Postprint: A Study on Persuasion Strategies in Health-Related Debunking Short Videos

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Abstract

目的/ 意义 Short videos constitute a crucial information dissemination medium in contemporary society. Understanding the content characteristics of health-related rumor-refuting short videos and enhancing their communication effectiveness holds significant importance for rumor governance.

方法/ 过程 Utilizing rumor-refuting short videos on COVID-19-related themes as samples and grounded in persuasion strategies, this study first extracts the types of persuasion strategies employed, the relationships among multiple persuasion strategy types, video elements frequently utilized for persuasion strategies, and investigates the associations between persuasion strategies and rumors. Subsequently, it examines the relationship between persuasion strategies in rumor-refuting short videos and user responses. Finally, it proposes measures to facilitate the dissemination of rumor-refuting short videos.

结果/ 结论 The findings reveal significant correlations among certain video elements, rumor types, and the adoption of persuasion strategies. Moreover, rumor-refuting short videos that simultaneously employ logical and other persuasion strategies are more likely to be favored by users. Future rumor-refuting short videos can optimize their dissemination based on these insights, thereby contributing to rumor governance.

Full Text

Preamble

Title: Research on Persuasion Strategies in Health-Related Rumor-Refuting Short Videos

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Abstract:
[**Purpose/Significance**] Short videos have become a critical information dissemination medium in contemporary society. Understanding the content characteristics of health-related rumor-refuting short videos and enhancing their communication effectiveness is vital for rumor governance. [**Method/Process**] Taking COVID-19-themed rumor-refuting short videos as samples and grounded in persuasion strategy theory, this study first identifies the types of persuasion strategies employed, relationships among multiple strategy types, commonly used video elements for persuasion, and explores associations between persuasion strategies and rumors. It then examines the relationship between persuasion strategies in rumor-refuting short videos and user responses. Finally, measures to promote the dissemination effectiveness of rumor-refuting short videos are proposed. [**Results/Conclusions**] The study finds clear correlations between certain video elements, rumor types, and persuasion strategy usage. In rumor-refuting short videos, those employing both logical and other persuasion strategies are more likely to be favored by users. Future rumor-refuting short videos can optimize dissemination based on these findings to support rumor governance.

Keywords: health short videos; rumor refuting; COVID-19; persuasion strategies; rumor governance
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1. Introduction

The rapid development of the Internet era has enabled unprecedented speed in information acquisition and publication. Persuasion is ubiquitous in human society, and SIMONS[1] defines it as human communication activity aimed at influencing others' beliefs, attitudes, or behaviors. Persuasion strategies refer to language-based attempts or tactics to influence others' beliefs, attitudes, or behaviors. While this expands dissemination reach and improves efficiency, it also provides convenient channels for rumor proliferation. Effectively preventing and governing rumor information has become a key concern for relevant authorities and researchers. Short videos represent a new mode of information dissemination and have become a new favorite for both rumor spreading and refuting due to their visual, convenient, and expressive characteristics. To effectively govern rumors, rumor-refuting short videos must employ persuasion strategies effectively to attract audiences, encourage sharing and belief, thereby enhancing dissemination effectiveness and achieving rumor governance goals.

However, questions remain regarding which persuasion strategies are used in rumor-refuting short videos, how to combine persuasion strategies with video production to mobilize positive user reactions, and how to ensure that refutation information spreads more powerfully than rumor information to maximize impact and curb rumor dissemination. This study takes persuasion strategies as its entry point and proposes four research questions: (1) What are the common persuasion strategies and frequently co-used strategies in COVID-19 rumor-refuting short videos? (2) What associations exist between persuasion strategies and video elements? (3) What associations exist between persuasion strategies and rumor themes in short videos? (4) How do different types of persuasion strategies affect user reactions to rumor-refuting short videos?

Existing research on rumor refutation effects and influencing factors primarily uses questionnaires and web data to construct evaluation frameworks from multiple dimensions including refutation subjects, audiences, and contextual features[11-13], employing regression models[11,12] and empirical studies[13] to explore dissemination effects. This study aims to analyze the current usage of persuasion strategies, video elements, and rumor theme characteristics in COVID-19-related rumor-refuting short videos, and explore the relationship between persuasion strategy usage and user reactions to propose strategies for enhancing dissemination effectiveness, providing feasible conclusions and recommendations for rumor-refuting information dissemination.

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2. Literature Review

2.1 Research on Rumor Refutation

2.1.1 Rumor-Refuting Information and Its Dissemination Rumor-refuting information essentially belongs to the category of counter-rumors. Existing research primarily combines theories from communication studies and social psychology to explore dissemination characteristics. Rumor-refuting subjects mainly include government organizations, opinion leaders, and involved parties, among five categories[4]. Rumor-refuting information exhibits relative lag, low diffusion, and singularity in discourse[5], with its diffusion process generally comprising three stages: outbreak, peak, and decline[6]. Influencing factors can be categorized into four types: rumor-refuting source, information content, audience, and channels. The source involves the publisher's authority, professionalism, and influence[7], while emotional expression also affects dissemination to varying degrees[8]. The audience's impact on dissemination is realized through subjective norms, perceived behavioral control, and awareness of adverse consequences[9]. Regarding channels, information from official government sources is generally considered more disseminable[10].

2.1.2 Rumor-Refuting Strategy Research Rumor refutation is an effective way to stop rumor spread, but successful refutation requires reasonable

strategies. Macro-level rumor-refuting strategies mainly include three modes: self-purification through spontaneous information sharing, organized refutation by official bodies like governments, and collaborative refutation by multiple actors. Self-purification strategies require exposing people to refutation information environments or adding warning reminders to rumor-filled websites to reduce spread through social network self-purification[14]. In organized refutation strategies, research discusses the role of government agencies and official media based on current events, constructing strategy frameworks from operational mechanisms[15,16]. Collaborative strategies focus on multi-actor coordination, timing, channels, and content. For instance, Jin and Jianbin[17] propose corresponding rumor governance measures from a socialized perspective, while Xiong Yan[18] suggests introducing third-party refuters such as industry experts and platform websites to achieve appropriate diversification of refutation subjects.

2.1.3 Health Information and Short Video Rumor-Refuting Strategy Research With rapidly growing demand for health information, obtaining health information via the Internet has become normalized. Scholars have begun exploring health information refutation in new media environments. Existing research identifies core refutation elements for health topics on social platforms, focusing on refutation information itself and constructing strategies from three perspectives: refutation information disseminators, audiences, and platforms[19]. Other studies propose optimization suggestions for online health rumor refutation mechanisms by combining network characteristics and audience psychology[20], or examine collaborative governance perspectives[21].

Short videos as a new mass communication medium have attracted academic attention for rumor-refuting strategies. Research explores factors affecting short video refutation effectiveness in public health emergencies from information technology and environment perspectives[22,23], using view counts, comments, and shares as effectiveness indicators[24]. The most commonly used strategy is emotional appeal, as seen in U.S. presidential candidates using Facebook to gain voter support[25]. Non-profit organizations' tweets with positive responses mostly employ rational and emotional appeals[26]. In economic contexts, video blog advertisements from commodity companies can stimulate consumer purchase intentions[27]. MAO[28] explored how social media containing misinformation uses persuasion strategies to drive rumor spread. Some scholars[29] detected rumor patterns in streaming social media by annotating ten types of persuasion strategies, finding emotional appeal to be the most used in Aristotelian persuasion strategies.

Although existing research demonstrates that various persuasion strategies in social media affect user behavior and attitudes, few studies examine the connection between refutation information and persuasion strategies. Most health information refutation strategies analyze government and audience perspectives, with governance strategies being relatively homogeneous. Most research adopts case studies, model construction, or single-perspective approaches from either

disseminators or audiences, with relatively limited investigation of persuasion strategies closely related to refutation effects, short video content elements, and other aspects. This study, based on Aristotle's persuasion strategy theory, explores factors influencing COVID-19 rumor-refuting short video dissemination to optimize video communication and support rumor governance.

2.2 Theoretical Research on Persuasion Strategies

Aristotle's rhetorical theory is one of the most classical and fundamental persuasion strategy theories. To enhance persuasiveness, effective rhetorical methods and means must be employed from multiple dimensions[25]. The theory describes three distinct yet inseparable dimensions in persuasion: Ethos (credibility), Pathos (emotional appeal), and Logos (logical appeal). Ethos establishes trust through the speaker's attitude and character traits. Pathos achieves audience identification and emotional resonance through emotional appeal. Logos uses logical support for claims, including logical reasoning, facts, evidence, surveys, statistics, examples, and historical or textual analogies.

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3. Data Collection and Coding

3.1 Data Collection

This study uses Python for data mining to crawl online data. Using "COVID-19 rumor refutation" as keywords on Douyin (TikTok's Chinese version) and "Refuting Rumor" on TikTok, we crawled all short videos from these search interfaces. By September 30, 2021, 465 videos were crawled from Douyin, including publication text and metadata. By November 6, 2021, 106 videos were crawped from TikTok. After individual review, 213 videos entered the coding phase, excluding duplicates or videos with identical content.

3.2 Data Coding

Sample video coding was conducted across three dimensions: persuasion strategies, video elements, and rumor themes. Based on Aristotle's rhetorical theory (Logos, Ethos, Pathos) and referencing CHEN's four categories of 13 persuasion strategies[28], we established coding standards. Three authors developed preliminary coding criteria through repeated testing and confirmation to ensure reliability and validity. When a short video presented multiple persuasion strategies or elements, all were coded.

3.2.1 Persuasion Strategy Coding The coding standard for persuasion strategies is shown in . The 13 strategies include: Logos (logical support), Inherent Authority (demonstrating the author's expertise), Borrowed Credibility (citing credible sources), Positive Emotion (evoking pleasant feelings), Negative Emotion (evoking unpleasant feelings), Patriotic Emotion, Other Emotions

(surprise, curiosity, ridicule), Storytelling, Reciprocity, Scarcity, Social Proof, Repetition, and Gratitude.

3.2.2 Video Element Coding Short videos primarily contain text and audio elements. This study considers only text and audio, excluding video footage. Text elements include pure text, non-pure text (text in images/screenshots), and subtitles/text animation. Audio elements include voice (human voice, modified voice), music (instrumental, lyrical), ambient sound (natural recording sounds, special effects), noise (disruptive sounds), and silence. The coding system is shown in .

3.2.3 Rumor Theme Coding Combining existing research on rumor types during COVID-19 prevention[30] and sample video content, rumor themes were categorized into five major types with ten sub-themes: pseudoscience (virus nature, origin, transmission, detection, symptoms; vaccine side effects, efficacy, dosage; prevention and treatment), event-related (rescue, transportation, protective measures, restrictions; living supplies, anti-epidemic materials), policy-related (school opening, population movement, work stoppage/resumption, transportation policies, vaccination policies), personnel-related (moral issues, subsidies, health code changes, confirmed cases, deaths, virus discovery; organizations, Zhong Nanshan, Red Cross, medical staff), and fraud-related (self-check applets). The coding standard is shown in .

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4. Results

4.1 Common Persuasion Strategies and Frequently Co-Used Strategies

4.1.1 Frequency Distribution of Persuasion Strategies in the Sample COVID-19 rumor-refuting short videos extensively employ persuasion strategies. Among credibility-based strategies, borrowed credibility is used more frequently than inherent authority (170 vs. 139 occurrences). Among other strategy types, Logos has the highest frequency (309), followed by scarcity (297). Among emotional strategies, positive emotion has the highest frequency (84), followed by negative emotion (32). The frequency distribution is shown in .

4.1.2 Persuasion Strategy Association Rule Analysis and Visualization To analyze how different persuasion strategies are used together, we applied the Apriori algorithm to COVID-19 rumor-refuting videos. Minimum support was set to 0.1, minimum confidence to 0.5, and only results with lift >1 were selected. shows that: (1) When using Logos, videos tend to simultaneously use borrowed credibility; (2) When using negative emotions, scarcity is employed; (3) When using positive emotions, borrowed credibility is preferred; (4) Whether

using Logos or other strategies, credibility-based strategies are frequently combined; (5) When using scarcity, negative emotions and borrowed credibility are common.

The visualization of persuasion strategy co-occurrence shows strong edge weights between Logos and scarcity, and between borrowed credibility and inherent authority, indicating frequent co-use. Logos has the highest weighted degree, followed by borrowed credibility. The network has an average clustering coefficient of 0.93 and average path length of 1.141, indicating tight network connections. The co-occurrence network diagram is shown in [Figure 1: see original paper].

4.2 Video Elements and Persuasion Strategies

4.2.1 Frequency Distribution of Video Element Usage Video element usage reflects short video production characteristics. Pure text and voice elements are most common (297 and 358 occurrences respectively), followed by music (119). Non-pure text and ambient sound are less used, while noise and silence are rarely used. The frequency distribution is shown in .

4.2.2 Association Between Video Elements and Persuasion Strategies Using multilevel association rule mining with Apriori (minimum support 0.1, confidence 0.5), we analyzed relationships between persuasion strategies and video elements. shows that all persuasion strategies and their combinations tend to use voice and music elements. Almost every COVID-19 rumor-refuting short video uses voice and pure text elements. When credibility strategies combine with others, there's a tendency to use non-pure text. Other strategies (like scarcity) show preference for ambient sound.

The co-occurrence network (minimum confidence 0.3) shows three modules with density 0.509, average clustering coefficient 0, and average path length 1.491. Logic strategies heavily use non-pure text, music, and voice. Credibility strategies frequently combine with non-pure text. Emotional and other strategies primarily use music. The network diagram is shown in [Figure 2: see original paper].

4.3 Rumor Themes and Persuasion Strategies

4.3.1 Distribution of Rumor Themes Being Refuted Rumors refuted in COVID-19 short videos fall into five major categories with ten themes. Pseudoscience rumors are most numerous (358), followed by event-related rumors. Among sub-themes, prevention/treatment rumors have the highest frequency (148), followed by vaccine rumors (136). Virus-related rumors exceed 50 occurrences, while personnel and fraud themes are less common. The frequency table is shown in .

4.3.2 Association Between Persuasion Strategies and Rumor Themes Multilevel association rule analysis (minimum support 0.1, confidence 0.5) re-

veals: (1) Policy rumors tend to use borrowed credibility + Logos combinations; (2) Public order rumors prefer borrowed credibility; (3) Prevention/treatment rumors tend to use borrowed credibility + inherent authority + Logos combinations; (4) Vaccine rumors prefer scarcity + Logos combinations.

The co-occurrence network shows two modules with density 0.44 and average path length 1.538. Prevention/treatment rumors have high weighted degree with Logos and credibility strategies. Vaccine rumors show strong edge weights with Logos. The network diagram is shown in [Figure 3: see original paper].

4.4 Relationship Between Persuasion Strategies and User Reactions

To explore this relationship, we grouped short videos by the number and type of persuasion strategies used. Videos using one strategy formed Group 1; those using two strategies formed Group 2 (subdivided into 2.1-2.6); three strategies formed Group 3 (subdivided into 3.1-3.4); and four strategies formed Group 4. User reactions were measured through likes, comments, and shares[22].

Descriptive statistics show Group 3.3 (Logos + Credibility + Other) has the highest average likes, Group 4 has the most comments, and Group 2.1 (Logos + Emotion) has the most shares. One-way ANOVA results ($F=1.942$, $p<0.05$) show significant differences in likes across groups. Post-hoc LSD tests reveal that Logos + Emotion + Credibility yields significantly fewer likes than Logos + Credibility + Other combinations. Comment analysis ($F=2.524$, $p=0.009$) also shows significant differences, with Logos + Emotion performing worse than Logos + Other, Logos + Credibility, and other combinations. No significant differences were found for shares ($p=0.135$). Results are shown in and .

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5. Discussion

5.1 Persuasion Strategies in Health-Related Rumor-Refuting Short Videos Are Primarily Logical and Diverse

COVID-19 rumor-refuting short videos predominantly use Logos strategies, often combined with emotional or credibility strategies. Other strategies are less frequently combined, primarily pairing with scarcity to enhance refutation effectiveness. This differs from existing research emphasizing opinion leaders' roles[6] and audience psychological factors[18], suggesting health-related short videos exhibit more diverse strategy combinations.

5.2 Effective Matching of Video Elements with Persuasion Strategies

Due to short videos' rich audio-visual elements compared to text, effective use of video elements is crucial. The study shows that when using Logos, credibility, emotion, or other persuasion strategies, videos combine pure text, non-pure

text, voice, or music. However, specific strategies show preferences: credibility strategies combined with others tend toward non-pure text, while scarcity strategies show preference for ambient sound. Future productions can more precisely match multiple video elements to strategies—for example, pairing ambient sound with scarcity strategies—to enhance richness and refutation effectiveness.

5.3 Selecting Specific Persuasion Strategies for Different Rumor Themes

For specific rumor themes, refutation videos preferentially use certain persuasion strategies. Reasonable use of specific strategy types has unexpected effects for particular themes. For pseudoscience themes like vaccine and prevention/treatment rumors, scarcity strategies (manifested as threat appeals) are preferred—audiences more readily accept refutation information after receiving threat messages. For public order rumors, borrowed credibility is preferred. Policy rumors tend to use Logos + Credibility, while some themes use positive emotion strategies. Future producers should consciously select appropriate persuasion strategies based on rumor themes to promote user engagement.

5.4 Using Logic and Other Persuasion Strategies Simultaneously to Mobilize User Reactions

Health-related rumor-refuting short videos show enhanced use of other strategy categories beyond basic approaches. The six "other" strategies (storytelling, reciprocity, scarcity, social proof, repetition, gratitude) combined with Logos demonstrate a trend toward more multi-combination strategies. Since Logos + Credibility and Logos + Emotion strategies show close relationships with positive user reactions, producers can effectively combine Logos with these six strategies to mobilize user engagement. Videos using Logos + Emotion + Credibility + Other combinations tend to receive higher likes and comments. Producers can enhance source reliability through borrowed credibility and inherent authority while using emotional appeals to mobilize audiences, thereby achieving better communication outcomes.

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6. Conclusion

This study provides methodological insights for exploring new media communication through data-driven approaches. Previous rumor research often focused on user behavior, communication subjects, or audience perspectives[4]. This paper expands rumor governance theory and information dissemination research by integrating multiple perspectives and constructing a research framework for short video refutation strategies from content production and rumor theme characteristics. While existing studies like MAO[24] analyzed rumor short videos from the rumor perspective, this research focuses on refutation videos, analyzing persuasion strategy characteristics closely related to refutation effectiveness.

The study's limitations include: (1) The sample is limited to COVID-19 rumor-refuting short videos, though health-related rumor-refuting videos encompass broader topics; (2) User effects were limited to likes, comments, and shares, without analyzing comment content or view counts due to privacy restrictions. Future research should expand the sample range to include more diverse health-related rumor-refuting videos and incorporate additional effectiveness metrics such as comment text analysis. Further studies could also employ fsQCA methods to explore configurational effects among refutation strategies, video elements, and rumor themes, and analyze causal relationships with communication effectiveness on platforms like TikTok.

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