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# Clearing the Smog? Examining the Relationship Between Traditional Media Versus Nontraditional Internet-Based Media and Risk Information Seeking in China

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Studies have examined the risk information seeking and processing (RISP) model across a range of contexts. However, few studies have examined media use as a predictor variable in the model or situations in which media outlets could provide people with different information on the same topic. This article examines the relationship between traditional and nontraditional Internet-based media in China and important variables (i.e., risk perceptions and emotions) related to the RISP model. With two rounds of cross-sectional survey data, our results show that traditional sources are associated with lower concern, ultimately translating into decreased negative emotions and lower intentions to seek out information, whereas the results show the opposite pattern for nontraditional online communication. Our findings extend the RISP model by connecting media use to information seeking, showing that the use of different media outlets could lead to different information-seeking tendencies through important intervening variables.

*Keywords: media use, RISP model, risk perception, negative affect, information seeking*

The World Health Organization (WHO, 2019a) has highlighted that air pollution is a major environmental risk to human health. Exposure to air pollution is a problem because it increases the likelihood of people suffering from a variety of health issues such as respiratory ailments (e.g., coughing and asthma), cardiovascular diseases (e.g., hypertension and stroke), and lung cancer (Gallagher et al., 2010; WHO, 2018). The WHO (2019b) estimates that ambient air pollution has been linked to 4.2 million deaths every year worldwide. The effects of air pollution are not limited to individuals' health; indeed, air pollution can also reduce agriculture yields (Lanzi, 2016). Although it affects countries around the world, the worst

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outcomes are concentrated in developing countries (e.g., China, India, Iran, Pakistan, and the Philippines; WHO, 2019c). China, in particular, has been dealing with problems associated with air pollution for decades. In particular, the issue of smog, which is concentrated air pollution, afflicts many population centers in the country. To address this problem, the Chinese government declared a "war" on air pollution in 2014 (Climate & Clean Air Coalition, 2019). However, despite some incremental improvements, air pollution generally, and smog specifically, continues to be a problem in China.

Traditional news media regulated by the Chinese government have reported progress regarding the problem of air pollution. However, some media outlets within the country have been more critical regarding the detrimental health consequences of air pollution. In essence, the public is receiving seemingly divergent information regarding the health threat versus any progress being made on controlling air pollution in China. These divergent messages could play an important role in creating concern, triggering reactions, and ultimately resulting in differences in people's information-seeking tendencies. Extant research has suggested that different media outlets could be associated with different or even opposite views regarding the same topic (Hmielowski, Feldman, Myers, Leiserowitz, & Maibach, 2014; Mou, 2012). If different outlets are providing people with different content regarding the issue of air pollution in China, viewers might report different levels of concern regarding this issue, which could affect their willingness to seek out new information on this matter. In essence, outlets that largely communicate information approved by the Communist Party, which focuses less on the risks tied to air pollution in China, could contribute to lower levels of concern and reduced anxiety connected to the risk, thereby resulting in lower levels of information-seeking behavior regarding this problem. By contrast, outlets that include a wider range of opinions, including a greater emphasis on the problems tied to air pollution in China, could increase perceived risk and anxiety regarding this problem. These higher levels of perceived risk and anxiety could result in greater intention to seek out information regarding air pollution in China.

This study used the risk information seeking and processing (RISP) model (Griffin, Dunwoody, & Neuwirth, 1999). Specifically, we examine a communication process model to investigate whether using traditional media and nontraditional Internet-based media results in different information-seeking tendencies through perceived threat and negative affect. For our article, we focus specifically on the smog problem in China. We first assess whether traditional (print or television) and nontraditional (online) media are associated with different perceptions of risk tied to smog. We then assess whether risk perceptions lead to information seeking through negative affect. To test these relationships, we collected two rounds of survey data in China.

## Literature Review

### *Risk Information Seeking and Processing Model*

This article uses the RISP model to understand people's information-seeking tendencies regarding smog as an environmental risk and health threat in China. The RISP model outlines the underlying processes that lead individuals to seek out and process risk information (Griffin et al., 1999). A number of factors precede the amount of effort people are willing to put forth regarding information-seeking and information-processing behaviors. The first antecedent variable predicting the ultimate outcome is people's level of

information sufficiency. The model uses information sufficiency to reflect the gap between how much information people have on a topic and how much they believe they need (Griffin et al., 1999). In essence, people assess their information needs regarding risks: The larger the gap between current knowledge and perceptions of how much they need, the more effortful the triggered seeking behaviors. The model also outlines that the link between sufficiency and seeking can be moderated by relevant channel beliefs (e.g., trust in a source) and people's perceived information-gathering capacity. The next antecedent variable is people's level of affective response tied to the risk (e.g., worry, anger). Affective response is preceded by cognitive evaluations of the characteristics of a hazard. Perceived hazard characteristics are preceded by several individual-level variables, such as relevant hazard experience, gender, ethnicity, and social status. This study devotes specific attention to the paths among perceived hazard characteristics, affective response, and information seeking (Griffin et al., 1999).

Although the RISP model is comprehensive, scholars using the RISP model have spent less time on some potentially important predictors (e.g., media) that could explain increases in risk perceptions. In the model, one of the main characteristics associated with perceived hazard characteristics is experience with the hazard. Relevant hazard experience in the RISP model includes people's direct experience with a hazard and/or indirect experience with a hazard that they believe is relevant (Griffin et al., 1999). In general, much of the work on the RISP model has focused on people's direct experience with risks. However, people do not always have direct experiences with risks (Kasperson et al., 1988). Therefore, in addition to direct experience, vicarious (indirect) experience coming from sources such as the media tied to certain events (Akerlof, Maibach, Fitzgerald, Cedeno, & Neuman, 2013; Kasperson et al., 1988) is a way for people to learn about hazards. In essence, it is important to expand on the hazard experience to pull apart direct (e.g., my own experience) and indirect experience (e.g., learning about it on TV) in the model.

In recent studies, researchers have tried to incorporate media as a predictor variable in the RISP model. For example, Ho, Detenber, Rosenthal, and Lee (2014) examined the indirect relationship between media use and the intention to seek out information through perceived risk and negative affect in the context of climate change among Singaporeans. Focusing on general media use in Singapore (e.g., print, television, and online news), Ho and colleagues' (2014) study showed that media use was associated with higher levels of information seeking through greater perceived risk and anxiety. Because there is little dispute over climate change in the media in Singapore, it makes sense that consuming media tied to this issue was associated with higher levels of information-seeking tendencies. However, not all media systems present people with one dominant message regarding issues within a country. For example, in the United States, different media outlets present different messages to the public regarding climate change (Feldman, Maibach, Roser-Renouf, & Leiserowitz, 2012). Therefore, it is worth examining how media outlets presenting people with different information could affect people's perceptions of these important issues, such as the issue of smog in China.

### *Traditional Versus Nontraditional Internet-Based Media*

Up to the 1980s, the Communist Party had near total control over all media outlets in China, leading the government to dominate the range of opinions presented to the public (Hallin & Mancini, 2011). A series of economic reforms in the 1990s resulted in increased access to sources that provided a wider range of opinions

than those presented in the more traditional state-supported outlets in China. Although many media outlets (e.g., television, radio, and magazines) were still state-run, new non-traditional sources started to penetrate the media market. Access to these outlets became even more pronounced after the Internet became available to the public in 1994. During 1995, the government voiced concern about losing control over the flow of information on the Internet. As a result, it enacted stricter rules regarding access to specific websites (Taubman, 1998). However, a range of new, nontraditional outlets emerged in China despite continued restrictions to accessing online information. These outlets include news websites and portals (e.g., Sina News, NetEase News), bulletin board systems (e.g., Tianya), blogs (e.g., Sina blogs, Wangyi blogs), and social media platforms (e.g., Sina Weibo). The nontraditional outlets, particularly the sources that are available online, have become increasingly popular in China (Huang & Lu, 2017; Zhou, 2011). For example, news portals (websites) such as Sina and Sohu have more daily viewers than traditional outlets such as the People's Daily (Noam, 2016). Another popular nontraditional outlet is Weibo, a Twitter-like service that became available to the public in 2009 with around 566 million current active users in China. Although these nontraditional Internet-based media companies follow instructions from the Department of Propaganda to remove sensitive messages (Zeng, Chan, & Fu, 2017), some information critical of the regime in China still makes its way to the public via coded language and proxies (e.g., virtual private networks [VPNs][1]; F. Yang, 2016).

From a general perspective, traditional and nontraditional outlets provide Chinese citizens with different worldviews. For example, more traditional outlets (i.e., state-run newspapers) generally promote social fairness and justice to increase harmony and stability within the country (Brady, 2009). These outlets present information that largely supports the Communist Party, and sometimes their coverage downplays social issues that reflect poorly on the government, such as wage inequality, government corruption, food safety, and environmental pollution (Luo, 2014). Although these new, nontraditional outlets include news and opinions that align with the Communist Party, they also likely provide Chinese citizens with an open and interactive public space that includes access to a wider range of opinions, some of which criticize the government and allow people to express concerns and discontent regarding issues such as corruption, environmental pollution, and food safety (Bondes & Schucher, 2014; Rauchfleisch & Schäfer, 2015). Moreover, some of these outlets include information regarding social movements that criticize the current social order in China (Feng & Feng, 2016).

General differences in coverage can manifest themselves in how traditional and nontraditional outlets report on specific issues in China. For example, Li and Qin (2001) found differences in coverage between the *People's Daily* (a traditional, state-sponsored newspaper) and *Qiangguo Forum* (a popular, nontraditional bulletin board system in China) regarding the American and Chinese aircraft collision incident in 1999. Although *Qiangguo Forum* is sponsored by the Chinese government and is affiliated with the *People's Daily*, Li and Qin showed that it included a wider range of opinions compared with traditional media outlets (e.g., the *People's Daily*). Specifically, *Qiangguo Forum* provided the name of a Chinese pilot involved in the crash before traditional media did and reported that the United States did not apologize for the incident; meanwhile, the *People's Daily* reported that the Chinese government had accepted an apology from the United States (Li & Qin, 2001).

[1] A VPN is a tool for encrypted computer communication. VPNs are commonly used by businesses and individuals in China to prevent the government from viewing the information people are consuming online. In essence, it helps to circumvent the government and enables a long list of overseas websites to cover topics the government considers to be politically sensitive (Bradsher, 2012).

### *Media and Risk Perceptions*

Research has shown that media plays an important role in understanding people's risk perceptions (Wachinger, Renn, Begg, & Kuhlicke, 2013). Moreover, scholars have argued that different portrayals of information across media outlets lead people to hold different perceptions of risk-related issues (Wahlberg & Sjoberg, 2000). In terms of general media effects, studies have found an association between media use and risk perceptions across different contexts (e.g., alcohol-related risks and risks tied to cancer; Slater & Jain, 2011). Scholars have also looked at the ways that media use could shape people's views of impersonal risks (e.g., environmental risks). Specific to environmental risks, Ho and colleagues (2014) and X. Wang (2017) found an association between media use and environmental risk perceptions among Asians. More importantly, research has shown that media outlets that present different portrayals of issues can be associated with people holding different views on important science and environmental issues. For instance, in the United States, the use of conservative media, which is skeptical of climate change, tends to be associated with doubts about the existence of climate change (Hmielowski et al., 2014). By contrast, the use of liberal and nonpartisan media in the United States, which generally reports on the scientific consensus tied to climate change, tends to be associated with believing that climate change is real and human-caused (Hmielowski et al., 2014). Although people likely use information from different perspectives (Holbert, Hmielowski, & Weeks, 2012), these studies show the importance of looking at the unique correlations for different media outlets.

Examining whether the use of different media outlets leads to different perceptions on important issues has also been applied to traditional and nontraditional outlets in China. One study showed that using traditional media outlets was associated with people seeing lower levels of government corruption, while the use of nontraditional outlets (e.g., grapevine news), where more corruption cases are reported, was associated with higher levels of perceived government corruption (Zhu, Lu, & Shi, 2013). Similarly, Mou (2012) found that the use of traditional, state-run media outlets (e.g., TV news and newspapers) was not associated with increased risk perceptions regarding food safety in China. By contrast, use of the Internet and Weibo was associated with higher levels of perceived risk, higher levels of engaging in preventive actions—for example, "I search for food safety information," "I purchase food products only from those retailers which I trust" (p. 59)—and higher levels of negative emotions.

Based on the research presented earlier, we believe that the use of traditional media outlets and nontraditional Internet-based outlets could be associated with people holding different views regarding the issue of smog in China. Although traditional media outlets have not completely ignored this issue in the past five years, they tend to pay less attention to the causes and negative effects of air pollution and are more likely to describe smog as "a natural phenomenon without serious impact on public health" (Liu & Li, 2017, p. 399). As a result, using outlets that emphasize these messages should be associated with lower levels of perceived risk regarding smog in China. By contrast, research that shows nontraditional outlets being more critical of the Chinese government might imply that people will be more likely to see content emphasizing problems associated with smog in China in nontraditional outlets. As a result, use of these outlets could be associated with higher levels of perceived risk. Based on the research presented in this section, we formulated our first hypothesis as follows:

*H1a:* *There will be a negative relationship between the use of traditional media and the perceived severity of smog in China, with higher levels of traditional media use associated with lower levels of perceived severity.*

*H1b:* *There will be a positive relationship between the use of nontraditional Internet-based media and the perceived severity of smog in China, with higher levels of nontraditional Internet-based media use associated with higher levels of perceived severity.*

### *Risk Perceptions and Affect*

One focus of the RISP model relevant to this article is the relationship between risk perceptions and affect. Griffin and associates (1999) proposed that risk perceptions induce negative affective responses. In essence, perceived hazard characteristics are based on the estimations of susceptibility and severity toward a perceived risk, potentially triggering different emotions (Griffin et al., 1999; Z. J. Yang & Kahlor, 2013). A series of empirical studies using the RISP model have shown that risk perceptions are associated with negative emotions such as worry and anxiety (e.g., Z. J. Yang & Kahlor, 2013; Z. J. Yang, Kahlor, & Griffin, 2014).

Other studies have also found similar relationships between risk perceptions and affect (e.g., Sjöberg, 2007). For example, Sjöberg (2007) found positive associations between risk perceptions on a variety of topics (i.e., terrorism, mobile phones, genetically modified foods, and nuclear waste) and eight negative emotions (anger, contempt, fear, sorrow, guilt, shame, worry, and pessimism). Mou and Lin (2014) found that higher perceived health risks in relation to food safety were associated with negative emotions such as anger, sadness, fear, anxiety, and resentment expressed by the Chinese public. Researchers also found a relationship between risk perceptions and negative emotions in the context of impersonal risks (Griffin et al., 2008). Because smog can be regarded as both an environmental and health risk, perceptions regarding air pollution should be associated with negative emotions such as worry and anxiety. Therefore, we propose the following hypothesis:

*H2:* *There will be a positive relationship between perceived severity and negative affect, with greater perceived severity associated with higher levels of negative affect.*

### *Affect and Information Seeking*

A number of studies have examined the effects of affect on attitudinal and behavioral outcomes. The RISP model proposes that affect, especially negative affect (e.g., worry and anger), could motivate information seeking. Although the RISP model includes information insufficiency as an intervening variable between affect and information seeking, examining the direct association beyond information insufficiency between these two variables is warranted for several reasons. First, studies using the RISP model have generally shown a direct relationship between affect and information seeking. For example, Hovick, Freimuth, Johnson-Turbes, and Chervin (2011) found that worry was associated with higher levels of information seeking regarding 10 health risks. Similarly, research has shown that people with stronger feelings of concern, worry, and anxiety about climate change are more likely to seek out risk information (Z. J. Yang & Kahlor, 2013; Z. J. Yang, Kahlor, & Griffin, 2014). In addition, affect is a powerful motivator for behaviors (e.g., Lazarus, 1991). For example, ter Huurne, Griffin, and Gutteling (2009) found a direct

association between negative affect and information seeking among people living in both the United States and the Netherlands. They also suggested that affect can serve as a direct motivator of information-seeking behavior. Other theories within the field of communication have also suggested that affect should be directly associated with information seeking. For example, uncertainty management theory has argued that anxiety can influence people's information-seeking behaviors (Brashers, 2001). Based on the research presented earlier, we propose the following hypothesis:

*H3: There will be a positive direct relationship between negative affect and information-seeking intentions, with higher levels of negative affect associated with greater intentions to seek out information.*

### *Indirect Relationship Between Media Use and Information Seeking*

The hypotheses proposed up to this point suggest that media use could influence information-seeking intentions about risk. The RISP model could be a cyclical process (Griffin, Dunwoody, & Yang, 2013). That is, the outcomes of the RISP model, such as information-seeking, can be seen as also affecting predictors of seeking in the model, such as risk perceptions and affective responses (Griffin et al., 2013). This line of inquiry can be connected to a growing area of research in communication that has tried to understand the mutually reinforcing effect between media use and attitudes (Slater, 2015) and to examine the underlying process of how one form of communication is connected to other forms (Hmielowski, Staggs, Hutchens, & Beam, 2020). In this case, media use and information seeking seem like "two sides of the same coin," in that past media use alone can predict information seeking intentions (Ho et al., 2014). However, research using the PRISM model has shown that these two concepts might not always be associated with one another (Ho et al., 2014). For example, Ho and her colleagues (2014) did not find a direct relationship between media use and information seeking regarding climate change in Singapore. Their study found that media use was only related to information seeking via mediators such as perceived risk and negative affect. This finding suggests that media use and information seeking should be treated as two forms of communication. Therefore, we propose that there will be indirect relationships in the opposite direction for our two communication variables through risk perceptions and negative affect on information-seeking intentions. Indeed, use of more traditional media outlets should be associated with lower levels of information-seeking intentions through lower levels of perceived risk and lower levels of negative affect, while there should be a positive indirect relationship for nontraditional media use. As a result, we propose our final hypothesis:

*H4a: There will be a negative indirect relationship between traditional media outlets and intentions to seek out information through risk perceptions and negative affect.*

*H4b: There will be a positive indirect relationship between nontraditional Internet-based media outlets and intentions to seek out information through risk perceptions and negative affect.*

## Method

This study collected two rounds of online survey data to test the model proposed in this article. In essence, the survey asked questions regarding people's risk perceptions, their affect, and their information

seeking tied to smog in China. The same questions (and framing of the questions) were included in both surveys. The first data set was collected from December 11, 2016, to January 2, 2017. Participants were recruited from the social media platforms Weibo and WeChat. We posted an invitation along with the survey link on both platforms via one of the researchers' personal accounts. Anyone over the age of 18 was invited to complete the survey. The invitation to Weibo users noted that respondents could leave their e-mail address to win $35 for completing the survey. Responses were anonymous unless they left their e-mail addresses. The post had been viewed 50,000 times when we stopped collecting data; however, only 333 people completed the survey. This sampling technique results in a sample that only includes people with access to the Internet, users of these websites, and possibly respondents who are willing to take a risk by voicing their own opinions in online surveys. After removing disqualified cases, 319 respondents were included in the analyses of the first data set.

The second data set was collected by Wenjuan Wang, one of the leading survey companies in China that follow the ESOMAR 28 guideline (the same as Dynata). The company's online panel includes over 32 million respondents. The data were collected from April 26, 2017, to May 25, 2017. We requested a stratified sample of participants from Beijing (250), Shanghai (250), Guangzhou (200), and Shenyang (100).[2] We chose these four cities because they are located in different areas across China (e.g., Beijing is in the North, and Shanghai is in the East) and vary in the amount of smog, from the most severe amounts of smog to the least (Tatlowm, 2016). The company randomly sent links to residents in the four cities. Anyone over the age of 18 was eligible to participate in the survey, with no other exclusion criteria. A total of 826 participants completed the survey. After removing respondents with missing data, 809 respondents were included in the analyses using the second data set.

## ***Measurement***

### *Media Use*

All media use items were measured with 5-point scales ranging from 1 (*never*) to 5 (*all the time*). Construct validity was established using a principal components analysis with responses toward media use on nine items. Results from a factor analysis yielded two factors, explaining 54.95% (Data Set 1) and 53.19% (Data Set 2) of the variance. As expected, these two factors reflect the use of traditional and nontraditional Internet-based media. The loadings for Factor 1 (i.e., traditional media) in Data Set 1 ranged from 0.59 to 0.85 and in Data Set 2 from 0.57 to 0.80. For the second factor (i.e., nontraditional Internet-based media), the loadings ranged from 0.56 to 0.77 in Data Set 1 and from 0.67 to 0.74 in Data Set 2. As a result, the use of traditional media was measured by asking respondents how frequently they used television, newspapers, magazines, and radio ($M_1$ = 2.73, $SD_1$ = 0.76, $a_1$ = .76; $M_2$ = 3.42, $SD_2$ = 0.78, $a_2$ = .73), which are strictly under the supervision of the Chinese government (Tolan, 2007; J. Wang & Wang, 2013). The use of nontraditional Internet-based media was measured with five items. Respondents were asked how often they use the Internet and mobile media outlets such as online news portals (e.g., Sina.com and Sohu.com), newsfeed apps via mobile phones (e.g., Toutiao News app), a Weibo news account, a Weibo

2 The populations of Beijing, Shanghai, Guangzhou, and Shenyang are 21.5 million, 25.15 million, 14.04 million, and 8.1 million, respectively. We used the ratios of 2.5:2.5:2:1 for the stratified sample of 800 participants.

individual verified account, and WeChat ($M_1$ = 3.59, $SD_1$ = 0.74, $\alpha_1$ = .76; $M_2$ = 3.64, $SD_2$ = 0.73, $\alpha_2$ = .74). Although there are online news portals connected to more traditional outlets and the Communist Party, the questions we asked focused on outlets owned by private corporations not completely controlled by the government. We averaged the items together for our measures of traditional- and nontraditional Internet-based media use.

*Perceived Severity*

Previous research measuring risk perceptions has focused on personal risks and generally has asked about individual-level perceptions regarding susceptibility and severity associated with a risk (Griffin et al., 1999). Although many scholars have applied the RISP model to personal risks, examining impersonal risks is equally important to understand people's behaviors, such as information seeking (Kahlor, Dunwoody, Griffin, & Neuwirth, 2006). Evidence also suggests that severity alone can explain people's willingness to engage in certain behaviors (Carpenter, 2010). In our article, we focused on impersonal risks and asked the respondents to evaluate, with one item, the severity of the smog problem in China as they perceived it. This question was measured with a 5-point scale ranging from 1 (*not at all serious*) to 5 (*very serious*) ($M_1$ = 4.23, $SD_1$ = 0.64; $M_2$ = 3.84, $SD_2$ = 0.74).

*Negative Affect*

Negative emotions such as fear and anxiety are often aroused by a threat posed by risk (LaBar, 2018). In addition, media coverage of an environmental issue often elicits public concern about the relative risks (Carmichael & Brulle, 2017). Therefore, we measured and averaged together people's responses to three items that asked how accurately words such as *concern* (worry), *fear*, and *anxiety* described their feelings about the issue of smog in China on a scale from 1 (*not accurate at all*) to 5 (*very accurate*) ($M_1$ = 3.78, $SD_1$ = 0.88, $\alpha_1$ = .81; $M_2$ = 3.67, $SD_2$ = 0.88, $\alpha_2$ = .75).

*Information Seeking*

Respondents were asked to indicate their information-seeking intention with one item. The question was measured with a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) based on the degree to which respondents agreed with the following statement: "I would seek more information when it comes to the topic of smog" ($M_1$ = 3.67, $SD_1$ = 0.87; $M_2$ = 3.94, $SD_2$ = 0.82).

### *Control Variables*

In addition to the variables outlined earlier, we included five demographic variables as controls in our statistical analyses. First, we asked respondents to report their biological sex, with response options being male, female, and other (64.7% female for Data Set 1 and 54.3% female for Data Set 2; people who selected "other" were removed from both data sets). We also asked respondents to report their ages. For Data Set 1, ages ranged from 18 to 69, with a mean of 31.38 ($SD_1$ = 9.58). For the second data set, ages ranged from 18 to 68, with a mean of 34.09 ($SD_2$ = 7.41). Respondents were also asked to report their education level on a 7-point scale that ranged from 1 (*primary school or lower*) to 7 (*doctorate or above*).

More than 70% of respondents had received a bachelor's degree or higher in both data sets ($Median_1 = 5$; $Median_2 = 5$). Income was measured on an 11-point scale that ranged from 1 (*less than 5,000 Chinese yuan*) to 11 (*more than 200,000 Chinese yuan*). More than two thirds of the respondents in both data sets had household incomes over 100,000 yuan ($Median_1 = 7$; $Median_2 = 7$). Because the severity of smog varies across the country, we asked respondents to report the province or district in which they reside (Data Set 1: North China 20.4%, East China 20.4%, South China 18.5%, Northeast China 2.5%, other province/district 27.6%; Data Set 2: Beijing 32.8%, Shanghai 32.1%, Guangzhou 22.9%, Shenyang 12.2%). This variable was dummy coded before analysis.[3]

### *Analysis*

The two proposed models were tested separately using the PROCESS macro in SPSS, employing Model 6. In testing the indirect relationships, we included both media use variables in the model. Each model included one of our focal media variables as a predictor and the second as a control variable. For example, in testing the mediation model between traditional media use and information seeking via risk perceptions and negative affect on information seeking, we also included nontraditional Internet-based media as a covariate. We did the same for the second model, which examined the indirect relationship between nontraditional media and information seeking through risk perceptions and negative affect.[4] We report unstandardized coefficients of direct relationships in Table 1 and indirect relationships in Table 2.

[3] For Data Set 1, we created four dichotomous variables with "other" as a reference group. For example, a variable name North was created such that we assigned 1 to people who reported living in the northern part of China and 0 to all other participants. We repeated this procedure for the remaining areas of China, leading to our four dichotomous variables. By using the same technique, we created three dichotomous variables with Northeast as a reference group in Data Set 2 because we stratified the sample from four cities across North, East, South, and Northeast areas of China.

4 We also ran the entire path model with both predictors in Mplus and largely found the same results. That is, when all control variables and theoretically relevant paths were included, the indirect relationships between both media variables and information seeking through our two intervening variables were significant.

***Table 1. Direct Relationships Among Variables.***

| | Data Set 1 | | | Data Set 2 | | |
|---|---|---|---|---|---|---|
| | Perceived severity | Negative affect | Information seeking | Perceived severity | Negative affect | Information seeking |
| Constant | 3.78 (0.39)*** | 1.00 (0.60) | 0.39 (0.60) | 3.24 (0.29)*** | 0.99 (0.34)** | 1.47 (0.34)*** |
| Traditional media | −0.15 (0.05)** | −0.11 (0.07) | 0.25 (0.07)*** | −0.10 (0.04)** | 0.04 (0.04) | 0.22 (0.04)*** |
| Nontraditional Internet-based media | 0.20 (0.06)*** | 0.31 (0.08)*** | 0.12 (0.08) | 0.18 (0.04)*** | 0.31 (0.04)*** | 0.09 (0.04)* |
| Perceived severity | - | 0.36 (0.08)*** | 0.12 (0.08) | - | 0.32 (0.04)*** | 0.08 (0.04) |
| Negative affect | - | - | 0.25 (0.06)*** | - | - | 0.09 (0.04)** |
| Control Variables | | | | | | |
| Age | 0.003 (0.005) | 0.004 (0.006) | 0.01 (0.006) | 0.002 (0.004) | 0.01 (0.004)** | 0.007 (0.004) |
| Gender | 0.07 (0.08) | 0.19 (0.10) | −0.08 (0.10) | −0.04 (0.05) | 0.16 (0.06)** | −0.13 (0.06)* |
| Education | −0.05 (0.05) | −0.003 (0.06) | 0.05 (0.06) | 0.11 (0.03)*** | −0.07 (0.04) | 0.06 (0.04) |
| Income | 0.01 (0.02) | 0.001 (0.03) | 0.001 (0.03) | −0.05 (0.02)*** | −0.04 (0.02)* | 0.07 (0.02)** |
| North/Beijing | 0.22 (0.10)* | 0.03 (0.14) | 0.42 (0.13)** | 0.29 (0.09)*** | 0.31 (0.09)*** | −0.04 (0.09) |
| East/Shanghai | 0.13 (0.11) | −0.16 (0.14) | 0.23 (0.14) | 0.09 (0.08) | 0.27 (0.09)** | −0.11 (0.09) |
| South/Guangzhou | 0.11 (0.11) | 0.01 (0.14) | 0.06 (0.14) | −0.24 (0.09)** | 0.12 (0.10) | 0.07 (0.10) |
| Northeast | 0.22 (0.26) | 0.50 (0.34) | 0.34 (0.34) | - | - | - |
| $R^2$ | 0.08 | 0.19 | 0.22 | 0.13*** | 0.23*** | 0.12*** |
| *F* | (10, 261) = 2.33* | (11, 260) = 5.59*** | (12, 259) = 6.11*** | (9, 799) = 13.82* | (10, 798) = 23.60*** | (11, 797) = 10.33*** |

*Note*. For Data Set 1, the variable province/district with five options was dummy coded into four variables: North, East, South, and Northeast, with other as the reference. For Data Set 2, the variable province/distract with four options was dummy coded into three variables: Beijing, Shanghai, and Guangzhou, with Shenyang as the reference.

* $p < .05$. ** $p < .01$. *** $p < .001$.

***Table 2. Indirect Relationships Between State/Nonstate Internet-Based Media and Information Seeking.***

| | Data Set 1 | | Data Set 2 | |
|---|---|---|---|---|
| | Estimate | 95% CI | Estimate | 95% CI |
| Traditional media-perceived severity-negative affect-information seeking | −0.01 (0.01) | [−0.03, −0.002] | −0.003 (0.002) | [−0.01, −0.0004] |
| Nontraditional Internet-based media-perceived severity-negative affect-information seeking | 0.02 (0.01) | [0.005, 0.04] | 0.01 (0.002) | [0.001, 0.01] |

*Note.* All indirect relationships are significant.

## Results

The first hypothesis was supported across both data sets. Our results revealed a negative relationship between the use of traditional media and the perceived severity of the smog issue in China ($B_1$ = −0.15, $SE_1$ = 0.05, $p_1$ < .01; $B_2$ = −0.10, $SE_2$ = 0.04, $p_2$ < .01). By contrast, there was a positive relationship between nontraditional Internet-based online media use and perceived severity of the smog issue in China across both data sets ($B_1$ = 0.20, $SE_1$ = 0.06, $p_1$ < .001; $B_2$ = 0.18, $SE_2$ = 0.04, $p_2$ < .001). In essence, the more individuals consumed traditional media, the less likely they were to perceive the smog issue as severe. By contrast, greater use of nontraditional Internet-based media was associated with higher levels of perceived severity of the smog issue in China.

Next, we examined our second hypothesis. Results from the analysis showed support for H2. Indeed, perceived severity was positively related to negative affect across both data sets ($B_1$ = 0.36, $SE_1$ = 0.08, $p_1$ < .001; $B_2$ = 0.32, $SE_2$ = 0.04, $p_2$ < .001). In essence, the more serious an issue people perceived smog in China to be, the more likely they were to report negative affect relative to this issue. Next, we tested our third hypothesis, which looked at the relationship between negative affect and information-seeking intentions. Our results showed support for H3: There was a positive relationship between negative affect and intention to seek out information across both data sets ($B_1$ = 0.25, $SE_1$ = 0.06, $p_1$ < .001; $B_2$ = 0.09, $SE_2$ = 0.04, $p_2$ < .01). In other words, the more likely people were to report negative affect relative to the issue of smog in China, the more likely they were also to say that they intended to seek out information relative to this important topic.

Finally, our results showed support for our final hypothesis. Regarding H4a, which focuses on the indirect relationship between traditional media use and information-seeking intentions, our test revealed a negative indirect relationship between traditional media use and information-seeking intentions through perceived severity and negative affect in both data sets (point estimate$_1$ = −0.01, $SE_1$ = 0.01, 95% CI [−0.03, −0.002] point estimate$_2$ = −0.003, $SE_2$ = 0.002, 95% CI [−0.01, −0.0004]). Specifically, the use of traditional media was associated with lower levels of perceived severity of this risk, which reduced people's level of negative affect and was ultimately associated with lower levels of intention to seek out information regarding the smog issue. By contrast, our test of H4b revealed a positive indirect relationship between nontraditional online media use and information-seeking intentions through perceived severity and negative affect across both data sets (*point estimate*$_1$ = 0.02, $SE_1$ = 0.01, 95% CI [0.005, 0.04]; *point estimate*$_2$ = 0.01, $SE_2$ = 0.002, 95% CI [0.001, 0.01]). In essence, the more an individual used nontraditional online media, the more likely he or she was to report believing that smog is a severe problem. This greater perceived severity translates into higher levels of negative affect, resulting in increased levels of intention to seek out information. Thus, H4a and H4b were supported. The full mediation model is presented in Figure 1.

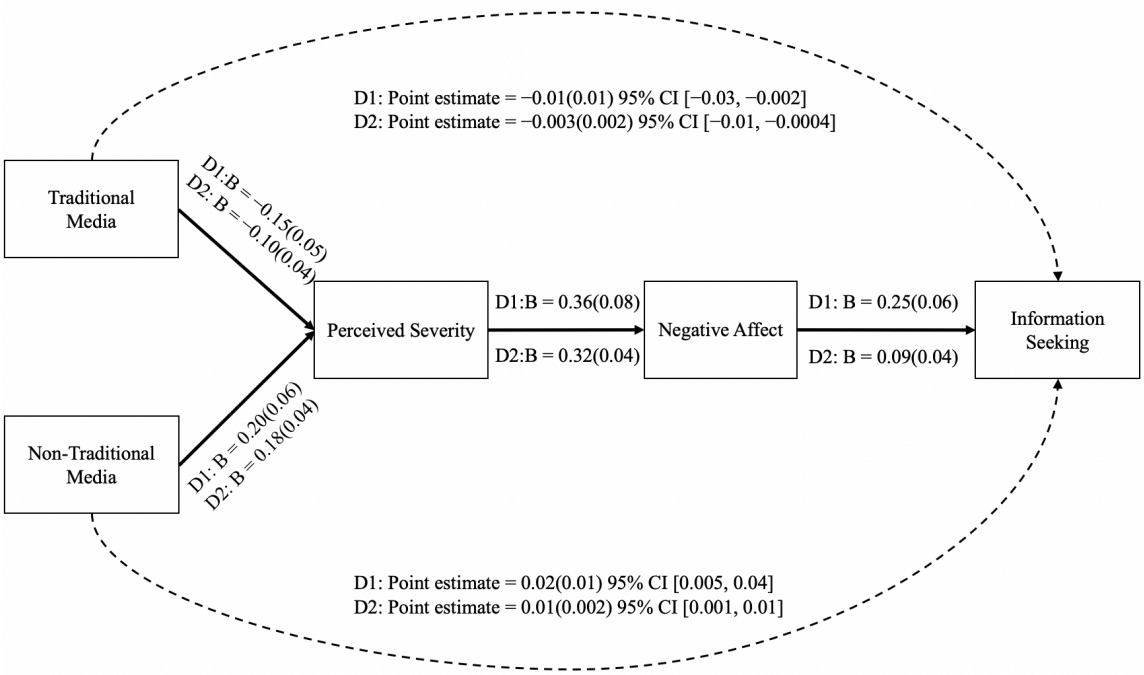


***Figure 1. Full model.***

## Discussion

### *Summary of Results*

This study used the RISP model to examine the association among media outlets that likely present different information to the public regarding air pollution in China. Overall, our results showed that use of different media sources was related to risk perceptions of smog, in opposite directions. Traditional media use was associated with lower levels of risk perceptions, while nontraditional online media use was associated with greater perceived risks. Our results also showed that the perceived seriousness of smog was related to greater negative affect and that negative affect was associated with an increased likelihood to seek out more information, both of which are consistent with previous studies that use the RISP model (Griffin et al., 2008; Z. J. Yang & Kahlor, 2013). Finally, results showed evidence that traditional- and nontraditional Internet-based media have opposite relationships with risk information-seeking behavior through the two intervening variables of risk perception and negative affect.

### *Contributions*

This study makes three contributions to the extant literature. First, it replicated the RISP model in the context of an impersonal risk (i.e., smog) in China. Although the applications of the RISP model have been proved valid when looking at environmental risks, the majority of them focus on topics such as climate change and water risks (e.g., Kahlor, 2007; Z. J. Yang, Aloe, & Feeley, 2014; Z. J. Yang, Kahlor, & Griffin,

2014). Therefore, examining whether this model works in another country across a different topic is an important contribution to the generalizability of the work being performed on the RISP model.

Second, our study extends the RISP model by treating media use as a predictor for risk perceptions, negative affect, and information seeking. Previous research has noted that scholars should not assume that media use and information seeking are the same variable. Having a general sense of media use and information seeking as two forms of communication, this study expands the RISP model and reinforcing spirals model. Indeed, the work on reinforcing spirals (Slater, 2015) and communication connectedness (Holbert & Benoit, 2009) highlights the importance of understanding how one form is associated with or predicts other forms of communication. By examining the associations between media use and information seeking, our study also opens the door to scholars building on the often-ignored aspect of the RISP model, which tried to pull apart routine and nonroutine forms of information seeking. Our article suggests that routine forms of information seeking, in the forms of using traditional and nontraditional outlets, could lead to different outcomes. In particular, nontraditional media, which we found increases information seeking, could be an indicator that this form of media triggers nonroutine communication patterns. In essence, looking at how communication leads to other forms of communication could open the door to scholars expanding on the ideas outlined in the RISP model to focus on understanding whether future communication behaviors stay within a routine set of information outlets or people break out of their routines to consume a wider array of information sources.

Third, our article adds to the growing literature examining affect and information seeking. Our study examined the direct association between these two variables beyond information insufficiency. Although the direct relationship and the indirect relationship may both exist between affect and information seeking, the RISP model proposes that information insufficiency is a result of affect, which leads to information seeking. By contrast, uncertainty management theory argues that uncertainty causes anxiety. In particular, this theory outlines that uncertainty (1) comes from people's judgment of their state of knowledge regarding a particular situation, which is similar to the concept of information (in)sufficiency in the RISP model, and (2) exists when people are unsure about the occurrence of an event (Brashers, 2001), which is related to risk perception in the RISP model. That is, one form of uncertainty (i.e., information insufficiency) occurs before affect. Therefore, future research should carefully examine whether uncertainty or information (in)sufficiency triggers affect or the other way around, and then look at both the direct relationship and the indirect relationship between affect and information seeking. Moreover, scholars relying on the RISP model have noted the importance of examining how emotions could increase both information seeking and avoidance (Hmielowski, Donaway, & Wang, 2019). In other words, scholars using the RISP model should work to expand on the range of variables of interest in future projects. Using other theories in the field of communication, scholars should continue modifying the RISP model to include a wider range of affect variables; this could also expand on understanding why people would engage in the different types of information seeking (e.g., systematic/heuristic) proposed in the model, as well as other outcomes, such as information avoidance.

Finally, our study complements previous research examining how the use of different outlets could lead people to hold different views on important issues. Specifically, this study examines the ways different media outlets can lead people to hold different perceptions of the same issue. Previous studies have noted

the importance of looking at different media sources relative to understanding perceptions of important issues in China. For example, Xiang and Hmielowski (2017) showed that the use of different media sources in China was associated with different outcomes regarding regime support. Our findings showing opposite patterns of results across our two data sets demonstrate the need for additional research that examines different media outlets regarding outcomes such as perceived risk, especially in countries with media systems that include a wide range of opinions.

### *Limitations*

Like other social science research, our findings are limited because of some weaknesses. First, our samples are not representative of the population in China. The first sample was restricted to Internet users, specifically users of Weibo and WeChat. Therefore, this sample is biased because it overrepresents those who use nontraditional news outlets. Our second data set consisted of online panels recruited from four cities with a stratified sample, which excludes the less wealthy segments of the population. As a result, we derived samples that differ from the Chinese population regarding gender, age, education, and income. However, our goal here is to make process inferences rather than population inferences (Hayes, 2009). Therefore, it is more important that we replicate our results across these two data sets. Second, researchers should examine content from traditional and nontraditional media outlets to assess the extent to which coverage of the smog issue does indeed vary by outlets. It is challenging to conduct a content analysis during this time frame on old data because some posts have been removed for various reasons. Collecting this content and examining more broadly the differences that may exist between traditional and nontraditional media will continue to be an important line of inquiry moving forward. Third, we acknowledge the limitation of the single-item measurement for risk perceptions and information-seeking intentions. Scholars suggest that single items can be used when the measurement is unambiguous to the respondents (Sackett & Larson, 1990). Moreover, findings do not vary much based on single- or multiple-item measures (e.g., Gardner, Cummings, Dunham, & Pierce, 1998). Regardless, our collection of two rounds of data in an attempt to replicate results suggests that we have a relatively robust set of findings. However, future studies should use multiple items to measure these concepts to reduce measurement error (Kamakura, 2015). Finally, our study did not examine subsequent variables after information seeking. One expectation of the RISP model is the development of stable attitudes and preventive behaviors (Griffin et al., 1999). Future research should consider adopting attitudinal and behavioral outcomes.

Overall, the present study extends the RISP model by examining how media use could shape individuals' risk perceptions of smog. In particular, the findings revealed how different media outlets could lead to different outcomes in the Chinese context. China has implemented policies and strategies to deal with air pollution at the national level. Despite traditional media reporting on air pollution in recent years, there is a lack of focus on the risks associated with smog. Our findings indicate that traditional media could demotivate public engagement because of lower perceived risks and negative emotions. Nontraditional Internet-based media, which provides a wider range of opinions, could diminish such effects and invoke public engagement to rectify environmental problems in the future. It is uncertain whether the restrictions of nontraditional Internet-based media will be tightened. Nevertheless, the findings in this study suggest long-term hope relative to delivering important information to the public regarding environmental issues. In addition, it will be important to step beyond the issue of smog moving forward. For example, the recent

global pandemic tied to COVID-19 provides an additional opportunity to examine whether the use of different media outlets in China (and within other countries around the world—e.g., the United States) could affect risk perceptions tied to COVID-19, which could, in turn, affect people's information-seeking behaviors.

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