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Affective agenda dynamics on social media: interactions of emotional content posted by the public, government, and media during the COVID-19 pandemic

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Emotions shared by posters on social media can have a profound impact on individuals and society. This was particularly evident during the COVID-19 pandemic. To examine the types, trends, and dynamics of emotions communicated by the public, government, and media, this study collected 67,689 public posts, 36,740 government posts, and 126,988 media posts on Sina Weibo during the first 6 months of the COVID-19 pandemic. The vector autoregression model and Granger causality analysis were used to measure affective agenda networks and examine affective agenda dynamics. The findings show that the public, government, and media predominantly expressed positive emotions on Sina Weibo. The findings also reveal the significant influence of government emotions on media emotions, which subsequently affects public emotions. This study extends agenda-setting theory by integrating the dimension of emotional contagion. It underscores the potential for government and media to shape public emotions during health crises in order to maintain social order and increase compliance with emergency policies.

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Introduction

As of 21 June 2023, there have been 768 million infections and 6.9 million deaths around the world due to COVID-19 (WHO, 2023). People increasingly turned to social media as their first and main channel to obtain information about the pandemic (Chan et al., 2020; Mongkhon et al., 2021; Gisondi et al., 2022; Jang and Baek, 2019). In addition, they used social media to manage their mood and express their emotions (Cauberghe et al., 2021; Hu et al., 2022; Oh et al., 2021), including fear, disappointment, anger, and guilt (Su et al., 2021). Emotional content on social media can have tremendous impacts on individuals and society (Ahmad and Murad, 2020; Dong et al., 2020). For example, the longer people were exposed to negative pandemic information, the higher their risk of developing symptoms of depression was (Mongkhon et al., 2021). Thus fear promoted the spread of rumors during the pandemic (Dong et al., 2020), and anger and fear led people to support restrictive policies to limit the spread of the COVID-19 virus.

Examining the dynamics of emotional content on social media is crucial for understanding communication processes during health crises in the new media era (Ferrara and Yang, 2015; Zheng et al., 2021). Drawing on data collected in China during the first 6 months of the COVID-19 pandemic, this study seeks to answer the following three questions: (1) What were the main types of emotions that the public, government, and traditional media posted on social media during the COVID-19 pandemic? (2) What emotional trends were observed in the content posted by the public, government, and traditional media on social media? (3) What are the temporal relationships between the emotional content posted by the three entities on social media?

One of the purposes of this study is to understand the dynamics governing the transmission of emotions through social media during the pandemic. Understanding this process could help reduce the spread of negative emotions during public health emergencies and direct negative emotions on social media toward constructive outlets. The second purpose of this study is to clarify the relationship between the government, the public, and the media with regard to emotional communication surrounding COVID-19, expanding the application of agenda-setting theory to the dimension of emotions.

Context of the current study

We collected data on Sina Weibo in China. Weibo, a microblog that is the Chinese equivalent of Twitter, is the largest social media platform in China (Dong et al., 2020). By December 2020, there were 521 million active monthly Weibo users (CNNIC, 2020). The average daily consumption of pandemic information on Weibo reached 16.1 billion during the COVID-19 crisis (Sina Weibo, 2021). In China, the government and traditional media played crucial roles in publishing pandemic information on social media. The total number of certified government Weibo accounts reached 140,000, receiving 450 billion clicks in 2020, and the number of certified traditional media Weibo accounts was over 38,000, with more than 2.4 trillion clicks on information posted by those accounts (Sina Weibo, 2021). Thus, Weibo is regarded by many as a space where different voices compete to shape public opinion (Guo and Zhang, 2021; Li et al., 2020; Wang et al., 2020).

Weibo provides an excellent opportunity to examine the dynamics of emotional content posted by the public, government, and media. In addition to censorship, the Chinese government also actively disseminates information to shape public moods and opinions (Fu and Lee, 2016; King et al., 2013). Although past studies have mainly focused on public emotions rather than emotions expressed by governments and traditional media (Tan et al., 2021; Zhao et al., 2020), the government and traditional media, as two main actors on Chinese social media, may utilize the platform to stabilize public emotions (Chen et al., 2020; Han et al., 2020).

Literature review

Types of emotional content. People used social media to express their emotions and cope with the pandemic (Cauberghe et al., 2021; Hu et al., 2022; Oh et al., 2021). An analysis conducted by Su et al. (2021) on 22,423 Weibo users found that people expressed various emotions in response to the pandemic, including fear, disappointment, guilt, anger, panic, blessings, faith, love, praise, and surprise in their posts. People posted more negative emotions on social media, including anxiety and fear during the initial phase of the pandemic (Ahmad and Murad, 2020; Li et al., 2020; Prikhidko et al., 2020). Shi et al. (2022) collected over 45 million Weibo posts during the first pandemic wave in China and found that the appearance of negative content led to the spread of fear.

In response to public anxiety about the pandemic, the Chinese government made a series of announcements on its official Weibo account in an attempt to refute rumors (Li et al., 2020). The central government of China manages local governments through various methods, such as taxation (Blanchard and Shleifer, 2020). It established the Cyberspace Administration of China (CAC) to regulate online content (Creemers, 2017). After the initial outbreak of COVID-19, the government expressed primarily positive emotions on Weibo to guide public sentiment (Wang et al., 2020). Liao et al. (2020) found that there were differences between the Weibo posts published by the government and those posted by the public during the pandemic. The government was more inclined to provide support in the form of praise and positive emotions, while the public was more likely to display sympathy as well as worry and other negative emotions.

Like the government, in recent years, traditional media have increasingly used social media to attract young readers (Guo and Zhang, 2021). Li and Long (2017) studied the style of expression of China's official party newspaper, the *People's Daily*, on Weibo. They found that compared with the severe and neutral style in its newspaper, the *People's Daily* frequently uses highly emotionally loaded wording to express support, sympathy, and appreciation on Weibo. Roberts et al. (2017) also found that during the 2014 Ebola outbreak, the most frequently read stories about the epidemic on global online media were personal stories about suffering in Africa that aroused emotion and compassion. In short, compared with stories disseminated in newspapers or on TV, stories published on social media by these same traditional information sources may be more emotional.

Previous studies have not addressed differences in the emotional content posted by the public, governments, and traditional media on social media. Thus the first research hypotheses for this study are:

H1a: The public predominately posted negative emotional content on social media during the COVID-19 pandemic.

H1b: The government predominately posted positive emotional content on social media during the COVID-19 pandemic.

H1c: The media predominately posted negative emotional content on social media during the COVID-19 pandemic.

Trends of emotional content. Several studies have examined the evolution of emotions expressed on social media in Japan over time. Vo and Collier (2013) discovered a gradual shift toward more positive emotions posted on Twitter during four earthquakes that occurred in Japan in 2011. In the context of the

COVID-19 pandemic, Su et al. (2021) conducted a study on Weibo and identified four distinct stages of emotional expression from January through April 2020: an initial period, an outbreak period, a stable period, and a prevention and control period. Compared to the initial period, during the outbreak period, Weibo posters increasingly used negative emotion words like *fear*, *disappointment*, and *anger*. However, as prevention and control measures were implemented, the use of panic-related words significantly decreased.

Examining posts on Weibo from December 1, 2019, to January 31, 2020, Liao et al. (2020) analyzed emotions expressed by both individuals and government entities regarding COVID-19. They observed changes in emotional patterns over time. As the pandemic unfolded, individual posts showed a rise in empathy and attributing blame, while government posts displayed a slight increase in sharing instrumental support, praise, and empathy.

However, those studies did not track the emotional trends in content posted by traditional media on social media compared to the public and the government. Thus, to address this gap, this study proposes the following question: what emotional trends were observed in the content posted by the public, government, and traditional media on social media?

Affective agenda dynamics between the public, government, and media. Agenda-setting theory was first proposed by McCombs and Shaw in 1972. The central concept of agenda-setting theory is that the media can influence what and how people think about a social issue. Researchers have also identified an influence of government agendas. For example, in crisis communication, journalists rely extensively on government sources (Priest et al., 1991; Shoemaker and Reese, 2013). During the COVID-19 pandemic, the Chinese government's agenda caused changes in the media's agenda on social media (Zhou and Zheng, 2022). These studies underscore how media and government agendas impact the public. Recent studies reveal a more dynamic relationship between media, public, and government agendas (Gruszczynski and Wagner, 2017; Russell Neuman et al., 2014; Zhou and Zheng, 2022).

The central idea of affective agenda setting is that emotional content posted on media can influence audiences' emotions. Coleman and Wu (2010) argue that emotion is a critical dimension of agenda-setting. It is evident that the emotional tone of publicly disseminated information can impact the public's emotions to some extent and thus play a role in planning public information. A great deal of research has documented online emotional contagion (Brady et al., 2017; Kramer et al., 2014), showing that emotional states can be transferred to others without their awareness. For example, in an experimental study, Kramer et al. (2014) showed that people produced more negative posts when positive expressions were reduced on their newsfeeds, and they produced more positive posts when negative expressions were reduced.

As observed during the COVID-19 pandemic, emotions can be essential in agenda-setting processes because emotions have tremendous influences on individuals' information processing (Dai et al., 2021; McComas, 2006; Peters et al., 2004; Zheng et al., 2021). When making judgments, people tend to rely more on emotions than information content (Slovic, 2004). On the one hand, the government and media may pick up emotional content posted by the public and acknowledge their emotional concerns. On the other hand, the government and media in China may share positive emotions to boost public confidence, as emotions can also influence people's preferences for policy options, their behaviors, and their support for the government (Dai et al., 2021). Therefore, we propose the second research hypothesis:

H2: Expressions of emotion on social media by the government, the media, and the public interacted with each other during the COVID-19 pandemic.

Methods

In this study, we used Python 3.7.0 and its data crawling framework Scrapy 1.5.1 to write a web crawler program to search for "super topics"—a term specific to Weibo designating topics that attract a large community of interested users—related to the domestic pandemic situation on the Sina Weibo platform using the keywords "pneumonia", "COVID-19", and "pandemic". Examples of search terms are "Wuhan pandemic", "focus on COVID-19 pneumonia pandemic", and "pay tribute to frontline medical staff in pandemic". The data include emoticons but exclude posts with no substantive content (such as links) or that were unrelated to the pandemic. The total number of public Weibo posts was 67,689.

To find government and media Weibo data, accounts were mainly extracted from the Government Index List and the Media Matrix Power List published by Weibo. The dimensions of a comprehensive investigation of the lists include communication power, interaction power, service power, and recognition degree. The data collection period was the same for government, media, and public posts. We randomly selected 72 government accounts and 72 media accounts from those lists. According to the 46th Statistical Report on China's Internet Development Status (CNNIC, 2020), as of June 2020, a total of 31 provinces in China had opened microblogs for government agencies. Thus, we chose two government accounts for each province (there are 40 for each province in the ranking). Following the principle of proportionality, 10 government accounts were selected at the central level (nearly 200 at the central level in the ranking). Media accounts included newspapers, magazines, radio stations, and mainstream media websites; 18 accounts were randomly selected from each category (the ranking list has 100 media in each category). Finally, 36,740 government posts and 126,988 media posts were obtained (see Fig. 1).

December 30, 2019, was chosen as the starting date for data collection because it was the earliest instance when people began discussing COVID-19 on Sina Weibo. Similarly, July 1, 2020 (6 months later), was selected as the endpoint for data collection following the assertion of Stone and McCombs (1981) that it typically takes 2–6 months for the media agenda to shift to the public agenda. Although the pandemic has been ongoing since December 2019, this study only examines the first 6 months of the crisis for two reasons. First, COVID-19 spread rapidly across China beginning in December 2019, and the number of infections and deaths in the first wave peaked by March 2020 (Gumbrecht et al., 2023). With the implementation of prevention and control measures by the Chinese government in late January 2020, the number of severe cases and deaths significantly decreased from April through June 2020 (Hu, 2020). This makes it highly significant to analyze changes in government, media, and public emotions on social media during the first 6 months of 2020. Second, unlike other stages of the COVID-19 pandemic, information about the harm of the virus was unclear during the first stage, leading to changes in public emotions caused by evolving government and media information and emotional dissemination as more information about the virus became available (Yang et al., 2022).

Prior to the analysis, we used Python's regular expressions and Jieba 0.42.1 natural language processing package to filter the stopwords and then categorized keywords in the Weibo text. For data analysis, we used Statsmodels 0.10.1 and Stata 14.0.
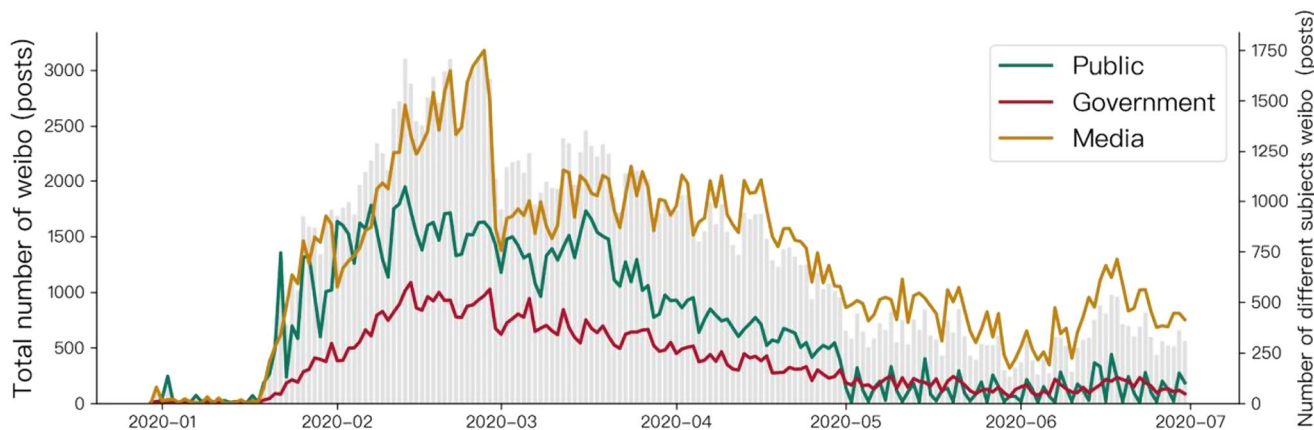
Fig. 1 The number of posts on Weibo among three different entities. The green color represents the public, red represents the government, and yellow represents the media.
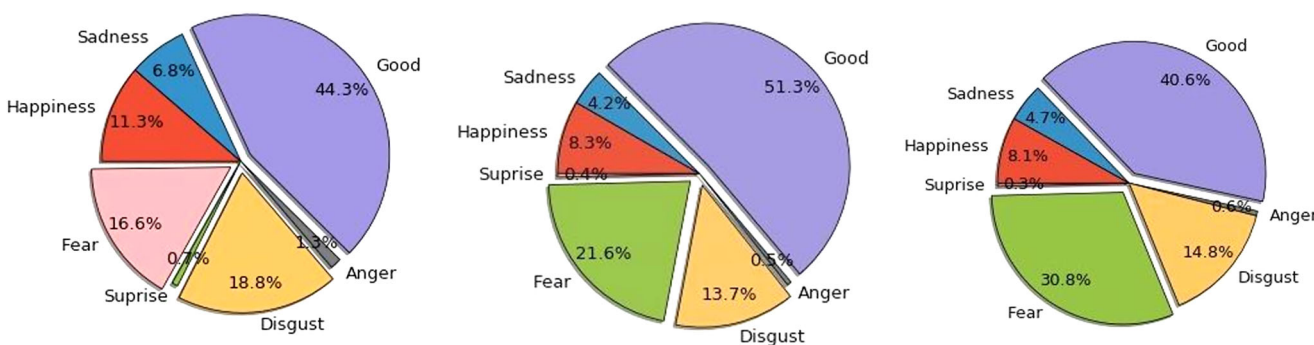

Fig. 2 The distribution of emotions among three different entities. 1. Distribution of emotions in public Weibo posts. 2. Distribution of emotions in government Weibo posts. 3. Distribution of emotions in media Weibo posts.

The main methods of applying big data technology to text sentiment analysis can be divided into lexicon-based methods and machine-based methods. The former uses the emotional lexicon corpus to match the text with the emotional keywords in the corpus, and then classifies text emotional types or calculates emotional tendencies. The classical lexicon-based method is commonly used for emotion analysis. Its advantage is that it can reflect unstructured characteristics of the text. In many cases, a lexicon-based method can provide some context as long as it considers the specific rules of emotional valence shifters (such as negative words or adverbs of degree). The machine-based method is a supervised learning algorithm, which trains machine-learning models to predict the emotional type or tendency of text. In this study, these two methods are combined, and the "emotional vocabulary ontology library" constructed by the Information Retrieval Laboratory of Dalian University of Technology was used as an emotional lexicon to match the emotional keywords in Weibo texts in order to identify the emotional types of texts posted by the government, the media, and the public. The machine-learning model, based on the naive Bayes algorithm, is constructed to predict the emotional tendency of Weibo texts and analyze the emotional evolution trends of different subjects on social media.

To test the dynamic influence of emotions on the public, government, and media on social media, this study uses a vector autoregression (VAR) model following the procedure recommended by Stock and Watson (2014). VAR is a multivariate time series model that extends univariate autoregression to multiple time series variables, with the dependent variable being a function of lagged values of all variables. Determining the appropriate number of lagged independent variables involved considering various information criteria, such as AIC, FPE, HQIC, and SBIC (Pesaran, 2015). Granger causality tests were then used to examine the causal relationship among the emotions of the public, government, and media. Finally, this study illustrated impulse response functions and cross-correlations to show the sequential influence of different subjects' emotions and their respective causal impacts.

Results

Emotional types of public, government, and media posts on Weibo. To test H1, we used a lexicon-based method to list emotional keywords and analyze the emotional types diffused by each subject on Weibo. Emotional keywords are the concrete reflection of the emotional expression of public opinion on Weibo during the pandemic; they represent the dominant emotion in a specific public opinion period. The emotional vocabulary ontology database contains 27,466 emotional keywords divided into 7 categories and 21 subcategories according to Ekman's emotional classification theory (Ekman, 1972). Based on the emotional lexicon corpus, we extracted 7,634 emotional keywords (frequency 20,1481) from public Weibo texts, 4861 emotional keywords (frequency 197,741) from government texts, and 7188 emotional keywords (frequency 774,907) from media texts, and then these emotional keywords were classified and counted, as shown in Fig. 2.1–2.3.

The figures show that the total frequency of the seven categories of emotions in public, government, and media posts on Weibo was basically consistent. Figure 2.1 shows that the

Fig. 3 The trend of emotions observed among three types of subjects. 1. Proportion and trend of public emotions on Weibo. 2. Proportion and trend of government emotions on Weibo. 3. Proportion and trend of media emotions on Weibo.

public expressed the highest proportion of disgust (37,939/ 201,481, 18.8%) and sadness (13,808/201,481, 6.8%). H1a was thus supported. The government had the highest proportion of good emotions, accounting for half of the emotions expressed in its Weibo texts (101,491/197,741, 51.3%; see Fig. 2.2). H1b was thus supported. In the media posts, the proportion of good (314,792/774,907, 40.6%) and fear (23,8621/774,907, 30.8%) is relatively high (see Fig. 2.3). Thus, H1c was not supported.

Trends of emotion diffusion among the public, the government, and the media on Weibo. A chi-square test was used to examine the relationship among different user subjects and the emotions in posted content. The results showed that there were significant differences in the emotional categories posted by different user subjects ($\chi^2_4 = 16955.904$, $p < 0.001$), and there was also a correlation among them (Cramer's $V = 0.192$, $p < 0.001$). We then analyzed the emotion diffusion trends of different subjects in more depth. Comparing Fig. 3.1–3.3, it can be concluded that the emotional trends of the public, the media, and the government on Weibo were generally consistent: the proportion of positive emotions was higher than negative emotions as a whole, and different types of emotions were maintained in a relatively stable state. Specifically, at the beginning of the pandemic, negative emotions dominated in a relatively high

proportion of posts for all three subjects and fluctuated greatly, especially when public negative emotions surpassed 90%. By mid-to-late January 2020, the positive emotions of the public, the government, and the media had risen significantly, while negative sentiments had dropped significantly. This may be related to government departments taking measures to increase public confidence and alleviate the pandemic. In mid-to-late January, the pandemic situation was still unclear; during this time government departments and the media released relevant information, and public comment on Weibo was less frequent. For example, on January 1, 2020, the City of Zunyi released a text titled "Spreading false news about COVID-19 in Wuhan, eight people were investigated by the police according to law". On the same day, the *Beijing News* stated on Weibo, "The Wuhan South China seafood market has closed. This incident brought 'unexplained pneumonia' into the public eye". On January 18, Academician Zhong Nanshan went to Wuhan to inspect the pandemic situation. On January 20, President Xi Jinping gave important instructions on the pandemic, stressing that the spread of the virus should be resolutely curbed, and positive emotions on Weibo increased visibly (see Fig. 3.1–3.3).

There are some differences between subjects with respect to specific emotions (see Fig. 3.1–3.3). First, from mid-January to early May, government and media emotions were relatively stable, with positive emotions accounting for more than 50% of

those expressed; neutral emotions followed, at 30–50%. In contrast, public posts on Weibo were dominated by neutral emotions (50–60%), followed by positive emotions (30–50%). This pattern is related to the role positioning of different subjects. Beginning in late January 2020, the government and the media attempted to guide public opinion by spreading positive emotions, and as the pandemic was gradually brought under control, negative emotions subsided. This may be due to the fact that after March 7, 2020, the quarantine was lifted in all parts of the country, including Hubei Province, where the pandemic first occurred. People began to travel and return to work, and their emotions gradually became less negative. During this period, the proportion of negative emotions of all three subjects was relatively low, and the quantity of pandemic-related posts on Weibo decreased significantly (see Fig. 1). Second, after early May 2020, public emotion fluctuated radically, with an upward trend in negative emotions. This may be due to the large-scale spread of the pandemic in other countries, which began to have a great impact on China as the risk of the virus being imported into China increased, raising people's concerns. For example, a post on Weibo read, "Look at the soaring COVID-19 cases in the no. 1 world power, the United States. My heart feels scared! I fear that the pandemic is out of control!"

Emotional impact of the public, the government, and the media on Weibo. To examine the causality between the emotions of different subjects, we conducted a VAR model test. The results indicate that the null hypothesis—that no instantaneous causality existed among the emotions of the public, government, and media —can be rejected. Through VAR and Granger causality tests, as shown in Fig. 4.1, it was found that the emotions of the government had a Granger causal effect on the emotions of the media ($\chi^2_2 = 15.293$, $p < 0.001$); the emotions of the media had a Granger causal effect on the emotions of the public ($\chi^2_2 = 9.687$, $p = 0.008$); and the emotions of the government had a Granger causal effect on the emotions of the public ($\chi^2_2 = 14.845$, $p < 0.001$).

As shown in Fig. 4.2–4.4, the cross-correlation analysis revealed that the emotions of the public were most significantly correlated with the emotions expressed by the media, with a lag of 13 days ($r = 0.221$). Additionally, the emotions of the public were found to be most associated with the emotions expressed by the government, with a lead time of 2 days ($r = 0.223$). Finally, the emotions of the media were most closely related to the emotions displayed by the government, with a lag of one day ($r = 0.223$).

The results above suggest that the order of influence of variables is "government → media → public". The Granger causality test illustrates the correlation between variables, and this sequence of variables can be explained from two perspectives. First, as government emotions increased, media emotions also increased. This, in turn, led to elevated emotions among the public. Second, when government emotions decreased, media emotions also decreased, which lowered public emotions.

Additionally, as government emotions were the Granger cause of media emotions and public emotions, respectively, the above results confirm that government emotions were the precursor of media and public emotions. Any changes in government emotions led to significant changes in media and public emotions. When government emotions rose, media and public emotions also rose. In contrast, a decline in government emotions led to a decline in media and public emotions. Therefore, H2 was supported.

Discussion
Principal findings. By examining context data on Weibo, this study analyzed the different types of emotion expressed in posts

and relationships among the public, the government, and the media during the COVID-19 pandemic in China. Overall, the results show that positive emotions dominated the Weibo posts of all three types of subjects, with the proportion of positive emotions diffused by the government the highest (51.4%). Those emotions included praise, reassurance, and trust. Furthermore, there was a significant difference and correlation among emotions expressed by the public, government, and media (Cramer's $V = 0.192$, $p < 0.001$). The public tended to express positive emotions such as wishes and beliefs, while the government and the media paid more attention to diffusing positive emotions around protection, medical treatment, and health so as to convey confidence. This result is roughly consistent with findings of other recent studies, such as that during the pandemic people used more words of blessing and faith (Su et al., 2021). As the government acts as a manager, its Weibo posts were more likely to highlight instrumental support (Liao et al., 2020). Traditional media also mainly conveyed joy and other happy emotions during the COVID-19 pandemic and sought to bring readers into the story emotionally (Konstantinidou, 2021).

Another major finding of this study is that at the beginning of the pandemic, the negative emotions of the public, government, and media were relatively high (50–80%). In late January 2020, as the government fully implemented protective measures, the negative emotions of the public, government, and media plummeted, and the proportion of positive emotions increased. From late January to July 2020, the public's neutral emotions were relatively high and stable (40–60%), while the government's and the media's positive emotions were relatively high (40–60%). At the beginning of the pandemic, due to unclear information about the source of the virus and how harmful it was, social media played a key role in spreading panic (Ahmad and Murad, 2020; Depoux et al., 2020). As the government adopted active prevention measures, prompting people to adopt prevention behaviors, public emotions stabilized (Duan et al., 2020). At the same time, the government and media disseminated pandemic information and positive emotions on social media, spreading those emotions to the public (Chen et al., 2020).

However, judging from the overall trends, the proportion of the public's neutral emotions was higher than positive or negative emotions. This shows that the public was relatively calm, but it may be more related to the influence of censorship of Weibo comments. In China, social media remains heavily censored and information about the COVID-19 pandemic is still under the strict control of the government (Chen et al., 2020; Ruan et al., 2020). Censorship methods include deleting posts and hiring internet commentators to publish positive comments on Weibo (King et al., 2017), which greatly reduced the proportion of negative emotions in social media posts. Due to the severity of the pandemic, the proportion of the public's positive emotions may not have been high, so that it appeared that the proportion of neutral emotions was higher than that of negative and positive emotions.

This study also reveals the relationships among the government, the media, and the public from an emotional perspective, based on agenda-setting theory. The findings suggest that government emotions have a significant impact on media emotions, which in turn affect public emotions. When government emotions rise, media emotions rise, and this leads to high public emotions. Conversely, when government emotions fall, media emotions also fall, resulting in low public emotions. Due to China's unique power structure, the government plays a leading role in disseminating public health information and influencing the news media (Luo, 2014). As of June 2020, the number of government microblogs on Weibo reached 141,000 (CNNIC, 2020), and their annual number of views exceeded 450 billion
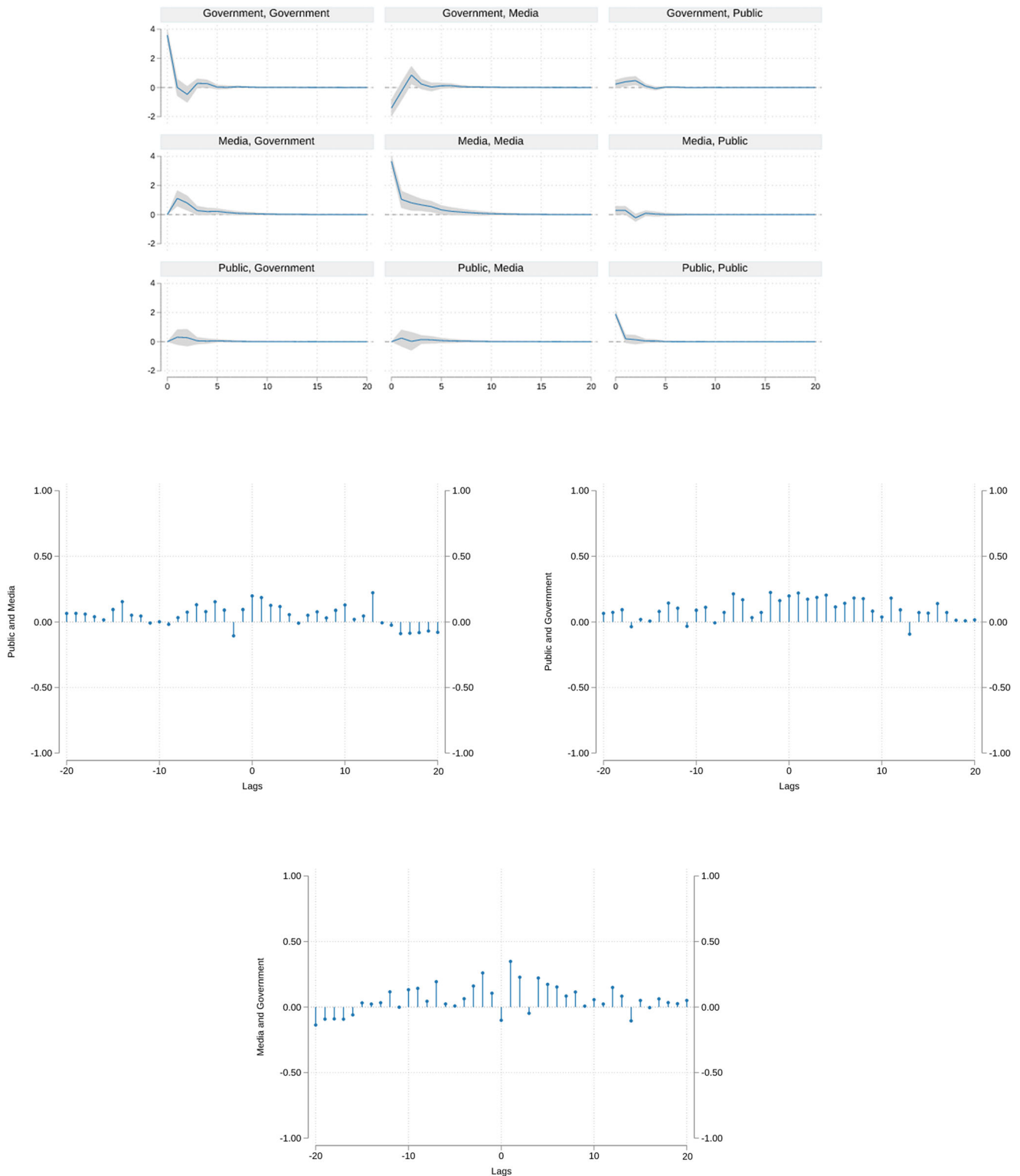
Fig. 4 Results of Granger causality tests and cross-correlation analysis. 1. Impulse response for interactions among emotions of different subjects. Impulse response function gives the reaction of a response variable to a one-time shock in an impulse variable; the title of each sub-plot represents the impulse variable and response variable, respectively. 2. Cross-correlation between emotions of public and media. 3. Cross-correlation between emotions of public and government. 4. Cross-correlation between emotions of media and government.

(Sina Weibo, 2021). Government accounts on Weibo provided crucial information and public services and played an integral role during the pandemic (Chen et al., 2021; Zheng and Zheng, 2014). In the context of social media censorship, media information sources rely primarily on government channels, and during pandemics, media reports must align with government emotions and messaging (Zhou and Zheng, 2022). Moreover, the public's emotions and behaviors in response to information are largely influenced by the media reports they encounter (Robertson et al., 2023).

The Chinese government emphasized the importance of positive "public opinion guidance" during the COVID-19 pandemic by limiting speculation and censoring negative comments, which served to maintain a positive image of the government and reduce public fear (Ruan et al., 2020). The government hoped to boost confidence in its response to the pandemic by conveying positive messages. In the early stages of the pandemic, governments worldwide instituted emergency responses, such as imposing blockades or providing medical supplies in affected areas. During this time, the Chinese government used social media as a platform to explain the rationale for its policies and provide detailed implementation steps. Discussions peaked in February 2020, when a new hospital was built within 10 days, generating strong positive sentiment and highlighting the government's dominance of the emotional agenda during crisis situations (Dai et al., 2021).

Theoretical and practical implications. This study expands on the traditional agenda-setting theory and enriches it from the perspective of emotion setting by revealing that the government can influence the media and the public at an emotional level. Particularly in an authoritarian country such as China, the government's emotions during a sudden crisis affect media emotions and subsequently, public emotions, reflecting government-led agenda setting. This further enhances the application of agenda-setting theory in the context of authoritarian countries and augments theoretical research on agenda-setting in diverse cultural settings. Further, our study uses Granger causality based on time-series analysis, which is widely recognized as a robust method for determining causality and providing accurate results, unlike traditional causal research that mainly relies on cross-lag analysis (McCombs and Valenzuela, 2020; Meraz, 2011). Last, this study has considerable practical value. The results show that during crises, in addition to providing guidance to populations through information, governments, and the media can ensure social stability and compliance with emergency policies by carefully selecting the emotional tone of publications on social media.

Conclusion

There are significant differences in the types of emotions expressed in Weibo texts published by the public, the government, and traditional media. These three actors also influence each other emotionally. Public posts are dominated by neutral emotions, while government and media posts are dominated by positive emotions. Government emotions affect the media, and then the media emotions affect public emotions.

Limitations. This study has some limitations. First, the lexicon-based method is based on the emotional lexicon corpus to match words. To a certain degree, it ignores the expression of context, which may lead to a situation where the overall emotional expression of the text is not completely consistent with the extracted emotional keywords. Second, texts published on Weibo are reviewed by the platform. The texts obtained from the hot search ranking during the pandemic period covered in this study were not based on a pure algorithm mode. Thus Weibo posts deleted by the censors or publishers themselves were ignored, which may lead to an emotional expression not completely conforming to the real context at that time. Third, this study primarily aimed to examine the relationship between different subjects related to emotion, while overlooking the connections between emotions and perspectives. A subsequent phase of this research will explore how emotional changes in government and media publications impact public viewpoints, and conversely, how the three entities reciprocally influence each other. Finally, this study examined the cause-and-effect relationship among public, government, and media emotions

through the Granger causality test. This method is basically a statistical causal relationship, rather than actual causation. Nonetheless, Granger causality, being a dynamic correlation, can determine whether a variable predicts another variable and the sequence of their influence under multivariate circumstances. Hence, it can offer insight into genuine cause-and-effect relationships.

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