

Based on Atmosphere Field Theory, the Evolution of Online Public Opinion of Accident Disasters: A Case Study of the "March 13 Major Gas Deflagration Accident"

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Abstract: To improve the accuracy of emergency management and public opinion regulation, we need to know how to alter emotions in the online public opinion of accident disasters. Traditional research has often treated "emotion" and "logic" separately, so this paper proposes the "Atmosphere Field Theory" and, based on the case of the "March 13" major gas deflagration accident in Yanjiao, Hebei, studies the emotional chain of public opinion development in detail. Based on the above research, the public's perception of the accident is in line with the progressive logic of "structure problem → moral shock → generalized belief → secondary stimulus → situational mobilization → ultimate stimulus", and it has two main evolutionary threads: first, there is a "safety-accountability chain" that starts with structural risks in urban gas safety, is promoted by improper emergency response behaviour, and finally leads to serious institutional accountability; second, there is a "rights-trust chain" that begins with the conflict over information control and the public's right to know, is triggered and amplified by the intervention of authoritative professional institutions, and thus damages government credibility. Therefore, this paper puts forward a four-in-one governance strategy with the qualities of being "forward-looking, collaborative, procedural and empathetic" to offer a theoretical support and practical reference for the fine governance of public opinion, giving full weight to both emotion and reason.

Keywords: Atmosphere Field Theory, Accident Disasters, Online Public Opinion, Emotional Change, Governance Strategies

Introduction

With the development of China in the 21st century and deep integration of rapid industrialisation, urbanisation and informatisation, the characteristics of public security risks have changed; they are now more complex, have chain reactions and cross-domain attributes. Due to the problems of aging infrastructure, industrial restructuring and the modernisation of the governance system, many accidents and disasters have occurred. Social media is instantaneous and has the attribute of cross-circle communication^[1], so local contradictions during emergencies can spread rapidly from the real world to the online environment, be easily transformed into nationwide public opinion, and even affect emergency response and policy formulation at present^[2]. Based on the above, tracing the development path of the online public's perception of accident disasters has become an urgent problem for research institutions and the government.

However, the problem of distinguishing between "emotion" and "reason" in the analysis of such public opinion has not been addressed. On the one hand, although sentiment analysis can show the accumulation and spread of public emotions^[3], it is difficult to know why there are changes in events. At the same time, although the structure of communication models^[4] or event logic graphs^[5] can show the development path of public opinion, they do not explain how emotions are generated, change and spread. It will limit our knowledge of how public opinion has changed in recent years and may affect the government's response.

1. Theoretical Foundation: Atmosphere Field Theory and its Analysis System

The Theory of Atmosphere Fields is a general way to explain changes in public opinion^[6]. It does not belong to the old structure-and-action division. Through the accumulation, change and release of emotional energy, one can observe how individual emotions lead to group behaviour in society. It is the logical sequence of "structure problem → moral shock → generalised belief → secondary stimulus → situational mobilisation → ultimate stimulus"^[7]. A structural problem is a basic defect in the social system or the system of government. Moral shock is a change in the socially accepted moral bottom line caused by an emergency, and it provides the first emotional impulse for public opinion. General beliefs are the general collective cognitions of the public about an event, and they provide cognitive support for emotional accumulation. The second is a special type that can greatly increase the emotional impact on the public and serve as a driving force for changing public opinion. Situational Mobilisation is the agreement reached by people in the public sphere through online communication to take collective action in a particular situation. The end result or official response is the final effect that will change the direction of public opinion.

The first reason for putting forward the Atmosphere Field Theory is to better explain emotions. First, it presents the moral and social connotations of emotional energy, and explains that atmosphere is not a person's emotion but a group's emotional changes caused by structural inequality. Second, there is a staged structure in the development of emotions, and they change gradually from accumulation and diffusion to sudden expression. Third, it also considers the interaction of emotion and structure; emotional energy is not only caused by structural contradictions but also shapes the structure of the public opinion field in reverse through group mobilisation. Therefore, the Atmosphere Field Theory can offer an analysis system for integrating form and atmosphere in the study of public opinion on accident disasters, explain why public opinion is high and how it changes over time, and thus provide all-round explanations for the entire evolutionary process.

2. Research Design

2.1 Case Selection

On March 13, 2024, there was a gas deflagration accident at a shop in Yanjiao Town, Sanhe City, Hebei Province, which resulted in 7 deaths and 27 injuries. After the incident, related topics quickly became popular on the Weibo hot list. As the rescue work advanced, a new way of conveying information from the construction site gradually attracted the attention of the media and became a hot topic among the public. That night, the All-China Journalists Association published an article in the newspaper condemning the incident and putting forward three serious problems for the public. On the morning of March 14, the accident disposal headquarters released a fault admission and apology statement, but it was still criticised for being late. In the afternoon of March 14, the authorities released information on the reasons for the accident, and public interest began to wane. This case is in the form of "initial outbreak, secondary fermentation, official response and gradual subsidence", and it is in line with the six stages of emotional development in the Atmosphere Field Theory, so it is suitable for research.

2.2 Data Sources

In order to obtain all-around information on the public's attitude, this paper has collected microblog posts, media reports and official notifications about the keywords "Yanjiao, explosion" from the Sina Weibo platform between March 13 and March 31, 2024. Weibo is a general platform that spreads public information and allows people to share their thoughts on events; thus, it contains many details and emotional expressions of the situation of public opinion. A total of 8,370 good samples were obtained in this paper. Preprocess the data to clean and segment the words before carrying out the qualitative analysis in this paper.

2.3 Research Methods

Qualitative case study methods will be used to study the six links of the progressive chain in the Atmosphere Field Theory and explore how emotions have changed in the online public's opinion on this issue. The analysis will be both theoretical and empirical; that is to say, we will identify important nodes, main issues, key actors and their emotions at different times in the course of changes in public

opinion to reveal fluctuations and internal driving forces of emotional energy in public opinion. In short, they need to know why they feel a certain way at different times, how emotional energy is being used, and what connection exists between changing emotions and structure.

First, there are sections and anchors for the text. According to the six stages of the Atmosphere Field Theory, and in conjunction with the time nodes of the development of the event and key public opinion incidents (such as the occurrence of the explosion, the obstruction of interviews, the statement by the All-China Journalists Association, and official notifications), this paper divides the evolution of public opinion into several stages. Based on the above, this paper organises and classifies the text data at all stages to form a staged analysis corpus.

Second, it will find the main problems and emotions. Based on fine-grained text analysis of the corpus at all times, high-frequency word extraction, issue clustering and emotion word annotation techniques are used to find the main problems in public opinion (such as "casualty situation", "reporters' right to interview" and "government response") and the corresponding emotions of the public (such as shock, anger, doubt, understanding) at each stage. According to the changes in problems and emotions at different times, this paper will show how the emotional energy of the public has changed over time.

Thirdly, discourse-action analysis will be employed on the main subjects. In the division of stages, this paper will study the speech acts and behaviours of all kinds of participants, such as ordinary internet users, opinion leaders, media, local governments, and so on. Based on the analysis of their discourse strategies, ways of evoking emotions and interacting at different times, this paper finds that some key figures have either led or changed the direction of public opinion.

Fourth, the studies have been carried out in stages and the results are inductive. At all times, independent analysis will be carried out, cross-stage comparisons will be made, and transformation nodes and driving forces (such as the triggering of secondary public opinion, intervention by authoritative institutions, and the speed of official responses) in the process of public opinion evolution from "outbreak" to "subsidence" will be identified to induce internal dynamics in the development of public opinion.

3. Case Analysis

Based on the analysis of online public opinion data, this paper finds that the development process of this case is fully in line with the six-stage model of Atmosphere Field Theory and shows two interconnected but different main chains of emotional development. The first is the "Safety-Accountability Chain" due to structural risks in urban public safety, and the second is the "Rights-Trust Chain" caused by conflicts over information rights.

3.1 Structural Issue

There are two related levels to the problem of structure in this accident.

The first is the system risk of public safety in urban governance. As a typical "dormitory town", Yanjiao is popular with many young people who work in Beijing. Aging of the pipeline network in the city's lifeline system, lack of maintenance, as well as formalism and blind spots in grassroots safety supervision are all long-standing hidden safety hazards. The root cause of the "gas leakage" is serious governance problems; for example, there has been insufficient investment in public safety during urbanization, and the responsibilities of all departments have not been clarified. This is the bottom soil of the "Safety-Accountability Chain".

The second is the institutional conflict over information rights in crisis communication. In the course of an emergency, the media's right to interview is the public's right to know and the right to supervise, and official information control is based on security concerns and the logical need to release authoritative information. There is an internal contradiction in the two logics of rights. If the shown control actions are too simple or rough, there will be strong public opposition to this problem. This is the original place of the "Rights-Trust Chain".

3.2 Moral Shock

When a structural problem leads to an accident, it is then called a "moral shock" and has serious

moral connotations. On the morning of March 13, there were 7 deaths and 27 injuries in the explosion. With the rapid spread of this information on social media, people have become very anxious about their own lives and have started to feel sympathy, fear and anxiety. At this time, the public has started to pay more attention to the disaster, and mourning has begun for the victims. This is the first emotional reason for all the public's opinion at this time and a general starting point for the two development tracks.

3.3 Generalised Belief

With the release of more information, people begin to attribute reasons to these circumstances and form a general opinion. Given that there have been previous cases of non-transparent information in some workplace safety accidents, some netizens now believe that "the truth has been covered up" or "the authorities are trying to downplay the seriousness of the incident". According to the cognitive framework of past experience mentioned above, the public has some doubts about the reasons for the accident and how many people were injured. This will lead to the next round of public opinion; that is to say, when a new trigger is confirmed, the accumulated emotional force will be quickly released and affect both evolution chains at the same time.

3.4 Secondary Stimulus

The second stimulus is also an important point in the development of the mood; it can strengthen the general conviction and increase the emotional intensity of the public significantly. The second reason for the accident is that there was no quick response to the emergency at that time.

On the "Safety-Accountability Chain": To ensure the safety of the rescue, the command centre will have the ultimate authority over the reporting journalists. Although it was first meant to be a safety management measure, due to its coarse style, lack of explanation and absence of human considerations, the public has begun to view it as an "obstruction" to the right to know and the right to supervise. Therefore, the authorities have failed to present a "solution" to the problem and have created a "problem" of new contradictions. Public attention has shifted from "how did the accident occur?" to "why is there such chaos in the response?", and the trust the public has placed in the authorities has begun to decline.

The "persuasion" operation on the "Rights-Trust Chain" is roughly shown in the figure above, and its nature has been widely regarded as an open violation of press freedom and the public's right to know, directly challenging socially accepted values. At that time, people will immediately form the general opinion that the authorities are trying to hide the truth. Thus, the previously scattered suspicions have been rapidly collected and organised into a strong force for investigation, and now a new wave of public opinion has been unleashed.

3.5 Situational Mobilisation

After the second stimulus, the public's mood will be "situational mobilisation", the emotions will change from sadness and anger to a demand for responsibility, and dispersed individuals will also form a consensus in public opinion via online platforms. The two chains of development have different directions for mobilisation, but together they form a very strong joint force of condemnation.

Situational Mobilisation in the "Safety-Accountability Chain" takes the form of the public combining their dissatisfaction with the act of "persuasion" and demands for "accountability" after the accident to organise collectively and seek institutional accountability. The people have pointed out that there are serious problems with government work and institutional fairness, and are now demanding full-process accountability for issues such as gas safety supervision and improper emergency response. In the end, the emotional energy of the public's opinion will not focus on a single case but will instead point out serious problems in the prevention of systemic risk and the governing capacity for procedural justice.

In the "Rights-Trust Chain", Situational Mobilisation has been promoted more actively by the intervention of authoritative professional institutions. On the night of the accident, the All-China Journalists Association published an article titled "Legitimate Interviewing is a Journalist's Right" and publicly condemned the crude obstruction behaviour, putting forward the three main questions: "Should journalists conduct interviews?", "Are journalists causing trouble?", and "Can a single press release truly replace on-site reporting?". As an outstanding professional organisation, it has elevated the

offence of "obstruction of interviews" to the level of a defence for fundamental values, such as "freedom of the press" and "the public's right to know", and thus provided a legal basis for the public's accumulated anger. It will give the public the idea that "the authorities are trying to cover up the truth", increase their emotions, and spread the news further.

3.6 Final Cause

Given the continuous rise in public demand, on the morning of March 14, the authorities issued a notice acknowledging the shortcomings in protecting the right to interview for journalists and offered an apology. This "final trigger" meets some of the basic needs of the people and thus gradually weakens the force of public opinion. However, the apology has not fully addressed the concerns of the public; some members of the public still believe that it is "blaming the grassroots level" and a "delayed response", so it has failed to meet the demand for genuine accountability and institutional reform. This is a typical problem with the current model of public opinion management: it is passive and reactive, lacking proactive communication; a formal apology lacks substance and genuine responsibility, so although it may reduce the scale of the conflict temporarily, it is impossible to win back public trust in the long run, and such incidents will likely occur again in the future. The undissipated emotional energy in the public's opinion indicates that rebuilding trust with the people is going to take a long time.

4. Countermeasures and Recommendations

The four strategies for good governance in this paper are "forward-looking", "cooperative", "procedural" and "empathetic", and they aim to change from a passive response mode to an active guidance mode at important times in the development of public opinion.

4.1 Forward-Looking Governance of the Structural Problems

As the root of emotional problems is structural, prevention should be the focus in advance rather than dealing with them after they have occurred. Structural risk is the basic source of emotional energy for public opinion, and the root cause of structural problems is an increase in the number of serious safety accidents. Previously, the form of government was "event-driven", and now we need to switch to a "data-driven" risk prevention mode. Improve the "One Map" digital platform for urban emergency management by collecting all kinds of data from all areas of the emergency response, fire control, public security, health services, etc.; conduct dynamic risk assessments regularly; and monitor the conditions of major sources of risk in urban areas, such as urban pipeline networks and old buildings. At the same time, it has also put forward the construction of a social disclosure mechanism for risk assessment, regularly released white papers on urban safety risks, published some public data, and proactively promoted public awareness. By using risk communication in daily life, we can promote the construction of a culture of social rationality at the grassroots level, build public trust in the government, and thus prevent serious safety accidents.

4.2 "Collaborative Governance" is the general idea

To address the main reason for the formation and strengthening of the general consciousness, the governance strategy should change from defensive confrontation to constructive collaboration. The intervention of authoritative professional organisations is to lead the spread of public opinion. The paper presents the following. At the same time, an emergency response system should be established at the accident site and a single on-site news centre should be set up. The centre should be the core of the spread of information, service support and communication coordination; it needs to provide verified and authoritative information to the media in a timely manner, be integrated into the "collaborative network" of emergency management. At the same time, we also need to build good relations with the relevant departments of the government, industry associations and influential people in society. Hold regular briefings, topical seminars and drills, etc., to foster a sense of common cause among the staff. The goal is to have these people present the facts and promote rationality in times of crisis, thus leading the "general belief" in a positive and constructive manner.

4.3 Procedural Governance will address the second reason

As the first link in the turn of public opinion on the secondary stimulus, governance should give full

attention to both technical response and procedural justice and emotional communication. The first reason for the secondary stimulus is a weak emergency response behaviour. Therefore, this paper will present the construction and implementation of regular emergency response plans and standard operating procedures for media coordination, information dissemination and public communication. The plan should specify that a media reception area will be set up at the emergency site, clarify who has the authority to release information and when, and standardise the language and behaviour of communication with the affected public and social media. At the time of responding to the incident, all management measures, such as cordoning off and asking people to leave, should be accompanied by an explanation of their legal basis, safety considerations and reasons for necessity. Use sincere and respectful words to have the authorities explain why such measures were taken, so that the public and media can better understand and cooperate; otherwise, there will be a "secondary stimulus" chain in the development of online public opinion.

4.4 "Empathetic Governance" to address the root cause

To address the remaining emotional energy in public opinion and the difficulty of rebuilding trust after the final stimulus, authorities should move away from a model of fixed responses, accurately address all the different demands of the public at different times, and shift from "information notification" to "trust repair". The first is to set some particular goals at different times. In the "moral shock" stage, the response should be to promote the values of life and humanitarianism, and show the warmth and responsibility of the government. At the stage of forming "generalized beliefs", when there are widespread doubts about the right to know and procedural fairness, one should directly address these basic value problems and provide institutional and principled explanations. First, we need to rebuild the emotional connection and institutional trust of the people. Therefore, at all times during the response process, one should be responsible, open-minded and modest. Substantive accountability and a will to correct will help the authorities reduce public anger and restore some of the trust the people have in the government.

5. Conclusion

According to the Atmosphere Field Theory, this paper will study the online public opinion on accident disasters. Based on the case of the "March 13 Major Gas Deflagration Accident", this paper will examine how well the six-stage framework of "structure problem → moral shock → generalized belief → secondary stimulus → situational mobilisation → ultimate stimulus" can explain such an event. As shown in the above case, there are mainly two development paths: the "Safety-Accountability Chain", which is a structural risk caused by a lack of emergency response, and the "Rights-Trust Chain", which is the result of a conflict over information rights and is worsened by the intervention of authorities. The former is the risk that emergency behaviour will be "alienated" and thus become a cause of public discontent, and the latter shows how authoritative opinion leaders use emotions to mobilize the public. Based on the above analysis, this paper puts forward a four-in-one governance strategy of "forward-looking, procedural, collaborative and empathetic" to change the model of online public opinion governance from "passive control" to "collaborative risk governance".

Fund Projects

Tianjin Philosophy and Social Science Planning Project: Research on the Path to Improving the Risk Management and Control Capability of Tianjin Grassroots Emergency Response from the Perspective of Overall National Security (TJGLQN24-013).

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