

# Analysis of Public Sentiment Evolution Mechanisms in Social Media Public Relations Crises

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## Abstract:

With the increasingly widespread use of social media, public sentiment during crises in public opinion exhibits characteristics of rapid escalation, broad impact, and complex evolution, posing significant challenges to maintaining social stability and crisis management. This paper explores three dimensions: “theoretical foundations of emotional shifts,” “pathways and diffusion patterns of emotional transmission,” and “management intervention mechanisms for emotional dynamics.” Findings indicate that public sentiment eruptions stem from structural societal contradictions explained by the “social combustion theory.” Within crisis scenarios, individual cognitive evaluations and cognitive biases become catalysts for emotional escalation. The propagation of public sentiment on social media follows a phased, non-linear trajectory. Opinion leaders emotionally charged narratives, and platform-enabled amplification collectively constitute key channels for sentiment diffusion. Effective sentiment management interventions require coordinated efforts among multiple stakeholders—including governments, media, and the public—through systematic approaches such as disseminating authoritative information, promoting constructive journalism practices, and enhancing public media literacy. This study provides an integrated analytical framework for deepening understanding of the dynamic shifts in public sentiment in the digital age, while also offering theoretical reference points for related public opinion governance practices.

**Keywords:** Social media; public opinion crisis; public sentiment; sentiment evolution; public opinion governance.

## 1. Introduction

With the continuous growth of social media users (China's internet population reached 1.092 billion in 2024), it has become a core platform for generating and disseminating public opinion, exerting profound influence on societal operations. Public opinion crises often emerge alongside sudden public incidents. For instance, the 2018 Facebook-Cambridge Analytica data breach exposed 87 million users' information, triggering a global public opinion crisis that caused the company's stock price to plummet by 18%. Public sentiment serves as the core driving force behind the development of public opinion, making systematic exploration of its transmission pathways and evolution patterns imperative. Sentiment analysis technology, leveraging natural language processing (NLP) to uncover emotional tendencies in text, has demonstrated value in public opinion monitoring (e.g., Weibo's 2022 sentiment early warning system reduced crisis response time by 30%). Within the social media ecosystem, public opinion crises, public sentiment, and sentiment analysis form a dynamic closed-loop system.

While existing research has achieved significant results across various fields—such as communication studies focusing on information dissemination patterns, psychology exploring individual emotional mechanisms, and computer science concentrating on analytical techniques, such studies often exhibit fragmented characteristics. Some scholars emphasize the psychological origins of emotions, others focus on their propagation trajectories within single platforms, while others discuss only post-crisis management strategies. Rarely do studies organically integrate these three dimensions into a unified analytical framework to systematically reveal the full chain of dynamics—from the generation and dissemination of public sentiment to its intervention. Consequently, constructing a comprehensive analytical framework capable of integrating multidisciplinary theories, mapping complete evolutionary pathways, and guiding intervention practices has become an urgent theoretical bottleneck requiring breakthroughs in the field of public opinion research. To address this gap, this paper innovatively integrates emotion transmission theory, group dynamics models, and multiple cutting-edge literature findings to establish a three-dimensional analytical framework encompassing “emotion evolution-transmission pathways-intervention strategies.” On the “emotion evolution” dimension, this framework combines “social combustion theory” with cognitive psychology. Starting from individual cognitive evaluations and cognitive biases in crisis situations, it explains how public emotions emerge against the backdrop of structural social contradictions. In the “transmission pathway” dimension, the framework reveals the multi-stage and non-linear

characteristics of emotional communication, clarifying the pivotal roles of opinion leaders, emotional narratives, and platform technology enablement (such as algorithmic recommendations and interactive mechanisms) within emotional diffusion networks. In the “Intervention Strategy” dimension, this framework breaks from traditional response approaches by emphasizing the systemic role of authoritative information provision, constructive journalism practices, and public media literacy enhancement. It proposes a multi-stakeholder collaborative governance model involving governments, media, and the public.

The significance of this research lies in constructing an integrated analytical framework that not only provides a robust theoretical foundation for governments and enterprises to transition from passive “firefighters” to proactive “emotional guides” through scientifically forward-looking strategies; it also promotes the deep practical application of sentiment analysis technologies in crisis early warning, governance, and evaluation. Ultimately, it contributes theoretical insights to safeguard social psychological well-being and public trust within complex network environments.

## 2. Theoretical Foundations of Emotional Evolution

The eruption and evolution of public sentiment during opinion crises are not without cause, rooted in profound macro-social contexts, micro-psychological mechanisms, and socially constructed logic.

From a macro perspective, the “Social Combustion Theory” proposed by relevant scholars offers an in-depth explanation for understanding the eruption of public sentiment during crises. This theory likens the emergence of collective online sentiment to a “social combustion,” requiring three conditions: the primary social contradictions as the “combustible material,” digital communication technologies as the “accelerant,” and temporary community empathy as the “ignition point” [1]. This indicates that negative public sentiment does not emerge spontaneously but rather represents the concentrated manifestation of deep-seated societal contradictions triggered by specific crisis events. Another study, grounded in the “Social Amplification of Risk Framework” (SARF), posits that public anger stems from perceptions of risk events in terms of fairness, severity, and novelty. These perceptions are rapidly amplified on social media, evolving from individual reactions into a societal phenomenon [2].

From a micro-cognitive psychology perspective, emotion originates in an individual's cognitive evaluation process. Drawing on Levenson's “emotional systems theory,” scholars propose that the public conducts “emotional appraisals” of crisis events. Based on personal

values, expectations, and other factors, individuals assess the event's harmfulness and assign responsibility, thereby triggering corresponding emotions. However, under intense crisis impact, this cognitive process often malfunctions [3]. Research indicates that the brain prioritizes negative emotional information. Under panic, individuals' cognitive systems become impaired, creating a vicious cycle of "panic arousal-cognitive impairment" that hinders rational judgment and may even lead to ignoring factual truths [4]. The "Integrated Crisis Model" (ICM) theory introduced by scholars systematically categorizes public emotions during crises into four primary types: anxiety, sadness, fear, and anger. This framework posits that these dominant emotions are closely linked to crisis types and organizational involvement, providing theoretical support for predicting and understanding emotional responses in specific crises [5].

Finally, the evolution of emotions is a process of social interaction and construction. In a study grounded in "triadic interaction determinism," researchers employed Qualitative Comparative Analysis (QCA) to demonstrate how complex interactions among three factors—individuals (e.g., interest claims), environment (e.g., event type, rule breaches), and behavior (e.g., interest conflicts)—collectively determine the final state of netizens' emotions [6]. When individuals initially express emotions on social media, these sentiments are perceived, imitated, and amplified through interactions. This phenomenon, termed the "empathy transmission mechanism" by other scholars, encompasses both affective empathy (emotional contagion) and cognitive empathy (perspective adoption) [7]. It is precisely this large-scale social interaction that ultimately drives the transformation and development of individual emotions into collective sentiment.

### 3. Transmission Pathways and Diffusion Patterns of Emotional Evolution

Within social media environments, once public sentiment crystallizes, it propagates and spreads along specific pathways and patterns, exhibiting complex and dynamic characteristics. This evolution is not a simple linear progression but manifests as a complex network with multi-stage, multi-node, and multi-modal features.

First, the evolution of public sentiment typically exhibits distinct multi-stage characteristics. Scholars have likened this process to a fluctuating, reversing "roller coaster" [1]. Analyses using the extended Fink four-stage crisis model (precursor phase, acute phase, chronic phase, terminal phase) reveal significant differences in the themes and intensity of public discourse across these stages [8]. Drawing on life-cycle theory, scholars further categorize public sentiment into three phases: outbreak, spread, and long

tail, with dominant emotions and discourse themes evolving throughout each stage[5]. Additionally, a 2023 study employed "inflection point detection" algorithms to accurately identify multiple turning points or "breakpoints" in public sentiment triggered by key news events, providing empirical support for the phased nature of sentiment evolution [9].

Second, opinion leaders play a pivotal role as hubs in emotional transmission. Research indicates that "mobile opinion leaders" (e.g., journalists, internet celebrities) increasingly shape online discourse, showing a greater propensity to disseminate attention-grabbing negative content [10]. Scholars also confirm that "online trials" initiated by expert-type and government official-type netizens most likely influence societal sentiment [3]. Another study found that during public health crises, verified accounts and influential users are more likely to be retweeted and liked, yet they may also disseminate low-credibility information. This complicates and heightens the critical role of opinion leaders in emotional contagion [11].

Third, emotional diffusion is closely tied to content discourse patterns. Scholars note that online emotions exhibit characteristics of radicalization and cross-infection [1]. Research indicates that the "concretization" tendency in media framing—emphasizing specific, personalized scenario descriptions—can trigger stronger public anxiety and anger [12]. Scholars also note that "tragic narratives" dominate public safety incidents. By constructing emotionally resonant tragic stories, they effectively evoke public empathy and sympathy. Such emotion-driven narratives achieve far greater dissemination impact than neutral factual statements [10].

Finally, the spread of emotions is profoundly influenced by the technical mechanisms of social media platforms. Scholars analyzing Twitter's platform "amplification" mechanisms note that retweets typically signify endorsement and amplification, while replies and quote-retweets provide space for expressing dissent and reframing discourse. During crises, the public frequently employs "receipts"—capturing and circulating contradictory past statements from authorities—which significantly heightens institutional distrust and negative sentiment [11]. Another study indicates that algorithmic recommendation systems accelerate group polarization by continuously pushing similar emotional content, forming "emotional echo chambers" [1]. Related research employs advanced techniques like multi-task learning and attention mechanisms to not only identify emotions but also precisely pinpoint key subjects and words triggering emotions within text, demonstrating technology's immense potential in deeply analyzing the micro-mechanisms of emotional propagation [13].

#### 4. Management Intervention Mechanisms for Emotional Evolution

In social media opinion crises, public sentiment harbors immense energy and latent risks, making effective management intervention mechanisms crucial. This is not about simple suppression but rather a systematic approach involving multiple stakeholders, government, media, and the public—centered on channeling, regulating, and transforming emotions.

From the perspective of government and public management departments, modernizing hazard control capabilities and ensuring timely, transparent information provision form the core of management intervention. Relevant research indicates that “hazard control” is a key factor influencing public sentiment [3]. If the government demonstrates efficient response capabilities during crises and ensures public safety, citizens’ anxiety and fear can be fundamentally alleviated. Timely disclosure of authoritative information is the fundamental solution to dispel rumors and stabilize public sentiment. Another empirical study found that uncertain information like rumors significantly fuels public panic, while greater public understanding of government control measures correlates with lower panic levels [14]. Governments must refine information management and dissemination mechanisms to release authoritative updates promptly, thereby reducing space for negative emotions to proliferate.

In emotional intervention, the role and responsibility of the media are particularly crucial. The concept of “constructive journalism” proposed by scholars offers a new model for media participation in emotional governance. This approach advocates that media focus on solutions, engage the public, and channel emotions to govern societal sentiment—transforming from passive “observers” into active ‘participants’ and “governors.” Media intervention manifests through narrative strategies [15]. Research indicates that while detailed reporting may intensify negative emotions, incorporating “heroic narratives” and “epidemic-as-battle metaphors” can effectively mitigate anger [12]. This offers media a nuanced approach to emotional guidance: when detailed reporting is necessary, its negative impact can be counterbalanced by incorporating positive narrative frameworks. Media must proactively assume the role of authoritative opinion leaders, occupying a pivotal position in online discourse.

Simultaneously, the public’s own role must not be overlooked. Emotional governance ultimately hinges on enhancing media literacy and emotional management capabilities—a societal imperative. Scholars emphasize that the public should proactively cultivate media literacy and strengthen self-emotional regulation, forming the foundation for a clear and healthy online discourse environment

[1]. This necessitates a shift from passive information recipients to active participants equipped with discernment skills. This entails: - Improving information discernment to avoid readily believing or spreading unverified claims; - Strengthening self-regulation to recognize how social media amplifies emotions during crises, thereby maintaining rationality and composure; - Cultivating an open and inclusive social mindset to persuade others through reason in online discussions, respect differing viewpoints, and collectively fostering a healthy discourse environment.

#### 5. Conclusion

Although this review establishes a relatively comprehensive analytical framework, numerous unresolved challenges persist in this field, indicating substantial scope for future exploration.

Current research challenges and limitations primarily manifest in three areas.

First, challenges stem from rapidly evolving platforms and technological black boxes. Social media platforms’ functionalities and algorithms are undergoing updates at an unprecedented pace. Emerging platforms like short-video apps and interest-based communities operate on distinct emotional propagation logic compared to traditional text-and-image platforms. Moreover, the recommendation algorithms of commercial platforms remain opaque “black boxes” to researchers, making it exceptionally difficult to pinpoint the technical drivers behind emotional diffusion. Second, insufficient research exists on cross-platform emotional flow. Public sentiment does not remain confined to a single platform but instead flows and influences across multiple platforms like Weibo, WeChat, Douyin, and Zhihu. Current technical tools and research methods struggle to effectively track and quantify the specifics of this cross-platform transmission chain, creating “blind spots” in overall understanding of emotional shifts. Third, the applicability of case studies remains limited. Most existing research is grounded in specific types of crisis events (e.g., public health incidents, safety accidents). The extent to which these findings can be applied to other types of public opinion crises requires validation through comparative analysis of diverse case studies.

Looking ahead, research in this field can pursue breakthroughs through the following avenues.

First, future research must strengthen interdisciplinary integration. This requires not only continued engagement from social science theories like communication studies and psychology but also deep collaboration with computer science. The goal is to develop sentiment analysis models capable of analyzing the impact of “black-box algorithms,” tracking cross-platform information flows, and integrating multimodal data (text, images, video), there-



by upgrading research methodologies. Second, the dual roles of artificial intelligence (AI) in emotion governance warrant in-depth examination. On the one hand, generative AI may become a potent tool for manufacturing and disseminating misinformation while inciting negative sentiments—its associated risks and countermeasures demand urgent research. On the other hand, AI holds promise as an effective assistant for large-scale, personalized emotional guidance and constructing “digital empathy” communication strategies, though its ethical frameworks and application scenarios require further exploration. Finally, at the practical application level, future governance strategies must shift from reacting passively to crises toward proactively building social-psychological resilience. This requires exploring how to cultivate a more rational, peaceful, and resilient social mindset during peacetime. This can be achieved by fostering a constructive online communication culture, enhancing digital literacy among the populace, and guiding platform algorithms toward positive development. Such foundational work will better equip society to “resist” the impact of extreme emotions when crises arise.

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