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The Impact of Severity and Susceptibility Information Content on Users' Psychological Responses in Sudden Disasters—The Moderating Role of Regulatory Focus

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Date: 2023-04-13T00:00:00+00:00

Abstract

Purpose/Significance: In sudden disaster contexts, self-media generates a massive volume of information content. Clarifying how information content influences users' psychological reactions is crucial for effective public opinion governance.

Method/Process: Based on the heuristic-systematic model of information processing and regulatory focus theory, this study constructs a model of users' psychological cognition and emotional responses in sudden disaster events from the perspectives of information content severity and susceptibility. Using Weibo public opinion data from a typical sudden disaster event—the “Jiuzhaigou earthquake”—as a case study, an empirical study was conducted via multiple moderated regression.

Results/Conclusions: Results indicate that users' primary cognitive responses are more strongly influenced by susceptibility, whereas secondary cognitive responses are more affected by severity. Susceptibility exerts greater impact than severity on users' positive and negative emotional responses. Compared to prevention-focused users, severity and susceptibility have weaker effects on promotion-focused users' cognitive responses. The findings offer important practical implications for emergency management departments to conduct precise user guidance during sudden incidents.

Full Text

Influence of Severity and Susceptibility Information Content on Users' Psychological Response in Emergencies — The Moderating Effect of Regulatory Focus

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Abstract

[Purpose/Significance] A massive volume of information is generated through social media during sudden disasters. Clarifying how information content influences users' psychological responses is critical for effective public opinion governance. **[Method/Process]** Drawing on the heuristic-systematic model of information processing, this study examines information content from the perspectives of severity and susceptibility, integrates regulatory focus theory, and constructs a model of users' psychological cognition and emotional responses during sudden disasters. Using the Jiuzhaigou earthquake as a typical case study of sudden disaster events, we conduct an empirical analysis of Weibo public opinion data through multiple moderated regression. **[Result/Conclusion]** The results demonstrate that users' primary cognitive responses are more strongly influenced by susceptibility, while secondary cognitive responses are more vulnerable to severity. Susceptibility exerts a greater impact than severity on both users' positive and negative emotional responses. Compared to prevention-focused users, severity and susceptibility have less influence on the cognitive responses of promotion-focused users. These findings offer important practical insights for emergency management departments in guiding public response during sudden incidents.

Keywords: severity; susceptibility; regulatory focus; psychological response

1. Introduction

Sudden disasters generate enormous amounts of information content on social media platforms, reflecting users' complex psychological processes and exerting significant influence on public psychology and opinion dissemination [?]. Major disasters such as earthquakes, tsunamis, floods, and mudslides are characterized

by their sudden onset, irresistible nature, severe consequences, unpredictability, and extensive impact scope, causing varying degrees of harm to people's lives and psychology while creating difficulties for government relief efforts and public guidance. As China's largest social media platform [?], Weibo has profoundly influenced politics, economy, culture, and daily life [?], while simultaneously enabling widespread dissemination of information about various sudden disasters. Without proper management, this can easily lead to the formation of online public opinion. Users' psychological reactions in sudden disaster contexts are highly complex, and the proliferation of inappropriate statements or online rumors during disaster-related opinion dissemination further disrupts public cognition. Ineffective governance can easily trigger major public opinion crises. Therefore, studying users' psychological responses during sudden disasters through social media information content is not only crucial for effective public opinion governance but also represents a key concern for emergency management in China.

When stimulated by social media information content, people exhibit cognitive and emotional reactions [?]. Psychological language, as an external manifestation of information content, inadvertently reflects users' inner worlds [?, ?] and plays a vital role in understanding psychological responses. Extensive behavioral and psychological research indicates that users with different characteristics produce different psychological reactions to external stimuli. In sudden disaster events, people display both long-formed trait regulatory focus and temporarily induced situational regulatory focus. This promotion or prevention orientation influences users' perception of information content and generates different emotional experiences [?]. However, user psychological responses in sudden disaster contexts have remained puzzling in existing research, with the underlying influence mechanisms still unclear [?]. Although increasing scholars have focused on public psychological responses during emergencies, in-depth exploration from the perspectives of information content severity and susceptibility combined with users' regulatory focus traits is still lacking.

The Heuristic-Systematic Model (HSM) [?] is a widely recognized communication model that discusses how people process external information to form decisions, providing a useful framework for explaining user behavior online [?]. This theory helps understand the psychological processes that users generate when stimulated by severity and susceptibility information content during sudden disasters. User trait research has also been a key focus in the field of user information behavior [?], which can be applied to understand the psychological reactions of different users after being threatened in sudden disaster contexts. Therefore, based on the HSM model and from the perspectives of severity and susceptibility, this study constructs a research model of how information content influences users' psychological responses during sudden disasters. Furthermore, integrating regulatory focus theory, we explore how different regulatory orientations affect users' cognitive and emotional psychological responses after being stimulated by information content. The research conclusions can help emergency management departments deeply understand public psychology and effectively improve governance effectiveness during sudden disasters.

2. Literature Review

2.1 HSM Model

The HSM model [?] posits that human information processing involves dual processes: heuristic and systematic. When motivation or ability for effortful processing is low, heuristic processing dominates, and heuristic cues such as source credibility influence attitudes. When information processing motivation and ability are relatively high, people employ more systematic processing, and the quality of persuasive arguments in information content influences attitude change. This theory has been applied in research on behavioral decision-making, social psychology, and electronic word-of-mouth, and has been widely used in recent years to study user psychology and dissemination behavior in emergency contexts. For example, Liu et al. [?] used the HSM model to study social connection actions in crisis situations, finding that both moral appeals and utilitarian appeals in information content types influence public participation. Qin et al. [?] constructed a model of public emotion and cognition in health crisis contexts against the backdrop of COVID-19, discovering that systematic processing has a significant positive effect on negative emotions and cognitive responses, while heuristic processing negatively affects negative emotional responses. Ali et al. [?] studied the psychological mechanisms of information dissemination on social media based on the HSM model, finding that due to the bias effect of heuristic processing, false information is more likely to be shared than true information.

Evidently, the HSM model has been widely applied by scholars to explain human information processing activities and can help understand the psychological processes that occur after people receive information content on social media. Along with the Elaboration Likelihood Model (ELM), the HSM model represents the two most popular dual-process models [?], both distinguishing between heuristic and systematic processing in information processing and acknowledging that systematic processing is more constrained by cognitive abilities than heuristic processing. However, the ELM model is typically used in persuasive communication contexts, whereas the HSM model is applied in broader validity-seeking contexts and information processing activities [?]. Additionally, the ELM model suggests that information processing influences attitudes through either central or peripheral routes, while the HSM model posits that both types of information processing can simultaneously influence attitude change. Comparatively, the HSM model is more suitable for studying the psychological responses of Weibo users when stimulated by massive amounts of information content formed through social media during sudden disasters, as users undergo heuristic and systematic information processing. Therefore, the HSM model holds significant theoretical importance in explaining human attitude change and information behavior, providing a reasonable theoretical framework for this study.

2.2 Regulatory Focus Theory

Higgins [?] proposes that humans have three types of selves: the actual self, the ideal self, and the ought self. The actual self represents attributes people believe they actually possess; the ideal self represents attributes they hope to ideally possess; and the ought self represents attributes they believe they should possess. The ideal self and ought self are referred to as self-guides, and the gap between the actual self and self-guides is called self-discrepancy. The process by which people attempt to reduce this self-discrepancy between their current state and desired end state by changing or controlling their thoughts and reactions is called self-regulation [?]. Regulatory focus refers to the different ways or tendencies people exhibit in regulating pleasure and pain during the self-regulation process of achieving goals. This tendency is independent of hedonistic principles and includes both trait regulatory focus formed through long-term upbringing and training, and situational regulatory focus induced by external stimuli, both of which significantly influence people's feelings, thoughts, and behaviors. Regulatory focus theory [?] suggests that humans are motivated to approach desired end states during goal pursuit through two distinct regulatory orientations: promotion focus, which emphasizes hopes and achievements, and prevention focus, which emphasizes responsibilities and safety. This theory focuses on the tendencies people display when achieving task goals and is commonly used in behavioral decision-making research, thus helping to explain the differences in psychological processes and responses that users exhibit when stimulated by external stimuli in sudden disaster contexts.

2.3 Research Framework

During sudden disasters, people are easily influenced by their external environment and instantly generate massive amounts of user-generated content through Weibo. The severity of the sudden disaster event and the susceptibility characteristics regarding potential personal impact embedded in Weibo information content are important factors threatening people's well-being and can influence users to produce specific psychological responses and subsequent behaviors. In the context of sudden disaster stimuli, blog posts containing severity-related terms such as "death," "fatal," "demise," and "mourning," or susceptibility-related terms such as "skin," "infection," "harmful," and "ingestion," flood people's senses. According to the HSM model, Weibo users may undergo rapid heuristic and slower systematic information processing in emergency contexts. The urgency of time may lead Weibo users to experience fast, unconscious primary cognitive appraisals or direct emotional responses, while also potentially engaging in secondary cognitive appraisal processes through conscious introspection and insight under rapidly changing external circumstances.

Furthermore, due to the high uncertainty of information during sudden disasters, Weibo users who see large amounts of information content may activate or generate trait or situational regulatory tendencies through self-regulation processes. This represents users' comparison of their actual self in the sudden

disaster context with their ideal or ought self to adjust discrepancies with the external environment, thereby exhibiting promotion or prevention self-regulation methods and tendencies. According to regulatory focus theory [?], Weibo users in sudden disasters may activate a promotion regulatory orientation that focuses on prestige or achievement, viewing event progress and emergency response more positively and optimistically, and adjusting discrepancies with the external environment according to their expectations and achievement goals. Alternatively, they may develop a prevention regulatory orientation that avoids responsibility or focuses on safety, paying more attention to responsibility and safety, thinking more cautiously and critically about event progress and emergency management, and adjusting discrepancies between the actual environment and the ought self. Different Weibo users have different regulatory focus characteristics and may produce different psychological cognitive and emotional responses when stimulated by external information content during sudden disasters.

Therefore, to clarify the psychological responses of Weibo users in sudden disaster contexts, this study builds upon the heuristic-systematic information processing model of HSM to examine how severity and susceptibility aspects of social media information content influence Weibo users' psychological cognition and emotional responses. Based on regulatory focus theory, we categorize Weibo users' self-regulation tendencies in sudden disasters into promotion and prevention orientations, and further investigate the moderating effects of different regulatory focus characteristics on the relationship between social media information content and Weibo users' psychological responses. The theoretical framework constructed in this study is shown in Figure 1 [Figure 1: see original paper].

2.4 Research Hypotheses

Figure 1. Research Model of the Influence of Social Media Information Content on Weibo Users' Psychological Responses

(1) Influence of severity and susceptibility in sudden disaster events on Weibo users' cognitive and emotional responses

Protection motivation theory [?] identifies severity and susceptibility as the most important factors threatening health behaviors. Severity refers to the seriousness of external threats, while susceptibility refers to the degree to which people perceive themselves as vulnerable to risk [?]. This theory assumes that severity and susceptibility intensify the spread of public fear and other negative emotions in risk contexts, as people in sudden disasters produce different psychological responses and attitudinal tendencies toward uncertain crisis environments.

The multi-component model of attitudes divides attitudes into two dimensions: cognitive responses and emotional responses [?]. Cognitive responses involve basic thinking and judgment about specific matters or objective situations, reflecting both primary and secondary cognitive appraisal processes when stimulated by external stimuli. Emotional responses express people's positive or negative

emotional states after being stimulated by external events.

In sudden disasters, people have direct feelings about what they see, hear, and touch in the external environment and easily feel the impulse to share through Weibo. Weibo users publish information content about disasters and rescue efforts through social media, and these descriptions intentionally or unintentionally contain their perceptions and attitudes toward disaster severity and personal susceptibility. Due to time urgency, other Weibo users rapidly produce fast heuristic information processing when stimulated by information content, conducting primary cognitive appraisals of the relevance of sudden disaster events and the pressure they experience, thereby generating primary cognitive psychological responses. Therefore, we propose the following hypotheses in the context of sudden disasters:

H1a: Information content containing severity has a positive effect on Weibo users' primary cognitive psychological responses.

H1b: Information content containing susceptibility has a positive effect on Weibo users' primary cognitive psychological responses.

Furthermore, when facing sudden disaster contexts that may pose risk threats, people also employ slow, analytical information processing to prevent cognitive miserliness [?]. Due to differences in Weibo users' cognitive structures and environmental uncertainty, the same information content may produce different cognitive experiences. As information about disaster dynamics, rescue progress, and donation situations becomes clearer, people no longer limit themselves to automatic and unconscious information processing modes and can more actively inhibit heuristic information processing. Under stimulation from information content containing severity and susceptibility, Weibo users move beyond primary cognitive appraisal to understand disaster-related information and instead rely on secondary cognitive processing for introspection, insight, and reflection about disaster events. Weibo users engage in deeper secondary cognitive appraisal processes in sudden disaster contexts, generating secondary cognitive psychological responses. Therefore, we propose:

H2a: Information content containing severity has a positive effect on Weibo users' secondary cognitive psychological responses.

H2b: Information content containing susceptibility has a positive effect on Weibo users' secondary cognitive psychological responses.

When facing complex information processing tasks, people produce corresponding emotional responses through heuristic information processing due to personal and environmental constraints [?]. Environmental stimuli can trigger different emotions in users, and even in the same environment, different users may experience different emotional responses. Weibo provides every citizen with opportunities to express opinions and offers each user a platform to spread positive energy and emotions. In sudden disaster events, when stimulated by blog posts containing severity and susceptibility-related terms, Weibo users produce corresponding psychological responses. On one hand, information content stim-

ulation leads Weibo users to experience positive emotions, generating prayers for disaster-affected areas, hopes for victims' health, respect for rescuers, and blessings for themselves and their families. Therefore, we propose:

H3a: Information content containing severity has a positive effect on Weibo users' positive emotional psychological responses.

H3b: Information content containing susceptibility has a positive effect on Weibo users' positive emotional psychological responses.

On the other hand, due to time urgency and information uncertainty, rescue efforts in sudden disasters face difficulties. Stimulation from severity and susceptibility information content is more likely to cause Weibo users to panic or experience high environmental pressure, producing uncomfortable physical states and triggering worries about event severity and uncertainty, fears about potential secondary disaster risks to themselves or family members, and anger about inadequate handling by relevant departments. Therefore, we propose:

H4a: Information content containing severity has a positive effect on Weibo users' negative emotional psychological responses.

H4b: Information content containing susceptibility has a positive effect on Weibo users' negative emotional psychological responses.

(2) Moderating effect of regulatory focus on the relationship between severity/susceptibility and Weibo users' psychological responses

According to regulatory focus theory [?], promotion-focused users pay more attention to whether positive outcomes exist, while prevention-focused users are more sensitive to negative outcomes. In sudden disaster contexts, blog posts contain large amounts of severity and susceptibility information content. Weibo users who are not at the scene or have no personal experience produce primary cognitive responses through their senses in a short time after being stimulated by blog content. Prevention-focused users adopt more local information processing methods and are more likely to view event-related information one-sidedly when seeing severity and susceptibility stimuli, strengthening environmental stimuli' impact on primary cognitive appraisal of pressure or threats. Promotion-focused users adopt more global information processing methods, can view severity and susceptibility stimuli more comprehensively, and weaken environmental stimuli' impact on primary cognitive appraisal of pressure or threats [?]. Therefore, regulatory focus moderates the relationship between information content and users' primary cognitive responses. In sudden disaster events, compared to prevention-focused users, we hypothesize:

H5a: Promotion focus weakens the positive effect of severity information content on Weibo users' primary cognitive responses.

H5b: Promotion focus weakens the positive effect of susceptibility information content on Weibo users' primary cognitive responses.

Furthermore, in sudden disasters, Weibo users conduct secondary cognitive appraisals of their physical and psychological coping based on situational demands.

Due to lower cognitive abilities among prevention-focused users, after seeing blog posts containing severity and susceptibility content, they have no time for more thinking about environmental stimuli or only generate individual assumptions about their coping strategies [?], producing relatively stronger secondary cognitive appraisals. Promotion-focused users have higher cognitive abilities, can generate more coping assumptions about environmental stimuli, think more comprehensively, and further weaken secondary cognitive appraisals produced by severity and susceptibility information content stimulation. Therefore, in sudden disaster events, regulatory focus moderates the relationship between information content and users' secondary cognitive responses. Compared to prevention-focused users, we hypothesize:

H6a: Promotion focus weakens the positive effect of severity information content on Weibo users' secondary cognitive responses.

H6b: Promotion focus weakens the positive effect of susceptibility information content on Weibo users' secondary cognitive responses.

In sudden disaster contexts, when Weibo users are stimulated by information content, they produce corresponding positive or negative emotional responses. Prevention-focused users are more sensitive to negative outcomes, pay more attention to losses caused by external stimuli, and produce more negative emotions and fewer positive emotions when encountering severity and susceptibility information content. Promotion-focused users pay more attention to positive outcomes, think more divergently, and have higher information tolerance [?]. After seeing blog posts containing severity and susceptibility content, they can think more comprehensively and analyze specific situations more positively, producing stronger positive emotions and relatively fewer negative emotions. Therefore, in sudden disaster events, regulatory focus moderates the relationship between information content and users' positive and negative emotional responses. Compared to prevention-focused users, we hypothesize:

H7a: Promotion focus strengthens the positive effect of severity information content on Weibo users' positive emotional responses.

H7b: Promotion focus strengthens the positive effect of susceptibility information content on Weibo users' positive emotional responses.

H8a: Promotion focus weakens the positive effect of severity information content on Weibo users' negative emotional responses.

H8b: Promotion focus weakens the positive effect of susceptibility information content on Weibo users' negative emotional responses.

3. Research Methodology

3.1 Data Source

Earthquakes are the most typical sudden disaster events. Due to their characteristics of strong suddenness, long disaster chains, wide disaster scope, and severe

damage, coupled with their potential to trigger secondary disasters such as landslides, mudslides, and plagues, they are also known as the foremost among natural disasters [?]. The sudden and accidental nature of earthquakes causes crisis information communication to often directly enter an outbreak period, making it easier to trigger psychological responses such as fear, anxiety, and helplessness [?]. Since selecting typical cases helps demonstrate and analyze the entire event process and is more suitable for deeply explaining the hidden patterns behind complex social phenomena [?], this study selects the “Jiuzhaigou earthquake” as the research object. Using Gooseeker’s Weibo keyword crawling function, we obtained 60,890 Weibo data entries. After deleting noise data and duplicate entries clearly unrelated to the Jiuzhaigou earthquake event, such as advertisements, entertainment, and celebrity content, we finally obtained 55,720 blog post data entries.

3.2 Variable Design

Existing research shows that LIWC can analyze given text content to obtain psychologically relevant vocabulary [?]. From a linguistic perspective, vocabulary in specific dimensions can reflect relevant features of matters or users’ psychological dynamics. Therefore, this study uses the Chinese LIWC dictionary of the TextMind system [?] for variable-related psychological dimension feature analysis.

Severity (SV) refers to the seriousness of harm or the severity of consequences caused by the existence of harm. In this study, it is represented by vocabulary describing the severity of disaster threats in blog posts published by Weibo users, such as: death, fatal, kill, injure, dying, wreckage, etc. Death-related words in the LIWC dictionary can effectively predict people’s dangerous states, and individuals using higher proportions of death words are more likely to belong to high-risk groups, making it suitable as a variable for measuring information content severity.

Susceptibility (SC) refers to the degree to which people perceive external threats and believe themselves vulnerable to risk. In this study, it is represented by vocabulary describing the degree of risk susceptibility in blog posts published by Weibo users, such as: infection, pathogen, harmful, ingestion, intake, health, etc. These words cover people’s attention to their bodies and health. In LIWC, physiological process words can represent people’s physiological states when easily affected by external stimuli, making them suitable for measuring information content susceptibility.

Regulatory Focus (RFC) refers to the promotion or prevention tendencies that people exhibit. In this study, it refers to the self-regulation methods and tendencies that Weibo users display after comparing their actual self with their ought self or ideal self during sudden disasters. Compared to prevention-focused users, promotion-focused users often express more expectations and achievements in their external language descriptions, such as: confidence, creation, ef-

fect, completion, conquest, etc. In LIWC, using different degrees of achievement words can effectively represent people's different promotion levels of regulatory focus characteristics, making it suitable as a variable for measuring regulatory focus.

Primary Cognition (PCG) refers to people's evaluation of event relevance and pressure. In this study, it refers to Weibo users' evaluation of the relevance and pressure of sudden disasters, typically described through words such as: noisy, harsh, loud, pitch-dark, bitter, dizzy, etc. In LIWC, using perceptual process words can effectively measure people's primary cognitive appraisals generated through senses, making it suitable for measuring users' primary cognitive psychological responses.

Secondary Cognition (SCG) refers to people's coping evaluations of body and mind based on situational demands. In this study, it refers to Weibo users' secondary cognitive appraisals after insight and thinking during sudden disasters, typically described through words such as: simply, believe, should, according to, root cause, attribution, etc. In LIWC, using cognitive process words can effectively measure people's secondary cognitive appraisals after thinking, making it suitable for measuring users' secondary cognitive psychological responses.

Positive Emotion (PEM) refers to psychological and physiological states that bring pleasant feelings. In this study, it refers to positive emotional experiences such as happiness and beauty that sudden disaster events bring to Weibo users, typically described through external psychological language such as: warm, pure land, approval, hero, inspiring, beautiful, etc. In LIWC, using positive emotion words can effectively measure people's internal positive emotional responses, making it suitable for measuring Weibo users' positive emotional psychological responses.

Negative Emotion (NEM) refers to psychological and physiological states that bring unpleasant feelings. In this study, it refers to negative emotional experiences such as fear, surprise, sadness, anger, and disgust that sudden disaster events bring to Weibo users, typically described through external psychological language such as: worry, poor, protest, violence, sarcasm, public outrage, etc. In LIWC, using negative emotion words can effectively measure people's negative emotional responses, making it suitable for measuring Weibo users' negative emotional psychological responses.

Additionally, to avoid potential model estimation bias caused by omitted variables, this study designed five control variables. Following Jin et al. [?], we designed three control variables: source type, number of posts, and number of followers, to control the influence of information sources on users' psychological responses to some extent. Meanwhile, based on Baidu Index changes, we divided the public opinion stages of disaster events [?] and used public opinion stage as a control variable. Furthermore, considering that user information behaviors differ across daily time periods and affect disaster events, we also used time period as a control variable [?]. In summary, the variable definitions and

sources designed in this study are shown in Table 1 .

4. Data Analysis and Hypothesis Testing

4.1 Descriptive Statistics and Correlation Analysis

Descriptive statistical information for variables is shown in Table 2 , including mean, standard deviation, minimum, maximum, skewness, and kurtosis. Table 2 shows that variables have significant correlations, with correlation coefficients all less than 0.5, allowing for subsequent hypothesis testing. To make variables more comparable, avoid unnecessary errors, ensure result reliability, and correct potential problems from skewed data distributions [?] to satisfy normal distribution conditions, this study applied logarithmic transformation.

4.2 Hypothesis Testing

To avoid endogeneity issues caused by mutual influence among variables, we constructed simultaneous equation models and used three-stage least squares (3SLS) [?] for parameter estimation. Following existing research, we employed multiple moderated regression analysis [?] and set regulatory focus as a dummy variable based on the median (0 = prevention focus, 1 = promotion focus) to test the moderating effects of different regulatory orientations.

To analyze the effects of severity and susceptibility information content on Weibo users' primary cognition and the moderating effect of regulatory focus, the constructed simultaneous equation model first included control variables (source type, post count, follower count, public opinion stage, and time period) and independent variables (severity and susceptibility). Regulatory focus was then added as a moderator, followed by interaction terms between independent variables and the moderator to test moderating effects. The specific models are:

Similarly, the simultaneous equation model for severity and susceptibility information content on users' secondary cognitive responses is:

In models M1-M6, α and β are intercept terms, Con represents control variables, γ and δ are estimated parameters for corresponding variables, θ is the estimated parameter for interaction terms, and ϵ_1 and ϵ_2 are random error terms for each model, satisfying normal distribution (0,1). The above simultaneous equation models were tested through multiple moderated regression analysis, with results shown in Table 3 .

Similarly, to test the main effects of information content on Weibo users' positive emotional responses and the moderating effect of regulatory focus between information content and emotional responses, we constructed the following simultaneous equation model with severity and susceptibility as independent variables, positive emotion as the dependent variable, and regulatory focus as the moderator:

The simultaneous equation model for severity and susceptibility information content on users' negative emotional responses is:

In models M7-M12, α and β are intercept terms, Con represents control variables, γ and δ are estimated parameters for corresponding variables, θ is the estimated parameter for interaction terms, and ϵ_1 and ϵ_2 are random error terms for each model, satisfying normal distribution (0,1). The above simultaneous equation models were tested through multiple moderated regression analysis, with results shown in Table 4 .

(1) Main effects of information content severity and susceptibility on Weibo users' cognitive responses

Models M1 and M4 show that in the Jiuzhaigou earthquake, the severity and susceptibility of Weibo information content had significant positive effects on both primary and secondary cognition. The effects of severity on primary and secondary cognitive responses were (0.011, $p < 0.1$; 0.583, $p < 0.05$), while susceptibility effects were (0.249, $p < 0.01$; 0.444, $p < 0.01$). The results indicate that more severity and susceptibility information content in sudden disasters leads to more primary and secondary cognitive responses from Weibo users, supporting H1a, H2a, H1b, and H2b.

The results also show that severity and susceptibility information content had greater influence on users' secondary cognitive responses than on primary cognitive responses (0.583 > 0.011; 0.444 > 0.249). This may be because the overwhelming amount of information may include casualties at the earthquake disaster site and users' subjective feelings. When stimulated by a tense environment, people unconsciously adopt heuristic information processing [?], generating rapid primary cognitive responses to severity and susceptibility information content through their senses. However, as information about disaster conditions and rescue efforts becomes clearer and information uncertainty decreases, people can engage in deeper thinking through analytical information processing [?], enabling severity and susceptibility information content to generate more secondary cognitive responses.

Additionally, we found that susceptibility had a greater effect than severity on primary cognitive responses (0.249 > 0.011), indicating that in sudden disaster contexts, time urgency leads to rapid information processing, and people instinctively focus on whether they themselves will be threatened or in danger from the earthquake disaster. After rapid, direct primary cognitive responses, further calm and deep thinking enables severity and susceptibility information content to produce stronger secondary cognitive responses. After rationally analyzing external environmental pressure and the susceptibility it brings to themselves, people begin to focus on the severity of the earthquake disaster's impact on lives and property, generating stronger secondary cognitive responses (0.583 > 0.444). This suggests that when people think deeply about information content, they can more rationally view the disaster's impact on people and pay more attention to the disaster's inherent severity.

(2) Main effects of information content severity and susceptibility on Weibo users' emotional responses

Models M7 and M10 show that severity's effects on Weibo users' positive and negative emotional responses were (-0.117, $p < 0.01$; 0.217, $p < 0.01$), while susceptibility's effects were (0.253, $p < 0.01$; 0.231, $p < 0.01$). Therefore, in sudden disaster contexts, severity in Weibo content has a significant negative effect on positive emotional responses and a significant positive effect on negative emotional responses. This finding supports H4a, but H3a is not supported. Susceptibility has significant positive effects on both positive and negative emotional responses, supporting both H3b and H4b.

The lack of support for H3a indicates that in the Jiuzhaigou earthquake, stronger severity in information content led to fewer positive emotions among Weibo users. This may be because severity describes the seriousness of external threats. During the Jiuzhaigou earthquake, large amounts of information about earthquake damage was instantly published on Weibo. After being stimulated by this severity content, on one hand, people at the earthquake site worried about aftershocks and potential secondary disasters like mudslides and landslides, often expressing more panic and fear on social media platforms. On the other hand, people not at the site expressed more anxiety and unease online about whether rescue would be timely and whether supplies would be sufficient. Additionally, the co-existence of positive and negative emotions reflects the high complexity of psychological processes in natural disaster emergencies [?]. According to the principle that "bad is stronger than good" [?], the innate tendency of human psychology often makes bad events have greater psychological impact than good events. In the Jiuzhaigou earthquake, as severity information content in blog posts increased, people's brains retained more negative memories of severity stimuli, correspondingly resulting in fewer positive emotions.

Meanwhile, when stimulated by severity information content about the Jiuzhaigou earthquake, Weibo users produced more negative emotions. When stimulated by susceptibility information content, Weibo users produced both more positive emotions and more negative emotions in response to external threats. This indicates that both the severity of sudden disasters and the personal susceptibility associated with them can generate emotional responses. In the Jiuzhaigou earthquake event, after being stimulated by severity information content, Weibo users produced more negative emotions out of fear of the disaster and pity for lives lost. However, in sudden disaster contexts, people pay more attention to how earthquakes and secondary disasters may affect themselves. On one hand, they feel fortunate and blessed that they are not affected, generating more positive emotions. On the other hand, they also worry and fear for their own health and life safety due to the earthquake and potential secondary disasters, generating more negative emotions.

Moreover, compared to severity content, susceptibility had greater influence on both Weibo users' positive and negative emotions ($0.253 > -0.117$, $0.231 > 0.217$). This may be because emotions are good or bad feelings generated by external

stimuli [?] and represent the result of users' rapid heuristic reactions [?]. Due to the suddenness of disasters and time urgency, people have no time for more thinking, and their immediate concern about whether they themselves will be affected makes Weibo users' emotions more susceptible to susceptibility information content.

(3) Moderating effects of regulatory focus

Moderating effect of regulatory focus on the relationship between severity/susceptibility and Weibo users' cognitive responses

Models M1-M3 test the moderating effect of regulatory focus on the relationship between severity/susceptibility and primary cognitive responses. The results show that after adding regulatory focus and its interaction terms with severity and susceptibility, the models' adjusted R^2 increased by 3.16% and 8.16% respectively, with interaction term coefficients significantly negative (-0.218, $p < 0.01$; -0.080, $p < 0.01$). This indicates that in the Jiuzhaigou earthquake, promotion-focused Weibo users are more optimistic and pay more attention to successful rescue of victims in their first reactions, so severity and susceptibility information content has weaker effects on their primary cognitive responses. That is, regulatory focus weakens the positive effects of severity and susceptibility information content on Weibo users' primary cognitive responses. Models M4-M6 test results show that regulatory focus weakens the positive effects of severity and susceptibility information content on secondary cognitive responses. As shown in Figure 2 [Figure 2: see original paper], the slopes of promotion-focused users' cognitive responses under severity and susceptibility information content stimulation are reduced, further verifying that promotion regulatory focus weakens the effects of severity and susceptibility information content on Weibo users' cognitive psychological responses. Therefore, H5a, H5b, H6a, and H6b are all supported.

Moderating effect of regulatory focus on the relationship between severity/susceptibility and Weibo users' emotional responses

Models M7-M9 test the moderating effect of regulatory focus on the relationship between severity/susceptibility and positive emotional responses. The results show that after adding regulatory focus and its interaction terms with severity and susceptibility, the models' adjusted R^2 increased by 21.54% and 1.27% respectively, with interaction term coefficients of (-0.127, $p < 0.01$; 0.021, $p < 0.05$). This indicates that in the Jiuzhaigou earthquake event, regulatory focus weakened the positive effect of severity content on positive emotional responses and weakened the positive effect of susceptibility content on positive emotional responses. Models M10-M12 test results show that regulatory focus strengthened the positive effect of severity information content on negative emotional responses and weakened the positive effect of susceptibility information content on negative emotional responses. As shown in Figures 3(b) and 3(d) [Figure 3: see original paper], in sudden disaster contexts, compared to prevention-focused users, the slope of promotion-focused users' positive emotional responses to

susceptibility is positive and slightly increased, indicating that promotion focus slightly strengthened susceptibility's effect on positive emotional responses. Meanwhile, the slope of susceptibility's effect on negative emotional responses decreased, indicating that promotion focus weakened susceptibility's effect on negative emotional responses. Therefore, H7b and H8b are supported.

However, as shown in Figures 3(a) and 3(c), the slope of promotion-focused users' positive emotional responses to severity decreased, indicating that promotion focus weakened severity's effect on positive emotional responses, while the slope of negative emotional responses to severity increased, indicating that promotion focus strengthened the effect of sudden event severity on negative emotional responses. Therefore, H7a and H8a are not supported. This may be partly due to the "bad is stronger than good" principle, where more severity produces more negative impact on users' positive emotions. It may also be because promotion-focused users focus more on expectations and achievements in their self-regulation process, emphasizing self-regulation between the ought self and ideal self [?, ?]. In sudden disasters, compared to prevention-focused users, promotion-focused users have more expectations and blessings and hope for timely handling and attention from emergency departments. However, as the saying goes, "the higher the expectation, the greater the disappointment." As severity content stimulation in blog posts strengthens, promotion-focused users are more likely than prevention-focused users to experience greater psychological contrast, producing fewer positive emotional responses and more negative emotions. Therefore, in sudden disasters, promotion focus actually weakens the positive effect of severity on positive emotional responses and strengthens its positive effect on negative emotional responses.

5. Discussion

5.1 Research Conclusions

Through analysis of typical "Jiuzhaigou earthquake" public opinion data on social media, based on the HSM model and regulatory focus theory, this study tested the effects of severity and susceptibility information content on Weibo users' psychological cognition and emotional responses, as well as the moderating role of regulatory focus, reaching the following conclusions:

First, in sudden disaster contexts, severity and susceptibility information content on social media influences Weibo users' cognitive responses. From the dual-process perspective of information processing, this study found that in sudden disaster events, Weibo users produce psychological cognitive responses through both heuristic and systematic information processing, verifying Yoo et al.'s [?] research conclusions in the sudden disaster context. This study further found that severity and susceptibility information content has greater influence on users' secondary cognitive responses than on primary cognitive responses, supporting the view that information content as a systematic factor influences users'

psychological cognitive responses. However, different from previous research, this study found that susceptibility content in blog posts has greater influence than severity on Weibo users' primary cognitive responses, while severity content has greater influence than susceptibility on secondary cognitive responses. This may be because in sudden disaster contexts, people typically adopt heuristic information processing for rapid primary cognitive responses, thus focusing more on personal susceptibility. However, as the sudden event and rescue situation become clearer, people further adopt systematic information processing, paying more attention to the severity of the sudden event, thereby generating secondary cognitive responses. Thus, in sudden disaster contexts, susceptibility information content typically triggers users' heuristic information processing, while severity information content more often triggers systematic information processing.

Second, in sudden disaster contexts, severity and susceptibility information content on social media influences Weibo users' emotional responses. From the dual-process perspective of information processing, this study found that in sudden disaster events, Weibo users produce psychological emotional responses through heuristic information processing, verifying Levine and Perlovsky's [?] viewpoint in the sudden disaster context. This study further discovered that severity and susceptibility in information content do not identically influence users' emotional responses: severity negatively affects positive emotional responses and positively affects negative emotional responses, while susceptibility significantly positively affects both positive and negative emotional responses. Different from previous research, this study deeply explored the influence of information content on emotional responses from an information processing perspective, finding that users' emotional responses in sudden disaster contexts typically result from heuristic information processing. Susceptibility-related information content has greater influence than event severity on both Weibo users' positive and negative emotional responses. Therefore, compared to disaster severity, people in sudden disaster contexts pay more attention through rapid, unconscious heuristic information processing to how disaster events affect their personal susceptibility, making susceptibility more influential than severity on emotional responses.

Third, regulatory focus moderates the relationship between information content and Weibo users' psychological responses. Compared to prevention-focused users, promotion focus weakens the effects of severity and susceptibility on both primary and secondary cognitive responses in sudden disaster contexts, supporting Forster and Higgins' [?] research conclusions in the sudden disaster context and indicating that promotion-focused users adopt systematic information processing to view social media information content more comprehensively. However, different from previous research, this study found that users' regulatory focus traits have distinctly different moderating effects on emotional responses: promotion focus weakens severity's positive effect on positive emotions and susceptibility's positive effect on negative emotions, but strengthens susceptibility's positive effect on positive emotions and severity's positive effect on negative emotions. This may be because people in sudden disasters often believe that "bad

is stronger than good” [?], and promotion-focused users are more susceptible to conventional principles such as negativity bias theory [?] when stimulated by disaster severity, but appear more rational and demonstrate relatively higher cognitive abilities [?] when stimulated by disaster-related susceptibility.

5.2 Theoretical Contributions and Practical Implications

This study makes three theoretical contributions:

First, this study reveals that in sudden disaster contexts, the public produces complex cognitive responses through heuristic and systematic information processing when stimulated by severity and susceptibility content on social media, enriching HSM model research in the sudden disaster domain from an information content perspective. Using psychological language analysis methods to analyze information content published by the public on social media, this study divides users’ cognitive responses into primary and secondary cognition, finding that primary cognition more often influences users through heuristic information processing, while secondary cognitive responses more often influence users through systematic information processing. Furthermore, susceptibility in sudden disaster information content typically triggers users’ heuristic information processing and has greater influence on primary cognitive responses, while severity information content influences secondary cognitive responses more through systematic information processing. From the perspective of severity and susceptibility in protection motivation theory, this study supplements research on how social media information content influences users’ psychological cognitive responses, thereby revealing the essential nature of users’ psychological cognitive responses at a deeper level.

Second, this study finds that severity and susceptibility information content on social media influences public emotional responses through heuristic information processing in sudden disaster contexts, further enriching HSM model research in the sudden disaster domain from an information processing perspective. This study deeply explores how severity and susceptibility in information content influence users’ positive and negative emotions during sudden disasters, finding that severity and susceptibility have opposite effects on positive emotional responses but the same positive effect on negative emotional responses. This study reveals that emotional responses more often influence users through heuristic information processing, and that susceptibility has greater influence than severity on both positive and negative emotional responses through heuristic information processing. This study supplements research on how severity and susceptibility information content influences emotional responses, effectively revealing the psychological mechanisms of emotional responses from the heuristic information processing perspective in sudden disaster contexts.

Third, this study finds that for promotion-focused users in sudden natural disaster contexts, the influence of severity and susceptibility information content on cognitive responses is weakened, further enriching regulatory focus theory

research on information content's influence on psychological responses from a cognitive perspective. Based on regulatory focus theory, this study analyzes how severity and susceptibility information content on social media influences psychological cognition and emotional responses of users with different regulatory orientations in sudden disaster contexts, finding that regulatory focus significantly negatively moderates the relationship between severity/susceptibility information content and cognitive responses, while its influence on emotional responses is relatively more complex under the influence of negativity bias. This study expands regulatory focus theory research on information content's influence on psychological responses from a cognitive response perspective, further enriching regulatory focus theory in the sudden disaster domain.

In terms of practical applications, this study offers practical implications for public opinion guidance during sudden disasters:

On one hand, this study finds that severity and susceptibility information content on social media can stimulate users to produce corresponding cognitive and emotional responses. Therefore, emergency management departments should adopt secondary cognitive language expression methods targeting disaster severity consequences and personal susceptibility to conduct positive, rational information exchange with the public, promptly respond to public concerns, and prevent and resolve public opinion risks from the source.

On the other hand, during sudden disaster events, it is necessary to monitor Weibo users' regulatory focus characteristics and conduct targeted public opinion guidance based on these characteristics. For prevention-focused Weibo users, emphasis should be placed on guiding their psychological cognition. While providing objective, real-time disaster information, guidance should employ more cognitive descriptions to weaken the psychological impact of external stimuli and avoid subsequent irrational public opinion dissemination behaviors. For promotion-focused Weibo users, more attention should be paid to guiding their psychological emotions by promptly publishing heartwarming cases of successful rescue efforts to promote more positive emotions, weaken the influence of negative emotions, and facilitate positive energy dissemination. Simultaneously, monitoring of susceptibility information content should be strengthened, with more attention invested for prevention-focused users to weaken sadness, panic, and other emotions caused by earthquake disasters, thereby effectively suppressing and blocking negative emotional dissemination resulting from psychological emotional responses.

5.3 Limitations and Future Research Directions

This study adopts psychological language analysis methods. Although it can reveal user psychology in sudden disaster contexts, it is difficult to capture completely authentic psychological reactions from social media data, making it challenging to ensure completely reliable measurement of human behavior, thus having certain limitations. In future research, we will consider design-

ing online psychological experiments on social media platforms and integrating experimental research methods with econometric analysis methods to detect people's psychological responses in sudden disaster scenarios, thereby further ensuring the completeness of research hypotheses and the reliability of results from experimental design and methodological perspectives.

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