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The effect of collective memory on sleepers: A study on the effect of regional city brand image in emergencies in the social media era

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Abstract:
This study examines the "Hangzhou Tap Water Incident"as a case study, employing experimental methods, questionnaire surveys, and in-depth interviews to investigate how regional urban brand image is influenced by sudden events in the social media era through the lens of the sleeper effect in collective memory. The findings reveal that in the digital age, netizens impressions of sudden events show no significant decline over time, demonstrating a "digital imprint" effect. Conversely, their negative attitudes decrease markedly over time, driven by both "emotional cooling" and the sleeper effect. In contrast, changes in netizens travel intentions remain unstable and insignificant, reflecting that tourism decisions emerge from complex interactions between individual risk perception and external information substitution cues. These conclusions provide new perspectives for understanding the evolution of collective memory in the digital age and offer empirical support for urban managers crisis communication strategies and brand restoration efforts.

Keywords:
social media,emergency events, urban brand image,collective memory, sleepers effect

1 Introduction

Social media is currently thriving, with the internet connecting urban residents across cities. Tourism destinations now primarily use social media as their primary platform to showcase their brand image. Our research shows that when topics related to city branding gain traction, they significantly impact a citys cultural tourism reputation and reduce tourist numbers. However, we observe that this influence fades after a period of collective online memory formation, leading to a recovery in visitor numbers. This raises an intriguing question: How much do regional events actually affect brand image, and what psychological mechanisms drive these impacts?

2 Literature Review

2.1 Research on the construction of urban image based on collective memory

Collective memory is the convergence of shared memories, knowledge and information among a group of

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people or social groups, which is deeply rooted in the identity of the group.

Tracing back to 1925,The eminent French sociologist Maurice Halbwachs first proposed the concept of "collective memory", clearly distinguishing it from individual private memories.[2] He emphasized that collective memory constitutes a shared historical repository among community members, not only widely disseminated and accepted but also perpetuated through sustained communication within the social sphere. As research progressed, academic understanding of collective memory became increasingly enriched and diversified. PierreNora further expanded this perspective by introducing the concept of "lieux dememoire" (memory spaces), highlighting the crucial role of specific locations in constructing collective memory. In modern civilized societies, the formation of collective memory is profoundly influenced by mass media, particularly evident in urban landscape depictions. Major historical events often emerge as core elements in public recollections; their immense social impact, amplified through detailed media coverage and in-depth analysis, resonates deeply with audiences, fostering emotional bonds and shared understanding toward their cities. Media organizations skillfully transform urban landscapes into culturally symbolic markers through sophisticated content planning and timely topic selection, employing ingenious techniques to...Through successive integration and remodeling, such symbols have left an indelible imprint on the consciousness, daily behavior and even sensory experience of the audience. They have gradually coalesced and sublimated into a complete and vivid urban image.

However, the existing research focuses on the construction of collective memory in cities, ignoring the effects of emergencies and sleep.

2.2 Research on the sleeper effect

In their research, Hovland and his team conducted an in-depth analysis of how the documentary The Battle of Britain influenced viewers attitudes[3]. They discovered a striking phenomenon: compared to short-term effects after viewing, the films impact on audience attitudes not only persisted but intensified over extended periods from five days to nine weeks. This characteristic of gradually increasing effectiveness over time inspired them to propose the concept of the "Sleeper Effect". Further research was conducted by Priest and colleagues,They emphasize that the "Sleeping Effect" challenges conventional cognitive patterns.[4] Typically, people expect persuasive information to leave the strongest memory traces during initial exposure, which gradually fade over time until being forgotten. However, the Sleeping Effect disrupts this pattern by describing a scenario - where specific types of information can remain latent for extended periods before resurfacing as delayed yet powerful memory echoes.

The academic community has established three primary theoretical frameworks to explain the "sleeper effect": the Clue Separation Hypothesis, Differential Decay Hypothesis, andUtility-Efficacy Model. [5] Each framework is grounded in substantial experimental data, offering unique perspectives and insights for understanding and predicting the occurrence of the sleeper effect.

However, no scholars have studied the effect of regional urban brand image on emergencies in the social media era from the perspective of sleepers effect.

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2.3 Impact study on emergencies

In the process of studying the risk assessment model of emergencies, many scholars have found that the frequency, scale and loss degree of emergencies will improve the publics risk perception.

In their seminal study Value Transmission and Consensus Building: Mechanisms of Online Public Opinion Impact on Policy Agenda in Agricultural Emergencies, scholars Liu Ying and Bao Guoxian conducted an in-depth analysis of the growing frequency of agricultural-related emergencies.[6] Their research reveals how intense public discourse during these crises amplifies public perspectives, demonstrating a growing influence that profoundly reshapes the policy agenda-setting process.In his academic work The Importance of Public Opinion Guidance in News Communication During Emergencies and Analysis of Guidance Strategies, Liu Qingbo emphasizes the pivotal role of public opinion steering in crisis management during news reporting. [7] He clarifies that this approach not only constitutes a crucial dimension of journalistic responsibility, but also serves as a solid foundation for maintaining social stability, promoting government transparency, and cultivating a culture of rational civic discourse.Chen Jiayi, however, has focused her research on A Study on the Spread of Netizens Emotions in Sudden Social Security Incidents. Her in-depth research in this field not only includes the design and implementation of empirical studies on the emotional changes in online platforms during specific periods, but also develops a targeted and practical emotion management framework to prevent potential social and psychological instability.[8]

In summary, existing research primarily focuses on how collective memory shapes urban identity. However, no studies have yet examined the sleeper effect within collective memory to analyze how regional brand image impacts during social media-era emergencies. This paper aims to investigate both the magnitude of regional emergency events influence on brand perception and the psychological mechanisms underlying such effects.

3 Methodology

Taking the Hangzhou tap water incident as an example, this paper adopts the experimental method, questionnaire survey method, and in-depth interview method for research.

3.1 Experimental method and questionnaire survey method

The experimental method serves as the core research method to test the proposed research hypotheses by repeating the measurement of the same group of respondents at different time points.

Based on the above question, the following assumptions are made:

H1: With the passage of time, netizens' impression of emergencies gradually weakens.

H2: With the passage of time, netizens' negative attitude towards this event gradually recovers.

H3: With the passage of time, netizens' intention to travel to this city gradually recovers.

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3.1.1. Experimental design

This study adopts a single-factor repeated measurement experimental design.

Independent variable: time interval.

This study sets up two measurement time points: T1- the initial stage of the event (that is, 1-2 days after the event is widely reported); T2- a period of time after the event (that is, one week after the T1 time point).

Dependent variables:

1.The degree to which the audience is impressed by the emergency.

2.The positive/negative attitude of the audience towards the event

3.Tourist intention of the audience to the city related to the event.

Control variables: First, to exclude the interference of irrelevant variables, this study screens the experimental subjects to ensure that their demographic characteristics (such as age, geographical distribution, social media use habits) remain stable during the sample period and that the same questionnaire tool and measurement process are used in both measurements.

3.1.2. Experimental materials

Based on event typicality, this study selects typical sudden public safety/service incidents that are closely related to urban health governance and residents' lives, which attract widespread attention and public opinion fluctuations, potentially causing direct impacts on the city's brand image. Based on event relevance, prominent cases are selected to facilitate measurement of audience attitudes toward the city and changes in tourism intentions. Considering feasibility, cases with clear time points are chosen from numerous examples to measure temporal interval variables.

Therefore, this study selects the "Hangzhou tap water incident" as the research case. At the T1 time point, typical news reports and netizen comments from the initial outbreak of the emergency on online media platforms such as Weibo, Douyin, or other platforms discussing information about the event are presented to participants. At the T2 time point, no new stimulus materials are provided, and only the test questionnaire is repeated to examine the effects brought by event intervals.

3.1.3 Experiment development and participation

Subject sampling: 100 non-residents of Hangzhou are recruited through an online questionnaire platform.

Pre-test (T1): At the initial stage of the event (within 1-2 days), participants read the standardized event materials and immediately fill in the questionnaire to measure the impression degree, event attitude, and tourism intention in Hangzhou.

Post-test (T2): One week after the first test, the same subjects complete the same questionnaire again without providing stimulus materials.

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Data processing: Questionnaires before and after are matched through a unique ID, invalid samples are eliminated, and a paired sample data set is formed.

3.1.4. Dependent variable measurement: Questionnaire survey method

The research objects for this hypothesis are recruited from an online questionnaire platform targeting non-resident residents in Hangzhou.

First, we conduct representative sampling within this group and select non-Hangzhou permanent residents who are online platform users as the research population;

Secondly, we compile the overall sampling frame based on the official data of the platform;

Thirdly, we conduct stratified multilevel sampling of the population frame with a 95% confidence interval and 3% sampling error. We select 100 residents as samples who have no direct interest in the event and primarily obtain information through online channels. If a resident refuses to participate, we sequentially seek the next eligible individual to fill the vacancy.

Since the dependent variables involve subjective responses from participants, all dependent variables are measured using questionnaire scales. The survey collects, organizes, and analyzes data twice on July 18 and July 25, 2025. A hybrid online-offline approach is adopted, utilizing WeChat Moments, QQ Space, Wenjuanxing sample library, and offline distribution. One week after the initial test, the same participants complete the same questionnaire again without providing any stimulus materials.

3.2 In-depth interview method

This study addresses two core questions: “the psychological evolution of users travel intentions after emergencies” and “the impact mechanism of group discussions on travel decisions.” Through semi-structured in-depth interviews, it collects primary data to reveal the dynamic interaction between individual psychological processes and group pressure.

3.2.1.Create interview outline

The interview questions are divided into three main parts:

Basic information layer: including the age, occupation, education level, whether there is a tourism experience in the place where the emergency occurred, the channels of attention to the emergency (such as social media, traditional media, information from relatives and friends, etc.) and the frequency of attention.

Core research layer: Reduce research questions to interview questions:

Psychological Perspective Question: Within one week after a crisis event, would your initial decision to visit the area be driven by emotion, intuition, or rational judgment? One month later, has your attitude toward traveling to the affected region changed? Consider key factors like safety, costs, and attraction accessibility. Compare these two decision-making approaches to examine how emotional resistance and rational analysis influence the balance of your choices.

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Group perspective question: After the incident, did family, friends, or colleagues discuss travel topics? Describe the core of the discussion and its tendencies (opposition, approval, or neutrality). Have the frequency and opinions of discussions changed over time? How have these changes influenced your personal travel plans?

Deep mining layer: The extension and refinement of the above problems are mainly related to the possible deep mining problems.

During interviews and research implementation, researchers rigorously avoided the fourfold ethical concerns and misconduct emphasized by scholar Alan Bryman: (1) causing harm to participants; (2) failing to use informed consent documents or materials; (3) violating participants privacy; (4) deceiving participants. If interviewees expressed reluctance to answer questions or dissatisfaction during interviews, they were permitted to remain silent or withdraw. Interview materials declared by participants as non-public were neither included nor cited in this study.

3.2.2.Interviewee selection

This study conducted semi-structured in-depth interviews lasting 25-30 minutes with 10 interviewees who learned about the emergency incident exclusively through media platforms. The interviews commenced in August 2025 and concluded in September 2025. The initial participants included relatives, friends, and classmates with recent travel plans who had shown interest in the incident. Subsequently, we recruited additional research subjects by recommending potential participants who met age and occupational diversity criteria through referrals from existing interviewees.

According to the maximum sampling principle of qualitative research methods, when the 1 0th respondent was collected, all interview contents were sufficient to answer the research questions, and the sample collection was stopped. The interviews were conducted by telephone interview/weChat text interview and one-to-one face-to-face interview.

4. Findings and discussion of the study

4.1 Findings

4.1.1 Social media user sample characteristics analysis

As shown in the figure, the survey participants were predominantly female (54%) with male participants (46%). The age distribution revealed a clear generational pattern: 34% were aged 21-25, followed by 35% under 15, 3% aged 20-29, 13% aged 31-40, 11% aged 41-50, 16% aged 51-60, and 4% over 60. Regarding educational background, 197 respondents (41%) held a “general bachelors degree”. Notably, 74% of participants had traveled to emergency locations, with 54% learning about the Hangzhou tap water incident through social media.

4.1.2 Description of structural analysis results of social media user samples

1.Data processing and hypothesis testing:

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Impressionability :

H1: With the passage of time, netizens impression of emergencies gradually weakens.

The paired sample T-test was used to analyze the degree of impression of netizens on emergencies before and after the time.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	前印象深刻程度	10.3400	100	2.59845	.25984
	后印象深刻程度	5.8700	100	2.99378	.29938

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	前印象深刻程度 & 后印象深刻程度	100	-.186	.063

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	前印象深刻程度 - 后印象深刻程度	4.47000	4.31454	.43145	3.61390	5.32610	10.360	99	.000

Figure 1 Results of sample impression intensity

The results showed that the pre-test mean of netizens impression of emergencies was 10.3400, and the post-test mean was 5.8700. The pre-test mean was higher than the post-test mean, indicating that netizens impression of emergencies gradually weakened with the passage of time.

The results showed that the pre-test and post-test correlation of netizens impression of emergencies was-0.186, and the probability P value was 0.063. Under the significance level, it was greater than 0.05, and there was no significant correlation between the two variables, so it was not suitable for paired sample T test.

Audiences positive/negative attitude towards the event :

H2: With the passage of time, netizens negative attitude towards the event showed a gradual recovery.

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Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Q6前负面态度 您认为该事件对您个人认知、行为或生活习惯产生的影响是?	2.08	100	.486	.049
	Q6后负面态度 您认为该事件对您个人认知、行为或生活习惯产生的影响是?	1.47	100	.688	.069

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Q6前负面态度 您认为该事件对您个人认知、行为或生活习惯产生的影响是? & Q6后负面态度 您认为该事件对您个人认知、行为或生活习惯产生的影响是?	100	-.204	.042

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Q6前负面态度 您认为该事件对您个人认知、行为或生活习惯产生的影响是? - Q6后负面态度 您认为该事件对您个人认知、行为或生活习惯产生的影响是?	.610	.920	.092	.427	.793	6.631	99	.000

Figure 2 Results of positive and negative attitudes of samples to the event

The results showed that the mean of the pre-test of negative attitude was 2.08, and the mean of the post-test was 1.47. The mean of the pre-test was higher than that of the post-test, indicating that with the passage of time, netizens negative attitude towards the event decreased.

That the correlation between the pre-test and post-test of netizens negative attitude was-0.204, and the probability P value was 0.042. Under the significance level, it was less than 0.05, and the two variables had a significant correlation, which was suitable for the paired sample T test.

The T value of the paired t-test between the pre-test and post-test of negative attitude was 6.631, and the probability P value was 0.000. Under the significance level, it was less than 0.05, so it was believed that with the passage of time, there was a significant difference between the pre-test and post-test of netizens negative attitude towards the event.

Tourism intention of the audience to the city related to the event:

H3: With the passage of time, netizens intention to travel to the city gradually recovers.

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Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	前旅游意向	11.2300	100	5.36516	.53652
	后旅游意向	20.4300	100	5.02168	.50217

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	前旅游意向 & 后旅游意向	100	-.097	.339

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	前旅游意向 - 后旅游意向	-9.20000	7.69494	.76949	-10.72684	-7.67316	-11.956	99	.000

Figure3 Tourism intention of sample cities related to events

That the pre-test mean value of netizens tourism intention to this city was 11.2300, and the post-test mean value was 20.4300. The post-test mean value was higher than the pre-test mean value, indicating that with the passage of time, netizens tourism intention to this city gradually rebounded.

The pre-test and post-test correlation of netizens impression of emergencies was-0.097, and the probability P value was 0.339. Under the significance level, it was greater than 0.05, and there was no significant correlation between the two variables, so it was not suitable for paired sample T test.

4.2 Research discussion

This study investigates how temporal intervals following urban emergencies in the social media era influence netizens impressions, attitudes, and travel intentions. Through questionnaire surveys, we obtained findings that partially contradict initial hypotheses. These results provide new perspectives and clues for understanding the long-term impact mechanisms of emergencies, while offering empirical evidence for crisis communication management and brand image promotion in the digital intelligence age.

4.2.1 No significant weakening of impression: Collective memory "stickiness" in the digital age

As time progresses, netizens impressions of sudden events do not diminish. This conclusion challenges the naive notion that "time erases all memories", questioning the assumption of "the internet having no memory" and revealing new characteristics of collective memory in the digital intelligence era. This phenomenon is not accidental. The significant transformation of collective memory under traditional contexts likely stems from the deep interplay between collective memory theory and media characteristics. To understand this mechanism, we must examine it from internet perspectives, media users engagement, and regional event dynamics, analyzing the patterns and dimensions of information dissemination during sudden events.

In the age of social media, information about sudden events is rapidly recorded, replicated, and disseminated, forming permanent digital traces. These traces do not easily disappear. Even if individuals subjectively feel their memories are vague, the relevant information remains stored in searchable digital spaces and spreads widely. This demonstrates that the dissemination of information about sudden events in this era has transcended the single-chain communication model of traditional media. When events occur, numerous

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individual users casually share, comment on, and like posts through social platforms to increase their visibility. Meanwhile, platforms automatically cache these interactions, while third-party institutions archive the information. Content related to the event—text, images, videos-is swiftly transformed into digital traces that can be permanently traced. Unlike the physical limitations of paper media, even if users subjective impressions become blurred after a period, when preparing for travel and conducting keyword searches on internet platforms, these digital traces remain permanently preserved and irreversible, providing a good explanation for user impression recall. Taking a sudden cultural tourism safety incident in a certain area as an example, discussions related topics on Weibo exceeded 5 million posts, and TikTok-related videos garnered over 200 million views. Although such content temporarily sinks with new hot topics, the platforms cloud storage system has completed permanent backups, becoming "digital stones" of collective memory.

The “digital imprint” effect significantly prolongs the decay cycle of collective memory. While this study examined a one-week timeframe-insufficient to cause noticeable fading in public digital recollection-factors like information cocoons and algorithmic recommendation systems further reinforce existing impressions. Even after events conclude, platforms persistently push related content based on browsing history and preferences, trapping users in information fields that resist fading. Additionally, individual differences in age, gender, attention levels, and social media engagement-such as elderly users indifference to local news versus frequent Hangzhou tourism updates-contribute to persistent impressions. Ultimately, temporal displacement fails to diminish netizens recollection of urban emergencies.

4.2.2 Decrease in negative attitudes: the dual effect of emotional cooling and sleep

Over time, netizens negative attitudes toward the incident gradually rebounded. The validity of Hypothesis 2 reveals the psychological mechanism of attitude change, which is very valuable for this study. We can explain it from two aspects.

First, examining the emotional factors most closely related to netizens attitudes, we can infer that the theory of emotional cooling played a significant role. When sudden events-especially those closely impacting netizens lives-occur, their emotions become highly aroused upon receiving information stimuli, leading to extreme negative attitudes. This is primarily driven by internal emotions like fear and anger, resulting in irrational judgments about the event. As time progresses and emotions gradually cool down, cognitive systems regain rational dominance. People then calmly assess the actual impact scope of the incident and proactively follow official response measures, thereby updating their resolution attitudes. For instance, during the initial phase of the incident, social media was flooded with panic statements like “I cant drink water anymore” and “I need to buy mineral water.” However, after a week, as authorities released water quality monitoring data explaining the handling progress, discussion shifted to more rational questions like "Is the water quality up to standard?" and “When will it fully recover?” Peoples psychology transitioned from stress response to normalcy, with public intense emotions cooling down. This shift from “emotion-driven” to “rational-driven” naturally led to an improvement in attitudes.

Beyond shifts in public sentiment, the results can also be explained by the sleeper effect theory. The classic sleeper effect suggests that in information dissemination, the credibility of the source may diminish over time while the persuasive power of the content itself tends to strengthen. Lets analyze this theory through the

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lens of our study: During Phase T1, the information source was the event itself. As the incident spread rapidly through social media, people were initially overwhelmed by its massive impact and uncertainty, which became the primary driver of negative public sentiment. At this stage, people received a “somethings wrong” stimulus and rarely delved into specific details or subsequent handling. During Phase T2, the information content shifted to the actual events consequences, official responses, and resolution outcomes. As time passed, the initial shock gradually faded, and people began focusing on substantive aspects like “how the issue was resolved” and “the credibility of official statements.” When the public perceives that the incident has been properly handled and risks effectively controlled, the initial negative attitude naturally diminishes significantly. This demonstrates a delayed response pattern...The process of more rational attitude adjustment is also a concrete embodiment of the effect of sleepers in the field of crisis communication.

Therefore, the above two path switching effectively explains the reasons for the recovery of netizens negative attitude.

4.2.3 Unstable tourism intention: The game between risk perception and alternative cues

The failure of Hypothesis 3 reveals that tourism decision-making is a more complex process than we anticipated, influenced not only by time but also by dynamic interactions of multiple variables. Our descriptive data shows a slight rebound in travel intentions among internet users, though the correlation remains statistically insignificant. This indicates that the recovery pattern doesnt apply universally across all individuals, suggesting we need to explore the underlying mechanisms within the population.

This phenomenon primarily relates to risk perception, which varies significantly among individuals. Each persons sensitivity and tolerance for risks differ considerably. For high-risk aversion types, lingering safety concerns-even after a week-may prevent their travel intentions from recovering. Such individuals might even see further decline due to unrelated risk events. Essentially, these users maintain subconscious risk-avoidance tendencies that influence their travel decisions. Conversely, risk-neutral or risk-seeking types can reassess travel plans within a week. Their cognitive processes may conclude that risks have diminished or normalized, eliminating avoidance impulses when planning trips. These individual differences ultimately contribute to the instability observed in overall data patterns.

When risk-averse users encounter alternative cues during travel intention formation and receive positive urban image updates, these new stimuli may override fading negative impressions. For example, when a city launches tourism promotions or other cities gain popularity through social media trends like viral check-in challenges. Consequently, the resurgence of travel intentions isnt solely due to public forgetting over time, but rather because emerging positive information overshadows historical negative narratives. This complexity in individual responses leads to irregular patterns in personal differences, ultimately diminishing the overall correlation between factors.

4.2.4 User psychology and group pressure: the mechanism of audience attitude change

When we further interviewed from the psychological and group perspective and tried to get the answers, we were surprised to find that users psychology would change from irrational to rational, and group pressure was also an important factor to reduce netizens desire to choose emergency places as travel destinations. The

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interviewees answers supported my idea:

"A week later, when I was offered to go to Hangzhou, my first reaction was that I was afraid of the water and didnt dare to go. A month later, we would check whether the tap water was normal."

"My roommates discussed whether the water in Hangzhou could be used and were inclined to not go there for the time being; a month later, they hardly discussed it, and their travel desire changed from not wanting to go at all to considering it if it is safe."

"When I go to Hangzhou, I will consider taking a group tour and staying in a hotel. I am afraid of problems because drinking water and washing up are all dependent on tap water. After a month, I will check the current water quality in Hangzhou online."

"If the Hangzhou authorities could post more real-time water quality data on social media, they would feel more secure."

When discussing with classmates about whether Hangzhou still looks Instagram-worthy, we agreed to wait until TikTok no longer mentions water quality issues. A week after the incident, I noticed the discussion volume dropped. My travel plans shifted from "completely avoiding it" to "might visit new Hangzhou hotspots if recommended by influencers, even if it means ignoring water quality concerns."

For example, in the above interview excerpts, this study conducted semi-structured in-depth interviews with ten non-Hangzhou netizens, and the analysis of research results can be obtained from two core perspectives: psychological perspective and group perspective.

Psychologically, the shift from emotion-driven reactions to rational analysis remains consistent with Experimental Methods validation of Hypothesis 2. Nearly all participants initially experienced strong negative emotions-primarily fear and anxiety-driven by immediate concerns about water quality impacts on their health and daily lives. These rapid emotional judgments led to heightened initial negativity. However, as time progressed, respondents generally adopted a more rational approach. They began seeking objective information like official water quality reports and comparing them with established standards to make informed decisions.

Furthermore, from a group perspective, initial collective memory and social pressure may lead early-stage respondents to feel social pressure. This can manifest as group consensus where others advise against going or suggest "let others take the first step." Proposing positive intentions at this stage often faces widespread opposition. If individuals choose to travel to Hangzhou, it might be perceived as "risky" or "untimely," effectively suppressing personal travel intentions through such group pressure. As time progresses, interview findings reveal that discussions about the incident gradually cease across all groups. The urban emergency no longer dominates conversations, and associated social pressures dissipate. At this stage, individual decisions become less influenced by group opinions. This demonstrates that collective pressure remains a significant contributing factor.

Finally, the ten interviewees exhibited individual differences in age, educational background, occupation, and travel experiences-all factors that may influence their attitudes toward tourism and decision-making pro-

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cesses. For instance, older interviewees tend to be more cautious in their decision-making and have longer planning cycles, while younger participants are more susceptible to social media influences and peer recommendations. Those with prior visits to Hangzhou might develop a stronger initial impression of the city, showing greater willingness to wait for improved conditions and demonstrating positive travel intentions. Meanwhile, respondents who have never been to Xiangfan may require more positive information to build trust in the city.

5 Conclusions and implications

5.1 Research Conclusions

This study examines the Hangzhou Tap Water Incident as a case study, employing experimental methods, questionnaire surveys, and in-depth interviews to investigate how regional urban brand image is influenced by public perception during social media-driven emergencies, through the lens of the sleeper effect in collective memory. The findings validate and refine our three initial hypotheses. Hypothesis 1 was disproven: Netizens memories of emergency events persist on social media despite time decay, challenging conventional wisdom. Hypothesis 2 holds true: Negative emotions diminish over time, with rational evaluation of official information gradually taking precedence under emotional cooling and the sleeper effect. Hypothesis 3 was rejected: Tourism intentions fluctuate unpredictably, unaffected by temporal factors alone, reflecting the complexity of travel decisions and individual differences. Additionally, in-depth interviews with 10 non-Hangzhou residents revealed psychological shifts from irrational to rational responses post-city emergencies-fully consistent with Hypothesis 2s analysis. Furthermore, group-level discussions demonstrate that collective discourse can mitigate public tourism intentions toward the city.

5.2 Research Implications

This study provides strategic insights for urban administrators and brand owners in crisis management. During the initial phase of an incident, priority should be given to managing and calming public emotions. In later stages, it is crucial to consistently deliver transparent and reliable information, enhance the credibility of authoritative parties, strengthen rational communication, and effectively guide public opinion to help restore the citys brand image.

Finally, this study has certain limitations. The case selection is limited in diversity and the sample size is relatively small, which may affect the generalizability of the findings. Additionally, the time span did not capture longer-term dynamic changes. In real-world tourism scenarios, factors influencing travel intentions are more complex and multifaceted, and this study failed to fully account for these variables. Future research could enhance the conclusions by analyzing emergency cases from different types and regions, extending the time horizon, and incorporating additional variables for deeper exploration.

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