushion hypothesis implies that the observed cross-national difference in risk preference is rooted in long-standing cultural value differences between the USA and China. If this is the case, then the cross-national differences in risk preference should have some corresponding manifestation in traditional cultural products such as fables, classical literature, and proverbs. To test this hypothesis, Weber *et al.* compared American and Chinese proverbs related to risks and risk-taking. The results support their cultural interpretation of national differences in risk preference. Specifically, Chinese proverbs were found to provide more risk-seeking advice than American proverbs. Moreover, for the same set of proverbs, the Chinese judges perceived them to advocate greater risk-seeking than the American judges, but this difference occurred only in the financial domain and not in the social domain. These results are highly consistent with the findings of our Study 2.

We must mention here that the cushion hypothesis does not imply that members in a collectivist society are always more generous to others than those in an individualistic society. Instead, people in a collectivist culture tend to treat ingroup members (those within their social network) and outgroup members (those outside their social network) more differently than people in an individualistic culture. Compared with those in an individualistic country, citizens in a collectivist country are probably more willing to provide financial help to their family members and relatives, but may not be as willing to render financial support to needy strangers.

The current research shows that risk preference is among the variables that seem to have some systematic cross-national variation. In addition, this variation can be different from lay expectations. We hope that this work will inspire further research to better determine the antecedents and consequences of cross-national differences in risk preference. At the same time, we also hope that our findings will help decision makers and negotiators in practical applications. As described in Bontempo, Bottom and Weber (1997), accurate prediction of one's opponent's risk preference is a key component that allows negotiators to achieve integrative bargaining solutions. To get maximum benefit from business and cultural exchanges between nations, participants in such exchanges need to realize that their foreign counterparts may not have the same risk preferences as themselves, and that predictions of a foreigner's risk preferences based on stereotypes can be seriously wrong.

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REFERENCES

- Bontempo, R. N., Bottom, W. P. and Weber, E. U. 'Cross-cultural differences in risk perception: A model-based approach', *Risk Analysis*, **17** (1997), 479–488.
- Bostic, R., Herrnstein, R. J. and Luce, R. D. 'The effect on the preference-reversal effect of using choice indifferences', *Journal of Economic Behavior and Organization*, **13** (1990), 193–212.
- Brachinger, H. W. and Weber, M. 'Risk as a primitive: A survey of measures of perceived risk', *OR Spektrum*, (1998), in press.
- Brislin, R. W. 'Back-translation for cross-national research', *Journal of Cross-national Research*, **1** (1970), 185–216.

- Bromiley, P. and Curley, S. P. 'Individual differences in risk taking', in Yates, J. F. (ed.), *Risk-taking Behavior* (pp. 87–132), Chichester: John Wiley, 1992.
- Brown, R. *Social Psychology*, New York: Free Press, 1965.
- Clark, R. D. III, Crockett, W. H. and Archer, R. I. 'Risk-as-value hypothesis: The relationship between perception of self, others, and the risky shift', *Journal of Personality and Social Psychology*, **20** (1971), 435–439.
- Douglas, U. and Wildavsky, A. *Risk and Culture*, Berkeley, CA: University of California Press, 1982.
- Fischhoff, B. 'Risk-taking: A developmental perspective', in Yates, J. F. (ed.), *Risk Taking Behavior* (pp. 133–162), Chichester: John Wiley, 1992.
- Hofstede, G. H. *Culture's Consequences*, Beverly Hills, CA: Sage Publications, 1980.
- Hong, L. K. 'Risky shift and cautious shift: Some direct evidence of the culture-value theory', *Social Psychology*, **41** (1978), 342–346.
- Hsee, C. K. and Weber, E. U. 'A fundamental prediction error: Self-other discrepancies in risk preference', *Journal of Experimental Psychology: General*, **126** (1997), 46–53.
- Lamm, H., Trommsdorff, G. and Rost-Schaude, E. 'Self image, perception of peers' risk acceptance and risky shift', *European Journal of Social Psychology*, **2** (1972), 255–272.
- Lee, J.-W., Yates, J. F., Shinotsuka, H., Singh, R., Onglatco, M. L. U., Yen, N. S., Gupta, M. and Bhatnagar, D. 'Cross-national differences in overconfidence', *Asian Journal of Psychology*, **1** (1995), 63–69.
- Luce, R. D. and Weber, E. U. 'An axiomatic theory of conjoint, expected risk', *Journal of Mathematical Psychology*, **30** (1986), 188–205.
- Markus, H. R. and Kitayama, S. 'Culture and self: Implications for cognition, emotion and motivation', *Psychological Review*, **98** (1991), 224–253.
- Morris, M. and Peng, K. 'Culture and cause: American and Chinese attributions for social and physical events', *Journal of Personality and Social Psychology*, **67** (1994), 949–971.
- Phillips, L. D. and Wright, G. N. 'Cultural differences in viewing uncertainty and assessing probabilities', in Jungermann, H. and de Zeeuw, G. (eds), *Decision-Making and Changes in Human Affairs* (pp. 507–515), Dordrecht: Reidel, 1977.
- Sarin, R. K. and Weber, M. 'Risk-value models', *European Journal of Operations Research*, **70** (1993), 135–149.
- Sethi, S. and Lepper, M. R. 'Rethinking the value of choice: A cultural perspective on intrinsic motivation', *Journal of Personality and Social Psychology*, in press.
- Shapira, Z. *Risk taking: A Managerial Perspective*, New York: Russell Sage Foundation, 1995.
- Svenson, O. 'Risks of road transportation in a psychological perspective', *Accident Analysis and Prevention*, **10** (1978), 267–280.
- Triandis, H. C. 'The contingency model in cross-national perspectives', in Chemers, M. M. and Ayman, R. (eds), *Leadership Theory and Research Perspectives and Directions* (pp. 167–188), San Diego: Academic Press, 1993.
- Wallach, M. A. and Wing, C. F. Jr. 'Is risk a value?', *Journal of Personality and Social Psychology*, **13** (1968), 207–214.
- Warner, J. 'The world is not always your oyster: Why cross-border mergers so often come to grief', *Business Week*, 30 October (1995), 132–134.
- Weber, E. U. and Hsee, C. K. 'Cultural differences in decisions under risk? The insights and tribulations of comparative studies', paper presented at New Idea in Decision Research conference, Northwestern University, Evanston, IL, 12 May 1997, and under review, *Psychonomic Bulletin & Review* (1998a).
- Weber, E. U. and Hsee, C. K. 'Cross-cultural differences in risk perception but cross-cultural similarities in attitudes towards risk', *Management Science*, **44** (1998b), 1205–1217.
- Weber, E. U., Hsee, C. K. and Sokolowska, J. 'What folklore tells about risk and risk taking? Cross-cultural comparisons of American, German and Chinese proverbs', *Organizational Behavior and Human Decision Processes*, (1998), in press.
- Weber, E. U. and Milliman, R. A. 'Perceived risk attitudes: Relating risk perception to risky choice', *Management Science*, **43** (1997), 122–143.
- Weinstein, N. D. 'Seeking reassuring or threatening information about environmental cancer', *Journal of Behavioral Medicine*, **16** (1979), 220–224.
- Wright, G. N. and Phillips, L. D. 'Personality and probabilistic thinking: An exploratory study', *British Journal of Psychology*, **70** (1979), 295–303.
- Wright, G. N. and Phillips, L. D. 'Cultural variation in probabilistic thinking: Alternative ways of dealing with uncertainty', *International Journal of Psychology*, **15** (1980), 239–257.
- Wright, G. N., Phillips, L. D. and Wisudha, A. 'Cultural comparison on decision making under uncertainty', in Deregowski, J. B., Dziurawiec, S. and Annis, R. C. (eds), *Expiscations in Cross Cultural Psychology* (pp. 387–402), Lisse, The Netherlands: Swetz & Zeitlinger BV, 1983.

- Yates, J. F. and Lee, J. W. 'Chinese decision making', in Bond, M. H. (ed.), *Handbook of Chinese Psychology*, Hong Kong: Oxford University Press, 1995.
- Yates, J. F. and Stone, E. R. 'The risk construct', in Yates, J. F. (ed.), *Risk-taking Behavior* (pp. 1–25), Chichester: John Wiley, 1992.
- Yates, J. F., Lee, J.-W. and Shinotsuka, H. 'Belief about overconfidence, including its cross-national variations', *Organizational Behavior and Human Decision Processes*, **65** (1996), 138–147.
- Yates, J. F., Lee, J.-W. and Bush, J. G. 'General knowledge overconfidence: cross-national variations, response style, and "reality"', *Organizational Behavior and Human Decision Processes*, **70** (1997), 87–94.
- Yates, J. F., Zhu, Y., Ronis, D. L., Wang, D. F., Shinotsuka, H. and Toda, W. 'Probability judgment accuracy: China, Japan, and the United States', *Organizational Behavior and Human Decision Processes*, **43** (1989), 147–171.

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