Research on Factors Influencing Willingness to Disseminate Online Public Opinion from the Perspective of Psychological Distance (Postprint)

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Abstract

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Full Text

Preamble

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Research on Influential Factors of Willingness to Disseminate Online Public Opinion from the Perspective of Psychological Distance

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Abstract

[**Purpose/Significance**] The formation of willingness to disseminate online public opinion represents a psychological activity of netizens that is inseparable from psychological distance. Understanding the main factors that influence this willingness enables supervisory and control departments to conduct more effective early warning and governance of online public opinion. [**Method/Process**] Through in-depth analysis of psychological distance theory and its components, this study develops a series of theoretical hypotheses from four dimensions: temporal distance, spatial distance, social distance, and probability. Using questionnaire surveys and optimal scaling regression analysis, the main influencing factors and their relative importance are identified. [**Result/Conclusion**] Seven primary factors that influence netizens' willingness to change their dissemination behavior are identified: reporting time, hometown relevance, yearning location relevance, life relevance, release by relatives and friends, release by official media, and release by enterprise officials. Monitoring public opinion through these seven factors can help control departments more effectively manage the direction of opinion dissemination.

Keywords: online public opinion; dissemination willingness; psychological distance; optimal scaling regression analysis
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1. Problem Statement

With the continuous growth of internet users and the improvement of mobile internet services, netizens' online participation has gradually increased along with their dependence on digital platforms. These developments enable more netizens to access information and express their views and attitudes toward public opinion events at any time [**?**]. However, the excessive freedom inherent in internet and self-media applications allows harmful information that negatively impacts social stability to spread widely, even evolving into public opinion crises [**?**]. To manage and provide early warning for these crises, scholars have conducted research from various perspectives.

Some scholars have explored the relationship between information dissemination characteristics in the self-media era and the generation of public opinion regarding major events, analyzing dilemmas in government response to online public opinion from the perspectives of information propagation features and current response status, such as insufficient early warning technology, fragmented management, and imperfect systems. They proposed corresponding solutions but did not establish a model of netizen sentiment's impact on online public opinion [**?**]. Others have analyzed the spatial and temporal evolution patterns of topic

intensity across different regions using spatial autocorrelation theory, employing Moran's I statistic to measure spatial clustering and examine spatiotemporal patterns of online public opinion topics. However, studying only spatiotemporal patterns is insufficient to capture the complexity of online public opinion [**?**]. Some researchers have constructed system dynamics models for online public opinion response, using Vensim PLE software for simulation and concluding that five main actors—public opinion events, netizens, media, online media, and government—have strong interactive relationships with online public opinion. They suggested analyzing public opinion response through factors such as event severity and sensitivity, netizen emotional intensity, media activity, and government information transparency, but did not compare the weights of these factors [**?**]. Other studies have examined relationships among factors influencing online government information dissemination in the self-media context using the DEMATEL method, finding that social network characteristics and the number of communication subjects are the most critical factors, though the scope was limited to government information and did not address other information types [**?**]. Some scholars have investigated factors influencing WeChat message forwarding based on the Logistic population growth model, finding that media reporting frequency and user forwarding probability significantly guide message dissemination, but without considering the influence of opinion leaders or users' emotions and living environments on forwarding behavior [**?**].

Given that changes in online public opinion dissemination willingness constitute a subjective psychological transformation with numerous and complex influencing factors that have been largely overlooked by current research, this study employs psychological distance theory to conduct in-depth analysis of dissemination willingness. From the dimensions of time, space, society, and probability, hypotheses about influencing factors are tested using optimal scaling regression to identify key factors affecting online public opinion dissemination willingness, aiming to provide references for government control and prediction efforts.

2. Psychological Distance and Dissemination Willingness

Psychological distance is a term in social psychology referring to an individual's subjective sense of closeness, acceptance, or difficulty in getting along with another individual or group [**?**]. Psychological distance consists of two points and the distance between them: a reference point and a comparison point. Unlike mathematical measurement functions, this distance represents a psychological gap produced under the influence of factors related to the two points. In online public opinion dissemination, the reference point and comparison point are the online information and netizens, respectively, with the distance representing the psychological gap between them. The proximity of this psychological distance affects netizens' dissemination willingness.

3. Psychological Distance Impact on Online Public Opinion Dissemination Willingness

Online public opinion dissemination willingness refers to netizens' personal choice and intensity of desire to disseminate information after psychological processing when they encounter or observe online information. When netizens develop a willingness to disseminate and act upon it, they join the dissemination chain of online public opinion. Dissemination behavior is the behavioral manifestation of dissemination willingness, which is the root cause of dissemination behavior. The willingness that leads netizens to join the public opinion dissemination chain can be called explicit dissemination willingness, as it impacts public opinion dissemination. Conversely, willingness that does not result in dissemination behavior is termed implicit dissemination willingness, which cannot be measured through corresponding behavioral data and does not affect public opinion dissemination, and is therefore not discussed here.

Online public opinion dissemination willingness correlates with netizens' psychological distance, with four primary dimensions for study: temporal distance, spatial distance, social distance, and probability [**?**]. Generally, events or information psychologically closer to netizens are more likely to evoke sympathy or recognition and have higher dissemination probability, thus generating stronger dissemination willingness [**?**]. Despite numerous communication media and changing dissemination methods, all dissemination behavior reflects certain willingness. Identifying netizens' dissemination willingness enables more accurate understanding of where online public opinion originates [**?**]. Therefore, studying dissemination willingness from the psychological distance perspective is more scientific and suitable for accurately describing psychological changes when netizens disseminate information. Uncovering psychological distance factors that can change online public opinion dissemination willingness helps understand the root causes of public opinion generation and facilitates more effective governance solutions and measures by control departments.

Online public opinion dissemination is essentially information dissemination. Analyzing influencing factors of dissemination willingness based on psychological distance requires examining information dissemination processes. In information dissemination, psychological distance exists between communicators and audiences, between communicators and reflected objects, and between reflected objects and audiences, forming the foundation of communication relationships [**?**]. In online public opinion dissemination, the communicator is the information publisher or forwarder, the reflected object is the online information, and the audience is the netizen. Generally, the communicator's thoughts are expressed through the reflected object, namely online information. Therefore, psychological distance in online public opinion dissemination can be transformed into the psychological gap between online information and netizens.

Each dimension of psychological distance involves several different factors. A hypothetical model is shown in Figure 1 [Figure 1: see original paper]. System-

atic quantitative analysis of these factors is necessary to identify the key factors truly influencing online public opinion dissemination willingness.

Temporal Distance Dimension: Online public opinion temporal distance is netizens' perception of proximity between the earliest reporting time of a public opinion event and the current time. This dimension is generally clear in public opinion dissemination, involving only the earliest reporting time without other factors. Current stage classifications of online public opinion dissemination also strongly correlate with temporal distance. Some scholars divide online public opinion dissemination into embryonic, mature, calming, and dormant periods [**?**], a classification based on reporting time. The embryonic period is the formation stage of public opinion. After formation, forwarding intensity gradually weakens and eventually disappears over time. In temporal distance dimension research, the earliest reporting time can be hypothesized as an influencing factor (H1), assuming that the earliest reporting time of online public opinion affects netizens' dissemination willingness.

Spatial Distance Dimension: Online public opinion spatial distance is netizens' perception of proximity between the event location and their own geographical situation. Spatial distance is relatively stable; greater physical distance creates greater perceived psychological distance [**?**]. However, geographical relevance can manifest in several ways: hometown, current residence, familiar location, or yearned-for location may differ for the same person. Therefore, these factors must be included in spatial distance hypotheses: hometown (H2), current residence (H3), familiar location (H4), and yearning location (H5) all affect netizens' dissemination willingness.

Social Distance Dimension: Online public opinion social distance is netizens' familiarity with the event or subject. Netizens perceive psychological distance as closer to individuals with high self-similarity [**?**, **?**]. This similarity primarily stems from interests, life, study, work, beliefs, etc. Deep engagement with any aspect increases knowledge about that aspect. When public opinion occurs in that domain, netizens automatically form impressions of the event or subject, creating familiarity and social distance perception. Therefore, social distance hypotheses include: interests and hobbies (H6), life (H7), study (H8), work (H9), and beliefs (H10) affect netizens' dissemination willingness.

Probability Dimension: Online public opinion probability dimension is netizens' assessment of the likelihood of event occurrence. Generally, socially influential people or those close to oneself are more trustworthy, and information from trusted sources is more likely to be forwarded. Therefore, probability dimension hypotheses include: release by celebrities and experts (H11), relatives and friends (H12), government officials (H13), media officials (H14), and enterprise officials (H15) affect netizens' dissemination willingness.

4. Empirical Analysis of Main Influencing Factors

4.1 Data Sources

Given that online public opinion dissemination primarily relies on the internet, the questionnaire was scientifically distributed electronically via networks to ensure targeted research subjects. To improve response validity, the survey purpose, methods, content, and precautions were explained, avoiding excessive technical jargon and using concise, accessible language. The questionnaire was entered into Wenjuanxing and distributed across multiple interactive platforms including WeChat, WeChat Moments, Weibo, and QQ, with distribution pathways radiating outward to achieve broad coverage. A total of 539 questionnaires were collected, with 39 invalid or incomplete responses excluded, yielding 500 valid questionnaires (92.8% validity rate).

4.2 Research Methods

In standard linear regression analysis, variables in regression equations are typically quantitative. Even nominal variables are recoded as binary or contrast variables [**?**]. In this survey, all variables were ordinal and could theoretically be coded as ordinal numbers for direct analysis as quantitative values. For example, reporting time (H1) could be assigned values 1-5 for its five response options (same day, within one week, within half a month, within one month, no time concern). However, this coding assumes uniform impact on the dependent variable, which is unrealistic given the non-uniform nature of the response options. Using standard linear regression could thus produce serious analytical bias. Therefore, this study employs more suitable optimal scaling regression analysis.

The conceptual background of optimal scaling regression assigns quantitative values to variable categories, enabling standard procedures to be solved using quantitative variables [**?**]. This optimization employs nonlinear transformation methods through iterative processes, simultaneously scaling nominal, ordinal, and numeric variables to assign optimal quantitative values to each original variable value. Standard linear regression can then be applied to transformed variables to obtain the best regression equation [**?**]. Subsequent analysis assigned values of -2.7321, -0.6121, 0.2294, 0.4857, and 0.9469 to the five reporting time options, significantly different from the initial 1-5 manual assignment, making standard linear regression more scientific and reasonable.

Optimal scaling regression uses alternating least squares to quantitatively calculate the impact of each independent variable category on the dependent variable. After variable discretization, the method iteratively seeks values y_r, b, and y_j under constraints j J_p and y_r D_r y_r = n_w to minimize the objective function, as shown in equations (1)-(3):

σ(y_r; b; y_j) = (G_r y_r - *{j J_p} b_j G_j y_j) W (G_r y_r -* {j J_p} b_j G_j y_j)

where y_r represents the category quantification vector for the response variable, y_j represents the category quantification vector for predictor variable j, b represents the p-order vector of regression coefficients for predictor variables, J_p is the index set of predictor variables, and b_j is the spline coefficient vector.

D_j = G_j W G_j, n_w = Σ_{i=1}^n w_i

W is a diagonal matrix with diagonal elements w_i, where w_i is the weight for object i.

APE = n^{-1}*w (G_r y_r - {j j(p)} βj G_j y_j) W (G_r y_r - {j j(p)} β_j G_j y_j)*

APE is the apparent prediction error value. Iteration terminates when the APE difference does not exceed the specified convergence criterion (a small positive number).

Optimal scaling regression has modest data requirements. It imposes no restrictions on independent variable types and makes no distributional assumptions about the dependent variable. Variable categories should be assigned continuous positive integers starting from 1. While the number of independent variables can be up to 200, only one dependent variable is permitted.

4.3 Variable Processing

4.3.1 Dependent Variable The question "In the past year, what was your average frequency of original posts or forwarded online information?" (Q0) was set as the dependent variable, with response categories assigned as: once or more daily = 1, once or more weekly = 2, once or more monthly = 3, once or more annually = 4, almost never = 5.

4.3.2 Independent Variables Q1 examined when netizens generally forward online information reported, with categories: same day = 1, within one week = 2, within half a month = 3, within one month = 4, no time concern = 5. All other questions examined netizens' propensity to disseminate corresponding online public opinion content, with responses coded according to the Likert scale [**?**]: strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5.

The questionnaire also included demographic questions for sample characterization: gender, occupation, education, and age. Occupation categories referenced the eight major categories in the *Occupational Classification Dictionary of the People's Republic of China*, with the military category replaced by students due to students' higher online public opinion participation.

4.4 Data Analysis

4.4.1 Sample Characteristics The survey sample comprised 500 participants. As shown in Table 1 and Figure 2 [Figure 2: see original paper], gender distribution was 37.4% male and 62.6% female—slightly more females but essentially balanced. Occupationally, agricultural and production/transport equipment operators represented smaller proportions at 0.8% and 1.4% respectively, but non-zero coverage indicates broad survey reach. Educationally, high school or below and junior college accounted for smaller proportions (6.0% and 8.0%), indicating the sample primarily comprised undergraduate and graduate students, consistent with higher-educated groups' greater participation in online public opinion dissemination. Age distribution covered 17-62 years, predominantly young and middle-aged adults (18-39), aligning with the demographic reality of online public opinion dissemination.

4.4.2 Multicollinearity Analysis Testing for multicollinearity among independent variables was crucial. Only by ensuring no severe correlations can we accurately evaluate each variable's contribution to the dependent variable. This study used stepwise regression, a common diagnostic method. Results showed all tolerance values between 0-1 were greater than 0.1 (not extremely small), and variance inflation factor (VIF) values between 1-∞ were all less than 10 (not extremely large). These results indicate no serious multicollinearity among independent variables.

4.4.3 Analysis Process Using SPSS 22's optimal scaling regression, the dependent variable and 15 independent variable hypotheses were analyzed. Optimal scaling regression requires all variable significance P-values to be less than 0.05; non-compliant variables must be removed and the equation adjusted. Three iterations were required to achieve compliance.

Table 3 shows variables with $P > 0.05$ after the first regression: residence location, familiar location, interests, study, work, beliefs, and government official release. These were removed for the second regression.

Table 4 shows the second regression results, where only celebrity/expert release had $P = 0.081 > 0.05$ and was removed for the third regression.

Tables 5 through 7 present the final optimal scaling regression results, all meeting requirements without further variable removal.

Table 5 shows $R^2 = 0.162$, indicating moderate model fit. Since the research aims to identify key influencing factors rather than derive a predictive model, moderate fit satisfies basic requirements. The significance P-value of $0.000 < 0.05$ indicates statistically significant regression.

Table 6 shows all variable P-values < 0.05, demonstrating good significance and reasonable variable selection. The final optimal scaling regression equation is:

$Y = 0.121 \times$ Reporting Time $+ 0.190 \times$ Hometown - $0.165 \times$ Yearning Location - $0.219 \times$ Life - $0.096 \times$ Relatives/Friends - $0.221 \times$ Media $+ 0.236 \times$ Enterprise

Table 7 shows correlations between independent variables and dependent variable. Yearning location, life relevance, relatives/friends release, media official release, and enterprise official release show negative correlations with frequency Y. Given the coding (strongly disagree = 1…strongly agree = 5) and frequency Y coding (once or more daily = 1…almost never = 5), the negative correlation indicates that information more relevant to yearning locations and life, and information released by relatives/friends, media officials, and enterprise officials, corresponds to higher dissemination frequency—i.e., greater influence on dissemination willingness.

Importance values indicate each variable's predictive impact. The importance ranking for frequency Y is: life relevance > media official release > yearning location > reporting time > relatives/friends release > hometown relevance > enterprise official release. Tolerance values before and after transformation are all > 0.1, confirming absence of multicollinearity.

Frequency statistics show 60.48% of participants posted or forwarded information from "same day" or "within one week," supporting hypothesis H1 that earliest reporting time affects dissemination willingness. For hometown-related content, 54.54% chose "strongly agree" or "agree," supporting hypothesis H2.

5. Data Analysis Results

5.1 Overall Data Analysis

Tables 5 and 6 demonstrate that optimal regression results meet basic data requirements and are valid. Table 7 illustrates relationships among data and the importance of each factor.

5.2 Analysis by Dimension

From the psychological distance perspective, using questionnaire analysis and optimal scaling methods, this study examines online public opinion dissemination willingness across four dimensions:

5.2.1 Temporal Distance Dimension Information reporting time is a crucial factor affecting dissemination willingness. Public opinion is time-sensitive; netizens generally ignore outdated information. Survey data show that forwarding probability for public opinion reported over half a month ago is already less than 5%. Therefore, in public opinion management, focus should be on monitoring newly reported content within half a month, tracking dissemination trends, and implementing appropriate responses. Analyzing the temporal distance dimension of netizen participation from a psychological distance perspective breaks from simple stage-based segmentation of public opinion dissem-

ination, quantitatively establishing "half a month" as a critical prevention and control period.

5.2.2 Spatial Distance Dimension Information related to hometowns and yearning locations significantly influences dissemination tendency. Traditional sayings like "fallen leaves return to roots" reflect Chinese people's attachment to hometowns. While the hypothesis suggested hometown-related information would have higher forwarding probability, results show hometown relevance importance at only 0.059, indicating weaker-than-expected weight. This may be because hometown affairs are overly familiar to locals—what seems novel and important to outsiders may be commonplace to residents. Interest in yearning locations has grown with improved economic conditions, as people increasingly focus on areas beyond their hometowns, paralleling the booming tourism industry and shifting online public opinion dissemination willingness. This analysis breaks the assumption that hometown information is most important, showing that yearning location-related public opinion often generates greater interest.

5.2.3 Social Distance Dimension Life-related information constitutes everyday conversation and similarly influences online public opinion dissemination. The more relevant to daily life, the greater the impact on dissemination tendency. In public opinion monitoring, attention should focus on life-relevant information, which typically spreads more widely than other content. Analyzing the social distance dimension highlights the influence of content on dissemination, further demonstrating the importance of public opinion categorization.

5.2.4 Probability Dimension Information released by relatives/friends, official media, and enterprise officials significantly influences dissemination willingness. Forwarding relatives'/friends' information may stem from perceived reliability or social obligation, though this factor's importance (0.10) ranks mid-range among the seven factors. Government official release was included in hypotheses but excluded from the final equation, possibly because official documents are difficult for ordinary citizens to interpret and often lengthy, with limited personally relevant content. Most people prefer targeted information interpreted by media and enterprises. Using media and enterprise official channels for correct public opinion propaganda often yields better results. This analysis reveals current netizens' recognition of opinion leaders in public opinion dissemination, providing theoretical support for directional monitoring and management.

The rapid development of internet and deepening self-media applications provide platforms for public opinion dissemination while also creating challenges for analysis and judgment. Identifying main influencing factors is crucial for prediction and monitoring. This study reveals seven important factors and their relative importance through questionnaire and data analysis, providing theoretical support for public opinion prediction and control. However, limitations exist: behavioral preferences often depend on survey samples and ap-

plication contexts. These results are based on the current sample and cannot fully explain all online public opinion dissemination phenomena. Due to time and resource constraints, constructing psychological distance indicator systems and effectively measuring dissemination willingness will be addressed in future research for more comprehensive, multi-dimensional analysis.

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Author Contributions

Zhang Xiaojun: Responsible for data collection and paper writing
Huang Wei: Responsible for research design and paper revision
Li Rui: Responsible for literature collection and abstract translation

Note: Figure translations are in progress. See original paper for figures.