

Original Article

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The psychological typhoon eye effect in responses to terrorism

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Abstract

Terrorist attacks can occur anywhere. As the threat of terrorism develops, the China-Eurasia Expo held in Ürümqi, China is attracting fewer potential visitors. A nationwide survey of 2034 residents from 31 provinces and municipalities in China was conducted to examine the relation between the distance to respondents' city of residence from Ürümqi and their levels of concern for safety and security concerning the Expo. The two were found to be positively related: the closer the respondents lived to Ürümqi, the less concerned they were with the safety and security of the Expo. This is consistent with the "psychological typhoon eye" effect, which states that people living closer to the center of an unfortunate event (whether natural or man-made hazards) are less concerned with the event's negative consequences. This effect appears to hold for terrorism. There are implications of this finding for international counter-terrorism practice, tourism, and research.

Fear is an instinctive response to threat, danger, and risk. U.S. President Roosevelt (1941) declared that "freedom from fear" is a fundamental freedom for mankind. Terrorism is a source of fear to many. The Global Terrorism Index has found that the number of those killed and the number of countries affected by terrorism are increasing annually. The number of countries with at least one death from terrorism was 22% higher in 2016 than in 2015 (Institute for Economics and Peace, 2016, 2017).

China was ranked the 31st most terrorism-affected country in 2017 (Institute for Economics and Peace, 2017). In China, the Xinjiang Uyghur Autonomous Region, which is located in the north-western part of the country and shares borders with several Central Asian countries, is considered a high-risk area for terrorist activities (Mei & Zhang, 2015). Since 2014, Xinjiang has taken down 1588 violent and terrorist gangs, arrested 12,995 terrorists, and seized 2052 explosive devices (State Council Information Office of the People's Republic of China, 2019). Terrorism and the threat of terrorism in this region have had negative effects on almost all aspects of the lives of its residents. Among these effects is the reduced attractiveness and influence of the China-Eurasia Expo, which is held in Ürümqi, the capital city of Xinjiang, and is an important commercial event for the region. The subjective fear induced by the objective risk of terrorism is a matter of life or death, one that has likely led to concerns over the security and safety of the China-Eurasia Expo.

Does everyone experience the same degree of fear? Slovic (1999) argued that "human beings have invented the concept *risk* to help them understand and cope with the dangers and uncertainties of life. Although these dangers are real, there is no such thing as 'real risk' or 'objective risk'" (p. 690).

Slovic's (1999) argument explains why people living closer to the center of an unfortunate event are less concerned with the event's negative consequences. For example, a catastrophic earthquake measuring 8.0 on the Richter scale struck China's Sichuan Province on May 12, 2008. From June 4 to July 15, 2008, Li et al. (Li, Liu et al., 2009; Li, Rao et al., 2009) surveyed 2262 adults, including residents in both the devastated and the nondevastated areas, on their post-earthquake concerns for their safety and health. It was found that in general, those who live in the most devastated areas had the least post-earthquake concerns, and the farther away people were from the earthquake area, the greater their concerns (see Figure 1). These concerns related to the estimated probability of an epidemic outbreak, the estimated need for safety measures, and the estimated numbers of psychological and medical workers needed.

Li et al. (2009) defined the finding, described as the "psychological typhoon eye" (PTE) effect, as the closer a person is to the center of a disaster area, the less concerned that person is with safety and health after that disaster. Li et al. conducted two subsequent surveys of 5216 residents in September and October 2008 and in April and May 2009. The results of these three waves led

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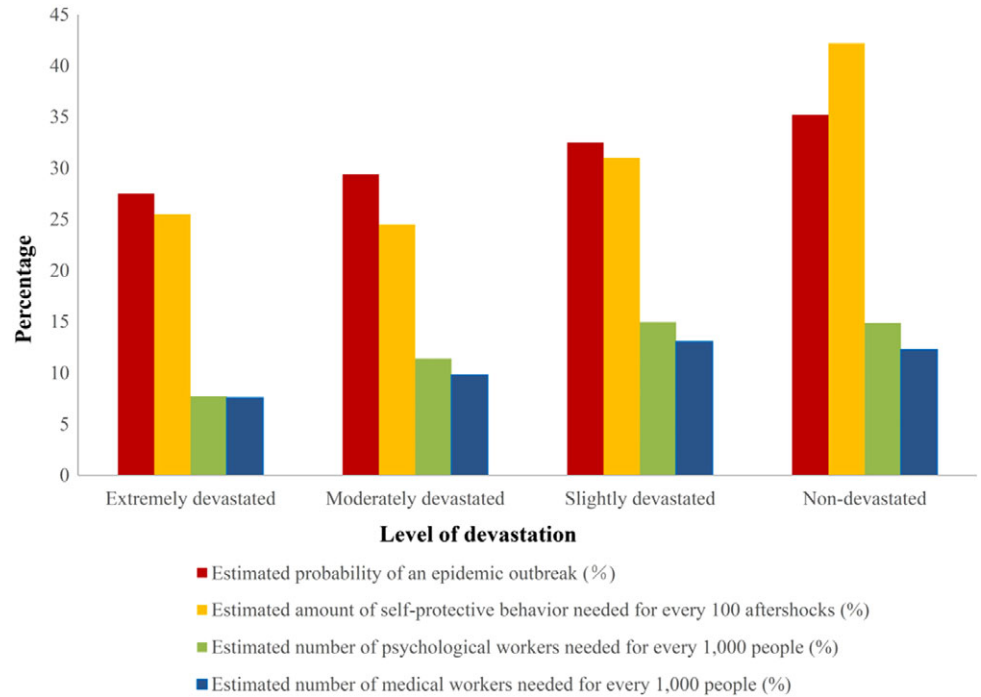


Figure 1. Residents' post-earthquake concerns about safety and health issues in areas with varied devastation levels (Li, Rao et al., 2009).

them to conclude that the PTE effect was robust through the passage of an entire year. During that time, the level of post-earthquake concerns remained the lowest for the greatest level of the devastated area. The PTE effects reported above (see also Wei, Tao, Liu, & Li, 2017), the comments they received (e.g., Bartels & Van Rooyen, 2012; Bonanno, Brewin, Kaniasty, & Greca, 2010; Liu, 2012; Liu, Wu, & Wang, 2011; Liu, Wu, & Zhang, 2011), and a journal editorial on the effects (Harada, 2011) all suggest the relation between the objective environment and the subjective mental state may not be as straightforward as a linear positive correlation. The psychological mechanism governing how people respond to environmental change and strive for freedom from fear may be quite complex.

Therefore, a question that remains of interest is: What is the relation between the objective danger and the subjective fear in the context of terrorist attacks in Xinjiang?

To answer this question, we note that the subjective fear induced by the threat of terrorism in Xinjiang differs from that caused by the Wenchuan earthquake in 2008 in several ways.

First, in the catastrophic 2008 earthquake in Wenchuan, the epicenter was the unique center of the risk source. However, risk source varies with time and space in the face of the threat of terrorism in Xinjiang. The threat of terrorism in Xinjiang has lasted for several years, with terrorist attacks not only in Ürümqi but also in other provincial capital cities, such as Kunming and Beijing. Even when people are away from Xinjiang, the threat of Xinjiang terrorism still exists among them. Under such a threat, the subjective fear induced by the objective risk of terrorism likely decreases gradually with time and distance (Slovic, 1987).

Second, the Wenchuan earthquake was a natural hazard, whereas the terrorist attacks in Xinjiang are man-made hazards. The concern is that man-made and natural hazards do not necessarily induce equivalent subjective fear. In the late 1950s, the Chinese people were decimated by a catastrophic famine caused by drought and weather conditions. During the catastrophe, our state of mind (subjective fear) went from *want* to freedom.

Keeping hunger away is the reason that underlies our motivation to strive for freedom from want. By contrast, during the terrorist attacks in Xinjiang, our state of mind went from *fear* to freedom. The right to freedom from fear deals with threats in the environment. This right seeks to ensure human security and protect individuals from threats such as wars, terrorism and crimes (for a detailed discussion see Wei et al., 2017). A notable difference is that the right to freedom works for people to surrender in wars, terrorism and crimes (man-made hazard), but it does not work when people surrender to natural hazards such as AIDS or COVID-19. No ways of surrendering can make people frightened or helpless.

Finally, in the PTE effect detected in the Wenchuan earthquake, the independent variable, distance, is not strictly the spatial distance from the epicenter but self-reported devastation levels. It was assumed that the more devastated the area, the closer it is to the epicenter. For example, an extremely devastated area in the quake was Longnan, which is located in Gansu province and further from the epicenter (Wenchuan) than some moderately or slightly devastated areas located within Sichuan province. By contrast, in a similar study that strictly measured the spatial distance from the epicenter, there were fewer posttraumatic stress disorder (PTSD) cases in a village that was closer to the epicenter (0.5 km) than in a village much further away (10 kms; Wang et al., 2000). That is, the dependent variable that Wang et al. (2000) measured was not the safety and security concerns but PTSD.

Taking the above-mentioned differences into account, we are not certain whether the subjective fear induced by the objective risk of terrorism will be expressed in the same way as that induced by natural hazards, such as a catastrophic earthquake (Li, Liu et al., 2009; Li, Rao et al., 2009; Li et al., 2010).

To better understand and analyze the terrorism risk in Xinjiang and other risks under investigation in a framework of risk classification, we can form a 3×2 table of risk source. Previous research has analyzed risk according to the source of harm or hazard, including social/man-made technological and natural hazards

Table 1. Classification of risk and for cases where evidence of the psychological typhoon eye effect have been reported in the media or in research

Rate of diffusion	Source of harm		
	Social/man-made hazards	Technological hazards	Natural hazards
Acute	German bombings of London (Wise, 2009) 9/11 terrorist attacks (Hoven et al., 2005)	Fukushima incident (Setiogi, 2011)	Earthquakes (Li, Liu et al., 2009; Li, Rao et al., 2009; Li et al., 2010; Wang et al., 2000; Xie, Xie, & Gan, 2011) SARS Epidemic (Xie, Stone, Zheng, & Zhang, 2011)
Chronic	(Psychological typhoon eye effect has not been reported in this category)	Industrial pollution (Tilt, 2006) Lead-zinc mining (Zheng et al., 2015) Nuclear power station (Guedeny & Mendel, 1973; Maderthaner, Guttman, Swaton, & Otway, 1978)	Biological invasion enters a new ecosystem without human intervention (the psychological typhoon eye effect has not been reported yet)

(Schneiderbauer & Ehrlich, 2004; Xie, Wang, Zhang, Li, & Yu, 2011). Social/human-made hazards are threats to communities that include human intent, negligence or error, and may involve the failure of a man-made system (Novelo-Casanova & Suárez, 2010); technological hazards are caused by misuse or accident in man-made technologies (Xie, Wang et al., 2011), whereas natural hazards are typically triggered by environmental changes (Schneiderbauer & Ehrlich, 2004). Risks are also categorized as acute versus chronic, according to their diffusion rate. Acute risks are nonroutine accidental hazards, whereas chronic risks cause harm gradually (Chakraborty, 2001; Chakraborty, Collins, Grineski, Montgomery, & Hernandez, 2014). Table 1 shows the six risk categories that result from crossing the aforementioned two factors: a source of harm and rate of diffusion.

Considering the persistency and transmissibility of the ever-present threat in Xinjiang terrorism, the PTE effect to be investigated in the present study can be categorized as a chronic, social/manmade risk, as shown in the bottom-left cell of Table 1.

Therefore, the present study aims to investigate whether the PTE effect, which was first observed in the context of acute and natural hazards, can be detected and replicated in the context of Xinjiang terrorism (chronic and man-made hazards). The survey findings are anticipated to provide clues for whether the loss of visitors to China-Eurasia Expo (specifically the loss of distant visitors) is in line with the phenomenon reported by this effect, that the further a person is to the center of a disaster area, the more concerned that person is with the safety and security of the area (Wei et al., 2017).

We therefore propose our working hypothesis: the spatial distance to a respondents' city of residence from Ürümqi and their levels of concern for safety and security concerning China-Eurasia Expo is positively related. That is, the closer the respondents live to Ürümqi, the less concerned they are with the safety and security of the expo. To test this hypothesis, we surveyed over 2000 residents from 31 provinces and municipalities of China about their concern for safety and security regarding the China-Eurasia Expo. We also measured the spatial distance from their residences to Ürümqi, the site of the Expo. We hope that the resulting findings could lead to a better understanding of the relationship between the objective danger and the subjective fear caused by terrorist threats.

Materials and methods

Data collection and sample

The sampling was limited to those who may have business with the China-Eurasia Expo, such as exhibitors, vendors, professional visitors, guests, staff, and ordinary audience, among others.

The sampling *inside* Xinjiang was coordinated by the Xinjiang Bureau of International Expo Affairs. A total of 100 anonymous questionnaires was distributed to individuals or organizations and enterprises associated with the China-Eurasia Expo by staff from local commerce authorities in 14 prefectures and cities in Xinjiang and the Commerce Bureau of Xinjiang Production and Construction Corps. Finally, 88 valid questionnaires were collected, representing a response rate of 88%. These questionnaires were returned to the Secretariat of China-Eurasia Expo by express mail.

The sampling *outside* Xinjiang was coordinated by the Xinjiang Uyghur Autonomous Region Merchants. A total of 2050 anonymous questionnaires was distributed to individuals or organizations and enterprises (about 30 questionnaires each) associated with the China-Eurasia Expo by staff from Xinjiang-stationed offices, chambers of commerce or associations from 28 provinces or municipalities, and staff from the local commerce department of Tibet and Hainan. Finally, 1946 valid questionnaires were collected, representing a response rate of 94.9%. These questionnaires were sent back to the Secretariat of the China-Eurasia Expo by express mail.

The nationwide survey was conducted from April 20 to June 20, 2018. Our final sample included 2034 individuals, residents of 31 of 34 provinces or municipalities of China, except for Hong Kong, Macao and Taiwan. Oral informed consent was obtained from all study respondents. The respondents were presented with a small gift, a toy memorializing the China-Eurasia Expo in the shape of its mascot, for completing the survey. Detailed demographic information about the respondents is presented in Table 2.

Measures

Concerns for the safety and security of the China-Eurasia Expo

Following the basic principle "the greater the risk, the greater the premium" in the insurance industry, and from the commonly used index Willing to Pay (WTP) from the area of economic behavior, the item "the cost of personal accident insurance that they would be willing to pay before attending the Expo" was developed to assess respondents' concerns about safety of the China-Eurasia Expo. Similarly, according to the principle "the greater the risk, the more security guards needed", the other item "estimated number of security guards needed per 10,000 attendees at the Expo" was developed to assess respondents' concerns about security of the Expo. The greater the number of guards or the cost of insurance, the higher a respondent's concerns about safety and security of the expo. These two items were interspersed among other questions about the preference of "halal food and the traditional Chinese Eight

Table 2. Survey respondents' demographic data ($N = 2034$)

		Percentage		Percentage	
Gender	Male	66.1	Education	Junior high school or below	1.0
	Female	33.9		High school	5.4
Age	Under 30	8.8	Junior college	18.8	
	30–39	19.1	Undergraduate	55.8	
	40–49	49.3	Postgraduate	19.0	
	50 and over	22.8	Numbers of times participated in the China-Eurasia Expo	0	49.1
Ethnic group	Han ethnicity	91.1	1	22.2	
	Minority ethnicities	8.9	2	17.5	
	Uyghur	2.3	3	6.3	
	Mongolian	2.0	4	3.4	
	Tibetan	0.8	5	1.4	
	Zhuang	0.6	Exhibitor	38.8	
	Hui	2.4	Vendor	16.4	
Residence	Kazakh	0.8	Professional visitor	3.3	
	Others	0.0	Guest	2.1	
	In Xinjiang	3.9	Ordinary audience	17.3	
	Not in Xinjiang	96.1	Staff	0.6	
			Unrelated	21.5	
			Identity of participants		

Cuisines” in a lengthy questionnaire. The wording of these two items is shown as follows:

How many security guards are needed for every 10,000 participants in the China-Eurasia Expo? _____ security guards.

How much would you spend on personal accident insurance to attend the China-Eurasia Expo? (0–1000 CNY) _____ CNY.

Distance to respondents' city of residence from Ürümqi

To measure the distance between a respondent's residential location and Ürümqi, we asked respondents to indicate the cities they lived in, and we calculated the distances using longitudes and latitudes.¹ The distribution of distance between respondents' residential geographical locations and Ürümqi are shown in Figure 2.

We also gathered demographic information, including each respondent's sex, age, education, ethnic group, number of times participated in the China-Eurasia Expo, identity of participants, and whether the respondent resided in Xinjiang or not.

Analyses

The data were analyzed on a personal computer using the R statistical software package (version 3.4.4 for Windows). Correlation coefficients were computed for all variables, including spatial distances and demographic variables. Hierarchical multiple regression analyses were conducted to evaluate the effects of spatial distance on the two items measuring concern for the safety and security of the expo. No missing values were found. All p values reported were two-sided, and p values $< .05$ were considered statistically significant.

Results

Table 3 shows the means and standard deviations for each measure, as well as the bivariate Pearson correlations for each pair of measures. Spatial distance was positively and significantly correlated with estimated number of security guards needed ($r = .45$, 95% CI [.42, .49], $p < .001$) and with the cost of personal accident insurance the respondent would be willing to pay ($r = .54$, 95% CI: [.50, .57], $p < .001$). These results provide initial support for our hypothesis that concern for the safety and security of the Expo did not attenuate over distance.

To determine how well spatial distances can explain respondents' concerns for the safety and security of the Expo, we conducted a hierarchical multiple regression analysis for each of the two safety and security measures. For each analysis, demographic variables were entered as predictors for the first step of a regression model; at the next step, spatial distance was entered together with demographic variables to determine the effects on the measure in addition to the controls.

We first analyzed respondents' estimated number of security guards needed, and the results of this process are shown in Table 4. Step 1 of the analysis used only demographic variables for predictors, which resulted in multiple R^2 of .06, $F(7, 2026) = 19.52$, $p < .001$. The next step included spatial distance as an additional predictor, resulting in multiple R^2 of .32, $F(8, 2025) = 118.02$, $p < .001$. A comparison of the two models indicated that the 25% increase in R^2 was statistically significant, $F(1, 2025) = 756.58$, $p < .001$. Moreover, spatial distance was positively related to the estimated number of security guards needed, $\beta = .66$ (95% CI [.62, .71]), $t(2025) = 27.51$, $p < .001$; thus, the closer were people to the area of potential terrorist threats, the less they were concerned for security (see also the scatterplot in Figure 3).

Table 3. Means, standard deviations, and pair-wise correlations of the measures

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Gender	N/A	N/A	-									
2. Age	2.86	0.87	-.05*	-								
3. Education	3.86	0.82	.13***	.08***	-							
4. Ethnic group	N/A	N/A	-.06**	-.04	-.16***	-						
5. Number of times participated in the China–Eurasia Expo	0.97	1.21	-.10***	.13***	.11***	.13***	-					
6. Residence	N/A	N/A	.08***	.06**	.13***	-.42***	-.20***	-				
7. Identity of participants	N/A	N/A	-.06**	.08***	.12***	.03	.28***	-.09***	-			
8. Spatial distance (kms)	2,518.57	703.48	.11***	.04	.25***	-.36***	-.13***	.61***	.04	-		
9. Estimated number of security guards needed	325.49	178.89	.12***	.02	.18***	-.13***	-.09***	.04	-.04	.45***	-	
10. Cost of personal accident insurance willing to pay (CNY)	316.58	186.22	.12**	.04	.21***	-.19***	-.07**	.25***	-.07**	.54***	.80***	-

Note: M, mean; SD, standard deviation. Variables were coded as follows: gender: 0 = male, 1 = female; age: 1 = Under 30, 2 = 30–39, 3 = 40–49, 4 = 50 and over; education: 1 = Junior high school or below, 2 = high school, 3 = Junior college, 4 = Undergraduate, 5 = Postgraduate; ethnic group: 0 = Han ethnicity, 1 = minority ethnicities; residence: 0 = in Xinjiang, 1 = not in Xinjiang; identity of participants: 0 = unrelated person, 1 = related person. N = 2034; *p < .05; **p < .01; ***p < .001.

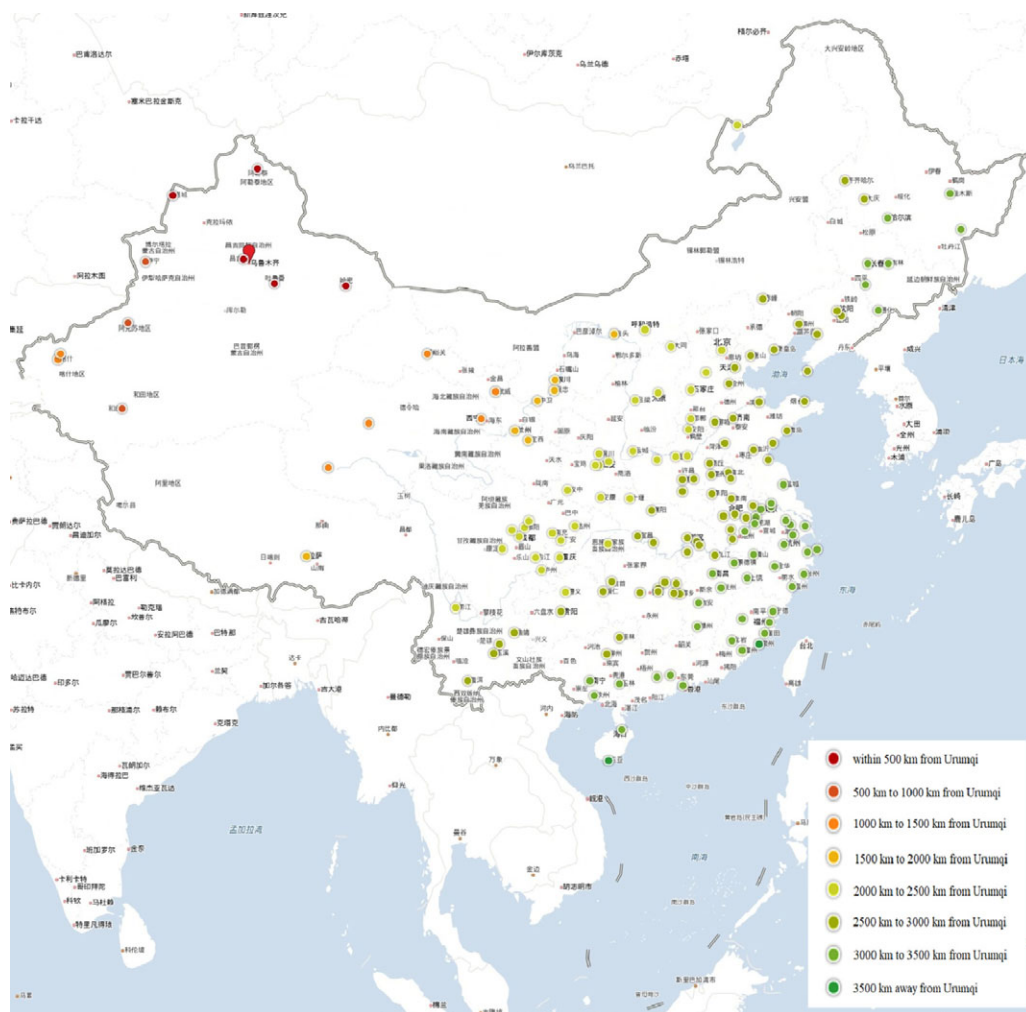


Figure 2. Distances between respondents' residences and Ürumqi, the site of the China–Eurasia Expo.

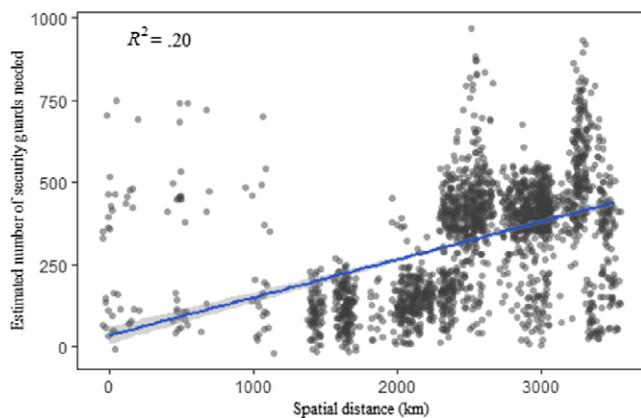
We conducted the same regression analysis, using the cost of personal accident insurance that the respondents would be willing to pay as the predicted variable, and the results are shown in Table 5. Again, step 1 included only the demographic variables

as predictors, and the regression had multiple R^2 of .11, $F(7, 2026) = 34.99, p < .001$. The next step included spatial distance as an additional predictor and resulted in multiple R^2 of .30, $F(8, 2025) = 118.14, p < .001$. A comparison of the two models

Table 4. Summary of regression analysis results for estimated number of security guards needed

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Step 1						
Gender	31.89***	8.27	.08	20.72**	7.07	.05
Age	4.83	4.51	.02	6.16	3.85	.03
Education	38.56***	4.92	.18	16.12***	4.28	.07
Ethnic group	65.53***	14.94	-.10	-21.96	12.85	-.04
Number of times participated in the China-Eurasia Expo	13.88***	3.44	-.09	-10.05***	2.94	-.07
Residence	-54.48*	22.24	-.06	-383.91***	22.45	-.42
Identity of participants	-13.58	9.81	-.03	-38.78***	8.42	-.09
Step 2						
Spatial distance				0.17***	0.01	.66
R^2						.32***
Adj R^2						.32***
ΔR^2						.25***

Note: $N = 2034$; * $p < .05$; ** $p < .01$; *** $p < .001$.

**Figure 3.** Scatterplot of spatial distance against estimated number of security guards needed, with the best-fitting regression line in the middle.

indicated that the 21% change in R^2 was statistically significant, $F(1, 2025) = 624.76$, $p < .001$. Furthermore, spatial distance was also positively related to the cost of personal accident insurance willing to purchase, $\beta = .60$ (95% CI [0.55, 0.65]), $t(2025) = 25.00$, $p < .001$; thus, the closer people were to the area of potential terrorist threats, the less willing they were to pay for personal accident insurance (see also the scatterplot in Figure 4). It should be noted that the two dependent measures, estimated security guards needed and the cost of personal accident insurance willing to pay, were highly correlated ($r = .80$; see Table 3), which may explain the similar results from the two analyses.

Thus, our analyses have shown that concern for safety and security at the China-Eurasia Expo is positively related to spatial distance between the respondent's residential geographical location and the site of the Expo. These findings should be interpreted in the light of the PTE effect relative to the impact of terrorism: the closer people are to a center of potential terrorist threat, the less concerned they are with it.

Discussion

In the context of terrorist attacks in Xinjiang, the PTE effect appears to hold for an under-investigated risk – chronic social/man-made hazards (bottom-left cell in Table 1). That is, the closer respondents lived to Ürümqi, a center of a potential terrorist threat in China and the site of the China-Eurasia Expo, the greater their estimated number of security guards needed at the Expo and the cost of personal accident insurance that they would be willing to pay before attending the Expo. Notably, the variable “closeness” measured in the present study is an objective physical distance, rather than a subjective “devastation level” reported in the finding of the Wenchuan earthquake (Li, Liu et al., 2009; Li, Rao et al., 2009). We note these findings of the PTE effect in response to terrorism: the closer the respondents lived to a high-incidence area of terrorism, the less concerned they were with the safety and security induced by the threat of terrorism.

In general, relative to other types of risk, terrorism risk has increased its prevalence in human societies and is affecting more people. However, it remains relatively under-investigated and needs to be researched regarding the mechanisms underlying the human response to the impact of such risks. The disparity between practice and research motivated us to investigate the mechanisms of the occurrence and development of risk perception in response to the threat of terrorist attacks.

In the context of terrorism, this study may be the first to report a discrepancy between residents' risk perception and real risk, although similar discrepancies have been reported for other risk types. For example, after the Fukushima incident following the Tohoku Earthquake on March 11, 2011, not the Japanese but the Chinese engaged in panic buying of salt, causing a shortage of salt in supermarkets in some major cities (Setiogi, 2011). The German government (but not the Japanese government) was compelled to re-evaluate nuclear power and decided to terminate the use of nuclear power in Germany by 2022 (Batsford, 2013).

In the context of terrorism risk, the duplication of the PTE effect means that those most concerned by terrorism are generally not those whose lives are most at risk. People can overreact and behave

Table 5. Summary of regression analysis results for amount of personal accident insurance the participants are willing to pay

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Step 1						
Gender	28.21***	8.40	.07	17.65*	7.36	.04
Age	5.43	4.58	.03	6.69	4.01	.03
Education	38.83***	5.00	.17	17.61***	4.45	.08
Ethnic group	-51.36***	15.18	-.08	-10.15	13.37	-.02
Number of times participated in China-Eurasia Expo	-4.02	3.50	-.03	-0.40	3.06	-.00
Residence	165.84***	22.60	.17	-145.73***	23.36	-.15
Identity of participants	-28.22**	9.96	-.06	-52.06***	8.77	-.11
Step 2						
Spatial distance				0.16***	0.01	.60
R^2			.11***			.32***
Adj R^2			.10***			.32***
ΔR^2						.21***

Note: $N = 2034$; * $p < .05$; ** $p < .01$; *** $p < .001$.

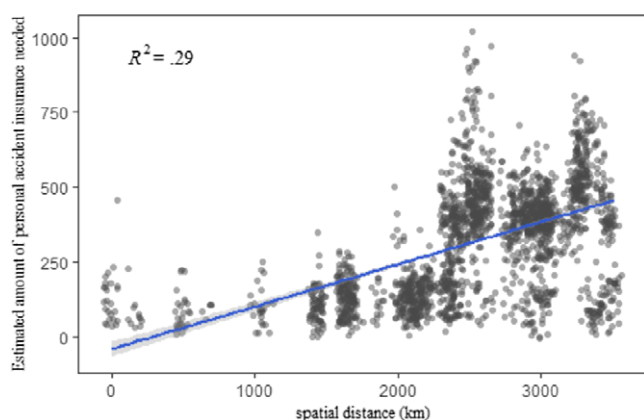


Figure 4. Scatterplot of spatial distance against cost of personal accident insurance willing to pay, with the best-fitting regression line in the middle.

irrationally when they overestimate the impact of terrorist attacks (e.g., Gaissmaier & Gigerenzer, 2012). This finding may explain why the loss of visitors to the China-Eurasia Expo were mostly from distant visitors. Thus, we should be cautious about interpreting results of risk perceptions and fully recognize the “mismatch” or “bias” between the risk perception assessed by the people who live closer to a given hazard site and the risk perception assessed by those living further away. Therefore, how to reduce the risk perception for people living far away and who have a low risk of being subjected to the negative consequences of terrorist attacks is key to managing the collective psychology of terrorism, and in the specific case of the China-Eurasia Expo, to regain its attractiveness to people outside the Xinjiang region.

Our research may also contribute to the tourism industry. Xinjiang is not only a high-incidence area of terrorism² but also rich in tourism resources. In particular, the implications we propose can be easily understood by considering the construal-level theory of psychological distance (CLT; Trope & Liberman, 2010).

A simple but effective guide provided by CLT is that the choices people make in response to distant events (e.g., considering a Xinjiang vacation in Beijing) are guided by abstract, higher level thinking, involving their general opinions of and attitudes toward a location (e.g., the safety of traveling in Xinjiang). However, when an individual is close to the situation (e.g., planning what to do while in Xinjiang), the choices made are guided more by concrete, lower level thinking, taking into account detailed aspects of the state of affairs (e.g., which restaurant to eat and which sight to visit). A corresponding guide for encouraging people to participate in the China-Eurasia Expo can be comparably proposed. For those who reside far away from (cf. psychologically distant situations) the site of the China-Eurasia Expo, soothing the invisible safety concern over the Expo by offering appropriate promotion (cf. *general* descriptions) may be a more effective way. For those who reside near (cf. are psychologically closer to the situation) the site of the China-Eurasia Expo, engaging or nudging people into seeing true signs about the interesting and exciting experiences they could have there, while correcting their (mis)perceptions of safety issues, may be a more effective way. Enabling people to think more concretely of Xinjiang (through various media channels) while presenting more concrete, safety-related numbers should help.

One of the problems that follows is the underlying mechanism of the PTE effect. This problem is also the limitation of the present study. Will the PTE effect detected in the context of man-made hazards share a domain-general mechanism with the PTE effect detected in the context of natural hazards? Or is the underlying mechanism for these two effects domain-specific, as suggested by Wang, Zheng, Xuan, Chen, and Li (2016)?

The potential explanations proposed for the PTE effect found in the Wenchuan earthquake, such as Festinger’s (1962) theory of cognitive dissonance and “psychological immunization” (Henderson, Montgomery, & Williams, 1972), have certain limitations. In the Wenchuan earthquake, we attempted to examine whether the psychological immunization theory (Henderson et al., 1972) could account for the PTE (Li et al., 2010), but the resulting finding revealed that the theory did not provide a

satisfactory explanation for these intriguing results. As for cognitive dissonance, no attempt has been made to test the applicability of Festinger's theory because manipulating the levels of cognitive dissonance in situations such as earthquake is difficult (Li et al., 2010).

Another possible limitation of this study is that we did not ask participants to directly rate their levels of concern for safety and security concerning the China-Eurasia Expo. The purpose of not measuring the participants' risk perception directly was to avoid the effects of "social desirability" and "political correctness". In future research, measuring the participants' risk perception directly and indirectly would be useful.

Detecting the PTE effect in the context of terrorism risk is very encouraging. The next task, exploring the underlying mechanism behind the effect, will be more arduous and challenging. It is also encouraging to note that a promising mechanism of the PTE effect, a "risk information proportion" account, was proposed as a post-hoc hypothesis in a recent study of investigating extended overseas PTE effect in response to COVID-19 (Yang et al., 2020). We hope such a challenging mission will attract increasing research attention in the near future.

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Endnotes

- 1 We used a computer program, which was provided by GPSSPG (<http://www.gpsspg.com/distance.htm>), to calculate distances.
- 2 Incomplete statistics show that from 1990 to the end of 2016, separatist, terrorist and extremist forces launched thousands of terrorist attacks in Xinjiang, killing large numbers of innocent people and hundreds of police officers, and causing immeasurable damage to property (State Council Information Office of the People's Republic of China, 2019).

References

- Bartels S.A. and VanRooyen M.J. (2012).** Medical complications associated with earthquakes. *The Lancet*, **379**, 748–757.
- Batsford S. (2013).** The great East Japan earthquake and tsunami viewed from western Europe: How has Fukushima influenced the peaceful use of atomic energy in Europe? *Tohoku Journal of Experimental Medicine*, **229**, 239–244.
- Bonanno G.A., Brewin C.R., Kaniasty K. and Greca A.M.L. (2010).** Weighing the costs of disaster: Consequences, risks, and resilience in individuals, families, and communities. *Psychological Science in the Public Interest*, **11**, 1–49.
- Chakraborty J. (2001).** Acute exposure to extremely hazardous substances: An analysis of environmental equity. *Risk Analysis*, **21**, 883–895.
- Chakraborty J., Collins T.W., Grineski S.E., Montgomery M.C. and Hernandez M. (2014).** Comparing disproportionate exposure to acute and chronic pollution risks: A case study in Houston, Texas. *Risk Analysis*, **34**, 2005–2020.
- Festinger L. (1962).** *A theory of cognitive dissonance* (vol. 2). Palo Alto, CA: Stanford University Press.
- Gaissmaier W. and Gigerenzer G. (2012).** 9/11, Act II: A fine-grained analysis of regional variations in traffic fatalities in the aftermath of the terrorist attacks. *Psychological Science*, **23**, 1449–1454.
- Guedeney C. and Mendel G. (1973).** *L'angoisse atomique et les centrales nucléaires: Contribution psychanalytique et sociopsychanalytique à l'étude d'un phénomène collectif*. Paris, France: Payot.
- Harada E.T. (2011).** Special issue: Cognitive studies in the real world. *Psychologia*, **54**, 67–67.
- Henderson A.S., Montgomery I.M. and Williams C.L. (1972).** Psychological immunisation: A proposal for preventive psychiatry. *The Lancet*, **299**, 1111–1113.
- Hoven C.W., Duarte C.S., Lucas C.P., Wu P., Mandell D.J., Goodwin R.D. ... Bin F. (2005).** Psychopathology among New York City public school children 6 months after September 11. *Archives of General Psychiatry*, **62**, 545–551.
- Institute for Economics and Peace. (2016).** *Global Terrorism Index Report*. <http://visionofhumanity.org/app/uploads/2017/02/Global-Terrorism-Index-2016.pdf>.
- Institute for Economics and Peace. (2017).** *Global Terrorism Index Report*. <http://visionofhumanity.org/app/uploads/2017/11/Global-Terrorism-Index-2017-Snapshot.pdf>.
- Li S., Liu H., Zheng R., Bai X.-W., Ren X.-P., Li J.-Z. ... Wang Z.-J. (2009).** Psychological typhoon eye in the 2008 Wenchuan earthquake of May 12. *Science & Technology Review*, **27**, 87–89.
- Li S., Rao L.-L., Bai X.-W., Ren X.-P., Zheng R., Li J.-Z. ... Liu H. (2009).** Psychological typhoon eye in the 2008 Wenchuan earthquake. *PLoS One*, **4**, e4964.
- Li S., Rao L.-L., Bai X.-W., Zheng R., Ren X.-P., Li J.-Z. ... Zhang K. (2010).** Progression of the "Psychological Typhoon Eye" and variations since the Wenchuan earthquake. *PLoS One*, **5**, e9727.
- Liu Z.K. (2012).** Exploring major disaster and psychological trauma, promoting mental health resilience and psychological harmony. *Bulletin of Chinese Academy of Sciences*, **27**, 191–198.
- Liu Z.K., Wu K.K. and Wang L. (2011).** Psychological and behavioral research after major disaster in China. *Advances in Psychological Science*, **19**, 1091–1098.
- Liu Z.K., Wu K.K. and Zhang K. (2011).** The current practice and challenges in psychological intervention after major natural disasters in China. *China Soft Science*, **5**, 56–64.
- Maderthaner R., Guttman G., Swaton E. and Otway H.J. (1978).** Effect of distance upon risk perception. *Journal of Applied Psychology*, **63**, 380–382.
- Mei C.-Q. and Zhang Y.-Q. (2015).** The status quo, characteristics and countermeasures of terrorist crimes in China. *Journal of Beijing Normal University (Social Sciences)*, (06), 174–182.
- Novelo-Casanova D. and Suárez G. (2010).** Natural and man-made hazards in the Cayman Islands. *Natural Hazards*, **55**, 441–466.
- Roosevelt F.D. (1941).** *Franklin D. Roosevelt Annual Message to Congress, January 6, 1941*; Records of the United States Senate; SEN 77A-H1; Record Group 46; National Archives.
- Schneiderbauer S. and Ehrlich D. (2004).** *Risk, hazard and people's vulnerability to natural hazards: A review of definitions, concepts and data*. Brussels: Office for Official Publication of the European Communities.
- Setiogi S. (2011).** Mixed uptake of social media among public health specialists. *Bulletin of the World Health Organization*, **89**, 784–785.
- Slovic P. (1987).** Perception of risk. *Science*, **236**, 280–285.
- Slovic P. (1999).** Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield. *Risk Analysis*, **19**, 689–701.
- State Council Information Office of the People's Republic of China. (2019, March).** *The Fight Against Terrorism and Extremism and Human Rights Protection in Xinjiang*. Retrieved from <http://www.scio.gov.cn/zfbps/32832/Document/1649931/1649931.htm>
- Tilt B. (2006).** Perceptions of risk from industrial pollution in China: A comparison of occupational groups. *Human Organization*, **65**, 115–127.
- Trope Y. and Liberman N. (2010).** Construal-level theory of psychological distance. *Psychological Review*, **117**, 440–463.

- Wang X.D., Gao L., Shinfuku N., Zhang H.B., Zhao C.Z. and Shen Y.C. (2000). Longitudinal study of earthquake-related PTSD in a randomly selected community sample in North China. *American Journal of Psychiatry*, 157, 1260–1266.
- Wang X.T., Zheng R., Xuan Y.-H., Chen J. & Li S. (2016). Not all risks are created equal: a twin study and meta-analyses of risk-taking across seven domains. *Journal of Experimental Psychology: General*, 145, 1548–1560.
- Wei Z.-H., Tao R., Liu H. and Li S. (2017). “Freedom from fear and want” and our psychological response to environmental changes. *Journal of Pacific Rim Psychology*, 11, E10.
- Wise J. (2009). *Extreme fear: The science of your mind in danger*. Macmillan.
- Xie J., Xie X. and Gan Y. (2011). Psychological typhoon eye effect in the Wenchuan earthquake. *Acta Scientiarum Naturalium Universitatis Pekinensis*, 47, 944–952.
- Xie X.F., Wang M., Zhang R.G., Li J. and Yu Q.Y. (2011). The role of emotions in risk communication. *Risk Analysis: An International Journal*, 31, 450–465.
- Xie X.-F., Stone E., Zheng R. and Zhang R.-G. (2011). The “Typhoon Eye Effect”: Determinants of distress during the SARS epidemic. *Journal of Risk Research*, 14, 1091–1107.
- Yang S.-W., Xu M.-X., Kuang Y., Ding Y., Zheng R., Rao L.-L. and Li S. (2020). Objective danger and subjective panic in Wuhan COVID-19: An extended overseas “Psychological Typhoon Eye” effect. *Chinese Journal of Applied Psychology*.
- Zheng R., Rao L.-L., Zheng X.-L., Cai C., Wei Z.-H., Xuan Y.-H. and Li S. (2015). The more involved in lead-zinc mining risk the less frightened: A psychological typhoon eye perspective. *Journal of Environmental Psychology*, 44, 126–134.