Risk Analysis, Vol. 23, No. 4, 2003

What Risks Are Chinese People Concerned About?

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The aim of this study is to investigate public perceived risk on various issues in present-day China. Two surveys were conducted in urban China in 1996 and 1998. In the first survey, risk perceptions of different occupational groups are compared. Gender differences within each occupational group are also analyzed. In the second survey, participants with diverse employment status were recruited. The overall risk rankings of both surveys indicate great concern with risks that threaten national stability and economic development, and less concern with high-technology risk such as threat from a nuclear power plant. It is also found that employees from high-profit firms are more concerned about macroscopic catastrophic risks, whereas laid-off workers and employees from money-losing enterprises are more concerned about daily life or self-concerned risks. The importance of actual exposure to risk, mass media coverage, culture, and psychometric dimensions are discussed.

KEY WORDS: Cultural theory; gender difference; mass media; occupation; public risk perception

1. INTRODUCTION

Understanding how the public thinks about risks is important for policy makers to set the agenda for risk-reduction actions. About two decades ago, Western scholars started to study the public's attitudes toward different risks. These studies embraced a wide range of issues, including health, safety, environmental, societal, and technology risks. The adopted methodology mostly followed the psychometric paradigm suggested by Slovic.(1) These data provided a large amount of information about public risk perception, including comparisons among people from different nations and regions. Compared to North America and Europe, however, large-scale public-risk-perception studies are still relatively scarce in Mainland China. In one study conducted by Keown in the 1980s, Hong Kong student participants were asked to rate the risk level and relevant risk characteristics of 30 hazards.(2) In the 1990s, Zhang conducted a study on environmental hazards in Mainland China.(3) In a more recent study by Neto and Mullet, Chinese students living in Macao offered their judgments on 87 hazardous activities, substances, and technologies.(4) These studies either recruited student participants,(2,4) or focused on specific domains such as environmental problems.(3) The current study aimed at exploring how contemporary Chinese people perceive risky issues across broader domains by using more representative samples. Many participants were employees living in urban China. It is justified to regard public risk perception as an essential social index because it could directly reflect the developments and changes in the whole society. The authors also wish to offer a basis for further comparative studies on risk perception in China and other countries.

The first survey in this article compares different occupational groups. The second survey compares employees who worked for high-profit firms,

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0272-4332/03/1200-0685$22.00/1

low-profit firms, as well as those who were laid off. Comparing risk perception across different subgroups can shed some light on understanding what factors may determine one's perceived risk level, which is a crucial question but without a conclusive answer yet. Researchers seek to explain what risks people worry about and how much they worry from different perspectives. The important factors include the actual exposure to risk, mass media coverage, culture, and psychometric risk characteristics.

1.1. Actual Exposure to Risk

The most straightforward explanation about how people perceive risks is "of course people are worried they have lots to worry about."[5] Although being challenged frequently, the actual extent of danger sometimes is a very potent predictor for perceived risk.[6]

Athough a precise estimate is hard to get, casual observation indicates that disease is one of the leading causes of fatalities and injuries for the average Chinese. In addition, experts assess road traffic injury as "the leading cause for population up to the age of 45 years and the leading cause of working-life years lost in China. An average of 229 people is killed as the result of road traffic crashes every day."[7] If perceived risk is determined by the actual exposure to hazard, we expect these two hazards to be among the top risk items that concern Chinese participants in general.

Sjöberg *et al.* contrasted two models regarding the impacts of different levels of threat.[8] The first model is Maslow's model on a hierarchy of needs—people only worry about more remote risks after the most urgent needs have been taken care of. Their findings did not support this model. For example, Brazilian slum dwellers, who lived an extremely poor life, were also worried about technology risks. The second model is a U-shaped pattern that was observed in a study on nuclear power plant employees.[9] It appears that a strong threat would make unrelated risks seem to be smaller, whereas a mild-to-moderate threat tends to increase the perceived level of all risks.

1.2. Mass Media Coverage

Perceived risk can also be influenced by mass media content because it makes some information more retrievable than others, which is commonly referred to as "availability heuristics."[10] People tend to overestimate some risks that are more frequently reported or more dramatic, and ignore other risks that are less covered by the mass media. In China today, the importance of political stability and economic development has been emphasized through authentic mass media coverage, whereas the risks associated with high technologies such as nuclear power and genetic engineering are less actively discussed in public. The risk of nuclear war is not emphasized by the mass media either.

1.3. Culture

Cultural theory suggests that people choose what to fear to maintain their way of life.[5,11] Although a systematic relationship has been identified from the empirical studies,[5] it is relatively weak given the low variance explained by cultural factors.[6] According to this perspective, *cultural biases*, which correspond to deeply held values that justify different patterns of social relations, can predict a broad spectrum of which types of hazards people will be concerned about.[5] Typical patterns of social relations include hierarchy, egalitarianism, or individualism. Adherents of hierarchy tend to worry more about social deviance, which may disrupt the established forms of social relations, but worry less about technology risks because of their trust in experts and authorities. Individualists also worry less about technology risks but for a different reason: they view nature as an unlimited resource for human beings to explore. They worry about social deviance only if it would disrupt market relations or freedom. Cultural theory predicts that egalitarians worry more about technology risks because they believe an inegalitarian society is more likely to do harm to the environment as well as to poor people, but they perceive less risk of war because they believe it is exaggerated either by a coalition of hierarchy or by individualists who try to justify an inegalitarian system.[5] In a country like China that has relatively higher power distance (such that there is much inequality present in society and more power translates into more privilege) and strong hierarchical cultural roots due to the Confucian heritage, we would expect people to worry more about war and social deviance that threaten the established forms of social relations, and worry less about technology risks. Other cultural dimensions can also be important. For example, Weber and Hsee found that Chinese respondents perceive monetary risks as being lower than their U.S. counterparts, but the attitudes toward perceived risks are not significantly different.[12] They proposed a "cushion hypothesis": it is relatively easier to seek monetary support from social connections in the collectivist culture like China, which provides a "cushion" to

lessen actual monetary risks. They further found that Chinese proverbs suggested more risk seeking for financial risks but not for social risks.[13] In the current study, we expect participants come from essentially the same cultural roots, but subcultures may exist to account for group difference.

1.4. Psychometric Paradigm

In addition to technical measurement such as annual fatalities or injuries, numerous studies verified that the public perceives risk as a qualitative and complex concept, which incorporates considerations of uncertainty, dread, catastrophic potential, controllability, equity, impacts on future generations, and so on.[1] Under the psychometric paradigm, these attributes can be reduced to two or three important factors, such as "dread" and "unknown" factors. It is found that the most dreadful and most unknown hazards (e.g., nuclear power) are more likely to be perceived as most risky, even though expert assessments of such risks are considerably lower.[8] Risk items such as traffic accidents and disease tend to be perceived as less risky, because they are less dreadful and more familiar. Although widely accepted, Sjöberg found that the explanatory value of the psychometric model is limited to about 20% of the variance.[6]

2. BACKGROUND

2.1. Risk Index

Fischhoff observed that "People disagree more about what risk is than about how large it is."Even among experts, it is observed that they refer to very different things when they use the word risk.[14] Although most of the previous studies emphasized risk in certain particular contexts, such as natural hazards and environmental problems, Yates and Stone found substantial consistency across contexts, and argued that this consistency rests on what can be legitimately called a risk construct, which is based on the essential elements of risk, including *potential losses*, *the significance of those losses*, and *the uncertainty associated with loss*.[15] They claimed that the considerable variations in how risk is characterized across contexts do not challenge the basic risk construct.

The studies presented in this article[4] are two further surveys based on a pilot study in 1994. The purpose of the pilot study was to identify what risks worry Chinese people most, and to develop a valid index of measured perceived risk.[16,17] Forty-six risk items were generated through interviews and questionnaires, which cover six issues:

1. Social problems, e.g., national turmoil and economic crisis;
2. Personal life, e.g., low income and disease;
3. Natural disasters, e.g., earthquakes and flood;
4. Risks caused by technological and industrial developments, e.g., nuclear power plant;
5. Individual hobbies, e.g., mountaineering and skiing;
6. Four special risks involved in an individual's economic activities, which were relatively new to Chinese people at the time of the survey, namely, resigning jobs, "xia-hai" (going into business), switching jobs, and purchasing stocks.

At the beginning of the pilot survey, the participants were asked to give direct ratings of the perceived risk on each hazard, which is a common procedure adopted by many of the previous studies. However, the researchers soon discovered that it was a difficult and unnatural task for most Chinese participants, which implicitly indicated that individuals from different nations might have different views and experiences of risks. Three indices that are more comprehensible for most Chinese participants were generalized to measure perceived risk degrees:

1. The importance of the risk items to individuals and society;
2. The magnitude of possible loss caused by the risk items;
3. The possibility of the actual realization of the consequences caused by the risk items.

The three indices are conceptually independent and parallel with the three critical elements of risk (*significance of loss, loss*, and *uncertainty associated with loss*) suggested by Yates and Stone.[13] For example, overpopulation may be regarded as an important issue for the Chinese, but the magnitude of the loss may only be moderate, and the probability of such loss could be relatively high. Three similar indices ("impact," "outcome," and "frequency") were also developed by Barnett and Breakwell [18] to measure personal experiences with hazardous activities.

[4] The current study was supported Grant 70171034 from the National Natural Sciences Foundation of China.

2.2. The "Xia-Gang" Phenomenon

During the past two decades, China has witnessed dramatic changes in its social, economic, and political systems. The dynamics and diversities in present-day China offer us excellent research opportunities to observe how people with different social experiences perceive potential risks. During the transition from a central planned economy to a market economy, one of the painful processes is that in order to improve efficiencies, many state-owned industries have had to lay off a large number of surplus employees. This process resulted in the large-scale so-called xia-gang phenomenon, which refers to being laid off by state-owned industries. These laid-off employees were used to having life-long jobs, and were never concerned about unemployment before they endured this painful shock. Conceivably, such an abrupt change could exert a lot of financial and psychological pressure on one's life. This special and sensitive group deserves more attention. The aim of the second survey was to gain some comprehensive understanding of the psychological state of laid-off workers through the analysis of their risk perceptions. The results could reflect mutual influences between the overall social development and individual psychological status.

3. STUDY ONE: GENERAL RISK RATING AND THE EFFECTS OF OCCUPATION AND GENDER ON RISK PERCEPTION

3.1. Method

3.1.1. Participants

A total of 847 respondents were recruited from Beijing and other cities in China in 1996. There were 430 men and 376 women participants, with gender information not provided for 41 participants. The average age was 32.95 years, with 320 participants between 18 and 24 years of age, 254 participants between 25 and 39 years, and 227 participants aged 40–55 years. Most of them were well educated: 598 had a college degree, and 121 had completed secondary school. The whole sample formed six subgroups based on their occupational backgrounds: 122 officials, 112 managers, 90 staff and workers, 120 professors, 299 students, and 104 others.

3.1.2. Procedures

The highest 28 risk items in the pilot survey were selected for the current study. These items are related to social issues, everyday life activities, natural disasters, and science and technology developments. At the beginning of the questionnaire, the risk items were explained to the participants. Based on the risk indices discussed in Section 2.1, the participants were asked to assess each risk item from three perspectives on a 1–10 point scale: (1) the importance of the risk items to individuals and society; (2) the magnitude of possible loss caused by the risk items; and (3) the possibility of the actual realization of the consequences caused by the risk item. The perceived degree of risk is the composite of the three indices.[5]

3.2. Results

3.2.1. General Risk Rating

Table I shows that six risk items were rated greater than 7 on the 1–10 point scale. The lowest rating item is railway transportation (mean = 4.93, $SD = 2.50$), and the highest rating item is nuclear war (mean = 7.82, $SD = 3.08$). The t-test shows that a significant difference came between the sixth and seventh risk items: low security (mean = 6.96, $SD = 2.02$) and social moral degradation (mean = 7.14, $SD = 2.05$). Therefore, we refer to the highest six items as "high-risk items" in the following analysis.

3.2.2. Differences Between Occupational Groups

Table I also demonstrates the perceived risk level by each occupational subgroup. The ranks of 28 risk items are correlated among all five occupational subgroups ($p < 0.01$) (Table II). Furthermore, the ranks of the six high-risk items are also correlated among the five subgroups.

However, MNOVA shows significant differences in average risk rating scores across five groups ($F(4,112) = 3.136$, $p < 0.001$). Only eight items do not show significant differences, among which three items are high-risk items. They are national turmoil, economic crisis, and overpopulation, which are among the topics that frequently appeared in the Chinese mass media.

The manager subgroup and staff/worker subgroup assigned higher ratings to certain risk items than the other subgroups. These items are low income ($F(4,112) = 24.74$, $p < 0.001$), house shortage ($F(4,112) = 19.66$, $p < 0.001$), and disease ($F(4,112) = 12.17$, $p < 0.001$). Besides, compared to the other four subgroups, the staff/worker subgroup showed

[5] In a previous study conducted by one of the authors, these indices were found to be significantly correlated, and came out as a factor that could explain 34.2% variance.[19]

Table I. Rank and Average Risk Rating (1—Least Risky, 10—Most Risky) by Whole Sample and Five Occupational Subgroups

Items	Mean (*SD*)						Rank					
	Whole Sample	Managers	Staff/ Workers	Officials	Students	Professors	Whole Sample	Managers	Staff/ Workers	Officials	Students	Professors
Nuclear war	7.90 (3.07)	7.73 (3.27)	6.90 (3.66)	8.29 (2.73)	7.99 (2.98)	8.20 (2.78)	1	2	13	1	2	1
National turmoil	7.85 (2.40)	7.94 (2.12)	7.40 (2.74)	8.06 (2.40)	7.99 (2.28)	7.57 (2.64)	2	1	8	2	1	3
War	7.66 (2.69)	7.73 (2.84)	6.91 (3.25)	7.69 (2.63)	7.74 (2.49)	7.95 (2.60)	3	3	12	3	3	2
Economic crisis	7.37 (2.06)	7.26 (2.01)	7.44 (2.35)	7.15 (2.22)	7.59 (1.87)	7.14 (2.14)	4	6	7	5	4	4
Overpopulation	7.24 (2.27)	7.05 (2.57)	7.45 (2.64)	7.28 (2.28)	7.40 (1.99)	6.83 (2.31)	5	10	5	4	5	7
Social moral degradation	7.14 (2.02)	7.46 (1.86)	7.91 (1.98)	6.83 (2.20)	7.05 (1.91)	6.80 (2.08)	6	4	2	6	7	8
Low security	6.98 (1.97)	7.45 (1.92)	7.27 (2.20)	6.42 (2.02)	6.93 (1.90)	7.03 (1.85)	7	5	9	10	9	5
Food shortage	6.93 (2.46)	6.81 (2.61)	6.22 (2.93)	6.77 (2.42)	7.26 (2.22)	6.92 (2.50)	8	14	21	8	6	6
Environmental pollution	6.93 (2.08)	7.22 (2.07)	7.60 (2.17)	6.42 (2.02)	7.05 (1.93)	6.55 (2.15)	9	7	4	10	8	9
Energy crisis	6.75 (2.14)	6.72 (2.28)	7.06 (2.33)	6.52 (2.16)	6.86 (2.03)	6.48 (2.07)	10	15	11	9	10	10
Crime	6.67 (2.13)	7.15 (2.13)	6.69 (2.43)	6.18 (2.36)	6.78 (1.90)	6.42 (2.08)	11	8	16	13	11	11
Inflation	6.41 (2.12)	6.88 (2.11)	7.68 (2.21)	6.36 (2.00)	6.05 (1.96)	5.97 (2.11)	12	13	3	11	12	14
Earthquake	6.34 (2.68)	6.96 (2.75)	6.31 (2.90)	6.79 (2.61)	5.90 (2.49)	6.40 (2.80)	13	12	19	7	17	12
Poor-quality products	6.21 (2.30)	6.28 (2.46)	7.45 (2.53)	5.98 (2.25)	5.97 (2.12)	6.04 (2.22)	14	20	5	15	13	13
Low income	6.05 (2.49)	6.98 (2.36)	7.93 (2.43)	6.02 (2.28)	5.42 (2.31)	5.33 (2.31)	15	11	1	14	24	23
Political disturbances	6.02 (2.32)	6.49 (2.40)	6.36 (2.65)	5.88 (2.41)	5.92 (2.11)	5.76 (2.33)	16	17	18	16	15	18
Poor medical service	5.98 (2.18)	6.17 (2.22)	6.78 (2.36)	5.68 (2.14)	5.97 (2.11)	5.53 (2.05)	17	21	15	20	14	20
Diseases	5.95 (2.57)	7.05 (2.39)	6.82 (2.47)	5.73 (2.34)	5.48 (2.56)	5.65 (2.65)	18	9	14	19	23	19
Floods	5.95 (2.24)	6.08 (2.46)	6.19 (2.49)	5.75 (2.18)	5.92 (2.12)	5.79 (2.18)	19	19	22	17	16	15
Electric power	5.87 (2.38)	6.35 (2.46)	6.52 (2.55)	5.60 (2.33)	5.63 (2.33)	5.79 (2.18)	20	23	17	22	20	17
Fire accidents	5.79 (2.35)	6.08 (2.45)	6.00 (2.74)	5.67 (2.37)	5.66 (2.20)	5.81 (2.30)	21	24	23	21	18	16
Traffic accidents	5.70 (2.54)	6.41 (2.57)	6.31 (2.66)	5.15 (2.63)	5.62 (2.37)	5.33 (2.55)	22	18	20	25	21	22
Drug taking	5.67 (2.52)	6.10 (2.71)	5.87 (2.86)	5.39 (2.61)	5.65 (2.26)	5.45 (2.54)	23	22	25	23	19	21
House shortage	5.58 (2.44)	6.54 (2.28)	7.17 (5.18)	5.18 (2.46)	5.25 (2.21)	4.75 (2.13)	24	16	10	24	25	25
Political and economic reforms	5.48 (2.32)	6.01 (2.25)	5.92 (2.60)	5.74 (2.18)	5.16 (2.25)	5.19 (2.33)	25	25	24	18	26	24
Broken family	5.36 (2.53)	5.85 (2.46)	5.53 (2.96)	5.10 (2.35)	5.48 (2.48)	4.70 (2.42)	26	26	27	26	22	26
Nuclear power	5.03 (2.61)	5.68 (2.87)	5.43 (2.81)	4.97 (2.55)	4.84 (2.50)	4.70 (2.45)	27	27	28	27	27	27
Railway transportation	4.87 (2.48)	5.35 (2.50)	5.84 (2.85)	4.78 (2.38)	4.56 (2.37)	4.61 (2.33)	28	28	26	28	28	28

Table II. Correlations of Risk Ranking among Five Occupational Subgroups

	Managers	Staff/Workers	Officials	Students
Staff/Workers	0.719			
Officials	0.843	0.624		
Students	0.768	0.541	0.822	
Professors	0.818	0.530	0.922	0.957

particular concern for two items: inflation ($F(4,112) = 12.19$, $p < 0.001$), and poor-quality products ($F(4,112) = 7.67$, $p < 0.001$). These differences may reflect the fact that staff/workers are actually paid less and enjoy less social welfare benefits than managers and other groups.

3.2.3. Gender Differences Within Each Occupational Subgroup

Previous studies have documented that men tend to judge risks as smaller and less problematic than women.[3,20,21] In this study, different patterns of gender differences emerged in each occupational group. To facilitate the comparison, for each occupational group, risk items were grouped by *R*-type cluster analysis into several categories. The gender difference for each risk category was then compared within each occupational group.

1. *Official subgroup:* Risk items were grouped into seven categories by cluster analysis. Only one category of items presents significant gender differences ($F = 7.058$, $p < 0.01$). This category includes poor medical service, low income, disease, inflation, poor-quality products, energy crisis, and political and economic reform.
2. *Manager subgroup:* All six clustered risk categories show significant gender differences ($F1 = 7.27$, $p < 0.01$; $F2 = 3.97$, $p < 0.05$; $F3 = 9.12$, $p = 0.01$; $F4 = 10.50$, $p < 0.01$; $F5 = 20.41$, $p < 0.001$; $F6 = 15.51$, $p < 0.001$). The degrees of risk are unanimously higher for women than those of men for each category.
3. *Staff/worker subgroup:* Gender difference only displays in one of the six risk categories ($F = 7.46$, $p < 0.01$). This category includes drug taking, earthquake, flood, fire, disease, broken family, and traffic accident, most of which are related to natural disaster and daily life.
4. *Professor subgroup:* MNOVA shows that two of the seven risk categories display gender differences ($F1 = 3.85$, $p = 0.05$; $F2 = 4.72$, $p < 0.05$). One category is related to natural disasters, e.g., earthquake and flood; the other category seems to be science- and technology-related risks, such as electric power, nuclear power, and railway transportation. Different from the above subgroups, no gender difference appears in daily-life-related risks.
5. *Student subgroup:* Five of six categories show gender differences ($F1 = 12.02$, $p < 0.01$; $F2 = 8.92$, $p < 0.01$; $F3 = 2.63$, $p = 0.1$; $F4 = 13.82$, $p < 0.001$; $F5 = 4.51$, $p < 0.05$). Only one category does not have gender difference, which includes poor medical service, low income, disease, broken family, housing shortage, and political and economical reform.

4. SURVEY TWO: THE EFFECTS OF EMPLOYMENT STATUS ON RISK PERCEPTION

4.1. Method

4.1.1. Participants

The second survey was conducted from the city of Qingdao in Shandong province in northeastern China in 1998. There were 374 participants, including 132 men and 211 women (gender information not provided for 31 participants), with 105 participants aged below 25 years, 164 participants at 25–39 years, and 75 participants above 40 years of age. Among them, 122 had a college degree, and 88 had completed secondary school. These participants formed four subgroups based on their employment status: 95 laid-off workers, 91 employees from money-losing companies, 114 employees from profitable domestic companies, and 73 employees from foreign capital companies.

4.1.2. Procedures

The same as in the first survey.

4.2. Results

4.2.1. Risk Rating Between Subgroups with Different Employment Status

Table III indicates that the laid-off workers rated the eight risk items as significantly higher, but rated four risk items as being significantly lower. It seems that the laid-off workers are more concerned about the risks involved in daily life, e.g., low income,

Table III. Rank and Average Risk Rating (1—Least Risky, 10—Most Risky) by Laid-Off Sample and On-Job Sample

Items	Mean (*SD*)			Rank		
	Laid-Off Sample	On-Job Sample	Difference	Laid-Off Sample	On-Job Sample	Difference
Low income	9.19 (1.58)	7.56 (2.24)	1.63*	1	14	−13
Poor-quality products	8.77 (1.78)	7.53 (2.42)	1.24*	2	15	−13
Poor medical service	8.77 (1.67)	7.59 (2.41)	1.18*	3	12	−9
Social moral degradation	8.67 (2.06)	7.68 (2.24)	0.99*	4	7	−3
Diseases	8.63 (2.37)	7.41 (2.63)	1.22*	5	18	−13
Economic crisis	8.57 (2.35)	7.79 (2.29)	0.78*	6	4	2
Low security	8.55 (1.95)	7.34 (2.34)	1.21*	7	19	−12
Inflation	8.41 (2.48)	7.30 (2.25)	1.11*	8	20	−12
Environmental pollution	8.23 (2.23)	8.20 (1.84)	0.03	9	1	8
Drug taking	7.56 (2.95)	7.46 (2.74)	0.10	10	17	−7
Crime	7.47 (2.83)	7.64 (2.39)	0.10	11	9	2
Food shortage	7.41 (3.12)	7.64 (2.44)	−0.23	12	8	4
Floods	7.36 (3.01)	7.59 (2.16)	−0.23	13	11	2
Fire accidents	7.35 (2.75)	7.48 (2.22)	−0.13	14	16	−2
House shortage	7.32 (2.85)	6.83 (2.46)	0.49	15	23	−8
Electric power	7.24 (2.66)	7.23 (2.37)	0.01	16	22	−6
Traffic accidents	7.18 (2.87)	7.26 (2.42)	−0.08	17	21	−4
Earthquake	7.17 (3.11)	7.56 (2.32)	−0.39	18	13	5
Overpopulation	6.97 (3.25)	7.72 (2.21)	−0.75	19	5	14
Broken family	6.91 (3.07)	6.46 (2.59)	0.46	20	26	−6
National turmoil	6.87 (3.44)	7.71 (2.64)	−0.84	21	6	15
War	6.71 (3.53)	7.92 (2.49)	−1.21*	22	3	19
Political and economic reforms	6.66 (2.99)	6.40 (2.61)	0.25	23	27	−4
Energy crisis	6.51 (3.12)	7.60 (2.40)	−1.08*	24	10	14
Nuclear war	6.25 (3.73)	8.16 (2.74)	−1.91*	25	2	23
Political disturbances	6.21 (3.08)	6.58 (2.56)	−0.37	26	25	1
Nuclear power	5.60 (3.08)	6.81 (2.60)	−1.21*	27	24	3
Railway transportation	5.56 (2.86)	6.29 (2.59)	−0.73	28	28	0

*Significantly different at 0.05 level.

poor-quality products, and poor medical service, whereas the on-job worker sample is more concerned about the remote, large-scale issues like nuclear war, nuclear power, war, and energy crisis. It partly supports the pattern suggested by Sjöberg *et al.*[8,9] A strong threat can lead people to perceive a higher risk that is more relevant to their immediate life, and perceive irrelevant and remote issues as being less risky.

Because the sample of workers from money-losing enterprises and of laid-off workers were identified as having similar financial conditions, we pooled these two groups into a so-called low-profit/laid-off sample, and pooled the sample of profit-making enterprises and foreign capital enterprises into a "high-profit/foreign-firms" sample. As expected, the low-profit/laid-off sample is more worried about those items with immediate impact on daily life, e.g., low income, poor-quality products, and poor medical service, whereas the high-profit/foreign-firm sample is more concerned about those issues that have broad and long-term effects, e.g., civil turmoil and energy crisis (Table IV).

4.2.2. A Comparison of Two Surveys

We combined all the participants in both surveys for factor analysis (Table V). The 28 items can be classified into five categories. The items in the first category are related to personal life, the second category includes mainly natural hazards, and the remaining categories are mostly connected with the social development issues.

A further comparison reveals that the risk ratings in the second survey are higher than the ratings in the first survey on four categories ($F1 = 65.90$, $p < 0.01$; $F2 = 50.47$, $p \leq 0.01$; $F3 = 0.52$, $p = 0.47$; $F4 = 34.18$, $p < 0.01$; $F5 = 11.85$, $p < 0.01$). Only the third category does not have any significant difference

Table IV. Rank and Average Risk Rating (1—Least Risky, 10—Most Risky) by Low-Profit/Laid-Off Sample and High-Profit/Foreign-Firm Sample

	Mean (*SD*)			Rank		
Items	Low-Profit/ Laid-Off Sample	High-Profit/ Foreign-Firm Sample	Difference	Low-Profit/ Laid-Off Sample	High-Profit/ Foreign-Firm Sample	Difference
Economic crisis	8.14 (2.20)	7.61 (1.97)	0.53*	1	5	−4
Low income	7.97 (2.26)	6.73 (2.33)	1.24*	2	19	−17
Environmental pollution	7.81 (2.19)	7.63 (1.94)	0.18	3	4	−1
Low security	7.73 (2.24)	6.97 (2.16)	0.76*	4	15	−11
Social moral degradation	7.68 (2.37)	7.32 (2.19)	0.36	5	8	−3
Poor medical service	7.65 (2.36)	6.93 (2.42)	0.72*	6	16	−10
Inflation	7.65 (2.44)	6.73 (2.11)	0.92*	7	19	−13
Diseases	7.61 (2.26)	7.17 (2.40)	0.44	8	12	−4
Poor-quality products	7.48 (2.63)	6.80 (2.55)	0.68*	9	17	−8
Food shortage	7.36 (2.77)	7.20 (2.43)	0.16	10	117	−1
National turmoil	7.34 (2.91)	7.73 (2.47)	−0.39	11	3	8
Floods	7.13 (2.76)	7.01 (2.15)	0.12	12	14	−2
Crime	7.08 (2.65)	7.26 (2.21)	−0.18	13	9	4
War	7.06 (3.10)	7.78 (2.53)	−0.72*	14	2	12
Fire accidents	7.03 (2.68)	6.80 (2.34)	0.23	15	17	−2
Electric power	6.91 (2.46)	6.70 (2.44)	0.21	16	21	−5
Nuclear war	6.91 (3.53)	7.99 (2.88)	−1.08*	16	1	15
Traffic accidents	6.59 (2.81)	6.53 (2.62)	0.06	18	22	−4
Drug taking	6.57 (3.14)	7.07 (2.64)	−0.50	19	13	6
Energy crisis	6.56 (2.82)	7.37 (2.09)	−0.81*	20	7	13
House shortage	6.55 (2.93)	6.08 (2.48)	0.47	21	26	−5
Earthquake	6.55 (2.98)	7.26 (2.45)	−0.71*	22	9	12
Overpopulation	6.47 (3.04)	7.51 (2.07)	−1.04*	23	6	17
Broken family	6.29 (3.00)	6.06 (2.54)	0.23	24	27	−3
Political and economic reforms	6.18 (2.71)	6.14 (2.47)	0.04	25	25	0
Political disturbances	6.00 (2.73)	6.34 (2.41)	−0.34	26	23	3
Nuclear power	5.45 (2.94)	6.22 (2.57)	−0.77*	27	24	3
Railway transportation	5.35 (2.63)	5.60 (2.63)	−0.25	28	28	0

*Significantly different at 0.05 level.

in risk rating, which includes civil turmoil, war, food shortage, economic crisis, and nuclear war. The second survey was conducted right after the Asian financial crisis, which was two years after the first survey. The timing of this later survey and the inclusion of laid-off worker samples may jointly account for the relatively higher risk rating.

5. DISCUSSION

The actual exposure to risks may not predict the overall risk ranking very well. The most evident examples are traffic accidents and disease. As indicated in the introduction, traffic accidents, regarded by experts as a "leading cause" for mortality and injury, are ranked only as 22 by the whole sample, whereas the less likely event, nuclear war, is ranked as the first one. Similarly, disease, another risk item with high mortality and injury, is only ranked as 18 by the whole sample. The psychometric paradigm has commonly been used to explain why people tend to worry about risks such as nuclear war, even though judged by experts as being low risks, and ignore the risks that are a greater cause for concern among experts, such as traffic accidents and disease. It implies that much wider dimensions of risk exist in lay people's mind, including dread, knowledge, control, etc. Given the data that we collected, we are not able to examine the exact relationship between these risk characteristics and perceived risks.

Regarding the differences in risk ranking between subgroups, it may, to some extent, reflect the differences of actual exposure to risk. For example, in the first survey, the staff/worker group, which is paid relatively poorly and is less protected by the social welfare system, shows much greater concern about low-income risk and other daily-life or financial risks, but shows less concern on the macroscopic risks, such as wars. This pattern is further confirmed by

Table V. Rotated Component Matrix by Factor Analysis

	Component				
	1	2	3	4	5
Category 1	**0.791**	**0.112**	−0.019	0.189	0.167
Low income					
House shortage	**0.713**	0.177	−0.079	0.191	0.219
Diseases	**0.635**	−0.403	−0.066	0.177	0.003
Inflation	**0.634**	−0.004	−0.250	0.281	0.162
Poor medical service	**0.613**	0.269	−0.109	0.268	0.301
Broken family	**0.476**	0.438	0.217	0.165	0.075
Category 2	0.258	**0.788**	0.164	0.160	0.165
Fire accidents					
Floods	0.220	**0.754**	0.211	0.128	0.183
Traffic accidents	0.491	**0.522**	−0.003	0.277	0.126
Category 3	0.052	0.070	**0.839**	0.055	0.124
National turmoil					
War	−0.148	0.344	**0.756**	0.124	0.158
Food shortage	0.188	0.176	**0.706**	0.026	0.055
Economic crisis	0.306	−0.009	**0.693**	0.197	0.221
Nuclear war	−0.257	0.403	**0.672**	0.021	0.183
Category 4	0.315	0.049	0.092	**0.761**	0.139
Social moral degradation					
Crimes	0.237	0.320	0.184	**0.706**	0.094
Low security	0.368	0.208	0.164	**0.672**	0.026
Poor-quality products	0.432	0.049	−0.134	**0.559**	0.269
Drug taking	0.140	0.473	0.202	**0.495**	0.283
Environmental pollution	0.257	0.326	−0.076	**0.449**	0.333
Category 5	0.398	0.276	0.091	0.032	**0.702**
Train transportation					
Nuclear power	0.179	0.425	0.223	0.034	**0.628**
Energy crisis	0.035	0.111	0.202	0.361	**0.585**
Political and economic reforms	0.310	−0.052	0.205	0.208	**0.567**
Electric powers	0.354	0.379	0.156	0.051	**0.526**
Political disturbances	0.103	0.170	0.340	0.410	**0.468**
Overpopulation	−0.028	0.044	0.064	0.456	**0.460**
Variances explained (%)	14.68	28.04	40.23	52.11	62.71

Note: Extraction Method: Principal component analysis. Rotation method: Varimax with Kaiser normalization.

the second survey in that employees from low-profit firms and the laid-off workers are more anxious for daily-life and financial-related risks, but rate macroscopic risks as less risky. From a psychological point of view, two models are considered here. The first model, the U-shape pattern observed by Sjöberg and Drottz-Sjoberg in their study on nuclear plant personnel, seems to be supported:[9] on one hand, the people who are under some major threat (e.g., the laid-off group in the second survey, or the group that perceived pronounced threat in their study) tend to perceive the general risks (e.g., nuclear war) as smaller, due to contrasting effects; on the other hand, people who are under mild-to-moderate threat tend to perceive *all* risks as higher because they are more alert to the risk signal. It appears that the managers' group tends to rate most risk items as higher than the official, teacher, and student groups. It is probably because the managers are actually under more stress than the other three groups in their daily routines, so they are more cautious about all risks. The second model, Maslow's model about five stages of hierarchy of needs, may not be strictly followed here. For example, laid-off workers were equally worried about some social problems such as social moral degradation, drug taking, and environmental pollution.

The lowest correlation between professor and staff/workers groups, and the highest correlation between professor and student groups, may reflect a combination of both situational and subcultural differences. Although students virtually have no income, they somehow shared similar patterns with professors and did not worry too much about low-income-related risks. It might be partly because they are somewhat

better protected financially, and partly because they are one of the groups that most closely interact with professors. In future studies, it would be interesting to see whether different subgroups differ in the cognitive map of perceived risks. For example, whether a laid-off worker disagrees with an on-job worker on how unknown or how dreadful nuclear war is, or whether different subgroups actually place different importance weights on the different risk dimensions, such as whether laid-off workers care less about the risks that have an impact on future generations. The latter difference is more fundamental in one's value systems.

The greater concern about national turmoil and economic crisis in all groups, and the smaller concern about the nuclear power plant, may be explained by both mass media and cultural roots. The importance of political stability and economic growth has been strengthened by the authentic media in China, and the messages about high-technology risks such as a domestic nuclear power plants are not intensive, if any, and most of these are positive images. But mass media coverage cannot explain why nuclear war is of most concern to the Chinese, because this risk is not discussed frequently in the mass media. Culture can also play an important role. In a culture with high power distance and a hierarchical tradition like China, the cultural theory will predict stronger worry about war and social deviance, and less worry about high-technology risk. However, the mass media and cultural roots seem to be less plausible when explaining the subgroup differences because we have no strong reasons to expect laid-off status to change one's fundamental cultural bias and one's exposure to the mass media.

Compared with the pilot survey in 1994, the attention of the public has shifted from more individual and self-concerned problems to those macro problems related to the development of the whole society. One finds that inflation and food shortage were ranked in the top six items in the 1994 survey, but were ranked significantly lower in the current study. It is not clear whether the change is caused by actual change in risk levels, or by difference in mass media content, or any other reasons. The underlying reasons for the dynamics of public risk perception demands further investigation.

The main pattern of gender differences supports previous findings that women tend to perceive higher risks than men.[3,20,21] However, gender differences seem to interact with occupational affiliation. It is interesting to find that gender differences are more extensive within the managers' sample, whereas the sample of officials and professors exhibits fewer gender differences. It may reflect the subtle differences in social construction for the role played by each gender in a different occupation.

It appears that risk perception is socially constructed, but regarding the question of how risk perception is shaped, the picture is mixed. The plausibility of one theory does not exclude the plausibility of other theories. Sometimes, all the theories may lead to the same prediction. For example, the low degree of perceived risk of the nuclear power plant by the Chinese could be a combination of various factors: there have been no accidents in nuclear power plants in China until now (risk exposure); the trust in experts and the tolerance for new technology may be caused by the hierarchical culture bias (cultural theory); nuclear power plants might be perceived as more beneficial to society [22] and more controllable (psychometric theory); and finally, mass media coverage about nuclear power plants is low and mostly positive (mass media theory). The possible interactions of these factors make the picture more interesting and more complex.

The two surveys presented here are exploratory in nature. It helps to offer a guideline for more confirmatory tests of rivalry theories. Future studies should pay attention to the interactive relationship between various factors, including individuals' risk attitudes,[12] psychometric dimensions of perceived risks, actual risk exposure, and other personal/cultural characteristics, such as anxiety, worldviews, and socioeconomic status. [23]

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