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# How trust in the government's flood response influences perception of flood hazard risk: Experimental evidences in China

**Kai Li**[1] | **Feng Yu**[1] | **Shenlong Yang**[2] | **Yongyu Guo**[3]

[1]Department of Psychology, Wuhan University, Wuhan, Hubei, China

[2]Institute of Social Psychology, School of Humanities and Social Science, Xi'an Jiaotong University, Xi'an, China

[3]School of Psychology, Nanjing Normal University, Nanjing, Jiangsu, China

**Correspondence**
Feng Yu, Department of Psychology, Wuhan University, Wuhan, Hubei, 430072, China.
Email: psychpedia@whu.edu.cn.

Yongyu Guo, School of Psychology, Nanjing Normal University, Nanjing, Jiangsu, China.
Email: yyguo@njnu.edu.cn

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## Abstract

Many studies have found that trust is a vital factor that influences risk perception. However, previous studies in this field have used surveys that provide limited information about causality. Therefore, experimental studies to explore the causality between trust and risk perceptions are needed. We conducted three studies to examine the relationship and mechanism of trust in the government's flood response and flood hazard risk perception. In Study 1, we found that people's risk perception and trust in the government's flood response were significantly negatively correlated. In Studies 2 and 3, using correlational and experimental methods, we found that the higher the public's trust in the government's flood response, the more they used heuristics to process risk information, and their risk perception was lower than that of the group with low trust in the government's flood response. Our research provides evidence of causality between trust and risk perceptions, suggesting that trust in the government's flood response can influence risk perception via heuristics in China, which provides a better understanding of the importance of trust in risk perception. These conclusions have policy implications for government responses to flood disasters, emphasizing the need for public participation and timely, transparent communication of accurate information and preventive strategies.

**KEYWORDS**
information processing, perception of flood hazard risk, trust in the government's flood response

**Public significance statement**

Trust in the government's flood response is negative with risk perception, this relationship can be explained by information processing. People have more heuristic processing when they have high trust in the government's flood response, then they will have lower risk perception.

## INTRODUCTION

Floods are a very destructive natural disaster (Kellens et al., 2013). In 2016, Wuhan, China, suffered from serious floods (see news by BBC. *China flooding: Wuhan on red alert for further rain*[1]). Risk perception refers to people's subjective estimation of the likelihood and dread (Slovic, 1987). As people sometimes do not take suggestions made by the government because of their misperception of floods risk (Bradford et al., 2012), clarifying the complex relationship between trust in the government's flood response and risk perception is becoming increasingly vital to increase the efficiency of risk communication (O'Sullivan et al., 2012).

Trust – which stems from people's judgments concerning an authority's propensity to be open and honest – serves to reduce people's perception of the complexity and uncertainty of a situation (White & Johnson, 2010). In risk domain, trust encompasses social trust and confidence (Earle, 2010; Earle et al., 2007). By reducing complexity, trust helps people to act in a complex environment (Siegrist, 2021). It also improves the understanding of people's risk perceptions. Moreover, it enables people to cope with different hazards in society and respond rationally (Siegrist & Cvetkovich, 2000; Viklund, 2003; Welch et al., 2005). Terpstra (2011) noted that trust and affect share similarities – both constructs reduce the complexity of risk judgment and consequently serve as "quick" guides for assessing risks. In the past decades, the relationship between trust and risk perception has received great attention (e.g., Freudenburg, 1993; Nakayachi & Cvetkovich, 2010; Shi et al., 2015; Siegrist et al., 2021).

People's satisfaction with specific public services reflects their trust in government, which is crucial for enhancing government performance and public legitimacy (Christensen & Laegreid, 2005). Moreover, trust in government influences physical health and social relationship more significantly (Liang, 2016). Government and social trust play indispensable roles in shaping risk perceptions, trust in central government leads to lower risks perceptions (Ma & Christensen, 2019). People with higher degrees of trust in government perceive lower consequences of potential earthquakes and tend to prepare less (Han et al., 2016).

Previous studies found that information processing styles can explain the relation of trust and risk perception. For example, researchers found that trust, as an information clue, had a significant effect on systemic information processing. Specifically, for high-confidence information, individuals rarely utilize detailed identification and processing – rather, they rely more on their

[1] https://www.bbc.com/news/world-asia-china-36721514

previous attitudes. Contrastingly, for low-confidence information, individuals think more about the issue (De Dreu & Beersma, 2010). Heuristic information processing is the process of "using a limited amount of available information to apply simple reasoning rules, patterns, or cognitive shortcuts to make judgments or decisions." While, systematic information processing is "a thorough and logical approach where people examine and evaluate all the information related to their judgment task, and combine all the helpful information to form their judgments" (Smerecnik et al., 2012). Concurrently, the researchers found that heuristic information processing was negatively correlated with disease risk perception and nuclear risk perception, and systematic information processing was positively correlated with risk perception (Tortosa-Edo et al., 2014; Trumbo & McComas, 2003, 2008).

However, the importance of trust has often been questioned (Siegrist, 2021; Sjöberg, 2001; Vainio et al., 2017; Viklund, 2003). Some researchers found that trust will decrease risk perception (Tumlison et al., 2017; Vainio et al., 2017). While, some researchers argue that a weak correlation exists between trust and risk perception (Lin et al., 2008; Sjöberg, 2001). Moreover, previous research has not clarified the relationship between trust and risk perception that is whether trust causally influences risk perception is not clear (Siegrist, 2021). Eiser et al. (2002) insist that trust does not causally influence risk perception, and both variables are simultaneously influenced by people's attitudes. Given the complexity of trust, it is essential to distinguish between its various forms. General trust in an institution differs from specific trust in its various facets. For example, general trust in government includes confidence in its low corruption levels, efficient use of tax revenues, and responsiveness to public opinion. While low trust in the use of tax funds may not influence flood risk perception, low confidence in the government's risk management significantly increases it (Terpstra, 2011). Investigating the relationship between public trust in the government's flood response and their risk perception is crucial. This analysis underscores the necessity of enhancing trust in specific governmental functions rather than relying solely on general trust in risk management.

## LITERATURE REVIEW

### Government trust and flood risk perception

Previous studies have demonstrated that trust plays a crucial role in perceived risk, often resulting in a reduced level of risk perception. For instance, Terpstra (2011) and Hung (2009) discovered that trust in public flood protection was negatively associated with preparedness. Additionally, Grothmann and Reusswig (2006) reported that relying on flood protection was negatively correlated with information seeking and the adoption of flood-mitigation measures in the past.

In contrast, some researchers have questioned the relationship between trust and the perception of hazards (e.g., Eiser et al., 2002; Sjöberg, 2001; Viklund, 2003). For instance, Sjöberg (2001) found a weak correlation between trust and risk perception. Lin et al. (2008) indicated that higher levels of trust or confidence in crisis management and the provision of flood warnings (by government, risk experts, and the media) increased mitigation intentions, insurance purchase intentions, and information-seeking intentions. In China, weather changes and flood hazard information are released to the public by government-run media. Information on whether flood risk occurs is also disseminated by the government. Therefore, we focus on trust in the government's flood response, which encompasses people's confidence and intentions regarding government protection.

## Trust in the government's flood response, information processing, and flood risk perception

Trust is one of the factors that affects information processing (Petty et al., 2002). Frewer et al. (1997) employed experimental methods to test the relationship between the processing of food safety information and the confidence of information sources. They found that the credibility of information sources had a negligible effect on the internalization of information, while the content of persuasive information or the type of disaster played a more prominent role (Frewer et al., 1997). Trumbo (2002) suggested that those who systematically process risk information might find that some problems are worth worrying about; thus, their risk perception will be high.

Previous research suggested that processing styles maybe the mediating various between trust and risk perception. According to elaboration likelihood model theory, trust is one of the factors that affects information processing (Petty et al., 2002). For low-involvement and high-confidence issues, individuals do not have sufficient motivation to process the information; thus, their previous attitudes guide their opinions (i.e., heuristic information processing). Contrastingly, for high-involvement and low-confidence issues, people utilize systematic processing. In this respect, high-reliability sources, such as experts, may be more persuasive than low-reliability sources (Pornpitakpan, 2004). Trust will influence the way individuals think about messages; moreover, the form of information processing has various consequences (Cacioppo et al., 1986). Using the ELM, researchers found the mechanism that links trust, information processing, and risk perception in the fields of food (Frewer et al., 1996), cancer (Tortosa-Edo et al., 2014), nuclear power (Trumbo & McComas, 2008), and climate change (Shi et al., 2015).

Nonetheless, the prior research has some limitations. First, the mechanism between trust and risk perception remains unclear. Previous research focuses on trust in information, the role of trust in the government's flood response is unclear. Second, do systematic or heuristic strategies mediate the relationship between trust in the government's flood response and flood risk perception? Third, prior research was conducted with correlational studies; the causality issue remains to be solved.

To address these limitations, we conducted three studies. We hypothesized the following: H1: Trust in the government's flood response is negatively associated with risk perception. H2: Trust in the government's flood response is positively associated with heuristic processing. H3: Trust in the government's flood response is negatively associated with systematic processing. H4: Heuristic processing is negatively associated with risk perception. H5: Systematic processing is positively associated with risk perception. H6: Heuristic processing and systematic processing mediate the relationship between trust in the government's flood response and risk perception.

## The present research

We designed three studies to examine the psychological mechanism through which trust in the government's flood response affects the public's perception of risk in the context of flood threats in China. Study 1 examines whether the relationship between trust and risk perception exists. Study 2 examines the mechanism of the effects of trust and risk perception. In Study 3, we designed an experiment to re-examine whether trust in the government's flood response has an impact on information processing methods and affects subsequent risk perception.

The present research expands on previous studies in three important ways. First, it examines the relationships of trust in the government's flood response and risk perception in China,

broadening the scope of risk perception research beyond Western, educated, industrialized, rich, and democratic samples (Henrich et al., 2010). Second, the relationship between trust and risk perception is elucidated with flood risk as a backdrop, using correlational and experimental methods, which will ensure robust results. Third, we examined the mechanism of trust and risk perception.

## STUDY 1

Study 1 was designed to examine whether trust in the government's flood response is negatively associated with the public's perception of flood risk. We collected data using the questionnaire method and observed the relationships between variables.

## Method

### Participants

To obtain small-medium power (effect size $f^2 = .05$ in a linear multiple regression analysis), a G*Power analysis suggested a total sample size of 159 participants was needed to obtain a power of .80 (Faul et al., 2009). However, because we did not know the "true effect," we oversampled in Study 1. Therefore, we recruited 360 participants in Wuhan, China, in 2016. Wuhan is downstream of the Yangtze River; thus, it is often threatened by flood risk during the June-to-September monsoon season (Liu et al., 2014). Forty invalid questionnaires were excluded for random responding (i.e., giving the same answer to all items or reporting an age > 100 years). Thus, the data from 320 participants were analyzed (216 women, 103 men, one did not report sex; there are two people with primary school education or below, four people with junior secondary education, seven people with senior secondary education, 242 people with university education, and 65 people with postgraduate education or above. $M_{age} = 23.34 \pm 6.23$ years).

### Materials

*Trust in the government's flood response*

We measure trust in the government's flood response using a single item. Specifically, we asked the participants how much they would trust the government in managing flood risks in Wuhan after having experienced the rainfall that caused waterlogging in 2016. Responses were made on a five-point Likert scale (1 = *completely distrust* to 7 = *completely trust*).

*Risk perception of flood*

Six items were adapted from Lin et al. (2008) and revised for the current context (e.g., "I feel worry/fear/panic recently"). Participants responded to each item on a scale ranging from 1 = *not at all* to 5 = *extremely*. Cronbach's alpha in this study was .83.

### Procedure

This study was approved by the Ethics Review Board of the XX University. We recruited participants by the Sojump, Sojump is an online participant recruitment platform in Mainland China. Participants gave their input on the trust in the government's flood response scale, completed the

**TABLE 1** Correlations between measures of gender, age, trust in the government's flood response and risk perception ($N = 320$).

| | M | SD | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 1. Gender | .32 | .47 | 1 | | | |
| 2. Age | 23.34 | 6.23 | −.07 | 1 | | |
| 3. Trust | 3.82 | 1.34 | −.03 | −.21** | 1 | |
| 4. Risk perception | 2.77 | .76 | −.05 | .11 | −.26** | 1 |

*Note*: M, mean; SD, standard deviation.
**$p < .01$.

flood risk perception questionnaire, and provided demographics information (in that order). We used SPSS 23.0 software for statistical analyses.

## Results

People's trust in the government significantly negatively associated with risk perception ($r = -.26$, $p < .001$) (see Table 1). People's trust in the government can significantly predict their risk perception ($b = -.25$, $p < .001$) after control the effect of age ($b = .10$, $p = .07$). These analyses indicated that trust in the government's flood response is negatively correlated with risk perception. In Study 2, we further tested the relationship between trust in the government's flood response and risk perception and the mechanism behind them.

## STUDY 2

Study 2 explores the mechanism behind why trust and risk perception are negatively correlated. We hypothesized that information processing methods mediate the effect of trust in the government's flood response on risk perception (H2–H5).

## Method

### Participants

A priori power analysis (using the pwr2ppl package in R) indicated that a sample of 753 gives a power of .95 to detect effects as small as $f^2 = .02$. A total of 900 questionnaires were distributed. After excluding 37 invalid questionnaires (missing data), the sample included 863 individuals (447 women, 416 men; $M_{age} = 20.93 \pm 2.06$ years).

### Procedure

This study was approved by the Ethics Review Board of the XX University. Paper questionnaires were distributed in the libraries and study rooms of universities in Wuhan. At the beginning of the questionnaire, all participants were fully informed that their anonymity was guaranteed, and

they could choose to withdraw at any time. If they completed the study, a small gift (about .5 U.S. dollars at the time of the study) was provided. All participants also provided demographic information.

## Materials

*Trust in the government's flood response scale*

This research refers to the measurement method of Ter Huurne and Gutteling (2009) on company trust, which was revised to "trust in the government's flood response" for this study. The questionnaire contains five statements, such as, "I believe the government will take measures as much as possible to minimize the flood threat faced by the people" (1 = *completely unbelieve*, 5 = *completely believe*). In this study, Cronbach's $\alpha$ was .87.

*Information processing method questionnaire*

The questionnaire used by Trumbo and McComas (2003, 2008) was used. Systematic processing comprised four items; a sample item is "When I see information related to flood threats, such as weather and river water levels, I need to think carefully about its reliability and authenticity." Ratings were provided on a 7-point Likert scale from 1 (*not at all*) to 7 (*extremely*), with higher scores indicating more systematic processing. Cronbach's alpha was .65 in this study. Heuristic processing comprised three items; a sample item is "Past experience makes it easy for me to judge the severity of the flood threat we face." Ratings were provided on a 7-point Likert scale from 1 (not at all) to 7 (extremely), with higher scores indicating more heuristic processing Cronbach's alpha was .73 in this study. Concerning these low internal consistency values, scholars have suggested that measuring heuristic processing is relatively difficult because people are reluctant to admit that they quickly form judgments with insufficient information (Trumbo & McComas, 2008). In general, although this measurement tool is not ideal, previous studies showed that it can predict risk perception well (Trumbo & McComas, 2008).

*Risk perception questionnaire*

We used five questions to measure risk perception. Sample items are "During the rainy season in the next five years, if Wuhan is faced with the same rainfall as the summer of 2016, then what do you think is the possibility that Wuhan will encounter urban waterlogging again?" and "During the rainy season of the next five years, if Wuhan again faces the same rainfall as the summer of 2016, how serious do you think the impact of the flood problem will be on Wuhan?" Participants responded to each item on a scale ranging from 1 = *not at all to* 7 = *extremely* ($\alpha = .72$).

## Results

We first computed correlations between trust in the government's flood response, information processing, and risk perception. As predicted by Hypothesis 1: People's trust in the government significantly negatively associated with risk perception ($r = -.18$, $p < .01$). H2 was supported: Trust in the government's flood response is positively associated with heuristic processing ($r = .28$, $p < .001$). H4 was supported: Heuristic processing is negatively associated with risk perception ($r = -.16$, $p < .001$). H3 was not supported: Trust in the government's flood response is

**TABLE 2** Correlations between measures of trust in the government's flood response, information processing and risk perception ($N = 863$).

| | M | SD | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 1. Trust | 5.30 | 1.11 | 1 | | | |
| 2. System processing | 4.04 | 1.13 | −.02 | 1 | | |
| 3. Heuristic processing | 4.90 | 1.14 | .28** | −.26** | 1 | |
| 4. Risk perception | 3.33 | .73 | −.18** | .03 | −.16** | 1 |

*Note*: M, mean; SD, standard deviation.
**$p < .01$.

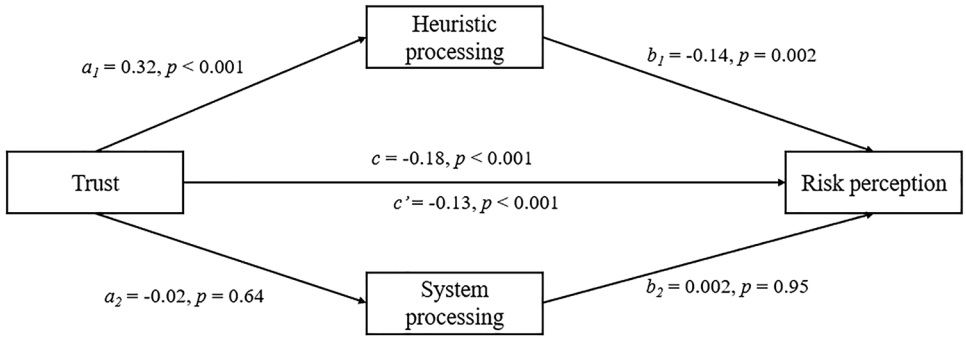


**FIGURE 1** Parallel mediation analysis of heuristic processing and system processing, number of bootstrap samples = 5000.

negatively associated with systematic processing ($r = -.02$, $p = .64$). H5 was not supported: Systematic processing is positively associated with risk perception ($r = .03$, $p = .33$) (see Table 2).

## Analysis of the mediation effect of information processing

A mediation analysis was conducted to examine whether information processing style can mediate the trust in the government's flood response and risk perception. We used Hayes Process Macro model 4 (Bootstrapping was set to 5000 resamples) to estimate our model. The results found: The total effect of the trust in the government's flood response on risk perception was significant ($b = -.18$, $SE = .03$, 95% CI (−.24, −.11), $p < .001$). The trust in the government's flood response significantly positively associated with heuristic processing ($b = .32$, $SE = .04$, 95% CI (.25, .40), $p < .001$). The association of trust in the government's flood response and system processing is not significant ($b = .02$, $SE = .03$, 95% CI (−.08, .05), $p = .64$). Heuristic processing significantly negatively associated with risk perception ($b = -.10$, $SE = .07$, 95% CI = [−.16, −.03], $p = .002$). System processing did not predict risk perception ($b = .002$, $SE = .06$, 95% CI = [−.07, .07], $p = .95$). The mediating effect of heuristic processing in trust in the government's flood response and risk perception was significant, while, the mediating effect of system processing was not significant. Figure 1 shows results of the parallel mediation analysis for Study 2.

## STUDY 3

Study 2 demonstrated a negative correlation between people's risk perception and their trust in the government's flood response, mediated by heuristic processing. However, Study 2 employed a questionnaire method, which precluded causal inference. To overcome this limitation, we conducted an experiment in Study 3 to test whether trust in the government influences the information processing methods and the subsequent risk perception of the participants.

## Method

### Participants

We recruited 183 participants using the regional settings of the Questionnaire Star platform. We asked the subjects if they were in Wuhan in July 2016. All of them were in Wuhan in July 2016. But five of them did not complete all the items and eight of them completed the experiment less than 1.5 min or more than 5 min. Thus, the final sample consisted of 160 participants ($M_{age} = 23.98 \pm 4.91$ years; 97 women and 63 men; 75 read low-trust materials and 85 read high-trust materials).

### Procedures and materials

The experiment used a single factorial between-groups design with independent (experimentally introduced perceived trust), dependent (risk perception), and mediating (system processing and heuristic processing) variables.

Participants were asked to read materials for either the low- or high-trust group: The low-trust group reviewed documents portraying the government as unreliable, citing evidence of consistent failure in disaster scenarios. Conversely, the high-trust group examined texts asserting that the government invariably proves reliable when facing disasters.

Thereafter, to test the priming effect, we asked the participants how much they trust the government (the same as Study 1). Then, they competed the information processing method questionnaire, the risk perception questionnaire (the same as Study 2), and provided basic demographic information. The information processing method and risk perception questionnaires were the same as those in Study 2. In this study, the Cronbach's alpha coefficients of the system processing dimension, heuristic processing dimension, and risk perception questionnaire were .78, .54, and .72, respectively. Finally, participants were informed of the real purpose of the experiment.

## Results

### Effectiveness of trust in the government's flood response manipulation

The results revealed that the score of the participants in the high-trust group ($M = 5.32$, $SD = 1.39$) and the score of the participants in the low-trust group ($M = 4.40$, $SD = 1.59$) significantly differed ($t(158) = 3.90$, $p < .01$), which shows that manipulating participants' trust in government in this experiment was effective. The high-trust group was coded as a dummy variable ("1"), and the low-trust group was coded as a dummy variable ("0").

**TABLE 3** Descriptive statistics and intercorrelations between variables ($N = 160$).

| Variables | High trust | | Low trust | | Comparison between groups | | |
|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | *t* | *p* | *d* |
| 1. Heuristic processing | 3.11 | .68 | 2.93 | .57 | 1.79 | .08 | .28 |
| 2. Systematic processing | 4.35 | 1.24 | 4.29 | 1.27 | .32 | .75 | .05 |
| 3. Risk perception | 3.42 | .75 | 3.64 | .50 | 2.20 | .03 | .34 |

*Note*: M, mean, SD, standard deviation.
$^{**}p < .01$.

## Descriptive and relevant analysis

SPSS 23.0 was used to describe and analyze the main variable data. The results are shown in Table 3. A significant difference was found in the scores of the high-trust group and the low-trust group for heuristic processing. The high-trust group used heuristic processing more ($M = 3.11$, $SD = .68$) than did the low-trust group ($M = 2.93$, $SD = .57$; $t(158) = 1.79$, $p = .08$, $d = .28$), the post hoc power analysis found that the statistical power for a significance level of .05 was .92. The risk perception of the high-trust group ($M = 3.42$, $SD = .75$) was significantly lower than that of the low-trust group ($M = 3.64$, $SD = .50$; $t(158) = 2.20$, $p = .03$, $d = .34$), the post hoc power analysis found that the statistical power for a significance level of .05 was .98.

## Analysis of the mediation effect of information processing

We test the mediation model again using the Hayes Process Macro model 4 (Bootstrapping was set to 5000 resamples). The results revealed that the association of trust in the government's flood response and heuristic processing was marginally significant ($b = .18$, $SE = .10$, 95% CI = [−.02, .38], $p = .08$), the post hoc power analysis found that the statistical power for a significance level of .05 was .87, supporting Hypothesis 2. However, trust in the government's flood response did not predict system processing ($b = .06$, $SE = .20$, 95% CI = [−.33, .46], $p = .75$), Hypothesis 3 was not supported. Heuristic processing significantly negatively associated with risk perception ($b = -.22$, $SE = .08$, 95% CI = [−.38, −.06], $p = .006$), the post hoc power analysis found that the statistical power for a significance level of .05 was .95. System processing did not predict risk perception ($b = .02$, $SE = .04$, 95% CI = [−.06, .09], $p = .66$). Again, the mediating effect of heuristic processing in trust in the government's flood response and risk perception was significant, while, the mediating effect of system processing was not significant. Figure 2 shows results of the parallel mediation analysis for Study 3.

# GENERAL DISCUSSION

Flood hazards occur very frequently, and how individuals perceive flood hazards is a critical component for formulating risk communication. People's trust in the government has a great influence on risk perception. In the past, scholars have shared different opinions on whether trust can affect people's risk perception. Siegrist and Cvetkovich (2000) emphasized that trust has an important influence on risk perception; however, this point has been strongly questioned by Sjöberg (2000). Notably, all prior research was conducted in Western countries. In China,

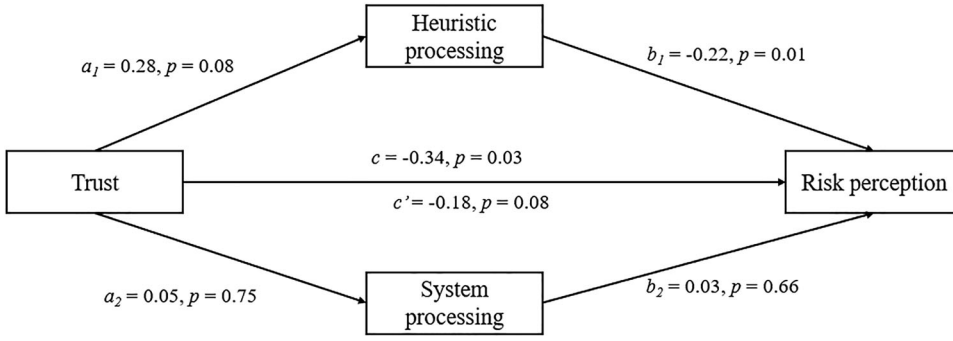


**FIGURE 2** Parallel mediation analysis of heuristic processing and system processing, number of bootstrap samples = 5000.

urban development is solely the responsibility of the government, not the citizens. The degree of diligence in flood prevention and the completeness of measures against extreme rain disasters are factors that influence trust in the government. Historically, the government has completely dominated urban construction and often vigorously promoted the perfection and beauty of city development. However, when faced with extreme weather such as torrential rains, these cities struggle to cope effectively with the disasters, leading many citizens to have almost no trust in their government. Furthermore, due to the lack of transparency in government operations and official corruption, public trust in the government is very low.

Our research makes at least three key contributions. First, we identified whether trust affects risk perception. Although, according to cultural theory, different cultural groups worry about distinct issues (Douglas & Wildavsky, 1982; Kahan et al., 2010), risk perceptions vary with cultural biases (i.e., worldviews; Wildavsky & Dake, 1990) and experience with previous hazards (Kellens et al., 2011; Lindell & Hwang, 2008; Terpstra, 2011). Researchers suggest that considering peoples' perceptions, social factors, psychological factors, and culture is essential (Bempah & Øyhus, 2017). Study 1 utilized a real, urban waterlogging risk event as the backdrop and examined the relationship between people's trust in the government and their risk perception. We revealed that the more people believe in the government, the lower their risk perception. This is consistent with previous results in the fields of food risk perception (e.g., Lu et al., 2015). While, the mechanism behind trust and risk perception still unclear.

Second, we explored the mechanism between trust and risk perception using flood risk as the backdrop. Studies 2 and 3 used two different methods to jointly test the negative relationship between trust and risk perception using information processing; that is, to answer the question, "How does trust work?", we clarified the importance of trust in risk perception and elucidated the key influential mechanisms. Studies 2 and 3 showed that the negative correlation between trust in government and risk perception could be explained by information processing methods. During floods, the higher the public's trust in the government, the more they will use heuristics to process risk information; their risk perception will also lower. This result is partly consistent with previous results (e.g., Trumbo, 2002). Trust is a state of mind, which refers to the possibility of accepting vulnerability (Rousseau et al., 1998) under the premise of making positive expectations of the intentions or actions of others. This mental state of trust makes it possible to reduce the complexity of things and prevent people from thinking too much about potential risks (Siegrist & Cvetkovich, 2000). People tend to use heuristic processing when they have a high

level of trust in the government, thus leading to a lower risk perception (Trumbo & McComas, 2008).

Third, this research found that when trust in the government's flood response is negative with risk perception, this relationship can be explained by information processing. Similar with the conclusion drawn by Tortosa-Edo et al. (2014), which was based on chemical pollution risk. Compared with chemical pollution risks, people have more experience with flood risks (Ge et al., 2011), thus, people may have more heuristic processing when facing flood risks. Future research can focus on how different risk events affect people's psychological processing mechanisms.

Our research highlights key policy implications for government flood risk responses. Effective flood management requires public participation in both emergency responses and preventive measures. This necessitates timely, transparent communication of accurate information by the government and the provision of preventive strategies. To prevent panic, the government must reassure the public about its flood prevention measures and response capabilities. Excessive risk perception can cause panic, while insufficient perception can lead to neglect of precautions. High trust in government responses encourages heuristic processing, reducing risk perception and promoting adherence to safety measures.

This study also has some limitations. First, the sample representativeness was limited. Although adult participants were employed in Study 1, the sampling scope was still limited to young populations, the samples obtained by using *Sojump* are usually college students with relatively high education levels, and they cannot fully represent the general public, the findings cannot be generalized to older populations. Second, this research utilized self-reported information processing methods, which are prone to key biases (e.g., social approval), this may lead very low reliabilities. Future research needs to explore more effective tools to capture participants' information processing. Third, the priming materials we used in Study 3 may not have just differed in terms of the perceived competence of the government; they also varied in how they framed the severity of the flooding. As a result, it may be challenging to distinguish the effects of trust from those of severity. Assessing participants' perceptions of these manipulations in future studies would be valuable. Finally, we did not did not measure general trust in government but trust in a specific function of government (flood mitigation), which leads to our manipulation of trust was "close" to risk perception. Future research can examine how the general trust in government influence information processing and risk perception.

## CONCLUSIONS

Trust in the government's flood response can influence risk perception of flood, the higher the public's trust in the government, the more they will use heuristics to process risk information; their risk perception will also lower

### AUTHOR CONTRIBUTIONS

Conceptualization, Kai Li, Feng Yu, and Yongyu Guo; methodology, Kai Li, Feng Yu, and Yongyu Guo; formal analysis, Kai Li; data curation, Kai Li,; writing – original draft preparation, Kai Li; writing – review and editing, Kai Li, Shenlong Yang; supervision, Feng Yu; funding acquisition, Yongyu Guo. All authors have read and agreed to the published version of the manuscript.

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## CONFLICT OF INTEREST STATEMENT

We declare that we do not have any commercial or associative interest that represents a conflict of interest in connection with the work submitted.

## DATA AVAILABILITY STATEMENT

Data will be provided if requested to the authors.

## OPEN RESEARCH BADGES

This article has earned Open Data badge. Data are available at https://osf.io/t8a5q/.

## ORCID

*Kai Li* https://orcid.org/0000-0002-3688-2418
*Yongyu Guo* https://orcid.org/0000-0002-4378-9350

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