Risk Perception of Chinese Urban Residents: An Institutional Theory Perspective*

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This article provides an institutional theory perspective to investigate how institutional factors influence the risk perception of Chinese urban residents. The three dimensions of institutional affiliation, social network, and trust mechanisms are theorized into three institutional (coercive, normative, and mimetic) forces. Based on analysis of the data collected from eight cities in the "Social Network and Work Experience" (JSNET2014) project, the proposed hypotheses are all supported except that the hypothesis regarding the New Year greeting networks and risk perception is only supported when interpersonal and institutional trust mechanisms are not controlled in the model. Contributions and implications for research and policymaking are discussed, and limitations and future research opportunities are also illustrated.

Keywords: *Risk perception, institutional affiliation, social network, trust, institutional factors*

Introduction

Understanding how people perceive risk is critical for understanding its impact on individual behaviors, such as the acceptance of specific technologies, policies, and norms (Siegrist and Arvai 2020). Amid the upheaval caused by Covid-19, research has shown that incorrect risk perceptions caused as a result of being misled by the media or some forms of public information increases the risk of defective decision making with regards to policy and decreases expected rates of voluntary compliance (Patel and Nath 2020). Therefore, the antecedents and underlying mechanisms that shape people's risk perception have drawn increasing attention from both academics and practitioners over the last four decades (Siegrist and Arvai 2020). Despite steady progress made in three dominant research streams—the characteristics of hazards, the characteristics of risk perceivers, and the application of heuristics to inform risk judgments—"mechanistic explanations" that offer explanations beyond mere descriptive differences in risk perceptions across countries are desperately needed (Siegrist and Arvai 2020).

Coinciding with 40 years of extensive research on risk perception, Chinese society has also experienced "40 years of agitation" since the start of the reform and opening-up policy. China has arguably entered its own "risk society" phase (Beck 1992, p. 13; Zheng and Huang 2012; Wu 2018). During the process of "compressed modernization" (Chang 1999), the Chinese risk society has demonstrated unique structural characteristics and the imbrication of different historical phase deviations (Beck, Deng, and Shen 2010; Xiao 2012; He 2018). Xiao (2012) further argues that the hyper-pluralism and complexity of social psychology in the Chinese risk society demands a more rigorous empirical research framework and methodology in order to examine risk perception and risk awareness, rather than simply relying on a single model or standard. As a core factor that influences risk perception, social systems shape an individual's world view or ideology, thus changing their risk perception and, to some extent, leading them to a consensus about risk perception (Slovic 2016, pp. 20-25). As is assumed by Slovic (2001: xxiii) that "risk is subjectively defined by individuals who may be influenced by a wide array of psychological, social, institutional, and cultural factors … many of these factors and their interrelationships can be quantified and modelled in order to illuminate the responses of individuals and their societies to the hazards that confront them" (Taylor-Gooby and

Zinn 2006, pp. 15-19). The dynamic multidisciplinary context factors of the Chinese risk society and the perceived risk by Chinese urban residents provide a natural empirical setting for researchers to conduct more in-depth research. However, extant literature remains highly fragmented and lacks a comprehensive theoretical framework to fully explain the evolving and complex nature of the emerging Chinese risk society.

This study aims to contribute to risk perception literature by exploring the inherent theoretical connections between various independently researched antecedents and the three institutional pillars of new institutional theory. Since new institutionalism focuses on the constitutive aspects of embeddedness, including how classifications, routines, scripts, and schemas shape cognition and behavior (DiMaggio and Powell 1991, p. 13; Thornton et al. 2012), the dual roles of institutional pressures can help not only embrace all the above-mentioned interdisciplinary context factors, but also determine the underlying mechanisms shaping the risk perception of Chinese urban residents.

Further, in the context of the Chinese risk society as a unique social experimental setting, institutional theory provides one of the best theoretical foundations for understanding the complexity and profundity of social structural transition or institutional transition (Peng 2003). Institutional theory can incorporate various multi-dimensional perspectives because it has a long tradition of being approached through various disciplines such as economics, sociology, and politics (Hall and Taylor 1996; Kato 1996; Peters 1999). Therefore, since risk has been socially and culturally constructed via social identification during the Chinese social and institutional transition, how Chinese inhabitants perceive risk and make choices is completely different due to their unique institutional settings (Xiao 2012). Do individuals under different levels of coercive forces with different institutional affiliations have variations in risk perception? Do normative pressures formed through social networking interactions make individual's risk perception systematically different? Do interpersonal trust and institutional trust with shared cognitive structures signify risk communication that can explain the variance in risk perception?

To answer these research questions from the perspective of new institutional theory, relevant literature has been reviewed to develop theoretical connections between fragmented factors and institutional pillars. By assuming that the mechanisms of institutional isomorphism can either enforce or mitigate the intensity of risk perceived by Chinese urban residents, multi-dimensional institutional factors are used to test those hypotheses. The

data from the JSNET2014 project are analyzed in order to empirically test if the three institutional forces—coercive, normative, and mimetic—which reflect various analytical mechanisms of institutionalization (DiMaggio and Powell 1983), significantly influence risk perception. The results of analysis and contributions are also discussed in detail.

Literature Review

Risk perception in the context of China has been consistently attracting more and more researchers to examine the unique logic of formative and operative mechanisms. The literature can be grouped into the following three major perspectives: the nature of the Chinese risk society, variations of risk perception during Chinese institutional and social transitions, and characteristics of both the hazards and Chinese risk perceivers.

Firstly, researchers have been debating and discussing whether China entered the risk society phase or not and, if so, what the nature of the Chinese risk society is. Xiao (2012) argues that the emergence or phase of the Chinese risk society cannot be determined simply by applying Beck's theoretical framework directly, but rather by embracing the unique nature and context of China's institutional and social transitions. Nevertheless, it is an indisputable fact that China has arrived at a risk society in its own way (Zheng and Huang 2012). The theoretical and methodological challenges to conducting research on the Chinese risk society emerge from the characteristics of regional differences and multiple composite risks perceived by the Chinese public which have been constructed during the dynamic process of social transition (Liu and Zhao 2011). Further, the time and space of premodern, modern, and postmodern have overlapped and become inextricably intertwined to construct the social realities of China through either expansion or compression of that space and time (Jing 1999). In order to investigate whether Chinese megacities have entered a risk society, Chen, Ge, and Li (2016) conducted a comparative study on risk society stages and the features of the following three metropolises: Beijing, Tokyo, and Seoul. The result shows that Beijing is still in a transitional stage between industrial and post-industrial society, and the citizens of Beijing have a relatively low level of risk knowledge compared to the other two megacities. Without a common conceptual and theoretical framework regarding the Chinese risk society, debate and conflicting results will linger as potential efforts for future research.

Secondly, some studies explore variation of risk perception constructed during Chinese social and institutional transitions in relation to the dimensions of institutional affiliation, social networks, and social trust. For example, based on an analysis of survey data from "Social Network and Work Experience" (JSNET2014) project, Wang (2016) has found that formal identity with regards to institutional affiliation had a significant impact on the perceived risk of Chinese urban residents, whereas cross-institutional informal social networking construction at the level of daily living did not form significant differences in risk perception. Therefore, the institutional differences in risk perception between urban residents in China are more reflective of formal institutional affiliations, and it is difficult to break through the rigid boundaries of institutional asylums for the construction of informal cross-institutional social networks within their daily lives.

However, the significance of social networks in China's transitional economy is changing (Bian and Huang 2015). The literature on Chinese *guanxi* and social networking have been comprehensively reviewed by Chen, Chen, and Huang (2012) in order to analyze, synthesize, and integrate the heterogeneities present in the concepts, operationalizations, antecedents, processes, outcomes, and contexts. As one of the most important channels to maintain *guanxi* capital in the Chinese context, social eating behavior can both increase social capital and impair political trust simultaneously (Chen and Bian 2015). Moreover, according to Liu (2012), the online networking of social life has been increasingly transforming social structures, in a scope both wide and deep. Therefore, behaviors related to social network construction on and off line cannot be neglected when examining the formation of risk perceptions in an emerging network society like in China.

At the same time, the main concern of risk perception has been shifting from "understanding" to "social trust" (Chen and Chen 2016). They argue that the public's trust in science, experts, and institutions has a direct impact on the public's perception of technological risks, and, further, that it has an indirect effect on the public's acceptance of specific high technologies. Additionally, Xi, Xie, and Xiong (2014) have explored the relationships between shared value, social trust, and risk perception with regards to genetically modified foods, and the results of one study indicate that social trust in institutions is an intermediary between shared value and risk perception; the results of the other study included in our review show that only the competence dimension of trust has a significant influence on risk perception. Researchers developed a conceptual model to investigate risk perception with regards to drug capsules and the behavioral response to the

Toxic Capsule Crisis, as well as the relationships between other relevant factors and the two variables, which indicates that only trust in the state's food and drug administration has a mitigating impact on risk perception (Feng et al. 2014). Although these efforts to figure out the impacts of multiple dimensional factors on risk perception are constructive and meaningful, they are akin to the blind men who tried to learn about and conceptualize what an elephant is by touching just a single part of its body. The "elephant" in this case refers to risk perception, and it is time for researchers to find a comprehensive theoretical framework which can better explain the antecedents and mechanisms of risk perception.

Lastly, characteristics of both the hazards and the Chinese risk perceivers have also been extensively researched. Some studies explore the public's perception of specific risks, such as the public awareness of air pollution, high-speed rail, energy risks, genetically modified foods, and drug risks in China (Becken et. al 2017; Guo, He, and Lian 2017; Yu et al. 2017; Chen and Chen 2016). For example, by investigating how 600 US and Australian residents perceive air pollution in China, the study shows that potential tourists' perceptions of the air quality crisis in China have had a negative impact on the destination image and their intention to visit China (Becken et. al 2017). Based on random survey data taken from Beijing-Shenyang high-speed railway and Beijing-Shanghai high-speed railway communities, the results of the analysis show that the perceived risk of high-speed railways is higher in the operation stage than it is in the construction stage (Guo, He, and Lian 2017). Another investigation into the Chinese community's perception of the risk of shale gas exploration has shown that, in China, older women tend to perceive lower risk and higher education levels are also often associated with lower risk perception (Yu et al. 2017). Socio-demographic variables such as gender, age, income, and education are not the main streams of contemporary risk perception literature, they are, instead, primarily researched as control variables (Siegrist and Arvai 2020).

Overall, existing literature on risk perception in China's transitional institutional context has been highly heterogeneous and fragmented, sometimes even contradictory. This body of research provides useful insights and empirical findings, but lacks an integrative theoretical foundation to explain "the hyper-pluralism and complexity of social psychology" (Xiao 2012) imbricated throughout the Chinese institutional transition process and the evolving cognitive culture. The transitional passage is not from one order to another but ongoing rearrangements of multiple orders (Stark 1996). However, current literature only involves a broad generalization about risk

characteristics during China's transition period without an integrated framework to reflect the "ongoing rearrangements of multiple orders." Thus, in order to provide a comprehensive and systematic theoretical framework to encompass institutional affiliation, social networks, and trust in the context of the Chinese risk society, this study takes on the perspective of new institutional theory. The concept of institutions is defined broadly so that it encompasses all the elements that have been reviewed above. In Scott's definition: "Institutions are comprised of regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life" (Scott 2008, p. 49). The three institutional pillars can be further divided into formal and informal institutions, and the dynamic relationships between them can embrace institutional transitions and the entangled construction of risk perception in China.

Interestingly, among the multi-dimensional yet fragmented factors reviewed above, some factors can be theorized into the framework of new institutional theory by building off of its inherent logic to connect the three institutional pillars. Therefore, in the following section, we propose hypotheses by developing theoretical connections that embrace and correspond with institutional affiliation, social network interactions, and social trust regarding regulatory, normative, and cognitive mechanisms.

Hypotheses Development

As a subjective cognition of social members, risk perception will be better understood in a specific institution (Beck et al. 2010). We argue that there is a close relationship between the risk perception of urban residents and the formal institutional structure of the current binary labor force market, as well as social network interactions, interpersonal trust, institutional trust, and other informal cultural traditions and norms. As mentioned above, it is no coincidence that the five variables across the three dimensions correspond to the three pillars of institutional theory, and that they are also inextricably intertwined constituting the unique Chinese institutional context.

Based on this assumption, to explain the inner relationships between the three institutional mechanisms and risk perception within the unique Chinese risk society, we mainly use the five variables to develop the following research hypotheses.

Institutional Affiliation and Risk Perception

First, institutional asylum plays an important role in forming risk perception in China, because it provides social identification and legitimacy to its social members. To identify themselves according to the dominant power of institutions, individuals, especially those who are "within the system," have to conform to the regulatory formal rules and institutions which represent the coercive forces of institutional pillars. Otherwise, one cannot survive "within the system" and has to leave for "outside the system."

The institutional affiliation of being "within the system" and "outside the system" has always been a unique perspective for the analysis of Chinese society. Being "within the system" is equivalent to being in a society with strong resources (civil servants, employees of state-owned enterprises or banks, etc.). Being "outside the system" means that individuals within that context need to solve the issue of "social security" by themselves, especially when formal institutions are underdeveloped (Peng 2003). Therefore, the distinction between these two concepts is actually the division between the advantaged group and the disadvantaged group, and it is an important indicator for analyzing social classes in China. The social class "within the system" includes highly educated people, party members, urban residents, and groups with pensions and medical insurance.

Relying on different powers, agents within and outside the system take up certain positions in the field. Agents within the system are closer to positions of the state power center, enabling them to allocate more resources in the field. In addition, urban residents within and outside the system differ in career development, opportunity set, social welfare security, and the logic of resource allocation (Wang 2016). Therefore, although people with state-owned enterprise identification within the system have to conform to the coercive forces without much recourse, in return for this they have less risk perception and greater risk endurance than those outside the system. We propose:

Hypothesis 1: There is an institutional difference in the risk perception of urban residents, and people within the system have lower risk perception than people outside the system.

Social Network Mechanisms and Risk Perception

More importantly, individual risk perception is not only a biological reaction

but also a complex social interaction that is based on different social elements. It relies greatly on the attainment of benefits, organizational culture, social status, mutual social networks, personal social identification, and other aspects of social organizations and groups. Therefore, certain normative pressures and differences are embodied in the level of social risk perceived by peer social members. In addition, considering the great impact of technological revolution on social development, risk is bred in the multiple tensions of social transition, so the risks inherent to the changing, complicated, and opening characteristics of the context of online networks can become real influences (Xu and Yu 2020). In China, more and more people are reliant on social network technology to construct their social network capital. Therefore, we include the actions of social network behaviors based on network technology in order to develop the following two hypotheses which are related via normative forces, another important institutional pillar.

In the network society, the amplification station of risk, which refers to an intermediary factor that amplifies risk, is divided into social and individual amplification stations (Kasperson 2012). The former includes personal networks, news media, political organizations, and social groups, while the latter refers to each risk communicator and recipient (Kasperson and Kasperson 2005, pp. 122-130). Kasperson (2012) argues that the social amplification of risk is determined by two mechanisms: an information mechanism and a response mechanism. For the transfer of the information mechanism, the information flow and information channel are the two most important aspects. Information flow mainly includes news media and an informal personal network. This article discusses the influence mechanism of the informal interpersonal network—which includes relatives, friends, neighbors, and colleagues—on risk communication. The response mechanism is the second phase of the amplification of risk, where the amplification of risk does not end but may generate a ripple or secondary effect, leading to the amplification of risk from people who are indirectly affected through additional stakeholders. Kasperson and Kasperson (2005) believe that the individual is the amplification station of risk, and the social amplification is rooted in the social experience of risk. Therefore, risk communication is related to personal risk perception, while the social network, as an intermediary mechanism of risk communication, becomes an important factor that influences personal risk perception.

Among the existing literature, from an operational point of view, social network interaction is focused mainly on the Chinese New Year greeting

networks and the catering networks (Bian 2012). As a representative of traditional Chinese culture, the New Year greeting network forms when Chinese people participate in an intense round of visiting, gift giving, and feasting with family, friends, colleagues, and neighbors during the celebration of the Chinese New Year. This network, which is based on relationships with strong ties, carries with it an abundance of emotional resources, making it an important way to maintain family affection and friendship. By measuring the size and composition of the New Year greeting network, the social capital embedded in the network can be examined. That social capital can provide emotional support and fulfill emotional needs, while this situation of "quasi-family affection" offers individuals a concentrated field by which to distinguish and examine the inconstancy of human emotion (Zou, Ao, and Li 2012). When communications based on the New Year greeting network are more frequent, the degree of bonding is higher, which also indicates more sentimental resources that can be utilized in regards to risk problems.

Different from the sentimental purpose of New Year greeting networks, the catering network is woven through social network activities with an instrumental purpose. Under certain circumstances, especially in terms of social eating, which reflects the Chinese cultural value of *renqing*, the process of generating and changing *guanxi* capital based on the catering network is likely to be accompanied by negative social influences, namely the "side effects" of *guanxi* capital. The communication of information regarding banquets and the achievement of banquet objectives involves discussions about politics with a low degree of political trust (Chen and Bian 2015). During the interactive process of social eating, negative news and gossip about food, transportation, medical treatment, and other security incidents are transmitted, which tends to influence personal values and self-awareness and further intensify questions about the government's management capability and its positive image. Self-security and risk perception are also virtually strengthened. Hence, in the catering network, a variety of information can be easily transmitted and discussed. For example, WeChat Moments of dining together can intensify risk perception among social members because the increased discussion surrounding the incident, such as in the Alipay account hacking and the fake-vaccine scandal. Therefore, the following two hypotheses are proposed with in opposition to each other.

Hypothesis 2a: *New Year greeting networks reduce the risk perception of urban residents.*

Hypothesis 2b: *Catering networks intensify the risk perception of urban residents.*

Social Trust Mechanisms and Risk Perception

To date, the coercive pressures which exist via the power of institutional affiliation and normative influences through sanctions of social network legitimation have been reviewed in order to propose corresponding hypotheses. It is time to investigate the cognitive impact on risk perception through risk communication with signification: social trust mechanisms.

Trust has the functions of maintaining social stability, promoting social cooperation, consolidating social solidarity, and enhancing social security, which tends to be divided into interpersonal trust and institutional trust. Giddens (1991, p. 19) believes that "attitudes of trust, in relation to specific situations, persons or systems, and on a more generalized level, are directly connected to the psychological security of individuals and groups. Trust and security, risk and danger: these exist in various historically unique conjunctions in conditions of modernity." As a social moral resource and form of social capital, trust is a lubricant of social life. A society based on general trust will be more efficient than a society without trust, and people in such a society will participate in social affairs more enthusiastically. A lack of interpersonal trust or a low degree of institutional trust will obstruct healthy social operations, resulting in more social conflict, reduced social security, and greatly increased public risk perception (Fukuyama 1995). Both interpersonal trust and institutional trust with their property of being socially embedded in relationships among people (Granovetter 1985) or institutions (Zucker 1986) are "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (Rousseau et al. 1998). Therefore, the interpretative mechanism of trust will enact the cognitive structures or structures of signification for "cognitive communities" in which common "mental models" are shared by members (Giddens 1979; Fiegenbaum and Thomas 1995). During this process, cognitive pressures, as one of the informal institutional pillars that help maintain social stability and social security, are meant to reduce public risk perception.

At the same time, with deepening social change and the development of modern science and technology, people tend to communicate and acquire information in more complex ways. Trust among people must switch from specific individual trust to a generalized system of trust or institutional trust. However, modern relationships between risk and trust should not be oversimplified. During the SARS outbreak, a distrust of social systems such

as science, technology, and government emerged, and this distrust has influenced people's acceptance of certain policies or new technologies. Further, if people are more educated, they show a greater distrust of technology and a higher degree of risk perception (Zhao 2004). Therefore, with regards to the network society, the influence of trust on the risk perception of social members deserves further discussion. In this vein, the authors propose the following two hypotheses: the higher the degree of interpersonal or institutional trust, the lower the perception of risk.

   Hypothesis 3a: Interpersonal trust contributes to reduced risk perception of urban residents.

   Hypothesis 3b: Institutional trust contributes to reduced risk perception of urban residents.

Methods

Data Description

The data for this paper were derived from the "Social Network and Work Experience" (JSNET2014) project carried out in the following eight cities of China: Changchun, Tianjin, Ji'nan, Shanghai, Xiamen, Guangzhou, Lanzhou, and Xi'an. Based on the Chinese General Social Survey (CGSS), the JSNET survey was designed as a social survey about job search experience and social network topics that was conducted by Bian Yanjie, the founder of CGSS. Its questionnaire design, survey implementation, and data collection all meet GSS survey requirements. The computer-assisted personal interviewing (CAPI) method was adopted in order to conduct personal in-home interviews. After determining the sampling framework using the field sampling mapping approach, the institute completed its sampling plan and used the computer system to send that to the investigators in the selected cities. Each investigator received the sampling plan and relevant training, carried a laptop to conduct the personal in-house interviews, and immediately uploaded the data they received to the system. The surveys conducted in communities and households of each city were based on a precise scientific sampling process, and the in-home sampling was determined according to criteria such as age and professional experience, making the collected data highly representative. Since the average time it took to complete the survey was about 60-90 minutes, the institute provided the respondents with incentives in the form of money and gifts in order to ensure

the authenticity of their data.

Measures

(1) Dependent Variable
The dependent variable is risk perception. The questionnaire used in the JSNET2014 project contains a combination of questions related to risk perception. The respondents were asked to score food safety, property safety, personal safety, transportation safety, medical safety, and personal privacy safety. The answers were divided into four degrees, from 1 ("extremely insecure") to 4 ("very safe"). Since risk perception and a sense of security are oppositional concepts, the order of degrees is reversed for the needs of the research. That is, an answer of 4 means "extremely insecure," while responses of 2 and 3 denote a medium level of risk perception, and a response of 1 means "very safe." The data are classified into three sequential degrees: low, medium, and high-risk perception. Since the independent variables are measured according to factor scores, we did not use factor analysis on the six indicators to construct the dependent variable. Instead, because the six indicators are formative indicators, we simply added them up to show the different levels of risk perception as totaled scores. After excluding the samples with missing data, the total scores of risk perception ranged from 6 to 24, following a normal distribution. Therefore, according to the inflection point position of the distribution, we defined 6-12 scores as indicating low risk, 13-18 scores as medium risk, and 19-24 scores as high risk. Thus, we generated an ordinal variable distinguishing low, medium, and high levels of risk perception.

(2) Independent Variables
The core independent variables include five variables across three dimensions.

Institutional affiliation: According to the nature of the collective institutional identities of the respondents, the Party and state organs, state-owned enterprises, state-owned institutions, and collective enterprises were considered to be "within the system" (=1), while those self-employed, or in private enterprises, foreign/joint venture enterprises, or joint-stock enterprises were considered to be "outside the system" (=0), forming the two classified variables of institutional affiliation.

Social network: Under the premise of Chinese New Year greetings through WeChat, messaging or other network mediums, variables related to

the New Year greeting network were obtained through factor analysis based on the network size (the quantity of mutual greetings between relatives, close friends, and other people), network vertex (the highest prestige of greeters' occupations), network distance (the gap between the lowest and the highest prestige of greeters' occupations), and network difference (the diversity and quantity of greeters' occupations).[1]

Through the factor analysis conducted based on the measurements of social eating frequency—including inviting people to dine out, being invited to dine out, and accompanying friends to dine out—the catering variables were generated by using principal component analysis and the varimax rotation.

Trust: The questionnaire measures the degrees of trust toward seven different types of objects, including interpersonal trust towards "family members," "friends," "neighbors," and "strangers" as well as institutional trust towards "the local government," "local courts," and "hospitals," which are classified into four categories: "completely trust," "trust," "distrust," and "completely distrust." The two common factors generated by using principal component analysis and varimax rotation based on the factor analysis were named the "interpersonal trust variable" and "institutional trust variable."

For a better explanation of models and comparison of data, we adjusted the generated values of factors of the New Year greeting network, catering network, interpersonal trust, and institutional trust, converting them into values from 0 to 100 (Bian and Li 2000).

(3) Control Variables

In addition to the core independent variables, we introduced control variables that may affect the risk perception of habitants, including demographic characteristics (gender, age, education level, marital status), socioeconomic status (political status, household status, annual family income, subjective class identity), and so on.

Descriptive Statistics

The resulting statistical descriptions of the main variables are shown in Table 1.

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[1] See occupational prestige scores of the New Year greeting networks in the paper written by Bian Yanjie et al. in 2012.

TABLE 1
STATISTICAL DESCRIPTION OF MAIN VARIABLES

Variable	Sample size	Mean value/ Percentage	Standard deviation	Minimal value	Maximum value
Gender	5459	0.472	0.499	0=Female	1=Male
Age	5459	43.51	13.66	18	69
Education level					
Primary or below	363	6.65%			
Secondary	2573	47.17%			
Tertiary or above	2519	46.18%			
Political status	5458	0.175		0=citizen	1=Communist party member
Marital status	5459	0.808	0.394	0=Single	1=Married
Household	5457	0.834	0.372	0=Provincial	1=Local
Annual family income (Logarithm)	5302	1.89	0.830	-2.303	4.605
Subjective class identity					
Lower	293	5.53%			
Middle	3935	73.21%			
Upper	1143	21.26%			
Institutional affiliation	5192	0.593	0.491	0=Within the system	1=Outside the system
Social network interaction					
New Year greeting network	4973	35.23	15.67	0	100
Catering network	5415	35.72	24.48	0	100
Trust					

Interpersonal trust	4903	67.91	11.03	0	100
Institutional trust	4903	51.24	17.18	0	100
Risk perception					
Low	630	11.58%			
Medium	4146	76.21%			
High	664	12.21%			

City	Sample size	Percentage (%)	City	Sample size	Percentage (%)
Changchun	599	10.96	Lanzhou	662	12.12
Ji'nan	598	10.98	Shanghai	808	14.82
Xi'an	803	14.71	Xiamen	599	10.95
Tianjin	813	14.91	Guangzhou	577	10.54

The results indicate that approximately 59 percent of respondents are within the system. The value of the New Year greeting network factor is close to that of the catering network; however, the latter's standard deviation is significantly larger than the former's. The value of the interpersonal trust factor is higher than that of the institutional trust factor; however, the latter's standard deviation is larger. The risk perception variables tend to be normally distributed.

The sample composition of each city is shown in Table 1. The total sample size across the eight cities was 5,459. The sample sizes of Tianjin, Shanghai, and Xi'an are slightly larger, while those of other cities were basically the same.

Results of the Analysis

To examine the influence of different factors on the risk perception of urban residents, the nested ordinal logistic regression model was used. Because of the large deviations in geographical space and the locations of the eight cities, regional differences exist at the levels of market development, the proportion

of space within or outside the system, and the customs of New Year greetings and social eating. As a result, for our analysis, we accept the premise that there are variations between the cities and adopt the two-level random intercept model, of which the first level is the individual respondent level and the second level is the city level. At the individual level, the intercept of models differs slightly due to the differences between the cities.

Model 1 is the benchmark model that reflects the influence of the control variable on the dependent variable. With the added variable of "institutional affiliation," Model 2 tests the difference in the institutional affiliation influence. Then, the two variables of "social network" are added in Model 3, including the New Year greeting network and catering network factors. Based on Model 3, the variables of the "trust" mechanism are added in Model 4, including the interpersonal trust and institutional trust factors. Models 2, 3, and 4 test the influences of the institutional asylum mechanism, social network mechanism, and trust maintenance mechanism, incrementally, with regards to risk perception. The results of the mixed effects of multilevel ordinal logistic regression models on Chinese urban residents' risk perception are shown in Table 2.

In Table 2, Model 1, which is the benchmark model, does not involve any core independent variables. The results of Model 2 indicate that institutional affiliation can cause systematic differences in the risk perception of urban residents. Compared with urban residents outside the system, those within the system under coercive forces have a lower level of risk perception, which shows that the asylum effect of the system exists for the social members within. Therefore, institutional affiliation determines different regulatory structures, and the level of coercive forces perceived by urban residents influence the degree to which risk is perceived. As a result, Hypothesis 1 was verified.

TABLE 2

ORDINAL LOGISTIC REGRESSION MODELS OF MULTILEVEL MIXED EFFECTS ON CHINESE URBAN RESIDENTS' RISK PERCEPTION

Variable	Model 1	Model 2	Model 3	Model 4
Male	-0.291***	-0.291***	-0.316***	-0.329***
	(0.066)	(0.069)	(0.073)	(0.078)
Age	-0.012	-0.010	0.004	0.004
	(0.021)	(0.022)	(0.023)	(0.024)
Education level				

Secondary	0.581***	0.565***	0.426***	0.479**
	(0.139)	(0.148)	(0.163)	(0.176)
Tertiary or above	0.827***	0.800***	0.591***	0.765***
	(0.157)	(0.167)	(0.184)	(0.198)
Communist party member	0.095	0.154$^{!}$	0.156	0.239*
	(0.090)	(0.093)	(0.097)	(0.105)
Married	0.290*	0.298*	0.294*	0.233$^{!}$
	(0.115)	(0.119)	(0.124)	(0.131)
Local	0.258**	0.326**	0.362***	0.357**
	(0.096)	(0.102)	(0.108)	(0.114)
Annual family income (Logarithm)	0.094*	0.129*	0.059	0.032
	(0.048)	(0.050)	(0.054)	(0.058)
Subjective class identity				
Middle	0.307*	0.275$^{!}$	0.274$^{!}$	0.184
	(0.145)	(0.149)	(0.157)	(0.164)
Upper	0.799***	0.757***	0.752***	0.483**
	(0.162)	(0.167)	(0.177)	(0.187)
Within the system		-0.337***	-0.345***	-0.304***
		(0.080)	(0.084)	(0.089)
New Year greeting network			0.007*	-0.006*
			(0.003)	(0.003)
Catering network			0.005**	0.004*
			(0.002)	(0.002)
Interpersonal trust				-0.010**
				(0.004)
Institutional trust				-0.038***
				(0.002)
Two cutting points	Omitted	Omitted	Omitted	Omitted

Random intercept	0.052[!]	0.077[!]	0.084[!]	0.056
	(0.031)	(0.044)	(0.048)	(0.035)
Sample size	5207	4972	4558	4134

Notes: The standard deviation is written between parentheses; The reference items in turn are: female, primary or below, citizen, unmarried, provincial, lower and outside the system; ! p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001
The age square has been controlled.

Model 3 includes two network factors: "New Year greeting network" and "catering network," whose results revealed significant positive correlations between the two variables and risk perception. As has been mentioned above, the New Year greeting network and the catering network are different methods for measuring social network interactions: the former is for the sentimental purpose, while the latter is for instrumental ones. Although the dimension of measurement differs, the construction of the respondents' social network has a common impact. To avoid the problem of collinearity, we applied correlation analysis on the two variables separately, and the results showed no substantially significant difference in the data, which does not affect the model verification. Therefore, we decided to add the two variables to the model at the same time for the analysis, which was convenient for comparison.

The results of Model 3 confirmed the prediction of the catering network, because the increase of its factor value intensifies the risk perception of urban residents. However, the results of the New Year greeting network were inconsistent with the hypothesis, which turns out to have the same directional influence with those of the catering network. The catering network would intensify the risk perception because of its emphasis on instrumental construction, information dissemination, and risk amplification mechanisms, while the New Year greeting network, which emphasizes the maintenance of relationships and affection, has a significant positive correlation with risk perception. Since the New Year greeting network can further be divided into instrumental and sentimental purposes according to the different levels of closeness of greeters such as family members, relatives, close friends, and strangers, the resources involved in the New Year greeting network fail in their functions of providing emotional and social support to reduce risk perception. On the contrary, the New Year greeting network under the normative pressures of instrumental purpose may share the same

mechanisms with the catering network. The measurement and analysis results show that the social network interactions, both for the New Year greeting network and the catering network, have a significant—though with very small coefficients—influence on risk perception with the same positive direction. Hence, Hypothesis 2a is not verified, while, the results do verify Hypothesis 2b. Therefore, Hypothesis 2 is partially verified.

Lastly in Model 4, the two factors of "interpersonal trust" and "institutional trust" were added. The results show that the significance and direction of the institutional affiliation and the catering network remain unchanged, while the direction of the New Year greeting turn out to be negative, which indicates that the original hypothesis 2a is supported when the social trust mechanism factors are controlled for as in Model 4. However, the regression coefficients of two social interaction networks, though significant, are both very small which might impair the explanatory power of the two key variables, and the results have to be cautiously explained.

As for the impact of the trust mechanisms on risk perception, the significance of interpersonal and institutional trust turns out to be negative. More specifically, the influence of institutional trust on risk perception is greater than that of interpersonal trust. Meaning that, when the level of institutional trust is higher, especially trust for the government, its influence to reduce the risk perception of urban residents is greater. In the Chinese risk society, the interpretative mechanism of trust in "local government," "local courts," and "hospitals" play a more important role in forming "cognitive communities" than the interpersonal trust towards "family members," "friends," "neighbors," and "strangers." However, both interpersonal trust and institutional trust under cognitive pressures with common "mental models" would reduce risk perception. Therefore, Hypothesis 3 is verified. Interestingly, from Model 2 to Model 4, different core independent variables were added in each model, and the results of every model show that the significance and direction remain unchanged except that the coefficient of New Year greeting network changes from positive in Model 3 to negative in Model 4, which means Hypothesis 2a has been verified in Model 4.

Regarding control variables, the results of the nested model provide some interesting results. First, we found that the higher the education level is the higher the risk perception because the more the individual knows about all aspects of society the more inclined they are to perceive risk. Second, compared with ordinary people, Communist Party members may know more about society and have more sources and accesses to information. Therefore, they, as a dominant group, perceive higher risk than disadvantaged groups.

Third, the locals are more fully embedded into the social life across all dimensions which are used to measure risk perception, their risk perception is also higher than that of outsiders who can barely integrate into their local societies. Fourth, compared with the low-level and middle-level groups with subjective class identities, the group with the highest subjective class identity has a higher degree of risk perception, but there is no significant difference between the middle-level and low-level groups.

The results of the above-mentioned control variables also indirectly show that those who have more knowledge, information, political status, and wealth will form a higher risk perception, which also confirms the proverbs "the more you have, the more you worry about losing it" and "the more you know, the less you trust."

Discussion

This paper provides a comprehensive theoretical framework to embrace and integrate various multi-dimensional factors and find empirical evidence regarding their impacts on risk perception for Chinese urban residents. Thus, we complement and enrich the abundant extant literature which is fragmented and lacks inherent "mechanistic explanations" that look beyond descriptive differences of risk perception (Siegrist and Arvai 2020). Based on new institutional theory, we found some inner theoretical connections between those fragmented factors and the three institutional pillars, and the hypotheses between those factors and risk perception of urban residents were tested within the unique context of the Chinese risk society.

Risk perception is not only a construction of subjective consciousness but also a social and cultural construction, reflecting the Chinese urban residents' identity with regards to their institutional affiliation, social network interactions, and trust maintenance mechanisms. Therefore, based on neo-institutional theory, we have proposed an integrative theoretical framework to map institutional affiliation, as a formal regulatory factor, and social network interactions along with social trust maintenance mechanisms, as informal normative and cognitive pressures. From a systematic and comprehensive interdisciplinary perspective, this paper contributes to the literature by promoting an integrative understanding on the determinants and processes of risk perception in the context of the Chinese risk society.

The analysis results are threefold; first, there is a significant difference in risk perception between urban residents within and outside the system.

Social members within the system still enjoy the advantages of development due to the security of state power and strategy by conforming to the coercive forces emanating from the system, while it is hard for people outside the system to avoid the risk involved in the on-going reforms and the shock in the market economy. Therefore, the risk perception of social members within the system is considerably lower than that of social members outside the system. Second, as an intermediary mechanism of risk communication and a social "amplification station" of risk, normative pressures from social network interaction mechanisms are more likely to increase the perception of risk. Both the New Year greeting network and the catering network have a positive influence on risk perception, expanding the range of risk communication and intensifying the level of risk perception. Regarding risk prevention, social capital, as a resource embedded in the New Year greeting network, plays its function of providing emotional and social support only when both interpersonal and institutional trust are controlled. As a matter of fact, the roles of the New Year greeting network can be either sentimental or instrumental according to the configurations of the greeters' (family members, relatives, close friends, and strangers) network. Without interpersonal and institutional trust, the New Year greeting network can also be instrumental in nature, similar to the catering network. For this reason, we have seemingly conflicting results from the different models of the analysis. Third, trust, as a social lubricant for maintaining social solidarity, integration, and stability, plays a significant role in reducing the risk perception of urban residents and in maintaining their psychological sense of security. From the new institutional theory perspective, the enactment of shared meanings and the common mental models of the "cognitive communities" are critical in forming both interpersonal and institutional trust, which have negative influences on risk perception. In the context of the Chinese risk society, when compared to interpersonal trust, institutional trust has a more significant effect on reducing risk perception. In addition, the results reflect that gender, education level, household, and subjective class identity have a significant influence on risk perception, while annual family income does not.

The results also provide some meaningful implications for both academics and policy makers. Considering the unique institutional context of China, this research reminds us to pay more attention to the problems of a risk society during structural transformations, like with the Chinese social system and the in-depth reforms of the market economy. First, people who work in non-state departments outside the system do not enjoy the security of national resource concession or policy, giving them a higher risk

perception than those within the system. This phenomenon of a man-made redistribution of risk and unequal distribution within and outside the system leads to serious social risk conflicts due to significant institutional differences, requiring further institutional reform, breaking institutional barriers, and monopolies of interests in order to achieve equal opportunities with regards to risk, within and outside the system. Second, due to the positive relationship between social network interactions and the risk perception of urban residents, the negative influence of social network mechanisms should be understood. Both the New Year greeting network and the catering network tend to be important methods for individuals to mobilize and accumulate *guanxi* capital, which also have a "side effect" in the case of insufficient public participation in informal institutions. Therefore, government departments should improve their positive image of serving their citizens and promoting social governance capacities in order to reduce the dissemination of negative information through informal networks (Chen and Bian, 2015). This can be done by taking control and taking measures to address the risk problems involved in the social network interactions. Finally, different groups of occupations and interests within and outside the system are often the root of conflict. When conflicts are expressed through the risk perception system, society requires a trust factor. Society should cultivate institutional trust based on the cultural contexts in order to tolerate uncertainties, insecurity regarding the future, and unpredictable events (Zhai 2008). Hence, it is necessary to establish a maintenance mechanism of trust, especially institutional trust, for different institutional affiliations and normative network interactions of different groups.

Limitations and Suggestions for Future Studies

Despite the findings and implications, the study provides some limitations where there exists great future research potential. First, this paper contributes to the literature by reframing extant multi-level and multi-dimensional factors into one single framework of institutional theory, but the theoretical connections between institutional theory and the antecedents of risk perception are still weak. We highly recommend that measurements of new institutional factors should be developed in the context of risk perception literature so that they can provide a more solid theoretical foundation for risk perception literature. Second, although the inside-outside dichotomy in this paper explains some institutional differences in risk perception, it neglects the variations among the members in each system or context. During the

institutional transition, risk perception both within and outside naturally show a distribution pattern of "center—marginalization," which means risk moves from the margin to the center. To figure out the difference between group variations of risk perception, the "extent of institutionalization" for each context must be controlled (Miranda and Kim 2006) because those members who are at the center of each system have more power and resources that allow them to feel safer, and those at the margin perceive a higher degree of risk. In terms of institutional affiliation, it is also necessary to recognize that there are differences in departments both within and outside the system. There are monopolistic state-owned and ordinary state-owned departments whose members are divided into permanent staff and contract workers, while there are also primary and secondary labor markets outside the system with differences in risk perception that could be differentiated internally. In the same logic, the function of the New Year greeting network should be examined in more detail because it can be either sentimental or instrumental as well. Third, it should be acknowledged that for different social groups, the risk opportunity structure changes in different stages of the group's life cycle, which results in differences in their risk perception. To understand more deeply the different characteristics of risk perception, future studies should clarify these differences and their consistency with regards to the risk opportunity structures of different social groups in their different life cycle stages.

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