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# Research on the ecological construction of online source of COVID-19

Yuxi Zhao[a], Zhen Wang[a,†], Yi Zou[a*], Lijuan Zhang[b]

[a] *School of Physics and Electronic Technology, Liaoning Normal University, Dalian, 116029, P.R. China*

[b] *School of Foreign Languages, ShaanXi Xueqian Normal University, Xi'an, 710100, P.R. China*

[†] *Yuxi Zhao, Zhen Wang, are co-first authors, all owning the first authorship.*

A R T I C L E I N F O

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A B S T R A C T

The online dissemination of emergencies can reflect the public opinion in a large scale. By studying the dissemination of online public emergencies, it is of help in the understanding, the management, and the guidance of the public sentiments so as to promote scientific dissemination. With the continuous increase of the Chinese netizens, the online public opinion dissemination of emergencies has become more and more important. Taking the online public opinion source of COVID-19 as an example, this paper analyzes the evolution process of the public opinion, based on the big data platform of public opinion monitoring; secondly it analyzes the ecological composition of the public opinion through the microscopic analysis of the grounded theory so as to reveal the information beneath the surface. It is discovered that the historical perception of the audience and the information from the official media, the traditional media and the online media jointly affect the development of the public opinion. In the end, this paper puts forward the online public opinion guidance strategies of emergencies, including the long-term science education strategy and the short-term multiparty coordination strategy.

## 1. Introduction

With the widespread of the Internet and the advent of the self-media era, the number of Chinese netizens continues to increase. According to the survey of China Internet Network Information Center (CNNIC), by June 2019, the number of Chinese netizens has reached 854 million with the Internet penetration rate of 61.2% (CNNIC, 2019). Cyberspace has become one part of people's daily life so that the public opinions, views and attitudes about the public events are aggregating and diffusing on the Internet. The research object of this paper is the online public opinion of emergencies. The online public opinion refers to the expression, dissemination, interaction and subsequent influence of the netizens' feelings, attitudes, and viewpoints with the network as the carrier and the event as the core(Li, Wu, Dai, Ju, Liu., & Zhu, 2015). According to the Law of the People's Republic of China on Emergency Response, an emergency refers to a natural disaster, an accident, a public health event or a social security event that occurs unexpectedly, causes or is likely to cause serious social damages and requires emergency response measures. The online dissemination of the emergency can reflect the public opinion in a large scale. By studying the online public opinion dissemination mechanism of emergencies, it is of great help in the understanding, the management and the guidance of the public sentiments so as to promote scientific dissemination.

In December 2019, a number of cases of unknown pneumonia were found in Wuhan, China. On January 8, 2020, the experts of the National Health Committee preliminarily identified the new coronavirus as the pathogen of the epidemic. As of March 16th, over 160,000 cases of new coronavirus pneumonia had been diagnosed worldwide, and a state of emergency had been declared in the Philippines, the United States, South Africa and several countries and regions in Europe. In the face of the raging epidemic, the scientific studies on tracing the origin of new coronavirus pneumonia have never stopped in addition to preventing and fighting the epidemic, and many of them have been reported on the Internet by the medium , causing much public discussion. This study focuses on the public opinion dissemination of the source of COVID-19. With the help of the public opinion monitoring system of Qingbo big data, and it first explores the evolution cycle and dissemination characteristics of the public opinion, based on the analysis of the public opinion data of the whole network. Then it analyzes the text characteristics of the hot Wechat article messages through the grounded theory. In addition, it constructs the ecological evolution structure of the online public opinion on emergencies from a micro perspective, thus deepening the understanding of online public opinion , so as to guide the online public opinion efficiently.

## 2. Literature Review

The research on public opinion in western is comparatively extensive, dating back to the 1950s (Doob, 1948), and the main

* Corresponding author. University of Prešov in Prešov, Slovak republic
*E-mail address*: 1584630093@qq.com (Yi Zou).

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analytical paths include the mechanisms of group and individual behavioral evolution of social conflict in macro-contexts. There are two viewpoints on the social impact of group conflicts from a macro perspective: one is that conflicts are adverse to the society, for it takes a long time to recover from the negative effects; the other is that conflicts are conducive to releasing social tensions, and the stability after conflicts is beneficial to further social development. With the development of science and technology, the academia has turned its attention to online public opinion. Leask et al.(2010) propose that public opinion monitors of emergencies should recognize the importance of the new media (Leask, Hooker, & King, 2010). Danielle et al.(2018) discover that compared with traditional media, digital media news intensifies the public anxiety(Danielle, Joseph, & Thomas, 2018). Ho et al.(2013) point out that influential network opinion leaders guide the public opinion mostly through emotional resonance (Ho, Peh, & SOH, 2013). The present research on online public opinion mainly focuses on the following aspects: the concept, the characteristics, the influence factors, the formation and evolution, the technology development as well as the management, all of which can be categorized into three divisions: the basic theory research, the social mechanism research and the social application research. Online public opinion is deeply rooted in Chinese society. Therefore, domestic scholars have proposed to localize the theory of online public opinion by looking for answers from the social elements such as politics, economy, and culture that are unique to China (Zuo, & Li, 2017). The formation and dissemination of the online public opinion is inseparable from the netizens, and due to different attitudes towards different medium issues, netizens with different opinions gather to form different groups, thus leading to communication gaps(Li, & Chen, 2014). However, few studies focuses on the impact of the emotional motives and the opinion leaders on the public perception and decision-making (Liu, & Liu, 2011).

## 3. Research Methods

Qingbo Index is a third-party assessment and research platform of new media big data, and the big data platform of Webo, Wechat and News Client. Its unique WCI, BCI, TGI algorithm formula has become the evaluation standard for major ministries, central enterprises and top 500 enterprises. Gounded on the big data of Qingbo Index, we have set "the virus source", "the virus origin" and "Patient Zero" as event keywords and have obtained the public opinion release index, which has been collated, and of which the 50-day data from January 17 to March 5 have been selected for visualization (Figure 1). It can be seen that topics related to the source of the virus are controversial and continue attract public attention. The public is eager to know the origin of the virus, so the discussion on tracing the new coronavirus has not stopped since the outbreak. As the source of the virus has not yet been determined, new issues continue to emerge in the process, which continues to stimulate the attention of the netizens. The attention of the netizens is high and long, and especially when statements such as "the virus is leaked by Wuhan Institute of Virology", "the U.S. is the source of the virus" and others have emerged, netizens' interest has been stimulated more frequently. Therefore constant rumors appeared as a result of the absence of truth and the anxiety of the public, which led to some irrational speech and behavior.

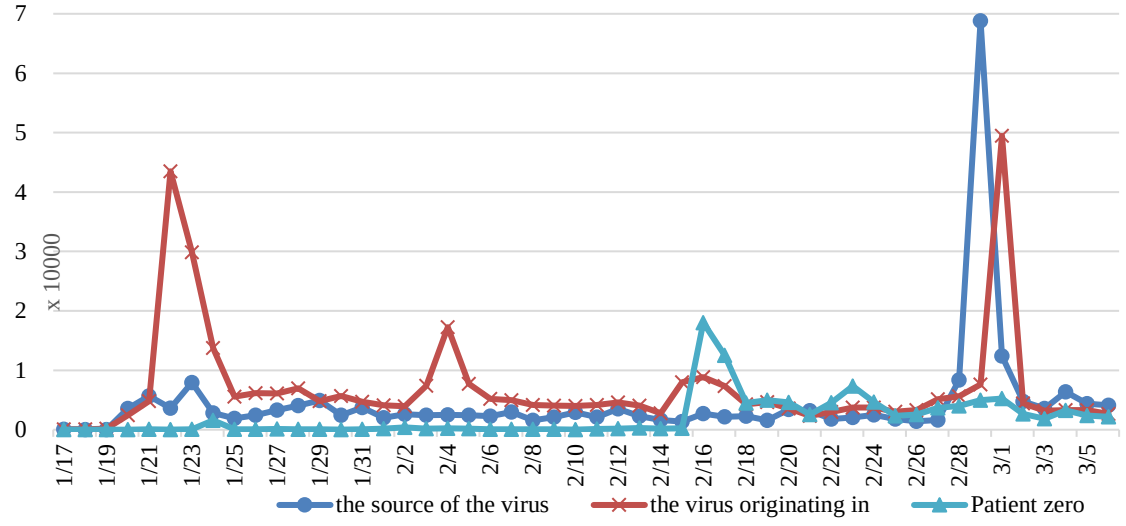


**Fig. 1.** Trends in issues related to the source of the virus

As can be seen from Figure 1, the dissemination evolution is characterized by distinct phases. The inflection points on the curve indicate the occurrence of milestone events in each phase. The evolution of public opinion can be divided into four main phases: incubation period, growth period, burst period and dormancy period. There are four distinct peaks in the curve, which appear from January 21 to January 25, February 2 to February 6, February 15 to February 18, and February 28 to March 2, respectively. In the area between the peaks, the heat of public opinion declines but does not disappear, with repeated fluctuation until the next peak. Further analyzing the key nodes of online public opinion, we find that the high popularity of the public opinion at the peak was due to the occurrence and reporting of fuse events, which gathered a lot of attention within a short period of time. The rapid spread of online public opinion increased in an explosive manner, and gradually decreased after reaching the peak, but the relevant reports did not stop, and the public opinion was ignited again after the appearance of the next fuse event.

We then further analyzed the textual content of media reports and examined the development of related topics. On January 20, at the high-level expert press conference organized by the National Health and Medical Commission, Academician Zhong Nanshan confirmed the existence of human-to-human transmission of the new coronavirus; the National Health and Medical Commission issued Announcement No. 1, which included pneumonia infected by the new coronavirus into the Category B infectious diseases stipulated in the Law of People's Republic of China on Prevention and Treatment of Infectious Diseases, and adopted measures for the

prevention and control of Category A infectious diseases. On January 23, Wuhan was closed. A series of government actions demonstrated the seriousness and urgency of the epidemic. The public woke up to the sudden epidemic and began to question the source of the virus. On January 23, Shi Zhengli's team of Wuhan Institute of Virology, Chinese Academy of Sciences, found that the new coronavirus was 96.2% consistent with the bat coronavirus RaTG13 previously detected on the Rhinolophus affinis in Yunnan Province, based on which the new coronavirus (nCoV-2019) originated in bats. In addition, according to previous epidemiological surveys, the earliest cases were mostly associated with South China seafood wholesale market in Wuhan, which was closed on January 1. At that time, the media mostly equated the relationship between the new coronavirus and the South China seafood wholesale market with the relationship between SARS and the Guangdong wildlife market. They generally criticized the behavior of eating wild animals, and called for eliminating wildlife consumption, reducing the invasion of wildlife habitats, and keeping away from wild animals, so as to avoid creating conditions for the transmission of the virus from wild animals to human beings. On February 3, an article titled "Behind the Source of New Viruses, 100 Million Lives Are Dying in Pain ..." was widely reprinted and reposted on WeChat platform. According to Qingbo Index data, there were 229 articles of the same name, most of which were reprinted in full text, with a total reading volume of more than 2.86 million. This article started from the information of the new viruses arising from wild animals consumption, condemned a series of acts of exploitation of nature and awakened the public's awareness of treating nature kindly.

From February 15 to February 18, the search for "the source of the virus" and "Patient Zero" rose sharply, and rumors spread that the new coronavirus had been synthesized and leaked by Wuhan Institute of Virology. On February 19, Wuhan Institute of Virology, Chinese Academy of Sciences issued a circular to refute rumors, condemning the rumors for causing great harm to researchers and severely interfering with the progress of scientific research missions. Rumors stop in the open. After the officials seriously confronted, took the public's questions and confusion, and responded positively, the heat subsided rapidly. On February 21, Xishuangbanna Tropical Botanical Garden of Chinese Academy of Sciences, in collaboration with South China Agricultural University and Beijing Brain Center analyzed the evolution and transmission of the new coronavirus based on the whole-genome data, and then submitted a preliminary report. On February 28, a guest on a Taiwan program paraphrased the report, and suggested a link between the source of the virus and the United States, based on the events such as unidentified pneumonia attributed to e-cigarettes and the autumn influenza outbreak in the United States. The video was widely disseminated. The following day, experts in traditional media dialogue, such as the Economic Daily News, pointed out that the study had some limitations in terms of sample collection and that the speculation that influenza was linked to new coronavirus pneumonia had no data basis, little credibility and was clinically unlikely. The heat of public opinion then subsided again. It can be seen that the stimulation and public opinion triggered by the source of the virus is only a "phase of silence", and once a new causative event occurs, it will most likely become the focus and hotspot of attention of netizens again, which is consistent with the findings of Jiang Shenghong (Jiang, 2008).

As one of the most popular self-media platforms at present, WeChat public account has the advantages of timely information dissemination and convenient user interaction. Since the launch of Tencent's WeChat Public function in 2012, the number of public accounts and users have grown explosively. The monthly active users of WeChat in 2019 have exceeded 1.1 billion. This study is based on the WeChat public account, with "the virus source", "the virus origin", and "Patient Zero" as keywords for article search. A total of 28 articles with over 10,000 reads were selected, including 2 articles in official media, 8 articles in traditional media and 18 articles in self-media, and the content and media attributes of the articles are shown in Figure 2. The text of the messages in the comment sections is collected for analysis, to clarify the focus and characteristics of public attention for scientific guidance.

The NLPIR( Natural Language Processing to Information Retrieval, NLPIR) big data semantic intelligence analysis system by Zhang Huaping of Beijing Institute of Technology, was used to identify and statistically analyze the keywords in the messages of 28 hot-read articles . The importance of the text was automatically weighted by computer based on the features of word frequency, word length, part of speech, location, Internet high-frequency words. The feature weights of the keywords were calculated, and the selected feature words were output in descending order (Chen, Xia, & Chen, 2019).

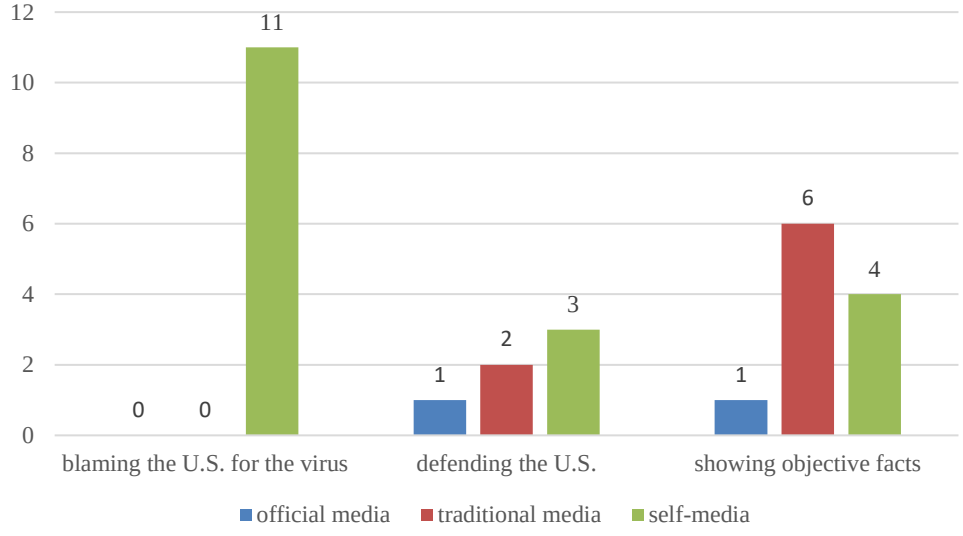


**Fig. 2.** Information source media attributes and information content distribution

## 4. Results

### *4.1.* Characteristics of online public opinion dissemination

With the technical support of the web-wide data research, semantic analysis and sentiment analysis, Qingbo public opinion

platform integrates the public opinion information matrix of traditional media, portal websites, webo, wechat, forums, etc. Based on the data analysis of public opinion, it is used to track the transmission path, and help to solve the problems of communication analysis, evaluation and decision-making in the field of public opinion. Based on the public opinion data of Qingbo platform, we further explored the characteristics of online public opinion dissemination. The fourth public opinion cycle caused by the Taiwan program from February 27 to March 4 was selected as the study interval and the event keywords "the virus source", "the virus origin", "the virus sourced from", "the virus originating in" and "Patient Zero" were set independently to analyze the public opinion information in order to track the event development.

From February 27, 2020 to March 4, 2020, a total of 167,385 pieces of relevant public opinion information were monitored. The main reports focused on the February 28, when Taiwan's program targeted the United States when proving the source of the virus, and after which various media outlets competed to report and comment on it, causing heated discussions. Also on February 28, local time, the World Health Organization held a conference on new new coronavirus pneumonia in Geneva, and the experts pointed out that the source of the new coronavirus could not be determined at present, and emphasized that the new coronavirus was not the fault of a certain region or an animal, calling on people to avoid blaming or even stigmatizing.The wave peak appeared on February 29, when the media discussion was mainly divided into three directions. One from the Taiwan program, blamed the source of the virus on the United States, based on the events such as the Wuhan Military Games, the autumn influenza outbreak and the unidentified pneumonia attributed to e-cigarettes in the United States. The other, on the contrary, from a scientific perspective, refuted the statements of the Taiwan program guest and pointed out that there was no detailed evidence for the time being. The third listed objective facts without making excessive inferential evaluations. On March 1, the heat of public opinion largely subsided. (As shown in Figure 3)

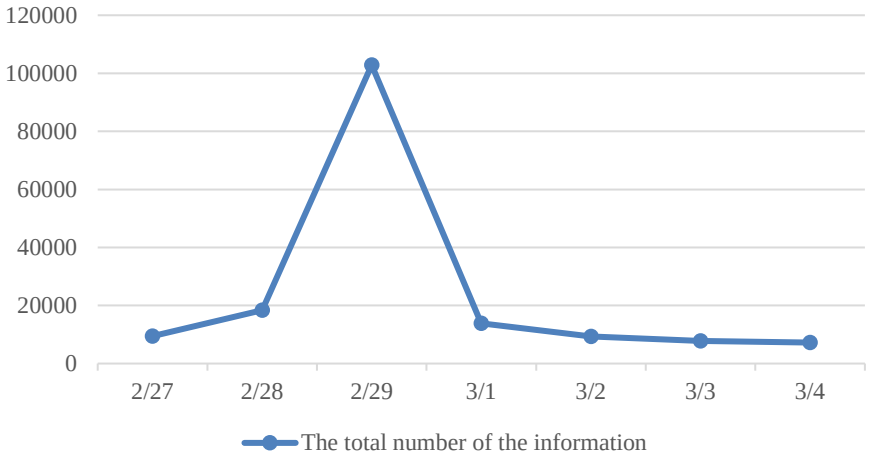


**Fig. 3.** Trends in the fourth public opinion outbreak cycle

Popular subject word clouds were made based on the frequency of word mentions (Figure 4). In addition to the central word "the virus", "United States" appeared the most frequently, at 123,545 times, and "the source", "China", "Taiwan", "the program", "the pneumonia" were also popular terms of concern, indicating that the discussion of the source of the virus at this stage revolved around the interpretation of the Taiwan program.


**Fig. 4.** Clouds of buzzwords in the fourth public opinion outbreak cycle

In terms of sentiment characteristics, the most neutral public opinion information was 95926, or 57.31%, followed by 39382 negative public opinion information, or 23.53%, and the least positive public opinion information was 32077, or 19.16%. Among them, the top three sentiments were fear 72.8%, praise 12.39% and disgust 9.36%, all of which started on February 28, peaked on February 29, and quickly fell back on March 1 as disinformation spread (Figure 5).

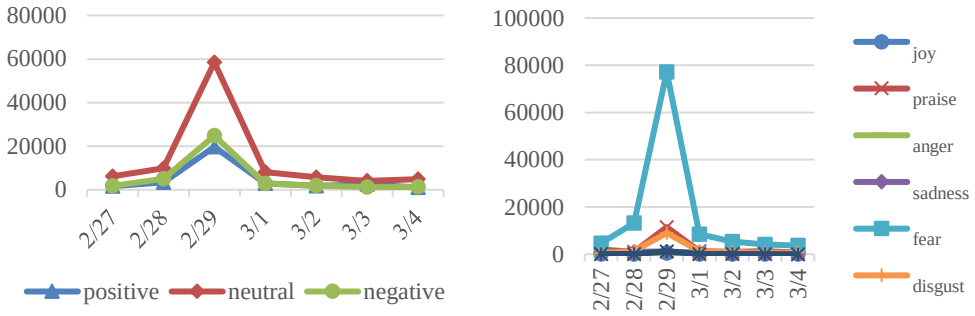


**Fig. 5.** Sentiment characteristics and evolution in the fourth public opinion outbreak cycle

### *4.2.* Public expression in public opinion events

The top 20 keywords in weighting ranking are shown in Table 1, from which the focus of public attention can be found. The weight of "the United States" ranks first, even exceeding the "virus", which indicates that the public attention to potential targets is extremely high. The "influenza" ranks 10th, which refers to the U.S. influenza outbreak in the autumn, indicating that the main basis of public suspicion of the United States is influenza. As the first outbreak country, "China" ranks third in weighting. "Conspiracy theories" ranks fourth, while the "truth" and the "science" ranks 16th and 19th, suggesting that the public does not fully accept the media's remarks, but rather discerns it critically, craves truth and appeals to scientific results. The 12th, 14th and 15th place of "the Community of Shared Future for Mankind", the "world", and the "people", respectively, indicate that the public's belief in building the community of shared future for mankind has been reinforced in the face of the global outbreak of infectious diseases.

**Table 1.** Top 20 comment text key words based on weighting ranking

| | keyword | Part of speech | weight | frequency | | keyword | Part of speech | weight | frequency |
|---|---|---|---|---|---|---|---|---|---|
| 1 | United States virus | nsf | 69.19 | 189 | 11 | The South China Seafood | n_new | 21.12 | 4 |
| 2 | China | n | 59.59 | 142 | 12 | Market | n_new | 20.88 | 5 |
| 3 | epidemic | ns | 52.94 | 196 | | the community of shared future | | | |
| 4 | nation | n | 39.23 | 75 | | | | | |
| 5 | conspiracy | n | 29.02 | 67 | 13 | for mankind | v | 17.84 | 25 |
| 6 | theories | n_new | 24.53 | 11 | 14 | believe | n | 17.46 | 34 |
| | The new | | | | 15 | world | n | 17.10 | 27 |
| 7 | coronavirus | n_new | 24.5 | 6 | 16 | people | n | 17.02 | 27 |
| 8 | source | n | 23.62 | 57 | 17 | truth | n_new | 16.92 | 8 |
| | wild animals | | | | | prevention and | | | |
| 9 | flu | n_new | 22.06 | 16 | 18 | control | v | 15.43 | 16 |
| 10 | | n | 21.50 | 31 | 19 | spread | n | 14.88 | 21 |
| | | | | | 20 | science | ns | 14.57 | 45 |
| | | | | | | Wuhan | | | |

Relying on the Nvivo software, we conducted a rooted analysis of public comments. Through the collection and analysis of empirical data, we abstracted and refined the conceptual category and logical framework that reflect the nature behind the phenomenon. After repeated verification and revision until the saturation of

The theory, the theoretical model was finally constructed(Suddaby, 2006). Firstly, the collected message text data is open coded, and is repeatedly revised compared with the actual data according to the NLPIR analysis results and literature reading results in the process of analysis and induction. The open-coded categories and concepts are then logically linked to tap deeper connections to grasp the event as a whole and prepare for selective coding to pick out the main categories. Finally, a selective coding process is carried out to select the core categories, and the entire event is described by analyzing and collating the core category and other categories.After selective coding, four core categories were finally identified in this study: public historical perception, public affective attitudes, public basis of judgment, and public derived behavior.

The source and content of the articles are set as material attributes. By matrix encoding the material attributes with key nodes, the relationship between the hot-read articles and their comments can be further explored. Matrix coding refers to the data crossover of the coded cross section between two item lists. According to the results of the matrix coding run between the nodes of the virus source judgments from the articles and their comments (Figure 6) , the following can be seen. When the articles blamed the United States for the virus, the comments also fall sideways to target the United States; for articles defending the United States, half of its comments remain neutral or hold the views that it may not necessarily be the United States, while the other half hold the opposite view, thinking that it is related to the United States. It is worth noting that nearly 20% of the comments have a subtle attitude thought that "possibly be the U.S. ", and subjectively choose to remain skeptical and continue to wait and see in face of articles refuting rumors. In the comment section of articles defending the U.S. or with no obvious tendency, nearly 30% of netizens in each believe that they should remain neutral when the source is currently unknown, and it is interesting to note that even if the report does not target the virus source for the United States or even refutes rumors, there are still nearly half of the

comments targeting the United States with the views of "being related to the U.S." and "possibly be the U.S.". It can be seen that the network platform not only provides space for the public to express views, but also offer more possibilities for information interconnection and discussion among the public. When the source is not yet clear, articles that present only objective facts bring more thought to the public, and their comments are more diverse and evenly distributed; while articles with strong points of view impede the potential of public discussion and thinking.

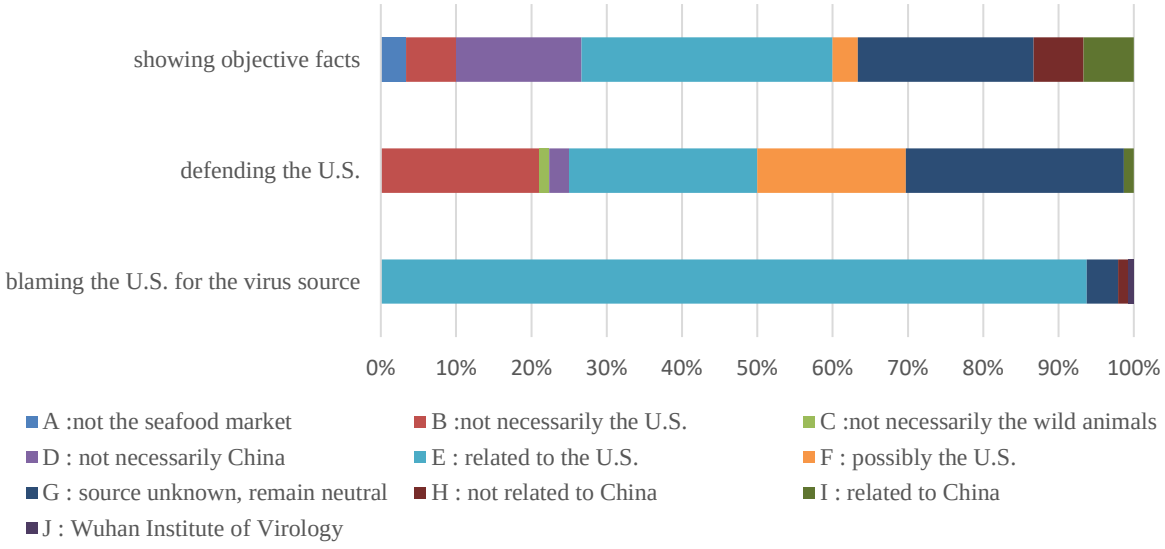


**Fig. 6.** Matrix coding results of article content and comments on virus source judgment

From the results of the sentiment matrix coding run of the articles and comments (Figure 7), it can be seen that the public's negative sentiment is exacerbated by the contradiction between the public's desire for the truth and the media coverage that speaks differently. It is clear that articles blaming the United States greatly aroused the positive feelings of the public to the motherland, which also explains the high weighting of “China” as a keyword. In these articles, loving the motherland and blaming the United States are almost equated, and the public can easily agree with these articles’ points of view when stimulated by double emotions (Figure 8), and the public views and attitudes are more homogeneous. In contrast, in the comment section of the official media and newspaper media, views and attitudes are more diverse, with more users choosing to critically accept and question the content of the articles and other comments. For the public, the official media accounts are a convenient window to face the government directly. Nearly 30% of the pubic comments in the official media comment section protest the media gimmick, and some of the public comments call for the rectification of the disinformation media. Meanwhile, traditional media still plays an important role as a source of information, and its authority, authenticity and influence are still widely recognized, which is consistent with Wang Ping ’s research findings on public opinion dissemination of emergencies on Weibo(Wang, & Xie, 2013). Traditional media is an important voice in the dissemination of public opinion on the Internet. Compared with self-media, its reports are often more detailed, and the interpretation of events is more in-depth and scientific. It is an important part of the current multi-media ecology.

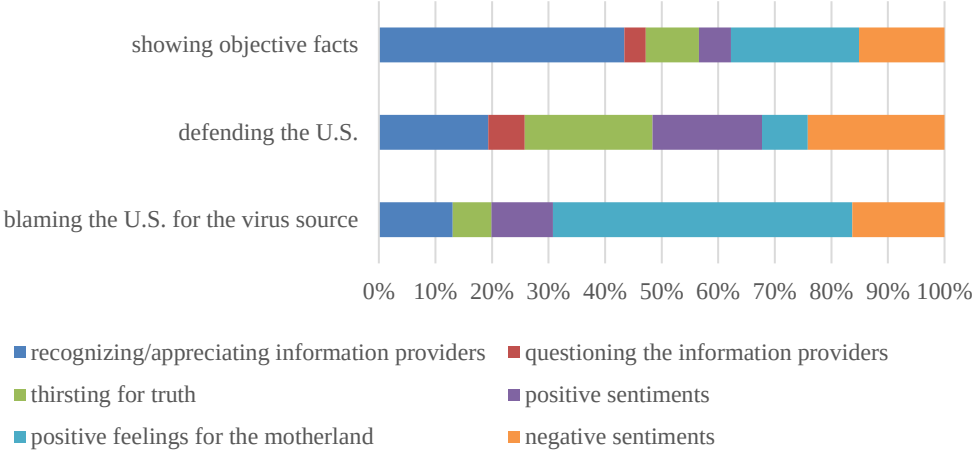


**Fig. 7.** Results of sentiment matrix coding run of articles and comments

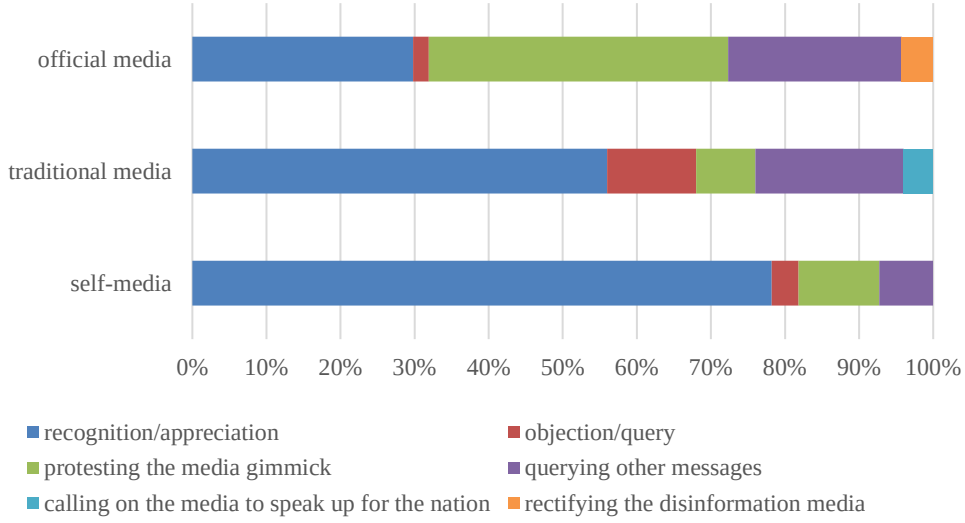


**Fig. 8.** Results of matrix coding run of information source and comment attitude

### *4.3.* Construction of the ecology of the online public opinion on public emergencies

Based on the division of the phases of public opinion evolution in the second part and the core coding category obtained from the microscopic perspective in the third part, the ecological evolution structure of online public opinion on public emergencies can be constructed (Figure 9). The public is the main producer of public opinion, and their identity in the online environment is netizens , whose communication behavior is closely associated with the social public psychology of society. In terms of the nodes of public historical perception on the U.S., there are only 1 neutral, 1 positive and the remaining 72 are all negative ones. After the outbreak of the epidemic, the United States repeatedly blamed China for the new coronavirus in its statements, using terms such as "China virus" and "Wuhan virus" to cause dissatisfaction and collective memory of the public, which led to the creation and spread of rumors. When some domestic media headed by Taiwan programs blamed the United States for the source of the virus, the information input to the public was consistent with their historical perception, resulting in a common imagination of public event. The rewriting and interpretation of the incident resulted in a second dissemination of rumors, which had no scientific basis, and thus forming public opinion hot spots. As discontent spreads, events are easily inflamed, and online opinion platforms provide space for people to vent their repressed feelings. Part of the public remained neutral and waited for the release of official information. When the authoritative and official media refuted the rumors, some people chose to wait and see rationally; it is worth noting that a considerable part of the public chose to remain skeptical and continue to wait and see in the face of the official refutation (Figure 7) , but almost all of the public chose to believe the refutation after the same type of rumor that the virus had been leaked by Wu Han Institute of Virology were clarified. The communication behavior of the public is closely related to its historical perception and group sentiment.

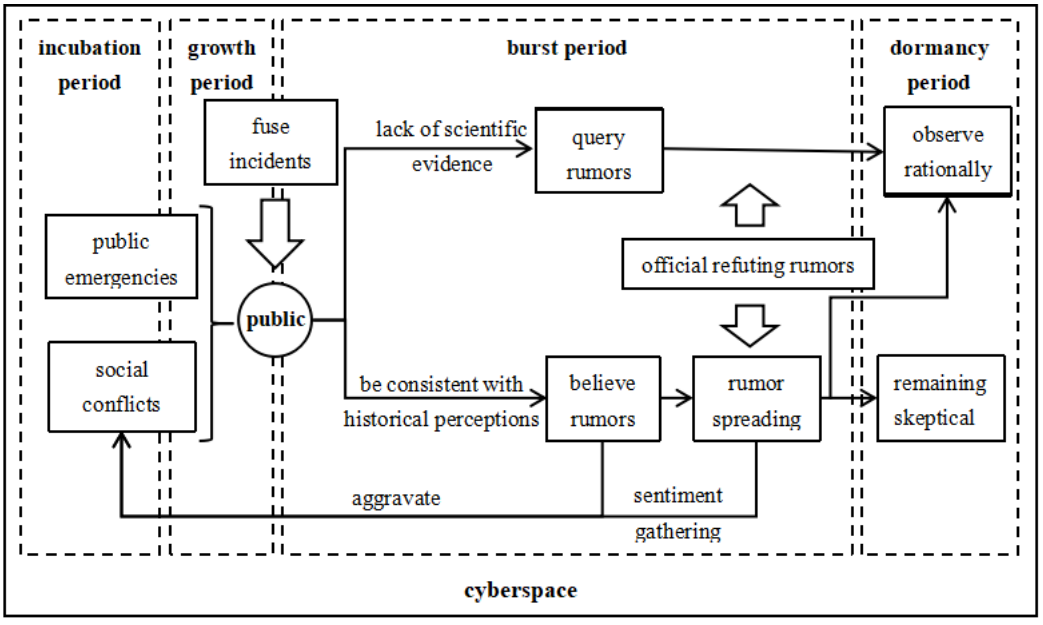


**Fig. 9.** Ecological evolution of online public opinion on public emergencies

## 5. Disscussion

Based on the public opinion on the source of COVID-19, this study divides the public opinion evolution cycle into incubation period, growth period, outbreak period and dormancy period by using the whole network public opinion data curve characteristics; the grounded theory is used to analyze the text characteristics of hot WeChat articles and messages and describe the ecological evolution process of online public opinion about emergencies from a microscopic point of view. It is found that the influence of both historical cognition and opinion leaders has caused group sentiments to gather, and if such sentiments are not effectively controlled and properly guided, they may turn into group events. Therefore, how to properly guide the public opinion to develop in a scientific and rational direction is crucial. The fluctuation of online public opinion is the result of the joint struggle of multiple factors. Under the mediation of cyberspace, the government, the media and the public have evolved from a one-way mode to an interactive mode. Combining with the core codes, a discussion is carried out from the three perspectives:the information provider-the government, the media, the information release media - the online platform, and the information receiving and dissemination subject-the public, so as to achieve an ecological balance of information on public opinion in emergencies.

For the Government, on the one hand, it is suggested to pay attention to strengthening public awareness of online culture and scientific education, and enhancing

the rational thinking and critical ability of netizens. On the other hand, it is necessary to strengthen the cultivation of professional talents, change the bureaucratic mode of discourse, fully connect with the public and engage in dialogue, and always keep an open perspective in order to keep abreast of the public's psychological state, so that it is to more effectively guide the transmission of public opinion in emergencies, and make more scientific and rational voices become important nodes in the dissemination of public opinion. After the outbreak of the public opinion on incidents, the relevant government departments and the subjects involved should release information in time to respond to public demands and clarify rumors, such as the rapid response made by Wuhan Institute of Virology the day after the outbreak of the rumor, which curbed the spread of rumors. It is necessary to make rational use of online communication function and free speech in cyberspace to timely understand people's situation, inform public opinion, collect people's wisdom and solve people's difficulties. Online public opinion becomes more important in the absence of effective means of measuring public opinion. Although online public opinion cannot represent absolute public opinion, it is an important supplement to public opinion (Wang, & Xie, 2013). People's assessment of the authenticity of those events that are not seen with their own eyes depends largely on the source of public opinion information, and information sourced from the government is more likely to be perceived as true and more easily disseminated (Zhang, Huang, & Song, 2017), which in turn has an impact on public psychology, perception, and behavior. The speed, transparency, and credibility of the government's disclosure of real information are the key factors in whether the government can guide netizens' opinion. The faster the disclosure and the higher the transparency, the faster the guidance, and the greater the number of people influenced; meanwhile the higher the credibility of the government and the higher the credibility of the information released by the government, the stronger the guidance to netizens (Du, & Liang, 2011). At the same time, it is important to be vigilant against the tendency of false public opinion on the Internet in order to prevent false information from damaging the online ecology and interfering with the formulation and implementation of public decisions.

In addition to government agencies, the online media body also includes the traditional newspapers and the emerging web-based freelance writers or groups. To a certain extent, the media can influence the public attitudes, views and perceptions of emergencies and often plays the role of opinion leader in the dissemination of public opinion. Opinion leaders are a small number of influential and active people in the process of information transmission and interpersonal interaction. There are also opinion leaders in the network environment, who have a great influence on the network, acting as a mediator or filter in the formation of mass communication effects, diffusing information to the audience and extending, interpreting, commenting on the information (Hu, 2012). The development of new media has amplified the influence of opinion leaders, and the traditional media should establish a team of opinion leaders to give voice in emergencies and dispel doubts. (Danielle, Joseph, & Thomas, 2018) , Newspapers tend to provide more accurate reports (Danielle, Joseph, & Thomas, 2018). The Economic Daily News, Global Times and other newspapers, have played the role of opinion leaders in the spread of this event and provided in-depth coverage, not only pointing out that the source of the virus is not yet clear and that scientific evidence is needed to infer whether the U.S. influenza epidemic is related to the new coronavirus, but also emphasizing the importance of tracing the source of the virus to the prevention of the epidemic and providing advice to the general public on prevention. For the public, the traditional media have a stable credibility of information source, a strong authenticity of information dissemination, and the advantages of providing information on the progress of incident investigation, and rational and authoritative news commentary. The role of the network as authoritative professional sources can enhance the effectiveness of online agenda setting and guide the healthy development of online public opinion. The traditional media should give full play to their unique advantages and promote their own strengths, so as to take the initiative in planning and set issues to lead the public opinion, to dig deeper into the truth and trace the details. In terms of feedback, they should guide the public to express their views in a rational and scientific way. Once it comes to the process of rumor breeding and spreading, they should timely release the truth and clarify the rumor so as to fulfill their social responsibility.

## 6. Conclusion

Online platforms provide a space for the public to discuss freely, bringing together netizens who share the same emotions, especially during catastrophic events where people are prone to fear, anxiety, helplessness, uncertainty, and want to be with people who are familiar with them or who share similarities with their own understanding of events (She, & Ye, 2011). However, due to the lack of information gatekeepers, online information is uneven, and online promoters confuse the public, resulting in the widespread of rumors of emergencies and bad information (Zhang, Qi, Ma, & Fang, 2010).When various opinions and viewpoints meet in cyberspace, it is easy to form weak trust relationship among netizens due to information asymmetry. In the case of emergencies, information is more likely to be transmitted to the nodes under the role of weak trust relationship (Li, & Chen, 2014). The disintegration of central right of traditional media discourse, changes in communication methods and the extension of physical space provide fertile ground for the formation of online public opinion (Yan, 2013). For example, during the avian influenza outbreak, some of the questions and answers in the Q&A section of Yahoo Knowledge were cautiously objective, while others were biased (Kim, Pinkerton, & Ganesh, 2012). Online platforms should improve the information filtering mechanism to manage

online rumors, and also should note that the use of technical means to block or delete information can only ease the heat of online public opinion in emergencies, which is not conducive to the management of public sentiment.

The public is the main participant and disseminator of online public opinion, and public attitudes directly influence the trend of public opinion which is formed by the joint discussion of many subjects in cyberspace.While heterogeneity implies alienation and conflict, homogeneity increases the risk of aimless and blind following(Li, & Chen, 2014). The theory of “Spiral of Silence” in communication study suggests that the public is afraid of isolation under pressure from the "climate of opinion", unable to withstand the pressure after initial silence, and likely to force itself into irrational convergence towards the "dominant opinion" (Hu, 2012). Public complex sentiments are prone to resonate with social public sentiments after being spread and mutually infected in cyberspace, leading to irrational behaviors and uncontrollable deterioration (Guo, 2019). For example, in 2012, as a result of Japan's "purchase" of the Diaoyu Islands, the public spontaneously staged large-scale demonstrations and acts of vandalism and looting, causing unnecessary damage to national and private property. In the dissemination, the public often mix past experiences, thoughts, personal motivation and emotions into the process. After being processed and reorganized, the information text is distorted and becomes rumors through the mechanism of flattening, sharpening, adding, assimilating (Wang, 2016). Evolving rumors spread emotions through cyberspace, and it is difficult for netizens to identify the authenticity of information due to the low level of the scientific literacy, making rumors swoop in. According to the results of the tenth survey on the scientific literacy of Chinese citizens released by the Chinese Association for Science and Technology, in 2018, 8.47% of Chinese citizens had basic scientific literacy, an increase of 2.27 percentage points from 6.20% in 2015, but there is still a certain gap compared to the international level, and it shows obvious characteristics matching the economic and social development (He, Zhang, Ren, Huang, 2018). In contrast, in PISA 2018, in which about 600,000 students from 79 countries and territories participated, students from four Chinese provinces and cities (Beijing, Shanghai, Jiangsu and Zhejiang) scored an average of 590 points in science, which ranked first among all participating countries (territories). Therefore, it is very important for netizens to improve their own online media literacy, avoiding agreeing with information without identifying and verifying it, consciously resisting rumors, emphasizing self-discipline in online behavior, so as to to cultivate civic awareness and create a good online environment.

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