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Chen, Liang; Shi, Jingyuan; Guo, Yu; Wang, Pianpian; Li, Yiwei

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**Agenda-Setting on Traditional versus Social Media: An Analysis of Haze-Related
Content Grounded in the Extended Parallel Process Model**

Liang Chen

School of Communication and Design, Sun Yat-sen University, Guangzhou, China

Jingyuan Shi

Department of Communication Studies, Hong Kong Baptist University, Kowloon Tong,
Hong Kong SAR, China

Yu Guo

Faculty of Humanities and Arts, Macau University of Science and Technology, Macau, China

Pianpian Wang

College of Mass Communication, Shenzhen University, Shenzhen, China

Yiwei Li

Institute for Journalism, Media and Communication Studies, Keio University, Yokohama,
Japan

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media: An analysis of haze-related content grounded in the extended parallel process
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Abstract

Purpose – The current study aims to explore and compare haze-related content between traditional and social media in China by applying agenda-setting theory and the extended parallel process model (EPPM). Specifically, this study examines the correlation between the two forms of media in terms of the ranking of the attributes of haze (i.e., the EPPM components) and the interrelationships among the attributes.

Design/methodology/approach – Content analysis and semantic network analysis were employed to address the research aims.

Findings – The results revealed that more than half of the total messages on both types of media reflected the EPPM components, either threat or efficacy information. However, the imbalance between the threat and efficacy information was more prominent in the haze-related content presented in the *People's Daily* than it was on *Weibo*. In addition, the results from a Spearman's rank-order correlation and a quadratic assignment procedure (QAP) indicated that there was no significant correlation between the *People's Daily* and *Weibo* in terms of the rankings of the attributes of haze (i.e., the EPPM components) or the interrelationships among the attributes.

Originality/value – This study is the first to apply a theoretical approach to examine and compare the nature of haze-related messages on traditional and social media.

Keywords: Haze, Traditional Media, Social Media, the Extended Parallel Process Model (EPPM), Agenda-Setting, China

Agenda-Setting on Traditional versus Social Media: An Analysis of Haze-Related Content Grounded in the Extended Parallel Process Model

With increasing industrialization and economic growth, haze, which is a complex mixture of air pollutants, has become one of the thorniest environmental health issues in China (Ling, 2013). The continued growth of manufacturing industries and the widespread use of private cars have contributed to China's crippling air pollution. The heavy haze has engulfed many major cities in northern China, such as Beijing and Tianjin. However, the problem is not confined to the northern areas. In 2013, haze shrouded more than 20 provinces and even wafted over China's southeast province, Hainan (Wu, 2013). There is evidence that exposure to haze has threatened the physical health of an increasing number of Chinese people. Exposure to haze could significantly promote the development and progression of many medical conditions, such as cardiovascular disease, cerebrovascular disease, respiratory diseases, and even cancers (He et al., 2016).

From the perspective of risk communication, the media portrayal of risk events not only conveys facts, but it also persuades, warns, and suggests prevention strategies for the public to change attitudes and behaviors (Mileti and Fitzpatrick, 1991). To curb haze, a large amount of haze-related content has been featured on China's mass media (Zhang et al., 2014). For example, in 2014, the *People's Daily*, one of most popular official newspapers of the Chinese Communist Party with a daily circulation of approximately 300 million, featured haze-related information in more than 50 issues (Wang, 2014). Similarly, haze has been one of the popular topics on *Weibo*, one of the most popular Chinese social media. Although social media was initially based on individual social networks, it has become a critical information source for the public (Schoen et al., 2013; Shi et al., 2018; Yan et al., 2017). Moreover, the mass communication function of social media has been well documented in recent communication research. For instance, several communication scholars have regarded

social media as a means of mass personal communication, which integrates interpersonal as well as mass communication on the platform (e.g., Walther and Valkenburg, 2017; Zhang and Peng, 2015). Therefore, when a risk event occurs, both traditional and social media deliver information to a massive audience.

To understand the role of media in a risk event, it is essential to delineate the media portrayal of the risk. Specifically, while some studies have examined risk information in the media, there is a lack of theoretical grounding when analyzing risk-related content (Brittle and Zint, 2003; Claassen et al., 2012). Moreover, most previous studies have focused on the coverage of traditional media, such as television and newspapers. There is a lack of empirical analysis of risk-related information on social media, which could function similarly to the traditional media with respect to risk events.

Hence, this theoretical-driven study explores the nature of haze-related messages in the *People's Daily* and on *Weibo* by applying agenda-setting theory and the extended parallel process model (EPPM). Furthermore, this study seeks to investigate the extent to which the agendas of haze are related on traditional and social media. Thus, we examine the correlation between the two forms of media in terms of the rankings of attributes of haze (i.e., the EPPM components) and the interrelationships among the attributes based on the agenda-setting theory.

Literature Review

The fundamental aim of risk communication is to deliver knowledge to the public to assist people as they respond to potential risks. The media is acknowledged as the most prevalent carrier of risk-related information in modern society, and it is considered to be effective for raising the public's awareness of risks and promoting precautionary actions (Cox, 2012). Considering the potential impact of the media on public reactions to risk, the current study endeavors to investigate how risk-related messages are constructed in

traditional and social media. To achieve this goal, the current research adopts agenda-setting theory and the EPPM to study haze-related information on Chinese media.

Agenda-setting theory focuses on the influences of news coverage on public opinion (McCombs and Shaw, 1972). The theory explains how the news media tells the public what to think and how to think about certain issues (McCombs and Shaw, 1993). However, the first step to understanding the media's influence is mapping how a certain issue is featured on the media. To analyze the haze-related agenda on Chinese media, we adopt the theoretical framework of EPPM, which has often been employed in studying health and environmental risk-related information on mass media (e.g., Choi and Lin, 2008; Klemm et al., 2015). According to the EPPM, messages can influence individuals' perceptions of threats and efficacy, which may lead to defensive avoidance or preventive behaviors (Witte, 1992, 1994). As such, we aim to examine haze-related content in the media in order to investigate whether traditional and social media set the agenda similarly in terms of the EPPM attributes and to explore whether the content of media coverage has the potential to facilitate desirable behavioral changes.

Agenda-Setting Theory

Agenda-setting is one of the most important theories in the media effects research (McCombs, 2005). Lippmann (1922) argued that people do not respond directly to events but instead live in a pseudo-environment shaped by media coverage. Later, McCombs and Shaw (1972) extended Lippmann's idea and proposed agenda-setting theory, suggesting that the salience of the issues covered by the media can be transferred to the public. In other words, the media can shape public opinion concerning the relative importance of issues, which is labeled the first level of agenda-setting. Furthermore, to extend this theory, the second level of agenda-setting has been constructed to include the attention to attributes of agenda-setting. In other words, the agenda-setting research at the second level focuses on how agenda

attributes affect public opinion (McCombs and Evatt, 1995). Many studies have demonstrated how the salience of the attributes that describe a certain object or issue in the media can affect the public's way of thinking toward the object or issue (e.g., Balmas and Sheaffer, 2010; McCombs et al., 2000).

In addition, in recent years, Guo and colleagues (Guo and McCombs, 2011; Guo, 2012) introduced semantic network analysis in agenda-setting theory and proposed the third level of agenda-setting or network agenda-setting. In the third level, the interrelationships among attributes are emphasized as important aspects that can affect the public's salience formation and transfer process. Specifically, unlike the first and second levels of agenda-setting, which only compare individual attributes or issues between the media and the public, network agenda-setting hypothesizes that the media can bundle different objects and attributes as well as make these bundles of elements salient in the audience's mind. Many empirical studies have constructed co-occurrence networks of attributes and examined the correlation between the attribute network presented on the media and the attribute network perceived by the public. The results have indicated that the co-occurrence of certain attributes with one another leads to a greater likelihood that the public will perceive them as salient together (Guo and McCombs, 2011; Guo, 2012; Schultz et al., 2012).

In the current social media era, it is necessary to examine agenda-setting in the context of a decentralized and networked online platform as well, given that social media is also able to deliver information to a massive audience, just like the traditional media (Huang and Yeo, 2018). In the last decade, many researchers have attempted to examine the homogenization of agendas between social media and traditional media on several social issues, but with mixed findings. For example, Sayre et al. (2010) examined the relationship between thousands of YouTube videos' agendas on same-sex marriage and the coverage of the same content in California by newspapers and online news outlets. Their results showed

that social media outlets set their agenda on the issue independently. However, some other studies indicated that the agenda on traditional media, such as newspapers, and online media, such as blogs and Twitter, were highly related to each other (e.g., Messner and Distaso, 2008). These inconsistent findings have also been documented in the Chinese context. For example, Li and Qin (2001) compared the attributes of the agendas of the 1999 US-China aircraft collision incident between the *Qiangguo Forum* (a Chinese online discussion forum) and the *People's Daily* and found that the online agendas were quite different from the official Chinese media agendas. However, some recent studies have revealed a high correlation between the social media and the traditional media agendas in China. For instance, more recent studies have found that, in terms of sociopolitical incidents or socially sensitive events, social media played an important role in transforming an original local event into a nationally prominent issue and served as a forerunner as well as an echo of traditional media messages (e.g., Oh and Yu, 2012; Luo, 2014; Zhou and Moy, 2007).

Although previous research has examined the homogenization of agendas between traditional and social media at the first and second levels of agenda-setting, little research has compared how agenda attributes are linked to each other (i.e., the third level of agenda-setting) across traditional and social media. Furthermore, previous analyses of media agendas about risk events have little theoretical grounding for analyzing the media content (Brittle and Zint, 2003; Claassen et al., 2012). Therefore, we intended to employ the EPPM, a risk message developing theory, to analyze agenda attributes in haze-related media content.

The Extended Parallel Process Model

The EPPM was first proposed by Witte (1992, 1994) as a message design theory with the aim of predicting how individuals will react to fear appeal messages. To motivate risk preventive behavior, messages should contain personally relevant threats that can attract the audience's attention, alerting them to the potential consequences of the hazard, and then

providing feasible suggestions to facilitate the avoidance of the risk. With the combination of these two components, perceived threat and perceived efficacy, recipients can be encouraged to take protective action to avert the threat. In detail, perceived threat is composed of perceptions of severity and susceptibility. Perceived severity refers to one's belief in the magnitude or seriousness of a threat, while perceived susceptibility refers to one's judgment of the likelihood of being affected by the threat. The two aspects that comprise the perceived threat determine an individual's motivation to respond to fear-arousing information (Maloney et al., 2011). Perceived efficacy in the EPPM, defined as individuals' confidence in their ability to perform the recommended action to avoid the threat, is also comprised of two dimensions: perceived self-efficacy and perceived response efficacy. The former concept is known as one's belief in his/her capacity to perform the suggested behaviors, and the latter refers to one's belief about whether the recommended response is effective enough to avert the threat.

The application of the EPPM can be divided into two steps, with the nature of the reaction being determined by the level of perceived efficacy (Maloney et al., 2011). First, the recipients must attend to and be aware of both the severity and the susceptibility of the hazard. As long as the audience recognizes the threat, a feasible response that can avert the threat should be shown to the target, to induce their perceived efficacy. When the perceived threat outweighs perceived efficacy, recipients tend to enter the fear control process through which they manage internal concerns and perform a defensive action. Alternatively, if the perceived efficacy is stronger than the perceived threat, the process of danger control will occur, and the recipients will tend to accept the message and consequently perform the beneficial behavior (Witte, 1992, 1994; Witte et al., 2001).

Although the model initially included only four components, EPPM scholars later added collective efficacy into the framework, especially when applying the model to social-

level threats, such as HIV/AIDS and hurricanes (e.g., Smith et al., 2007; Roberto et al., 2009). Perceived collective efficacy refers to a group's shared belief in its ability to organize and execute the actions required to achieve goals, and it focuses on the perceptions of a group or country's ability, instead of an individual's ability, to problem-solve (Bandura 1997). Scholars have found that for large-scale social problems, individuals who are confident in their group are more likely to perform preventive actions (Bandura, 2006; Koletsou and Mancy, 2011), and such phenomenon are more salient in the context of collective cultures (Stanley, 2006). Thus, in the current study, we will include collective efficacy as an additional component to the EPPM to examine haze-related media content, given that haze is a large-scale environmental problem. Indeed, preventing and reducing haze is not only an individual issue, but it is a collective problem (Granderson, 2014). Furthermore, as the Chinese culture is regarded as a highly collectivist culture in which most people are interdependent within their group or society (Hofstede, 1990; Klassen 2004), we believe it is necessary to take collective efficacy as a component in analyzing haze-related media content.

As a message design theory, the EPPM has been applied as an important theoretical framework for designing educational programs and interventions for a variety of health and risk issues, such as HIV/AIDS (e.g., Cameron et al., 1999) and cancer (e.g., Hubbell, 2006; Shi and Smith, 2016). In addition, many recent studies have used the EPPM to develop coding schemes to examine the media representation of health and environment-related risks, such as cervical cancer (Lee, 2011), hurricanes (Choi and Lin, 2008), and the H1N1 pandemic (Klemm et al., 2015), to investigate the potential effects of the media coverage. For example, Lee (2011) analyzed HPV-related messages in YouTube news videos and found that, compared to threat components, significantly more messages contained the efficacy component. The scholar claimed that the imbalance between threat and efficacy components may have been less likely to increase message recipients' perceived need for the HPV

vaccine, even though a considerable amount of efficacy information was presented (Lee, 2011). Klemm et al. (2015) explored H1N1 pandemic-related news on television, newspapers and magazines in European countries and found that the threat information was less prevalent than efficacy information. They concluded that news that relies heavily on delivering threatening information without being accompanied by adequate amounts of efficacy information will heighten recipients' emotional response of fear, which impedes their preventive actions and leads to maladaptive behavior. Collectively, these empirical studies show that the EPPM has been a valuable framework for understanding media content in risk events. Thus, we employed this theoretical framework to analyze haze-related media content to investigate the homogenization of agenda-setting between traditional and social media in the Chinese context. The research question (RQ) is presented as follows:

RQ: With respect to haze-related content, to what extent is the agenda-setting on traditional and social media related in terms of the EPPM attributes presented?

Method

Data

The haze-related content was collected from both the *People's Daily* and *Weibo*. First, we used the keyword "haze" (雾霾) to search for and retrieve all of the relevant articles from the *People's Daily* from January 2012 to December 2015 using databases including China National Knowledge Infrastructure and Duxiu.com. The search inquiries returned 85 articles. However, among these articles, eleven of them focused on economic haze, political haze, or psychological haze instead of environmental haze; thus, these articles were eliminated. Therefore, the final sample from the *People's Daily* included 74 articles.

In addition, the keyword "haze" (雾霾) was used to search "hot posts" (i.e., popular posts) on *Weibo* from January 2012 to December 2015. The searching results included 1,531 posts. In this study, to better reflect the mass communication function of *Weibo*, we used the

“hot posts” for the sample because such posts normally have large numbers of shares, likes, or comments on *Weibo* (Wan, 2016), which means that these posts obtain a high level of public attention and reach massive audiences.

Content Analysis

Due to the characteristics of semantic network analysis, which was required to examine the co-occurrence of the EPPM attributes of haze, the unit of analysis is one paragraph for the *People's Daily* and a single post for *Weibo*. Scholars have demonstrated the validity of considering each paragraph as a unit of analysis for news reports and each post or tweet as the unit of analysis for social media in studies employed content analysis and semantic network analysis (e.g., Shi and Chen, 2014; Chen and Shi, 2015; Ragas et al., 2011). Accordingly, the sample size from the *People's Daily* was 985. In terms of *Weibo*, commercial advertisements and messages containing only emoticons, punctuation, interjections, or a single hyperlink were excluded from the sample. Repeated posts were counted only once. Hence, the final sample size from *Weibo* was 1,175 after eliminating 356 posts.

Two graduate students who are majoring in communication were hired to complete the coding. Based on the EPPM, all of the messages were coded with five predetermined categories (see Table 1): a) severity, b) susceptibility, c) response efficacy, d) self-efficacy, and e) collective efficacy. The coding scheme is not mutually exclusive, and each message was coded as 1 (present) or 0 (absent) for the five EPPM components. To strengthen the reliability of the two coders, before they started working, we explained to both of them the definitions and examples of each category to give them a better understanding of the five EPPM components. Inter-coder reliability was established with approximately 20.80 % of the sample from each media platform ($n = 205$ from the *People's Daily* and $n = 245$ from *Weibo*). The results of Krippendorff's alpha test (2007) were reported as .82

(susceptibility), .83 (severity), .91 (response efficacy), .87 (self-efficacy), and .88 (collective efficacy), all of which reached the acceptable level of inter-coder reliability. The discrepancies were then addressed, and the coding rules were established to avoid ambiguities in word meanings and category definitions. Finally, the remaining messages were split in half and separately coded by the two coders.

Network Analysis

In addition to content analysis, a Spearman's rank-order correlation was conducted to compare the rankings of the EPPM attributes of haze between the *People's Daily* and *Weibo*. In addition, semantic network analysis was conducted with *Ucinet 6* to map the diagram of the networks of attributes on both types of media. We then ran a QAP to compare the correlations between the two agenda networks.

Results

The results revealed that more than half of the total messages in the *People's Daily* delivered the EPPM components, $n = 526$, 53.40%. Similarly, over half of the total messages on *Weibo* involved the EPPM components, $n = 656$, 55.82%. As reported in Table 2, more messages reflected threat components ($n = 334$, 33.90%) than efficacy components ($n = 274$, 27.82%) in the *People's Daily*. Specifically, 223 (22.64%) and 99 (10.05%) messages addressed susceptibility and severity, respectively. In terms of efficacy components, 201 (20.41%), 188 (19.09%), and 79 (8.02%) messages mentioned response efficacy, collective efficacy and self-efficacy, respectively. Similarly, more messages delivered threat components ($n = 527$, 44.85%) than efficacy components ($n = 225$, 19.15%) on *Weibo*. Specifically, the greatest number of messages included susceptibility ($n = 425$, 36.17%), followed by response efficacy ($n = 155$, 13.19%) and severity ($n = 152$, 12.90%). Only 119 (10.12%) and 26 (2.21%) messages mentioned self-efficacy and collective efficacy,

respectively. In sum, the imbalance between the threat and efficacy information was larger in the haze-related content in the *People's Daily* than on *Weibo*.

In addition, we calculated the correlation between the rankings of the agenda attributes (i.e., the EPPM components) of haze-related media coverage in the *People's Daily* and on *Weibo*. A Spearman's rank-order correlation between the attributes of the haze-related content in the two media was performed:

$$r_s = 1 - \frac{6 \sum d_i^2}{n - (n^2 - 1)}$$

where d_i represents the difference between the ranks of corresponding variables and n represents the number of observations (Kinnear and Gray, 1999). The results showed that the EPPM attributes of haze in the *People's Daily* was not significantly correlated with it on *Weibo*, $r = .70$, $p = .40$. This suggests that the two media platforms concentrate on different EPPM aspects of haze despite some similarities indicated above (see Table 4).

Next, we mapped the undirected network of components based on the co-occurrence of components in a single unit of content (see Figures 1 and Figure 2), and we explored these components' degree centralities that indicate how frequently each category is mentioned together with the others. First, in the network concerning the *People's Daily*, response efficacy ($k = 178$) and collective efficacy ($k = 155$) had higher degree centralities than the other three components: susceptibility ($k = 120$), severity ($k = 115$), and self-efficacy ($k = 86$) (see Table 3). Thus, response efficacy and collective efficacy played central roles in the network of the EPPM components in the *People's Daily*. In addition, susceptibility ($k = 116$) played the most central role in the network of EPPM components on *Weibo*. Its degree centrality was higher than self-efficacy ($k = 80$), response efficacy ($k = 65$), severity ($k = 52$), and collective efficacy ($k = 13$) (see Table 3). Lastly, we analyzed the correlation between the network agendas of the *People's Daily* and *Weibo*. First, we tested the density of the two agenda networks:

$$d = \frac{2m}{n(n-1)}$$

where d represents the network density, n is the number of nodes, and m is the number of edges in the network (Hagberg et al., 2008). The results indicated that the attributes were more closely connected in the *People's Daily* ($d = 32.9$) than on *Weibo* ($d = 16.3$). Thus, the EPPM components were more closely connected in the *People's Daily* than on *Weibo*. Next, we conducted a QAP. A bivariate QAP determines whether two network structures are significantly related to each other (Mantel, 1967). Unlike a traditional least-squares estimation, which is based on the assumption of independency, a QAP is a permutation-based nonparametric test that preserves the integrity of the observed structures (Krackhardt, 1987). In the bivariate QAP, we aimed to test the association Γ_{YX} between two network variables X and Y:

$$Y = \Gamma_1 \pi(X) + e$$

where X and Y are the observed network matrices; $\pi(X)$ is the permutation of matrix X; and Γ_1 is the correlation between $\pi(X)$ and Y. The permutation of X and the calculation of the correlation between X and Y are repeated to generate a distribution of Γ_1 . This distribution is then compared with the observed Γ_{YX} to test the null hypothesis of no association between the two networks (Dekker et al., 2007). The QAP test of 500 permutations revealed that the network of attributes of the haze issue in the *People's Daily* was not significantly associated with that on *Weibo* ($r = .12, p = .39$). The results of the correlation and QAP are presented in Table 4.

Discussion

The current study investigated agenda-setting in traditional and social media in China, both of which are able to deliver information to a massive audience during a risk event. Specifically, we examined the agenda of attributes according to a risk message developing theory in the case of haze, which is a pressing social and environmental risk in China. The

findings revealed that although more than half of the total haze-related messages on both media platforms, the *People's Daily* and *Weibo*, mentioned the EPPM components, these two media platforms set agendas independently, either at the second-level or the third-level, for this risk event. The current study offers some enlightening contributions. First, the present research is the first study to apply the EPPM to content to analyze the nature of messages regarding haze on both traditional and social media in the Chinese context. Second, this study is among a small number of attempts to examine agenda-setting in the context of environmental health risks, which expands the applications of agenda-setting into uncharted areas, such as the environment and health events.

Attribute Agenda-Setting

In terms of the agenda attributes, the amounts of threat and efficacy information about haze were approximately balanced in the *People's Daily's* news reports. In addition, the efficacy information on this media platform included in-depth discussions about the regulations, policies, or rules released by the government to address the haze issue and the new technologies invented by scientists to prevent haze (i.e., collective efficacy) and their effectiveness (i.e., response efficacy). Meanwhile, there was limited content about individual strategies about preventing haze or reducing the negative effects of haze (i.e., self-efficacy). According to the EPPM's premise, a lack of self-efficacy information may fail to educate individuals about how to perform protective actions in the risk of haze. However, collective efficacy information presented in this national newspaper might reduce public panic and concerns about haze, given that such information emphasizes a collective ability in reducing a social-level risk. To advance the theoretical framework, future research should examine whether including collective efficacy alone, with a sufficient threat level, will be effective for inducing danger control processes in the case of a social-level risk event. Moreover, there is a need to study whether omitting self-efficacy information in the case of a social-level threat

leads to unintended effects suggested by the EPPM, such as defensive avoidance and maladaptive behavior, or other potential unintended effects, such as optimistic bias.

In contrast, *Weibo* presented more messages about threat than efficacy. Specifically, a large portion of the content focused on the prevalence of haze and the adverse effects of haze on health. For example, some messages indicated that prolonged exposure to the haze will reduce life expectancy, and some other messages stated that a thick haze engulfs many Chinese cities. Although this prevalence of threat information, with little efficacy, could alert individuals about the hazardous nature of haze, it might also induce a high level of fear and thus lead to information avoidance and reducing protective behavior compliance, as predicted by the EPPM. In addition, taking a closer examination of the efficacy information revealed that, unlike the *People's Daily*, *Weibo* mainly presented individual-level efficacy information about what individuals could do to avert the threat of haze and the effectiveness of those recommended behaviors, and very few messages addressed the country or government's efforts in combating haze (i.e., collective efficacy). Moreover, our analysis revealed that several *Weibo* messages also expressed doubts about the country's capabilities to address the haze issue, since this environmental issue has occurred consistently over the last decade in China. However, beliefs about collective efforts were found to be critical in inducing the performance of recommended actions in the case of facing social threats (Smith et al., 2007). For instance, Koletsou and Mancy (2011) have indicated that individuals with a stronger perception of collective efficacy are more likely to perform preventive actions to counteract environmental pollution.

In sum, the two media platforms were similar in terms the frequency of the EPPM attributes presented in their haze-related content: more than half of the messages on both platforms mentioned at least one of the EPPM components. For threat information, messages on both platforms containing severity appeared less frequently than messages containing

susceptibility. One possible explanation could be that the severity of haze has been realized among the Chinese population due to the serious nature of this environmental disaster. Thus, the media coverage focused on the susceptibility of the threat instead. On the other hand, the imbalance between the threat and efficacy information was more prominent on *Weibo* than in the *People's Daily*. Additionally, it is not surprising that these two media platforms differed in how they presented efficacy information: one emphasized the collective level whereas the other emphasized the individual level. This might be because of the different roles of the two media platforms. The *People's Daily*, as a national newspaper, adopts a wide scope and presents how the country as a whole can avert the risk of haze, an environmental disaster. However, *Weibo* is a social media platform, and the messages presented on it have been tailored to fit its users' needs; thus, it addresses the individual level of efficacy instead of the collective. As revealed by the rank-order correlation, there was no significant correlation between the *People's Daily* and *Weibo* in terms ranking the agenda attributes of haze (i.e., the EPPM components). This means that traditional media may not affect or guide social media agenda in terms of how they portray the issue of haze.

Network Agenda-Setting

Additionally, we created the networks of the EPPM components in the *People's Daily* and *Weibo* to explore the central components in haze-related content. First, the results revealed that the EPPM components were closely connected in the coverage of the *People's Daily*, while the EPPM components in the haze-related messages were less cohesive and more scattered on *Weibo*. This dynamic may exist because the stories in the newspaper are normally written by professional journalists who have the knowledge and skills to create well-structured news reports about risk events. However, the posts on social media are user-generated, so each user is able to create their own content (Shao, 2009). Thus, it is not

surprising that the coverage in traditional media is well structured and framed compared to social media.

In addition, the QAP revealed that the network of attributes of the haze issue in the *People's Daily* was not significantly correlated to that on *Weibo*. Specifically, the results showed that in the *People's Daily*, response efficacy and collective efficacy were the two central components that were most frequently mentioned with other attributes. In fact, the critical roles of collective efficacy and response efficacy reflect the function of the *People's Daily* in the Chinese society well. As an official newspaper of the Communist Party, the *People's Daily* provides viewpoints of the party and serves as a propaganda tool (Chang and Ren, 2018). Therefore, presenting the efforts and achievements of the government and other official organizations is its main purpose when covering risk issues. On *Weibo*, susceptibility played the most central role in haze-related messages, and it often co-occurred with the other components including self-efficacy, severity, and response efficacy. This phenomenon may be due to the nature of social media, such that attracting attention and engagement from other users is a critical goal of social media posts (Chen et al., 2016; Cheung et al., 2015). In fact, previous research has documented that highlighting the likelihood of people being influenced or harmed by the risk could be an effective strategy to direct attention from a massive audience (Wogalter et al., 2005).

The structural difference between the agenda attributes, again, indicates that traditional and social media set their agendas independently with respect to the risk of haze in the Chinese context. The independence of their agendas may be due to their different information sources. As mentioned above, the *People's Daily* is an official information outlet of the government. To some extent, it reflects how the government would like to draw a holistic picture of a certain issue for the public. However, on *Weibo*, numerous information sources and users are presented. The haze-related information on this social media platform

has been framed or tailored to present perspectives from different stakeholders, instead of only the government, in this risk event. Therefore, the social media platform does not follow the agenda set by the mainstream newspaper. Another plausible reason for this divergence is that the strict censorship of traditional media in China leads to the mainstream traditional media's relatively low perceived credibility among the public (Zhang et al., 2014). Some scholars have suggested that messages on social media could be considered as a representation of online public opinion (Luo, 2014; Zhou and Moy, 2007). Thus, if people perceived little credibility from the haze-related content on the newspaper, they will not follow the agenda in their social media discussions and instead focus on the topics that have been under-presented in the news coverage, such as the self-efficacy of the protective behavior. However, this explanation needs further examination with a larger, more representative sample of social media messages.

Practical Implications

Regarding the practical implications, the biggest contribution of the current research is providing insight into how to synchronize traditional and social media to mobilize the public's attention regarding environmental protection and to motivate the public to engage in preventive actions and activities with respect to haze. The findings of the current research indicated the gap between traditional and social media in responding to environmental risks. Specifically, the results revealed that the *People's Daily* covered a greater amount of content focusing on what actions the government takes to tackle haze and how effective the actions are; however, the newspaper ignored actions that can be taken at the individual level. In other words, traditional media did not tell individuals what they can or should do to prevent haze or reduce the negative effects of haze, which has been a major component of social media content. In addition, the non-significant correlation between the traditional and social media agenda suggests that these two media platforms may complement each other in a risk event to

provide useful information to a massive audience, in order to inform, alter, and educate the public. This has important practical implications for environmental health practitioners and relevant agencies to tackle haze, which is that different the media platforms should be employed simultaneously in the case of a risk event. To better motivate individuals to engage in anti-haze actions, in addition to the coverage of risk events and collective efficacy which might be a main topic on traditional media, information about self-efficacy and response efficacy on social media is also critical to the public. The content about the threat of the risk as well as risk-reduction and prevention strategies that are accessible to the public from both media platforms will motivate the public to adopt protective actions and increase their perceived ability in terms of environmental risk prevention.

Limitations and Future Research

Several limitations of this study should be acknowledged. First, we analyzed only the textual media content and did not examine haze-related images or videos that might include the EPPM components. Future research may consider scrutinizing the EPPM components in pictorial materials, especially on social media. Second, we explored the static correlation between the EPPM components in traditional and social media. However, considering the rapid information flow in the social media era, future research should explore the dynamic relationship between traditional and social media agendas. Finally, although this study explored and compared the nature and structure of haze-related content in traditional and social media, it did not examine the effectiveness of this content. For instance, future research may conduct experiments to study the impacts of the different media's coverage on readers' beliefs and protective behaviors.

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Table 1.

Coding Scheme

Category	Definition	Sample Message in People's Daily	Sample Message on Weibo
Severity	Messages reflecting the seriousness of haze	Haze is serious air pollution. Haze particles can affect the heart and lungs.	Haze poses a serious health hazard.
Susceptibility	Messages reflecting the likelihood that target will experience haze	An unexpected heavy haze started to engulf large part of China.	The haze is more and more heavy in my city.
Self-efficacy	Messages reflecting the self's ability to engage in some recommended behavioral response	It is easy for us to use public transport transportation instead private cars.	It is easy for everyone to take public buses and trains instead of private cars, as they can carry more people in one journey. This reduce the amount of pollution produced.
Response efficacy	Messages reflecting the effectiveness of some recommended response for preventing or reducing haze	Reducing emissions from cars and diesel trucks is effective in controlling haze.	Recycling paper, plastic, glass is a good way to reduce haze because this conserves energy and reduces production emissions.
Collective efficacy	Messages reflecting the whole societies or communities' capabilities to engage in some recommended behavioral response	The government has made a lot of efforts to prevent and reduce air pollution. Haze in some areas has been controlled.	The government is able to manage and control haze.

Table 2

Number of Messages, and Percentage of Total for EPPM Components in People's Daily and on Weibo.

Media Platform	Categories Included	Number of Messages	Percentage of the Total Messages
People's Daily	EPPM Components	526	53.40
	Threat	334	33.90
	Efficacy	274	27.82
	Severity	99	10.05
	Susceptibility	223	22.64
	Response efficacy	201	20.41
	Self-efficacy	79	8.02
	Collective efficacy	188	19.09
Weibo	EPPM Components	656	55.82
	Threat	527	44.85
	Efficacy	225	19.15
	Severity	152	12.90
	Susceptibility	425	36.17
	Response efficacy	155	13.19
	Self-efficacy	119	10.12
	Collective efficacy	26	2.21

Note: The total is not 100% due to the non-mutually exclusive coding scheme.

Table 3

Degree Centralities of Networks of EPPM Components on People's Daily and Weibo

Media Platform	Categories included	Number of Degree (k)
People's Daily	Severity	115
	Susceptibility	120
	Self-efficacy	86
	Response efficacy	178
	Collective efficacy	155
Weibo	Severity	52
	Susceptibility	116
	Self-efficacy	80
	Response efficacy	65
	Collective efficacy	13

Table 4.

The Spearman's Rank-order Correlation between People's Daily and Weibo and QAP for Network Agendas of People's Daily and Weibo

Variables	1	2
1. People's Daily	-	.12 ^{n.s.}
2. Weibo	.70 ^{n.s.}	-

Note. ^{n.s.} not significant at $p < .05$ level. Below the diagonal is spearman's rank-order correlation, above the diagonal is QAP

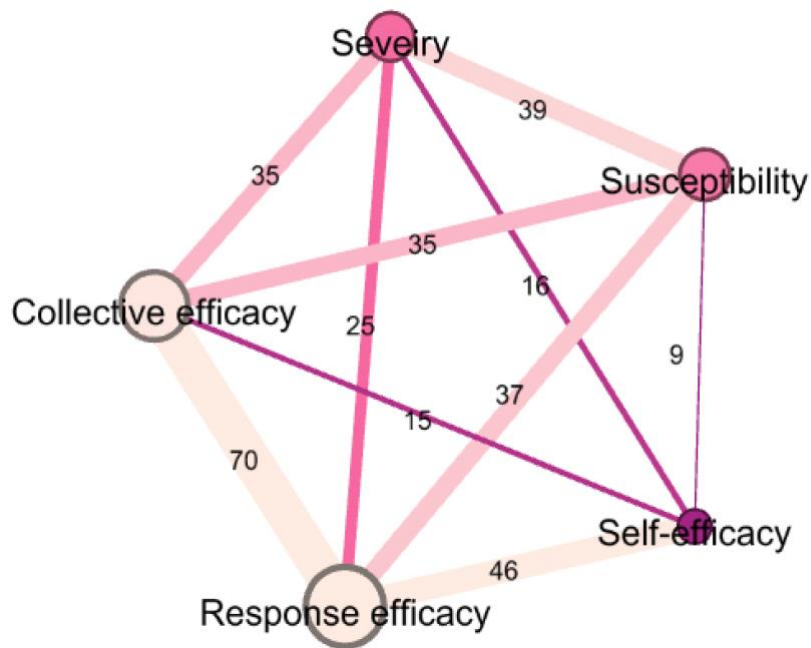


Figure 1. Network of EPPM components in *People's Daily*

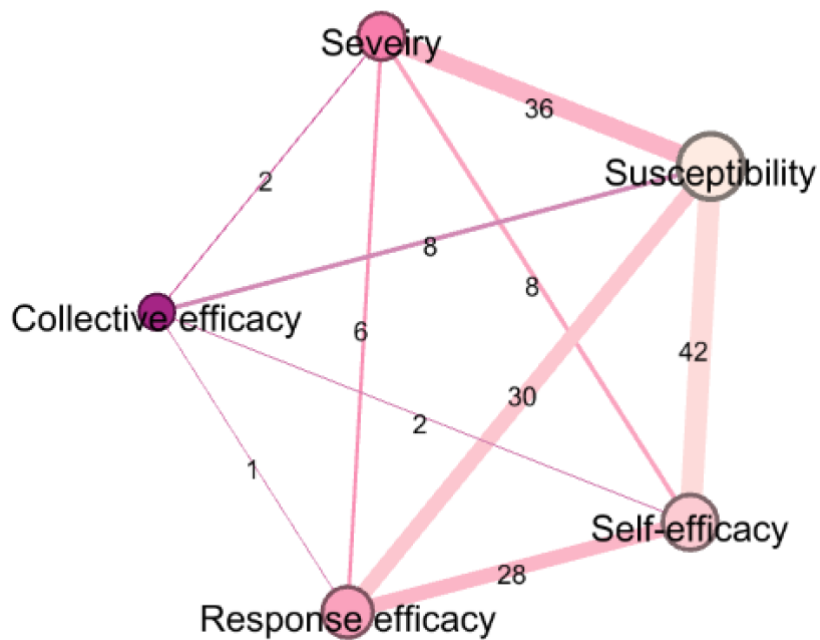


Figure 2. Network of EPPM components in *Weibo*