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### When do people feel more risk? The effect of ambiguity tolerance and message source on purchasing intention of earthquake insurance

Dongqing Zhu <sup>a</sup>, Xiaofei Xie <sup>a</sup> & Jiaqiu Xie <sup>a</sup>

<sup>a</sup> Department of Psychology, Peking University, Beijing, P.R. China

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## **When do people feel more risk? The effect of ambiguity tolerance and message source on purchasing intention of earthquake insurance**

Dongqing Zhu, Xiaofei Xie\* and Jiaqiu Xie

*Department of Psychology, Peking University, Beijing, P.R. China*

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The present study explored the impact of message source and ambiguity tolerance (AT) on risk perception and purchasing intention of earthquake insurance. Two months after Wenchuan earthquake, adult residents exposed to seismic hazard ( $n = 108$ ) were first asked to finish the AT scale and five items of risk perception. After being provided with a risk message from 'news media' (publicity) or 'peers' (word-of-mouth), they were instructed to report their intention to purchase the seismic insurance. All sociodemographic data were also collected. Results indicated an interaction of message source and AT on intention of buying earthquake insurance with risk perception as a mediator. Specifically, people with higher AT felt more risk and were more willing to buy earthquake insurance when the risk message is from publicity than that from word-of-mouth; while people with lower AT demonstrated nearly the same risk perception and intention of buying insurance under both types of information conditions. The results were interpreted in relation to heuristic systematic model of persuasion, and were discussed in terms of theoretical and practical implications.

**Keywords:** publicity; word-of-mouth; ambiguity tolerance; heuristic systematic model; risk perception; earthquake insurance

### **Introduction**

Earthquakes represent one of the most hazardous environmental risks of our time. According to statistics released by China Earthquake Administration, altogether 91 earthquakes of magnitude seven or over occurred worldwide from 2008 to 2011, of which Wenchuan earthquake, which happened in 2008, caused a large quantity of casualties and property losses. Also the magnitude nine earthquake, which struck Japan on 11 March 2011, triggered the tsunami which then caused the explosion in Fukushima Nuclear Power Station. Besides the extraordinary fatal aftermath, the nuclear crisis resulting from the earthquake, has attracted more attention from governments and scientists all over the world. Although human power would not allow us to control the occurrence of earthquakes, the damage and loss of life it entails are partially controllable by enhancing the effectiveness of risk communication.

Generally, the purpose of risk communication is to change individuals' awareness or behaviors by exchange and transmission of risk information. Mileti and Fitzpatrick (1992) reported that earthquake risk communication programs in Califor-

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\*Corresponding author. Email: [xiaofei@pku.edu.cn](mailto:xiaofei@pku.edu.cn)

nia in the USA had affected residents' risk perceptions. This process includes two kinds of influential factors, the objective characteristics of the information (e.g. information source, and information valence) and the psychological characteristics of the receivers (e.g. trust, personality, knowledge status, and valuation). Zhu, Xie, and Gan (2011) explored the moderation between information source and the valuation of information credibility on perception of seismic risk. Based on this work, the current research attempts to explore how personality, which is a different kind of psychological characteristic, makes the information from disparate sources play different roles. Moreover, previous study focused on the change of individuals' risk perception, but of particular relevance to this research is not only risk perception but also the willingness to make decisions. In particular, we investigate whether publicity and word-of-mouth, even when the substantive content of the message itself is constant, exert different impacts on risk perception and purchasing intention of earthquake insurance of recipients with high or low AT.

### *Heuristic systematic persuasion model*

The heuristic systematic model (HSM) is a model of attitude change proposed by Chaiken (1980) and later developed by Eagly and Chaiken (see Eagly and Chaiken 1993). It specifies two routes to persuasion: systematic processing and heuristic processing. Systematic processing determined by the ability and motivation of respondents to process message content carefully. Heuristic processing is triggered by the features of available information that enable the use of cognitive heuristics to form judgments and decisions. The current research borrows HSM of persuasion to give a comprehensive explanation of the interaction between AT orientation and message source on risk perception.

The HSM assumes that both modes of processing can occur simultaneously, such that they could sometimes act on each other. An example of a heuristic is 'experts can be trusted,' leading those using the heuristic mode to support more arguments advocated by experts. Systematic processing, in contrast, will attenuate the heuristic tendency to agree to the viewpoints espoused by experts. However, when weak arguments are presented by experts, heuristic processing can bias the systematic processing. Specifically, the perceived expertise of a source may form expectations of the validity of the experts' arguments, which then elevate the valuation of those arguments. It can be seen from the above example that message content and message source bring about systematic processing and heuristic processing at the same time.

### *Message source*

Message source is one of the most important traits of information. 'News media' (publicity) and 'peers' (word-of-mouth) are perceived as two important information sources which are confirmed to have strong effects on individuals' perception. Hoyer and Lievens (2005) revealed that both recruitment advertising and word-of-mouth could improve organizational attractiveness and they also summarized the different features between the two sources. Publicity is broadcasted as official news by non-personal mass communication, such as newspapers and television; while word-of-mouth information is disseminated as gossip via interpersonal communication with a higher degree of confidentiality. Therefore, people consider publicity much more

reliable than word-of-mouth depending on the different features of the two sources (Zhu, Xie, and Gan 2011).

### ***Ambiguity tolerance***

In consideration of the uncertain circumstances during the post-earthquake period, AT orientation could moderate the relation between message source and risk perception. AT is defined as the extent to which an individual perceives an ambiguous situation as a threat or a source of discomfort (Budner 1962). Afterwards, Bochner (1965) categorized the primary and secondary characteristics of ambiguity intolerance. One of the primary characteristics is 'early selection and maintenance of one solution in a perceptually ambiguous situation.' Frenkel-Brunswik (1951) also claimed that judging too soon and keeping original intentions was one of the important characteristics of ambiguity intolerance. Moreover, another difference between ambiguity tolerant and intolerant people is that the former may recognize the information characteristics more exactly in complex situations, and be more apprehensive about the features of the target. For example, Bandura (1982) found that individuals with higher AT should be better able to diagnose the task requirements and all salient task features when they were faced with a complex task.

According to the HSM, risk information including negative content could attract more attention from individuals (Cacioppo and Berntson 1994; Rozin and Royzman 2001) and thus induce the systematic processing. Therefore, ambiguity intolerant individuals could easily jump to conclusions based on the message content and thus constrain the heuristic processing, which subdue the effect of the message source. On the contrary, people with high AT would not get to the conclusion too soon. That means the heuristic processing would be aroused and message source would be taken advantage of. Of importance, ambiguity tolerant individuals recognize and apprehend more precisely the information characteristics and thus believe that publicity is more trustworthy than word-of-mouth. Hence, if the message came from the news media, the high AT were likely to count on the message content; if the message came from a peer, the high AT were not concerned about message content. In a word, the low AT care more about message content, whereas the high AT value message source more and would respond to risk depending more on publicity than word-of-mouth.

### ***Risk perception and decision-making***

From a traditional perspective, individuals' decision-making is believed to link directly to perception and cognition. Research on health decisions confirmed that risk perception, based on perceived probability and severity of the potential harm, was negatively related to respondents' personal willingness to enroll in a clinical trial (Yang et al. 2010). In driver distraction area, Titchener and Wong (2010) explored the close association between drivers' risk perception and a range of drivers' distractions and found that features inherent in the distractions may also contribute to risk perceptions. In addition, travel research provides ample evidence for the fact that the presence of risk influences the travel decision-making process (Mawby 2000; Pizam, Tarlow, and Bloom 1997; Sönmez and Graefe 1998). Furthermore, visitors' risk perceptions also influence the on-site behavior of tourists as well as their intention to return to a destination or to recommend it to others (Bar-

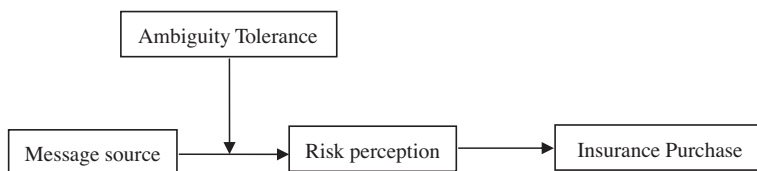


Figure 1. The objectives of the present study.

ker, Page, and Meyer 2003; George 2003). In disaster response domain, individuals' risk perception of hazards has been long theorized and empirically identified as an important predictor of people's decisions to adjust to various kinds of natural hazards, including flooding (Grothmann and Reusswig 2006), hurricanes (Peacock, Brody, and Highfield 2005), tsunamis (Johnston et al. 2005), as well as earthquakes (Lindell and Perry 2000; Whitney, Lindell, and Nguyen 2004). Moreover, Ozdemir and Yilmaz (2011) provided evidence that risk perception could to a great degree predict the likelihood of homeowners' purchasing the compulsory earthquake insurance in Istanbul where a major earthquake is expected within 30 years. Therefore, risk perception may mediate the moderation between message source and AT on decision-making.

### **Research model**

In this research, we not only attempt to examine the effect of individuals' inherent personality AT on risk perception in the process of risk communication, but also focus on how message source and AT affect the willingness to make decisions. This research is aimed at examining the impact of message source on risk perception and decision-making of individuals with high or low AT. According to HSM and the AT characteristics, ambiguity intolerant individuals could make decisions relying on message content and ignore where the message comes from; while ambiguity tolerant individuals could test the message source first, and then make decisions based on message content. In addition, individuals' decision-making is believed to link directly to perception and cognition. We thus predict that AT orientation could moderate the impact of message source on decision-making and such effect could be mediated by perceptions of seismic risk. Specifically, for the high AT, publicity tends to be successful at enhancing their risk perception and then their intention to buy the earthquake insurance, but word-of-mouth does not. For the low AT, it seems that they always focus on the information content; therefore it makes no difference to them and where the messages come from (see Figure 1).

### **Method**

Our study was conducted in the city of Mianzhu located less than 50 km away from the quake's epicenter Wenchuan Town, which became one of the most severely affected areas. After the earthquake occurred, the local inhabitants were settled in temporary tents. The target population consisted of only adults living in the tents.

### ***Participants and procedure***

In July 2008, two months after the earthquake, with the help of the local government, the trained experimenters visited the temporary tents and distributed the questionnaire to 115 adult inhabitants who indicated that they were interested in taking part in our survey. The sample was stratified with respect to age and gender. Finally, a total of 108 questionnaires were returned, with response rates of 93.9% ( $n=50$  in publicity condition,  $n=58$  in word-of-mouth condition).

After the participants were recruited, they were randomly assigned to two message conditions. First, they completed a survey assessing their AT and risk perception towards the earthquake. Then, they reported their reactions to earthquake insurance purchase. After that, they finished the items assessing the contextual variables. At last, all sociodemographic data were also collected. After finishing our survey, they received a gift or money for their time.

Of the 108 respondents, who all personally experienced the May 2008 earthquake, 53% were men ( $n=57$ ) and 47% were women ( $n=51$ ). Their ages ranged from 18 to 62 years ( $M=36.0$ ,  $SD=10.4$ ). As regards level of education, 20% of respondents had attended secondary school, 25% had a high school diploma, and 55% had a university degree. With respect to family composition, 51% of the respondents reported living in a household composed of three members, 29% lived with more than three persons, and 16% lived with another person, while 4% were single. Moreover, 32% of the participants lost friends or relatives in the earthquake; about half of the respondents (49%) were in a fair economic condition; 48% declared that their assets and houses were damaged badly.

### ***Measures***

#### *Ambiguity tolerance*

We used a 20-item scale, containing 15 reverse items, developed by MacDonald (1970) to capture individual differences in AT (e.g. 'A problem has little attraction for me if I don't think it has a solution', *reverse scored*). The full-item set is listed in Appendix A. Scale response items were 1 = *strongly disagree* to 5 = *strongly agree*. A higher score represented higher tolerance of ambiguity. We summed all items to create the AT score ( $\alpha = .79$ ).

#### *Risk perception*

Based on the five-factor model of risk perception (Liu, Huang, and Zhou 2006), Zhu, Xie, and Gan (2011) developed five corresponding items to inquire about the public perception of seismic risk. We also used these items to assess the victims' risk perception towards the earthquake. Sample items included 'How difficult do you think it would be to control the damages caused by the terrible catastrophe'; 'How often do you think there would be a great danger around you.' Respondents used a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*) to rate their post-earthquake feelings. A higher score represented feeling more risk, and we summed all items to create the insecurity score ( $\alpha = .90$ ).

#### *Contextual variables*

We identified several potentially relevant contextual variables. This section asked participants to answer the following questions: How many persons do you live

with? Did you lose your friends or relatives in the earthquake? (*yes/no*) How serious were your houses and assets damaged by this earthquake? (*little/fairly/badly*) How is your financial status? (*good/fair/bad*).

After that, we used a 16-item scale, developed by Cong and An (2004) to capture individuals' insecurity. Respondents reported their level of agreement using a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item is 'I am used to giving up my own desire or requirement.' A higher score represented higher insecurity. We summed all items to create the insecurity score ( $\alpha = .90$ ).

### *Sociodemographic information*

All sociodemographic characteristics and contextual variables were obtained at the end of the questionnaire. This section asked participants to report their gender, age, and level of education (e.g. secondary education certificate/senior school diploma/diploma or university degree).

### *Experimental design*

Since purchasing any kind of insurance against natural disaster is one of the protective behaviors (Miceli, Sotgiu, and Settanni 2008), and unrealistic optimism may not bias victims' decisions in a short time after the earthquake (Burger and Palmer 1992; Helweg-Larsen 1999), we chose earthquake insurance purchase as the decision-making scenario. Participants first received an essay describing 'Ming Wang,' an average victim, who suffered heavy losses in the earthquake and an account of why he bought earthquake insurance. After that, participants were asked to suppose that they were in the same situation and indicate their willingness to buy the earthquake insurance. And then they reported the information sufficiency in this scenario, which may well predict how people seek and process risk information (see e.g. Trumbo and McComas 2003). The descriptions of the contextual information were identical across conditions, except the source of message. Specifically, publicity was depicted as 'He learned the following information from newspapers, radio and television'; while word-of-mouth was depicted as 'He happened to hear those around him talking about the following information'. Participants were asked to read the description below:

Ming Wang is an average victim of Wenchuan earthquake. Due to the tremendous disaster, he had a deep and big crack in the roof of his house building. Recently, (*he learned the following information from newspapers, radio and television: He happened to hear those around him talking about the following information:*) The occurrence probability of strong aftershocks with magnitude of five or over might be very high in the foreseeable future. What the government could afford for the victims seemed to be very limited. So it could hardly compensate the heavy losses the aftershocks are likely to cause.

Meanwhile a local insurance company comes up with a new business – earthquake insurance. People who attend the earthquake insurance should pay earthquake insurance gold by the month. If aftershocks cause great damage, the insurance company will recompense the loss.

Ming Wang has reached his own decision on whether to purchase the earthquake insurance after much meditation.

After reading this description, participants were asked: 'If you were in the above situation, would you be willing to buy the earthquake insurance,' answers ranged from 1 (*not willing to buy at all*) to 7 (*quite willing to buy definitely*), and 'Is the provided information enough for you to make decision,' answers ranged from 1 (*not enough at all*) to 7 (*very enough*).

## Results

Means, standard deviations, and intercorrelations are presented in Table 1. Most of the correlations are low, but there are some that are noteworthy. As can be seen, risk perception was significantly correlated with intention of buying earthquake insurance ( $r = .29^{**}$ ), as well as AT ( $r = .22^*$ ). In accordance with previous research result (Ozdemir and Yilmaz 2011), we also found the economic condition was positively correlated to willingness to buy insurance ( $r = .21^*$ ). Furthermore, risk perception was positively associated with level of damage ( $r = .19^*$ ), as well as insecurity ( $r = -.22^*$ ), suggesting that personal experience and feeling may play a significant role in individuals' perception-forming process.

According to the correlations between variables, AT was correlated with age, level of damage, and insecurity. In order to examine the effect of the covariates between the above variables, we used independent sample *T*-test and found no significant differences of age ( $t(106) = .42, p > .05$ ), level of damage ( $t(106) = 2.29, p > .05$ ), and insecurity ( $t(106) = .09, p > .05$ ) between the two message source groups, suggesting that the covariates do not seem to affect our result.

## Moderation

In order to conduct the regression analyses, we coded the sociodemographic and contextual variables. For example, gender: female=0, male=1; level of education (dummy variables: ED1, ED2): secondary education certificate=(0,0), senior school diploma=(1,0), diploma or university degree=(0,1); loss of friends or relatives: no=0, yes=1; damage during the earthquake (dummy variable: DA1, DA2): little=(0,0), fairly=(1,0), badly=(0,1); and economic situation (dummy variable: ES1, ES2): bad=(0,0), fair=(1,0), good=(0,1). We also coded message source as follows: word-of-mouth=0, publicity=1.

While controlling for all sociodemographic and contextual characteristics, as well as information sufficiency, we conducted moderated hierarchical regression analyses to analyze how the intention of buying the earthquake insurance (treated as a dependent variable) was related to message source and AT.

Following the recommendation of Cohen et al. (2003), the message source and AT (continuous; mean-centered) were entered as predictors in the second step and their interaction was entered in a third step. The results demonstrated that neither message source ( $\beta = .08, p > .05$ ) nor AT ( $\beta = -.01, p > .05$ ) had significant effects on the intention of buying insurance. However, there was a significant interaction between message source and AT on purchasing intention of earthquake insurance ( $\beta = .19, p < .05$ ;  $\Delta R^2 = .04, \Delta F(1, 95) = 3.10, p < .05$ ).



Table 1. Means (M), standard deviations (SD), and correlations across variables.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender	.53	.50	1.00											
2. Age	36.03	10.39	.11	1.00										
3. Level of education	1.31	.78	-.11	-.33**	1.00									
4. Family composition	2.77	1.02	-.05	-.12	-.15	1.00								
5. Level of damage	1.43	.69	-.06	.17	.02	.19*	1.00							
6. Loss friends or relatives	.35	.48	-.16	.22*	.01	-.08	-.01	1.00						
7. Economic situation	1.02	.72	.04	-.06	.20*	.08	.06	.04	1.00					
8. Insecurity	32.56	9.42	-.09	.08	-.09	.01	-.06	.03	.08	1.00				
9. Ambiguity tolerance	43.29	8.80	.15	-.20*	.14	-.13	-.20*	-.10	.09	-.27**	1.00			
10. Risk perception	16.24	5.82	-.10	-.02	-.03	.10	.19*	.03	.11	.21*	-.22*	1.00		
11. Information sufficiency	5.12	1.14	-.03	.03	.11	-.11	-.01	.05	.02	.00	-.01	.08	1.00	
12. Buying insurance	4.69	2.49	-.00	-.01	-.06	-.01	.04	.11	.21*	.09	-.03	.29**	.13	1.00

Note: In order to analyze the correlations between the variables, gender was coded 0 for female and 1 for male; level of education was coded 0 for secondary education certificate, 1 for senior school diploma, 2 for diploma or university degree. Family composition was coded 1 for living alone, 2 for living with another person, 3 for living in a household composed of three members, 4 for living with more than three members. Damage caused by the earthquake was coded 0 for little, 1 for fairly, 2 for badly; loss of friends or relatives was coded 0 for no, 1 for yes; and economic situation was coded 0 for bad, 1 for fair, 2 for good. Buying insurance = intention of buying earthquake insurance. \* $p = .05$ . \*\* $p = .01$ .

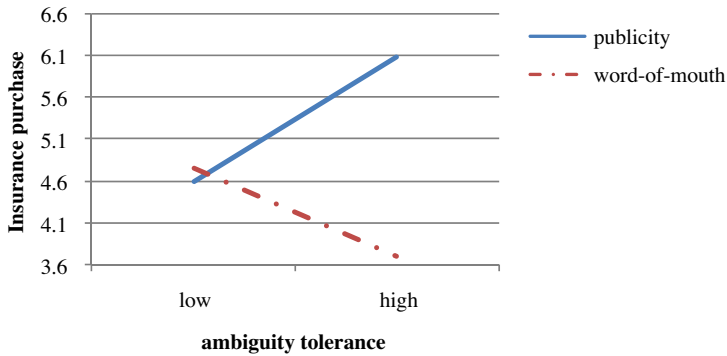


Figure 2. Insurance purchase as a function of message source and AT.  
Note: Plot depicts predicted means 1 SD lower and higher than average on the AT.

As illustrated in Figure 2, among participants with lower AT (1 SD lower than average on the AT), publicity and word-of-mouth condition in concern seemed to have similar effects on participants' purchase intention ( $M=4.60$  vs.  $M=4.76$ ;  $F(1, 20)=.01$ ,  $p>.05$ ). Whereas participants with higher AT (1 SD higher than average on the AT) expressed a more favorable purchase intention toward publicity than word-of-mouth ( $M=6.08$  vs.  $M=3.70$ ;  $F(1, 20)=7.84$ ,  $p=.01$ ). The results supported our prediction that ambiguity tolerant people were more willing to buy the seismic insurance when the message was publicity than word-of-mouth, but ambiguity intolerant people had nearly the same intention of buying insurance under both types of information conditions.

Similarly, we conducted moderated hierarchical regression analyses to analyze how risk perception (treated as a dependent variable) is related to message source and AT. The results showed that message source ( $\beta=-.21$ ,  $p<.05$ ) had a significant effect on risk perception, while AT did not show such an effect ( $\beta=.16$ ,  $p>.05$ ). However, there was also a significant interaction between message source and AT on risk perception ( $\beta=.25$ ,  $p<.05$ ;  $\Delta R^2=.06$ ,  $\Delta F(1, 95)=3.20$ ,  $p<.05$ ).

As illustrated in Figure 3, among participants with lower AT (1 SD lower than average on the AT), publicity and word-of-mouth condition in concern seemed to have similar effects on participants' risk perception ( $M=18.20$  vs.  $M=18.82$ ;

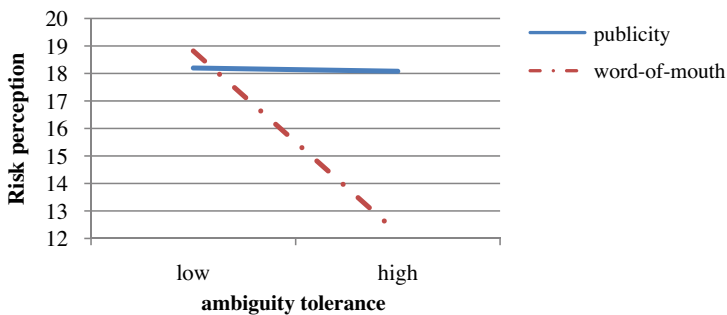


Figure 3. Risk perception as a function of message source and AT.  
Note: Plot depicts predicted means 1 SD lower and higher than average on the AT.

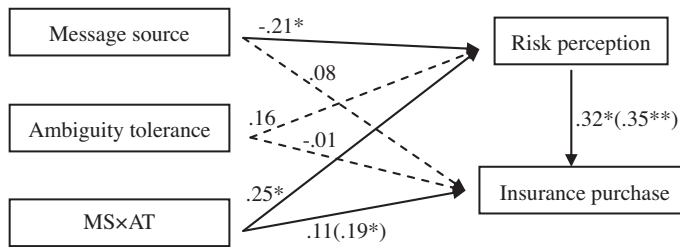


Figure 4. Regression results of mediation of risk perception.

Note: MS = Message source, AT = ambiguity tolerance, \* $p = .05$ , \*\* $p = .01$ .

$F(1, 20) = .09$ ,  $p > .05$ ). Whereas participants with higher AT (1 SD higher than average on the AT) expressed higher risk perception under publicity than word-of-mouth condition ( $M = 18.08$  vs.  $M = 12.20$ ;  $F(1, 20) = 13.27$ ,  $p < .01$ ). The results indicated that the high AT felt more risk under publicity than word-of-mouth condition, but the low AT did not.

### Mediation

Based on our analyses above, risk perception was a plausible mediator between the moderation of message source and AT and intention to buy insurance. To explore this possibility, we conducted a series of regression analyses while controlling for all other variables including sociodemographic characteristics, contextual variables, and information sufficiency. First, as previously shown, message source and AT interacted to influence both intention of buying earthquake insurance ( $\beta = .19$ ,  $p < .05$ ) and risk perception ( $\beta = .25$ ,  $p < .05$ ). In addition, risk perception predicted intention of buying earthquake insurance ( $\beta = .35$ ,  $p < .01$ ). Finally, when we entered the message source and AT main effect terms, the AT  $\times$  source interaction, and risk perception in a simultaneous regression model predicting intention of buying earthquake insurance, risk perception became a significant predictor ( $\beta = .32$ ,  $p < .05$ ), while the AT  $\times$  source interaction became insignificant ( $\beta = .11$ ,  $p > .05$ ). The results showed that risk perception did significantly mediate the moderation and intention of buying insurance (see Figure 4).

### Discussions

Our study highlights the interaction of message source and AT on intention of buying earthquake insurance and the mediation of risk perception between them. Specifically, the ambiguity tolerant people perceived the higher/lower risk ( $M = 18.08$  vs.  $M = 12.20$ ) and reported higher/lower level of intention to buy insurance ( $M = 6.08$  vs.  $M = 3.70$ ) under publicity/word-of-mouth condition. However, this was not the case with individuals with lower AT, whose risk perception and inclination of buying insurance were not significantly different ( $M = 18.20$  vs.  $M = 18.82$ ;  $M = 4.60$  vs.  $M = 4.76$ ) under the two information conditions. Thus it can be seen that ambiguity intolerant individuals seem to be only concerned about message content, but ambiguity tolerant individuals would place message source first and then focus on message content.

It is interesting that the above pattern of moderation between message source and AT that we found in the present study resembles the result of the previous research. Iyer and Ravindran (2009) were concerned about the effect of two incentive schemes, which rewards contributors for shared knowledge on ambiguity tolerant/intolerant people in an organizational environment. Their results manifested that for ambiguity tolerant individuals, an incentive mechanism that rewards the contributor for shared knowledge used by a knowledge user, and the knowledge user for the act of reuse, was more effective than a simpler incentive scheme that merely rewards knowledge sharing when usefulness level is low; and ambiguity intolerant individuals reacted equally to both types of incentive schemes regardless of usefulness. This pattern of moderation between AT and usefulness level of knowledge on sharing knowledge is similar to our result. Although the previous result was obtained in the organizational context, it still could verify our research's reliability to a certain extent.

It is worth noting that we assessed participants' intention of buying earthquake insurance by setting a decision-making context including different message conditions. In the context, we offered 'Ming Wang' this figure, but not so many details of insurance. Because according to the construal level approach, people advising others focus on the end state or outcome (i.e. desirability aspects). When evaluating personal decisions, however, people give more weight to the more specific process to achieve that outcome (i.e. feasibility aspects) (Liviatan, Trope, and Liberman 2008; Xu and Xie 2011). Therefore, if we directly made the participants suppose the situation, they may potentially be affected by some feasible issues, such as costs of insurance, detailed rules of compensation, his/her ability to cover financial costs, and so on; but if we provided 'Ming Wang' in the decision-making context and asked the participants to suppose Wang's situation, they may consider the purpose and significance of buying insurance more and care about some feasible factors less. Furthermore, we also measured information sufficiency as a control variable at the end of the section. Most people think the amount of the provided information is appropriate for making a decision ( $M=5.12$ ) and information sufficiency shows no significant correlation with the intention of buying earthquake insurance ( $r=.13$ ). Overall, it seems that we do not have to provide so much detailed information in the decision scenario. In this way, the experimental scenario could simplify a great deal so as to rule out the interference of the other factors.

Additionally, risk perception has long been identified and considered as an important predictor of people's actual behavior or behavior intention in many areas (e.g. health decision, driver distraction, tourism, and disaster response). The close connection between risk perception and willingness of making decision is supported by our research again. However, the previous researchers used different methods to measure risk perception. Some researchers used two items, focusing on likelihood and severity estimates of risk events, to measure risk perception, which is the generic and most frequently used strategy (Mulilis and Lippa 1990; Slovic 1987; Yang et al. 2010). Some researchers asked participants to assess risk event on different risk characteristics. For example, Titchener and Wong (2010) used nine qualitative characteristics to measure drivers' perception on distraction risk, including familiarity, knowledge, voluntariness, exposure, probability, and controllability. Schusterschitz, Schütz, and Wiedemann (2010) also used nine, yet different qualitative characteristics to assess tourists' perception on vacation risks, such as dreadfulness of the event of damage, memorability of the event of damage, and so on. Likewise,

we use participants' responses on five risk characteristics as an indicator for their perception of seismic risk. It is important to note that all above measures refer to a rationalist view of the construct of risk perception, which does not comprise affective aspects. But many researchers proposed risk perception may be properly conceptualized as a complex process which encompasses both cognitive and affective aspects (Loewenstein et al. 2001; Miceli, Sotgiu, and Settanni 2008; Slovic et al. 2004). Hence, future research could examine the effect of risk perception including affective dimension in an earthquake context.

### *Limitations and implications*

The current study has a number of limitations that should be addressed in future research. First, as a questionnaire survey, it might be argued that the number of our sample is not so great. In fact, it is very difficult for us to collect data only two months after the destructive earthquake. On one hand, most of the earthquake victims living in the tents just lived a stable life. However, strong aftershocks still rocked the area frequently and they had to keep moving around all the time. On the other hand, because Mianzhu City is located in a mountain area, the cost of data collection is very high and our available resources including the assistance from the local government are limited. The above two reasons lead to the relative small size of our sample. While we have attempted to minimize this problem in every way we can, this problem is still a concern and might be one of the aspects which may affect the results observed in the study. Second, this is a single study and the findings may be unreliable. However, we used experimental design to attempt to improve its reliability. In this section, we set a purchasing earthquake insurance context, which were described identically across conditions except the source of message. Furthermore, we controlled the effects of many other related variables and excluded the variables covariates effect in our analyses. In addition, as mentioned above, the analogous pattern exists in the earlier literature. All of these strengthened our research's reliability to a certain extent.

In comparison with previous research, the research theoretically extends the HSM and AT areas. As to the HSM, unlike the previous finding that systematic processing usually improved the quality of decision, whereas heuristic processing biased individuals' decisions (Chaiken 1980; Eagly and Chaiken 1993), we focused on the positive effect of heuristic processing, with a finding that message sources can sometimes help people make more advisable decisions. As to AT area, the vast majority of the researches on AT are almost conducted in organizational context (Endres, Chowdhury, and Milner 2009; Lewin and Stephens 1994; McCormick 2001). However, we examined how AT influenced victims' decisions in the crisis environment so as to enrich the AT area and expand the applied scope of AT.

In addition to these theoretical contributions, the study has clear practical implications. After the earthquake disaster occurred, word-of-mouth inevitably turned into all sorts of rumors. Since rumors, as a form of word-of-mouth, may have a greater impact on ambiguity intolerant people, government administrators need to correctly guide the special group who are at high risk of rumors. So as to help individuals not fall into confusion and withdrawing help following rumors.

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## Appendix A. AT scale

1. A problem has little attraction for me if I do not think it has a solution.
2. I am just a little uncomfortable with people unless I feel that I can understand their behavior.

3. There is a right way and a wrong way to do almost everything.
4. I would rather bet 1 to 6 on a long shot than 3 to 1 on a probable winner.
5. The way to understand complex problems is to be concerned with their larger aspects instead of breaking them into smaller pieces.
6. I get pretty anxious when I am in a social situation over which I have no control.
7. Practically every problem has a solution.
8. It bothers me when I am unable to follow another person's train of thought.
9. I have always felt that there is a clear difference between right and wrong.
10. It bothers me when I do not know how other people react to me.
11. Nothing gets accomplished in this world unless you stick to some basic rules.
12. If I were a doctor, I would prefer the uncertainties of a psychiatrist to the clear and definite work of someone like a surgeon or X-ray specialist.
13. Vague and impressionistic pictures really have little appeal for me.
14. If I were a scientist, it would bother me that my work would never be completed (because science will always make new discoveries).
15. Before an examination, I feel much less anxious if I know how many questions there will be.
16. The best part of working a jigsaw puzzle is putting in that last piece.
17. Sometimes I rather enjoy going against the rules and doing things I am not supposed to do.
18. I do not like to work on a problem unless there is a possibility of coming out with a clear-cut and unambiguous answer.
19. I like to fool around with new ideas, even if they turn out later to be a total waste of time.
20. Perfect balance is the essence of all good composition.