

Research Article

Differential Trust and Hierarchical Regulation: A Study of the Effectiveness of Rumor Refutation on Government Micro-Blogs—Analysis Based on 1290 Rumor Refutation Messages

Wanlian Li^{1,2} and Xing Chen ¹

¹School of Public Administration and Law, Hunan Agricultural University, Changsha 410128, China

²Emergency Management Teaching and Research Department, Guangdong Institute of Public Administration, Guangdong 510802, China

Correspondence should be addressed to Xing Chen; 554661889@stu.hunau.edu.cn

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Purpose/Significance. This study aims to explore the differences in the effectiveness of rumor refutation dissemination on government micro-blogs and to identify factors that may lead to such differences, so as to provide reference for the management of emergencies and to improve the effectiveness of rumor refutation. *Methodology/Procedure.* Using Octopus software to collect data from thirty government micro-blogs, the number of retweets, likes, and comments were used as indicators of the effectiveness of refutation dissemination and different levels of government micro-blogs were used as moderating variables to construct a regression model of the effect of content features and text features on refutation dissemination. The regression model was constructed to test the moderating effects of micro-blog content and text features on the effectiveness of micro-blog refutation. *Results/Conclusions.* The empirical results show that whether a micro-blog is from the region or not and whether a micro-blog has a title or not have a significant effect on the effectiveness of micro-blog refutation dissemination. Therefore, refutation strategies such as combining layers, giving equal importance to content and form, and focusing on originality can be adopted to enhance the refutation effect of government micro-blogs.

1. Introduction

With the development of the mobile Internet and the popularity of mobile communication, the Internet has become a hub of social opinion. At the same time, due to the instantaneous and hidden nature of the Internet, it is also easy for the Internet to become a breeding ground for rumors. Meng and Yu analysed Internet rumors involving terrorism and found that Internet rumors are characterized by high volume, rapid growth, rapid spread, and great harm [1]. Wu et al. analysed online rumors based on mobile phones during the New Crown Pneumonia epidemic and concluded that online rumors are characterized by a proliferation of subjects and anonymity, diverse and complex content, and explosive spread [2]. The circulation of Internet rumors not only is a major challenge to the clarity of

cyberspace, but also poses a certain threat to the image of the government and social stability. Therefore, governments at all levels attach great importance to rumor management, and it is an important strategy to dispel rumors at the first opportunity in the appropriate field and space. Xu, based on a study of online rumors generated by the New Coronary Pneumonia epidemic, concluded that the management of online rumors requires the establishment of a rumor classification mechanism and targeted management, the enhancement of netizens' sense of ownership of rumor dispelling and the improvement of their ability to dispel rumors [3]. Micro-blogs have become an important gathering place for Internet users due to their low threshold, ease of dissemination, large number of users, and low cost of publication, which has also prompted governments at all levels to enter the micro-blogging space and register and

operate government micro-blogs. According to the “Report on the Influence of Government Micro-Blogs in 2020” released by the People’s Daily Online Public Opinion Data Center [4], as of December 31, 2020, the number of government micro-blogs certified by Sina micro-blog reached 17,7437, including 140,837 official micro-blogs of government agencies and 36,600 micro-blogs of public officials. As an emerging thing, government micro-blogs have built a new bridge of communication between the government and the public [5]. The use of government micro-blogs to dispel rumors is not only an important option for reaching a large number of Internet users, but also an important channel for official government information to be communicated and delivered. Practice shows that there are differences in the effectiveness of different government micro-blogs in dispelling rumors. The effectiveness of micro-blogs in dispelling refutation is dominated by the central-level mainstream media, while the regional-level and prefecture-level and below mainstream media have less influence on the effectiveness of refutation [6]. In addition, Chen and Ji found that although Chinese government micro-blogs have made certain achievements, there are still many problems in some aspects, such as the formalism of government micro-blogs and the lack of comprehensive and standardised information content, the slow speed of refutation, the lack of strict logic, and insufficient basis for refutation. The speed of refutation is slow, and the logic of refutation is not rigorous enough [7]. After a study, Li et al. found that, in the process of public opinion management, government micro-blogs have a weak sense of cooperation and inefficient disinformation dissemination [8]. So what factors affect the effectiveness of refutation on government micro-blogs? How can the effectiveness of refutation on government micro-blogs be improved more effectively? This is the main question that needs to be addressed in this paper. Given that government micro-blogs are increasingly used by government departments as a powerful tool and instrument to dispel rumors, it is essential that this study is devoted to understanding the effectiveness of government micro-blogs and the factors affecting their effectiveness. It is therefore necessary for this study to understand the effectiveness of the dissemination of disinformation on government micro-blogs and the factors that influence their effectiveness and to make recommendations to address their shortcomings.

2. Formulation of the Problem and Theoretical Assumptions

2.1. Characteristics of Micro-Blog Content and the Effectiveness of Rumor Refutation Dissemination. Weibo content is the most important vehicle for conveying information, and its characteristics best reflect the intrinsic content quality of rumor refutation tweets. The characteristics of micro-blog content include whether the micro-blog is a rumor refutation micro-blog in the region, whether it is original, the type of rumor, and the method of rumor refutation. It can be found that different types of information gain different levels of attention, and the topics of micro-blog content have a significant relationship with popularity, with rumor

refutation micro-blogs on different topics gaining different numbers of retweets, comments, and likes. In general, rumors dispelled by government micro-blogs belong to the region and are more likely to attract the attention of social groups, and the public will feel that they are closely related to them and are more willing to retweet and share them. Chen et al. found that original micro-blogs can achieve better communication effects [9]. In other words, original tweets are more attractive than non-original tweets, and the public is more likely to comment and like original tweets.

2.2. Formal Characteristics of Micro-Blogs and the Effectiveness of Rumor Refutation. The form and content of a micro-blog are complementary and indispensable. High-quality content needs to be presented in an appropriate way in order to gain more public attention. The format of a blog post will, to a certain extent, influence the public’s desire to view it. The format of a blog post includes whether it has images and videos, hyperlinks, @ symbols, headlines and topics, etc. Zeng found that the quality of information, the credibility of the source, the level of public approval of the rumor, and the number of retweets had an impact [10]. On the effectiveness of rumor refutation, Shi and Xie explored how this affects the effectiveness of information dissemination on government micro-blogs in terms of both information content and information presentation, [11], while Lu found that there was no significant difference in the number of retweets and comments on micro-blogs with or without hyperlinks and with or without the @ symbol, but in the variable of rumor refutation mode, rumor refutation of the rebuttal + truth style had relatively more retweets and comments, and they argued that the rebuttal-truth approach requires expertise in explaining the truth and the ability to discern facts, which makes it easier for people to see through rumors and recognise the truth than the direct denial approach [6]. Hyperlinks are generally used to provide additional information about the content of a micro-blog, but most micro-blog users are reluctant to click on hyperlinks because of their quick browsing habits, and those with the @ symbol are generally not the original rumor refutation tweets, but more passive responses to others [9]. Tweets with pictures and videos are clearer and more convincing, i.e., “pictures with the truth,” as we often say.

2.3. Rumor Characteristics, Rumor Sources, Rumor Refutation Channels, and the Effectiveness of Rumor Refutation Dissemination. By empirically analysing the case of mask use time and 162 technology micro-blog rumors, Yin and Xu found the “importance” and “ambiguity” of the rumor itself, the “credibility” of the rumor monger, the “critical judgment” of the public, the “tightness of the relevance of each rumor refutation,” and the “speed of retweeting” of the media. The analysis found the “importance” and “ambiguity” of the rumor itself, the “credibility” of the rumor monger, the “critical judgment” of the public, the “closeness of the correlation between the rumors,” the “speed of retweeting,” and the “activity” of the media. Xiang and Chen used modeling simulation to simulate the spread of rumors based on the viral

propagation model and the evaluation algorithm of rumor sources [12] and found that the important factors affecting the spread and control of micro-blog rumors were mainly the node influence degree. The simulation found that the important factors influencing the spread and control of micro-blog rumors were mainly content conviction and suppression timing; rumor source influence was correlated with the number of spreads, the number of infected nodes and the distribution of rank influence degree, and the effectiveness of rumor suppression [13].

Does the content characteristics, form characteristics, and rumor refutation methods of government micro-blogs have a significant impact on their rumor refutation effectiveness? This is the question that needs to be tested in this paper, which leads to the following hypothesis to be tested:

H1: whether the rumor refutation micro-blogs in the region have a significant impact on the effectiveness of rumor refutation dissemination.

H2: whether or not original rumor refutation tweets have a significant effect on the effectiveness of rumor refutation dissemination.

H3: the method of rumor refutation has an impact on the effectiveness of the dissemination of rumor refutation.

H4: micro-blog format characteristics have a significant impact on the effectiveness of rumor refutation dissemination.

2.4. Micro-Blogging Hierarchy and Differential Order Government Trust. Many scholars have found that people generally have different levels of trust in different levels of government [14–17]. Li systematically discussed the “hierarchical differences in government trust” from the perspective of theoretical constructs based on the exploration of peasant resistance, and formally named it “differential government trust” [18]. Some scholars have found that differential government trust exists among urban residents [19], rural residents [20], university students [21], and civil servants [22] and that the differential pattern of government trust is characterized by a central-provincial-local decreasing pattern. The differential pattern of trust in government is generally characterized by a decreasing central-provincial-local hierarchy, i.e., higher trust in central-level government agencies and lower trust in grassroots-level government agencies. The ultimate effect of rumor refutation on government micro-blogs is to gain public trust and is based on the differences [23]. In people’s evaluation of different levels of government in the differential order of trust, this paper suggests that the effectiveness of rumor refutation on government micro-blogs at different levels of government also differs to some extent. The differential trust of different levels of government micro-blogs affects the effectiveness of rumor refutation through two main mechanisms: first, different levels of government micro-blogs have a direct influence on the effectiveness of rumor refutation, and second, different levels of government micro-blogs may play a moderating role in the relationship between the content, form, and

manner of rumor refutation and the effectiveness of rumor refutation due to the existence of differential trust. This leads to the following hypothesis:

H5: the effectiveness of rumor refutation differs across different levels of government micro-blogs, and there is a moderating effect of the level of government micro-blogs in the relationship between the content, form, and mode characteristics of micro-blogs and the effectiveness of rumor refutation dissemination.

This paper proposes the above research hypotheses by combining the four theories of public management theory, differential government trust theory, information asymmetry theory, and 5W theory, and the preliminary theoretical model framework is shown in Figure 1.

3. Data Sources and Description of Variables

3.1. Data Sources. In this paper, 30 different categories of government micro-blogs were selected from three levels: firstly, national-level government micro-blogs, i.e., government micro-blogs whose registrants are subordinate units of national ministries, which have a general and high coverage; secondly, provincial-level government micro-blogs, i.e., government micro-blogs whose registrants are subordinate units of provincial ministries, which have a strong regional dimension; and thirdly, government micro-blogs at the prefectural level and below, i.e., government micro-blogs whose registrants are administrative units at the prefectural level and below, which have a grassroots and mass dimension. The third one is government micro-blogs at the prefectural level and below, i.e., government micro-blogs of administrative units at the prefectural level and below, which are grassroots in nature and have a mass appeal. In this study, nine national-level government micro-blogs, 12 provincial-level government micro-blogs, and nine government micro-blogs at the prefectural level and below were collected using the Houyi and Octopus collectors (see Table 1), and the data on these government micro-blogs were collected from 2019 to 2020. The data were collected from these government micro-blogs for the years 2019 to 2020. The specific acquisition process is divided into the following five steps. Step 1: locate the specific network address to be captured. Step 2: give the acquisition conditions. Step 3: pre-test. Step 4: capture. In this study, in order to improve the efficiency, the acquisition is carried out simultaneously with stand-alone acquisition in addition to one-click cloud crawling. Step 5: data export. Once all the above steps are completed, the collected data needs to be integrated and summarised for storage. Therefore, the above five steps are repeated to collect all the information of all the disinformation micro-blogs of the 30 government micro-blog accounts in two years, and after collecting all the relevant information of the target micro-blogs, the final collected data is obtained. Finally, the data collected from the 30 government micro-blogs are integrated together. As the amount of data collected in this paper is large and the post-processing work is complicated, the collected data are exported from EXCEL software and then stored in a database in a regular way. Due to the security features of Sina Weibo, it

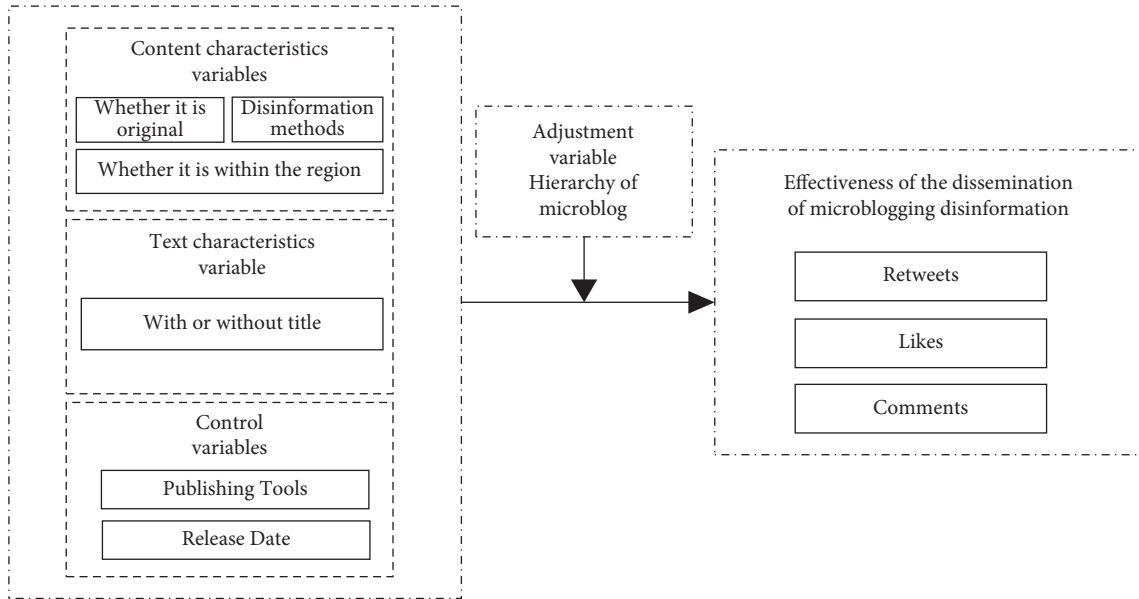


FIGURE 1: Theoretical framework model.

TABLE 1: Thirty selected government micro-blogs of different levels.

National-level government micro-blogs	Provincial government micro-blogs	Government micro-blogs at prefecture level and below
Micro-Word Education Chinese Police Online	Hunan Highway Police Pudong Release	Ping'an Shangqiu Wuxi Release
Scientific Refutation	Chongqing Communist Youth League	Shannan Internet Police Patrol and Enforcement
New State Capital China anti-cult Police and Public Work Together	Three Qin Youth Wuhan Release Beijing Release	Furong Public Security Tangshan Release Zfw ping an Pucheng
Chinese Students Online	Health Chengdu Official Micro-Blog	Mianyang Internet Police Patrol Enforcement
Central Committee of the Communist Youth League	Youthful Shandong	Jiangbei Prosecution
China Chang'an	Hebei Public Security Network Spokesperson Jiangsu Politics and Law Shenzhen Health Care Commission Capital Internet Police	Changsha Police

was not possible to collect all the required information from the Weibo backend client at one time, so the data collection was completed in 21 days after repeated operations and constant debugging of the collection conditions and rules. The data collected included the time of posting, posting tool, content, number of comments, retweets, likes, etc. After data processing, duplicate values and missing values were removed, resulting in 1,290 pieces of valid data.

3.2. Variable Measurement and Coding

- (1) Dependent variable: rumor refutation effect. According to the rule description of Qingbo Big Data, the Micro-blog Communication Index (BCI) reflects the communication ability and effectiveness of accounts through the activity and communication degree of micro-blogs, using data including the number of posts X1, the number of original micro-

blogs X2, the number of retweets X3, the number of comments X4, the number of original micro-blog retweets X5, the number of original micro-blog comments X6, and the number of likes X7 [25]. Fan used the total number of retweets, comments, and likes of government micro-blog information M as the participation index [26]. Under the behavioral index of the government micro-blog communication effectiveness evaluation system, Lan and Sun constructed the rumor refutation dissemination power, which mainly consists [27] of the number of retweets, comments, and likes of a blog post. The larger the value is, the more attention the blog post gets, the wider the coverage level is, the more people see it, and the more effective the dissemination is. Based on this, this paper takes the number of retweets, comments, and likes of rumor refutation micro-blogs as the main indicator of the

effectiveness of the dissemination of rumor refutation on micro-blogs. Since the three-character segments of the number of retweets, comments, and likes can be obtained directly through crawling techniques, the number of retweets, comments, and likes of different Weibo rumor refutation messages are summed up and entered directly into the model as numerical variables.

- (2) Independent variables: content characteristics and form characteristics of rumor refutation.

Content characteristics are factors related to the intrinsic quality of the rumor refutation, including whether it is within the region, whether it is original, and the rumor refutation method. The original tweets are coded as 1, while the opposite is coded as 0. Rumor refutation methods are divided into two categories: direct refutation and denial are coded as 1, and direct refutation + truth statement is coded as 2.

Formal variables are influencing factors related to the external presentation of the rumor content, referring to the form in which the rumor refutation tweet is presented to the public, i.e., the layout of the text, including whether it has a headline, whether it has an image, whether it has an @ symbol, etc. The above dichotomous variables are classified according to the presence or absence of such features, with the presence of such features coded as 1 and the opposite coded as 0.

- (3) Moderating variables: government micro-blogging tiers. Government micro-blogs are divided into three tiers, namely, the national tier, the provincial and departmental tiers, and the local and municipal tiers and below, coded as 3, 2, and 1, respectively.
- (4) Control variables: the control variables are the timing and tools used by Weibo to publish rumor refutation.

Posting times: dividing the release time into peak and off-peak hours. According to the peak time division of Internet users' access to the Internet provided by the China Electronic Commerce Research Center [27], three time periods between 10am and 11am, 15pm and 17pm, and 20pm–22pm in the evening are defined as the peak time of Internet access, coded as 1; the rest of the time period is the off-peak period, coded as 0.

Posting tools: the tools used to publish rumor refutation on government micro-blogs are generally computers and mobile phones, and the code for publishing rumor refutation on computers is 1, while the code for publishing rumor refutation on mobile phones is 0.

4. Data Analysis and Results

4.1. Model Testing. A linear model usually requires the explanatory variables to be continuous numerical variables

before subsequent analysis can be carried out. In this paper, we investigate the factors affecting the effectiveness of rumor dispelling on government micro-blogs and use three main indicators, namely, the number of retweets, the number of likes, and the number of comments, to measure the effectiveness of the dissemination of rumor dispelling information on government micro-blogs. The general linear regression model requires the dependent variable to obey a normal distribution. The dependent variable in this study is the sum of the number of retweets, comments, and likes of each government micro-blog, and according to the results of the K-M test, the K-S value is 0.875, with a significance level of 0.192, which is greater than 0.05. Therefore, it is believed that the data on the effectiveness of the dissemination of disinformation on Weibo as a whole follows a normal distribution. In this study, the SPSS26.0 software was used to test the above six independent variables, and it was found that the VIF values of the six independent variables were all less than 10 and less than 3, indicating that there was a weak covariance between the independent variables, which would not have a significant impact on the results, so all the above six independent variables could be included in the model. The general linear regression model is formulated as follows:

$$Y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_p x_{ip} + \varepsilon_i, \quad i = 1, 2, \dots, n, \quad (1)$$

where Y denotes the explanatory variable, i.e., the dependent variable, x denotes the independent variable, β denotes the regression coefficient, and ε_i denotes the error term

4.2. Results of Statistical Analysis. The results of the mean, standard deviation, and correlation analysis are presented in Table 2. Table 2 shows whether or not the micro-blog is within the region shows a significant positive correlation with the effectiveness of the dissemination of micro-blog rumor refutation ($p < 0.01$) and whether or not it carries a title shows a significant negative correlation with the effectiveness of the dissemination of micro-blog rumor refutation ($p < 0.01$). These results provide preliminary support for the research hypothesis.

4.3. Hypothesis Testing. The analysis was conducted using independent, control, and dependent variables. Hierarchical regression analysis was then conducted using the Statistical Package for the Social Sciences, SPSS26 version 0, to analyse how originality, regionality, rumor refutation method, and with or without headlines affected the effectiveness of rumor refutation on national-level, provincial-level, and local-level government micro-blogs, while controlling for posting tools and posting time. We applied standard procedures to test the moderating effects. The interaction effect was calculated as the product of the mean central score of each explanatory variable and the moderating variable. An alpha level of $p < 0.05$ was used to determine the statistical significance of each model. Results are presented in Table 3.

In Table 3, model 1 shows the results of a null model including only the posting tool and posting time, model 2 adds

explanatory variables to test the effectiveness of government micro-blogs, and models 3 to 8 add moderating variables and moderating interaction terms to test the moderating effect of the level of government micro-blogs on the relationship between the content characteristics, form characteristics, and the effectiveness of micro-blog rumor refutation.

From the results of the corresponding data in Table 3, it can be seen that there is a significant positive correlation between whether it is within the region and the effectiveness of the dissemination of rumor refutation on Weibo ($\beta = 0.0106$, $p < 0.001$, model 2), and Hypothesis H1 is verified. Hypothesis H2 and hypothesis H3 are not supported for the time being. Hypothesis H4 was verified, as there was a significant negative correlation between whether or not to carry a headline and the effectiveness of rumor refutation dissemination on Weibo ($\beta = -0.104$, $p < 0.001$, model 2). Hypothesis H5 proposes that there is a moderating effect of the micro-blogging hierarchy in terms of micro-blogging content and formal characteristics on the effectiveness of micro-blogging rumor refutation. To test the hypothesis, based on the above regressions, the moderating variable micro-blog hierarchy was included in model 3. The results are shown in model 3, where the beta value of micro-blog level is 0.076 and $p < 0.01$; thus hypothesis H5 is verified. To further test the moderating effect, a full model was built by including the product terms of micro-blog tier and whether it is original, whether it is within the region, how it is disinforming, and whether it has a headline in model four to eight, respectively, as well as all variables in model eight. Based on the results shown in the table above, it can be seen that the p values for the product terms of the micro-blog hierarchy and the respective variables are all significant. Combined with the previous model, it is found that the micro-blogging hierarchy positively moderates the effect of whether or not the message is within the region, the method of rumor refutation, and whether or not the message has a headline and the effectiveness of the micro-blogging rumor refutation. The micro-blogging hierarchy had a significant substitution relationship between whether or not it was original and the effectiveness of micro-blogging rumor refutation dissemination.

5. Conclusions and Implications of the Study

5.1. Research Findings. Based on theories such as public crisis management and differential government trust, this paper explores the factors influencing the effectiveness of the dissemination of rumor refutation on government micro-blogs, using one year's worth of rumor refutation from 30 government micro-blogs as the research object. Using the micro-blogging hierarchy as a moderating variable, this paper explains the paths that influence the effectiveness of the dissemination of rumor refutation on micro-blogs.

The results of the study show the following:

- (1) The variable of whether it is a rumor refutation micro-blog in the region has a significant positive effect on the effectiveness of rumor refutation

dissemination. For Internet users in their own region, they will pay more attention to what is happening around them. In the case of regional and local-level government micro-blogs, information closely related to the local area has stronger geographical proximity [11], and the rumor refutation posted should be a topic of greater interest to local people. Therefore, if the content of the rumor refutation is within the region, the community will be more convinced and the rumor refutation will be more effective.

- (2) The variable of whether the rumor refutation tweet had a headline or not had a significant negative effect on the dissemination of rumor refutation; i.e., the rumor refutation tweet without a headline was more effective. While some experts have concluded that tweets with headlines are more effective than tweets without headlines [6], this study concludes the opposite. The possible explanation for this is that tweets with headlines are usually highly general and can quickly convey the content [6]. Of rumor refutation, and based on the prevalence of fast-food culture, most netizens already know the truth about the incident through the headline and may not take the time to read the tweet or even retweet it.
- (3) Micro-blog hierarchy has a significant moderating effect on the spread of rumor refutation on government micro-blogs. Studies have found that the level of government micro-blogs directly affects the effectiveness of rumor refutation, and the higher the level of government micro-blogs, the better the rumor refutation effect.
- (4) The micro-blogging hierarchy positively moderates the relationship between information within and outside the region, whether or not it carries a headline, the method of rumor refutation, and the effectiveness of rumor refutation. The higher the micro-blogging tier, the more effective the rumor refutation micro-blogs in the region are. The micro-blogging tier reinforces the negative effect of tweets with headlines on the effectiveness of dissemination; i.e., the micro-blogging tier significantly contributes to the relationship between whether or not tweets with headlines are effective and the effectiveness of dissemination. The micro-blogging hierarchy has a significant positive moderating effect on the manner of rumor refutation. Micro-blog hierarchy reinforces the negative effect of rumor refutation mode on the dissemination of rumor refutation. For high tier government micro-blogs, simple rumor refutation tweets such as direct denial can achieve good results, while low tier government micro-blogs should focus on diversifying their rumor refutation methods by combining direct denial with truth-telling, in order to compensate for the low trust level of low tier.

TABLE 2: Results of correlation analysis.

	Average value	Standard deviation	Publishing tools	Release date	Dissemination effect	Original or not	Is it within the region	Rumor refutation methods	With or without title	Twitter hierarchy
Publishing tools	0.7	0.458	1							
Release date	0.32	0.466	0.05	1						
Dissemination effect	554.84	6089.053	-0.03	-0.026	1					
Original or not	0.17	0.373	0.123**	0.02	0.022	1				
Is it within the region	0.4	0.49	0.125**	-0.006	.076**	0.258**	1			
Rumor refutation methods	1.55	0.499	0.016	0.01	-0.039	0.141**	0.044	1		
With or without title	0.84	0.37	-0.055*	-0.003	-0.084**	-0.005	0.208**	0.122**	1	
Twitter hierarchy	1.96	0.748	0.299**	0.038	0.084**	0.162**	0.634**	0.047	0.064*	1

**Correlation significant at 0.01 level (two-tailed). *Correlation significant at 0.05 level (two-tailed).

- (5) Micro-blog level has a significant positive moderating effect on the relationship between the originality of rumor refutation content and the effectiveness of rumor refutation, and there is a significant substitution between micro-blog level and the originality of rumor refutation content in the effectiveness of rumor refutation on government micro-blogs. When the level of government micro-blogs is low, the positive effect of original micro-blogs is more obvious, but as the level of government micro-blogs gradually increases, the role of original micro-blogs gradually decreases. This is because the higher the level of government micro-blogs, the greater the rumor refutation effect it has on government micro-blogs, regardless of whether the content it publishes is original or not; conversely, if low-level government micro-blogs are to have the same rumor refutation effect as high-level government micro-blogs, they should publish more original content.

5.2. *Revelation.* Based on the above findings, the following practical insights are drawn:

- (1) Combining layers to enhance the dissemination of micro-blog rumor refutation.

Promote the balanced and rapid development of government micro-blogs at all levels, cross-regional and cross-departmental alliances, and multimedia interactions to improve the media quality and credibility of governments below the central level. Government micro-blogs at different levels should clearly position themselves, actively assume media responsibilities, improve their persuasive power, and enhance their communication. Government micro-blogs at higher levels should take advantage of their high authority to actively cooperate with government departments in their rumor refutation efforts

and assume social responsibility. It is important to note that lower-tier government micro-blogs should also play to their own geographical advantages when dispelling rumors and do a good job of clarifying local rumors to complement higher-tier government micro-blogs, creating a long-tail effect.

- (2) Equal emphasis on content and form to enhance the infectious effect of micro-blogging rumor refutation.

When publishing rumor refutation, it is important to pay attention to both the content and form of rumor refutation micro-blogs, ensuring both the truthfulness and objectivity of the content and the correctness and simplicity of the form, so that netizens can understand more comprehensive and reliable rumor refutation even when reading in fragments in the context of the fast food of mobile terminals. Excessively long rumor refutation can lead to reading fatigue, so when faced with complex rumors, try to clarify the facts in the most concise language possible, preferably with pictures or videos to support them. The only way to make the content more explanatory and convincing is to have a good combination of content and form and to better enhance the effectiveness of the information.

- (3) Focus on originality and expand the influence of micro-blog rumor refutation.

According to the data collected in this study, in the process of rumor refutation on government micro-blogs, provincial and prefectural government micro-blogs have a low rate of originality, and their rumor refutation content is mostly reposted from other micro-blogs or regrouped from existing rumor refutation on the Internet, resulting in a high degree of homogeneity and not making the most of their regional advantages. From the point of view of audience curiosity, both central and provincial government micro-blogs should focus on publishing original blog

TABLE 3: Stratified regression model results.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model VIII (full model)
Control variables	-0.028 (-0.991)	-0.045 (-1.572)	-0.061** (-2.065)	-0.064** (-2.147)	-0.052* (-1.729)	-0.065** (-2.191)	-0.059** (-2.001)	-0.047 (-1.591)
Content feature variables	-0.025 (-0.877)	-0.023 (-0.83)	-0.026 (-0.918)	-0.026 (-0.924)	-0.022 (-0.789)	-0.027 (-0.969)	-0.022 (-0.799)	-0.016 (-0.576)
Text feature variables		0.003 (-0.091)	0.004 (-0.136)	0.019 (-0.61)	0.009 (0.292)	0.015 (0.484)	0.006 (0.211)	0.05 (1.594)
		0.106*** (-3.516)	0.06 (-1.603)	0.05 (-1.321)	0.059 (1.589)	0.057 (1.511)	0.069* (1.842)	0.049 (1.307)
		-0.031 (-1.071)	-0.033 (-1.154)	-0.03 (-1.04)	-0.032 (-1.126)	-0.04 (-1.394)	-0.028 (-0.986)	-0.026 (-0.92)
		-0.104*** (-3.566)	-0.099*** (-3.394)	0.095*** (-3.223)	-0.106*** (-3.59)	0.096*** (-3.277)	-0.121*** (-4.063)	-0.126*** (-4.222)
			0.076** 2.062	0.084** 2.254	0.052 (1.333)	0.079** (2.134)	0.093*** (2.501)	0.062 (1.599)
Adjustment variables				-0.052* (-1.766)	0.056* (1.802)			-0.088*** (-2.748)
								0.114*** (3.357)
								-0.063*** (-2.217)
								-0.123*** (-4.155)
R-side	0.01	0.021	0.024	0.026	0.027	0.029	0.034	0.05

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

posts rather than republishing existing rumor dispelling information. When clarifying rumors, it is important to capture original content and focus on differentiated reporting of rumor dispelling content.

- (4) Information symmetry to improve the persuasive power of micro-blog rumor refutation.

In economic, social, or political activities, the information available to everyone is asymmetrical and therefore prone to a crisis of confidence. In social, political, and other related matters, the government is naturally at an information advantage and has more authoritative and official information than the public, while the public is at an information disadvantage and is therefore vulnerable to anxiety and panic. When rumors emerge, the public is eager to understand what they care about, and because of the limited information available to them, it is easy for Internet users to believe false information circulating online. At this point, government departments should use government micro-blogs as a platform to release real information about events, and government micro-blogs at all levels should release official news promptly and swiftly in response to inaccurate information posted online.

6. Shortcomings and Outlook

This study collects official data from Sina's government micro-blog and uses the number of retweets, comments, and likes as indicators of the effectiveness of rumor refutation dissemination on government micro-blogs. The study also reveals the role of differential government trust theory in explaining the effectiveness of rumor refutation dissemination. It is therefore important to develop policies or programmes to promote the strength of rumor refutation at the national level and to improve the effectiveness of rumor refutation at the provincial and local levels. It is important to note that this study is still incomplete due to the lack of knowledge and capacity. Firstly, a large amount of real data has been collected to maintain the objectivity of the study, but due to the limitations of the micro-blogging platform, there are still many missing data. The selection of variables on government micro-blogs is not comprehensive enough, and the theoretical support is weak, so it is not possible to conduct an in-depth study and explanation of the effectiveness of rumor refutation dissemination. Secondly, in this paper's definition of the dissemination effect of disinformation, the definition of the behaviour of the recipient group is only limited to the number of retweets, likes and comments, and other superficial behaviours of the government micro-blog. In fact, the behavioral changes of Internet users brought about by the dissemination of government micro-blogs are very diverse, and these behavioral changes are also an important part of the communication effect. This study has not conducted any in-depth research on the behaviour of the recipient group and therefore lacks generalisability, so it remains to be seen whether the findings are applicable to the disinformation behaviour of all governments.

It is hoped that this study will provide feasible suggestions and countermeasures for the management of online rumors and that the public will take ownership and participate in the management of online rumors, so that they will not believe in rumors but will not spread them and that the online environment will be clear and transparent.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest to report regarding the present study.

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