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## Diffusion of Ethnic Culture Integrating Topic Evolution from Hotspot Events: Postprint

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### Abstract

[Purpose/Significance] This study employs information diffusion research methods to investigate the evolutionary diffusion patterns of ethnic culture within social media hotspots—a special category of events accompanying cultural content dissemination—thereby providing a novel perspective for elucidating ethnic culture diffusion mechanisms and facilitating ethnic culture transmission. [Methods/Process] Utilizing texts posted regarding the “Ding Zhen Incident” on the Weibo platform as the data source, we construct a topic-ethnic cultural symbol-sentiment association network based on LDA topic modeling, ethnic cultural symbol identification, and sentiment analysis to reconstruct the contextual dynamics of ethnic culture evolutionary diffusion accompanying the propagation of different themes in hotspot events. We quantify the ethnic culture dissemination influence of various user types and explore the relay process of ethnic culture transmission among different actors in hotspot events. [Results/Conclusions] The results demonstrate that analyzing the patterns of ethnic culture diffusion pathways in social media contexts from two dimensions—namely, topic-ethnic cultural symbol-sentiment association network construction and communication actor influence—can assist humanities scholars in accurately comprehending the nuances of cultural dissemination and its dynamic interactive characteristics.

### Full Text

### Preamble

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**Research on the Diffusion of National Culture Integrating the Theme Evolution of Hot Events**

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**Abstract:**

[Objective/Significance] By employing information diffusion research methods, this study investigates the evolutionary diffusion patterns of national culture in social media hot events—a special type of event that accompanies cultural content dissemination—providing a new perspective for explaining the laws of national cultural diffusion and promoting national cultural communication. [Method/Process] Taking Weibo posts about the “Ding Zhen Event” as the data source, this study constructs a theme-national culture symbol-emotion association network based on the LDA topic model, national culture symbol recognition, and sentiment analysis to reconstruct the dynamic context of national culture evolution and diffusion under different themes during hot events. It quantifies the influence of different types of users on national culture diffusion and explores the relay process of different subjects in national culture transmission during hot events. [Result/Conclusion] The results demonstrate that analyzing the diffusion path patterns of national culture in social media contexts from two levels—the construction of theme-national culture symbol-emotion association networks and the influence of communication subjects—can help humanities scholars accurately grasp the details and dynamic interaction characteristics of cultural diffusion.

**Keywords:** national culture diffusion; association network; topic analysis; cultural symbol; sentiment analysis; communication subject

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National culture, as the spiritual and material wealth created collectively by human groups, is primarily transmitted through language, behavior, and artifacts, inheriting within identity and promoting the development of national communities through continuity. Symbols, as cultural identifiers created by humans, serve as intermediaries and bridges connecting people with culture. National cultural symbols, as vehicles of cultural meaning, represent the externalized and codified expression of national culture under the combined effects of long-term historical accumulation, social forces, and media technology, encompassing ethnic costumes, songs and dances, figures, festivals, food, and artifacts. With the rapid development of social media information technology, traditional cultures represented by costumes and architecture are undergoing digital transformation, spreading through interactive texts and images via social media channels, providing effective pathways for national culture to be inherited within differentiated professional influence audiences. Therefore, based on the background of social media information diffusion, exploring the interactive evolutionary diffusion patterns between event themes and national culture during hot events that accompany national culture diffusion, and analyzing the influence of communication subjects in the diffusion process, holds important practical significance for transforming cultural communication research paradigms through digital technology, stimulating the interactive vitality of national culture dissemination under hot topic effects, and effectively promoting national cultural identity.

Research on national culture diffusion originated in cultural geography, relying on population migration and mobility. Scholars have employed semiotics and memetics perspectives, using content analysis to analyze generalized cultural symbols such as costumes, figures, and artworks from the perspectives of cultural information encoding, diffusion media, and information decoding, examining audience emotional communication and current dissemination characteristics. However, the scalability of these methods remains questionable, and they overlook the complexity of information dissemination in social media environments. Hot events integrating cultural content diffusion represent a special type of social media hot event, where audiences' multi-dimensional cultural content perception and cultural identity formation interact and mutually influence the event's evolution. From the perspective of social media information diffusion, existing research emphasizes the evolution of events themselves in sudden public incidents, such as mining audience attention themes at different stages, emotional cognition characteristics under different themes, and the role of key communication user nodes in event diffusion, while paying less attention to the interactive evolutionary patterns between event theme evolution and cultural diffusion that accompany cultural content flow. In light of this, this study attempts to integrate social media information diffusion research methods into the national culture diffusion research framework to reveal the evolution patterns of national culture content diffusion in complex social media environments.

This study addresses two questions: (1) How does national culture extend from original event topics? What characteristics do national cultural symbols diffusion and user emotions present under different discussion theme contexts? (2) How do different user subjects influence national culture communication during the information diffusion process?

To answer these questions, this study first examines the evolution of posting themes based on the overall diffusion trend of events, extracts national cultural symbols and associated emotions in Weibo users' posts, constructs association structures between different dimensions, and draws interaction networks to explore the relationships between event theme contexts and national cultural symbols diffusion and emotional perception. The time dimension is also incorporated to investigate the temporal evolution characteristics of national culture diffusion under hot events. Second, based on reconstructing the national culture diffusion process in hot events, the study examines the influence of different types of communication subjects on national culture diffusion.

## Literature Review

### 2.1 Cultural Diffusion Research

Cultural diffusion refers to the migration and integration of ideas and technical experiences from their origin to neighboring spaces, often accompanying long-distance population flow. The essence of cultural communication is interactive communication between individuals and groups in different cultural fields. This

process involves the transmission and interpretation of superficial symbols while also exploring deeper psychological mechanisms, emphasizing psychological appeals and forming communication, understanding, and identification between different cultures through the integration of cognitive structures and universal emotions. Existing cultural diffusion research can be divided into two aspects: (1) research on cultural communication patterns, characteristics, and functions based on semiotics; and (2) social media cultural diffusion research based on memetics.

Semiotics posits that anything with meaning is called a sign, and meaning must be interpreted through signs. From a semiotic perspective, culture develops through symbols, which serve as expression intermediaries of “meaning” in culture and become tools for audience communication. Peirce’s triadic theory of signs takes the information receiver—the audience—as the standard, arguing that signs consist of “representamen,” “object,” and “interpretant,” with “interpretant” being audience-centered and focusing on the audience’s understanding of symbolic meaning. The essence of symbol diffusion is an interactive process between communicators and interpreters using symbols as carriers, which deepens the understanding of the meanings carried by symbols. Symbol diffusion facilitates the extension of cultural meaning dissemination. Based on the triadic theory of signs, Yang Yi analyzed the effective paradigm provided by symbols for cultural meaning dissemination in Guizhou tea culture symbol communication. Zhang Xin et al. combined questionnaire surveys and other methods to analyze the communication cognition of Chinese cultural symbols from the perspective of Kyrgyzstan people across four dimensions: content, effect, cognition, and media. Additionally, the evolution process mechanism from place names and personal names to cultural symbols, such as Longxi and Shanxi scholars, has attracted attention from library and archival science scholars.

With artificial intelligence and big data technology as the foundation, social media-based cultural diffusion research has become a hotspot. Internet-based cultural communication exhibits viral dissemination characteristics, often occurring in the form of internet memes. Internet platforms feature high participation and interaction, involving not only the dissemination of original content but also the diffusion of new cultural symbols and ideas derived from the original cultural content. N. Gal et al. categorized cross-cultural digital culture user-generated content into four dimensions: value, framework, emotion, and communication stance. Y. Katz et al. further refined five dimensions of cultural diffusion through grounded analysis of absurd language expressions in social media: linguistic expression, contextualization, imitation, remix, and disruption.

In summary, although cultural diffusion research has analyzed patterns, characteristics, and functions, several shortcomings remain: First, semiotic-based cultural diffusion research primarily uses questionnaires and case analysis to observe the generation, dissemination status, and problems of national cultural symbols, analyzing deep causes and providing countermeasures based on communication status, but has not extended cultural diffusion research to the com-

plex information dissemination context of social media. With the occurrence of rapidly evolving and explosive hot events, national cultural content diffusion also presents new characteristics. Second, existing research mostly uses content analysis to manually mine universal cultural value differences that lead to different features in the cultural communication process, remaining at the level of analyzing existing data such as user browsing and forwarding of posts on Weibo and Twitter, and cannot reflect the dynamic diffusion evolution patterns of national culture.

## 2.2 Social Media Information Diffusion Research

Information diffusion in social media is defined as the dissemination process of ideas, behaviors, and technologies through social media channels among user nodes, essentially representing multi-directional interaction among users, information, and systems. In the new media environment, represented by public opinion hot events, related research mostly analyzes information themes, key communication subjects, emotional evolution, and the impact and evolution patterns of secondary and derivative events in emergencies.

Research on social media network public opinion hot events focuses on mining audience hot topics and the roles of communication subjects. On one hand, scholars have combined lifecycle theory with time dimensions, using TF-IDF models to mine implicit theme information and public opinion evolution patterns in public health emergencies. Others have used LDA topic models based on the Zhihu platform to explore network discussion theme content and intensity evolution trends during the COVID-19 pandemic. Some scholars have combined stakeholder theory with lifecycle theory, using LDA models to explore the evolution patterns of topics of concern for different communication subjects at different stages of public health events on Weibo and WeChat platforms. On the other hand, research has introduced emotional dimensions to explore audience emotional tendencies under different hot topics. For instance, scholars have investigated emotional expression differences under different Weibo theme classifications based on Weibo emergencies, or explored the interaction patterns between different emotions and dissemination effects. Some researchers have combined LDA topic models, word2vec models, and SnowNLP methods to explore social media users' emotional tendencies toward different public opinion objects and their evolution trends across different lifecycles. Others have built sentiment classification models through SVM methods to analyze different public opinion themes and corresponding emotional trends in events.

In the information technology era, information is disseminated through multiple channels. Network public opinion can easily become alienated under various factors, forming secondary and derivative events. Secondary and derivative events are often similar to or different from the original event type, forming complex chain effects with strong destructive power and influence. Current research on secondary and derivative events of emergencies based on social media mainly involves two aspects: On one hand, scholars focus on identifying sec-

ondary and derivative events in network public opinion. For example, An Lu et al. constructed judgment rules for secondary and derivative events of emergencies based on Weibo text topic clustering and H-index calculation to identify derivative events involving different subjects. Li Yiquan et al. used a bistable stochastic resonance model to identify derivative events using overseas student public opinion events as examples and analyzed the resonance causes of event clusters. On the other hand, scholars have summarized the derivative characteristics and functions of network public opinion. For instance, Wang Lijun summarized derivative chain structure types based on network public opinion derivative patterns. Gao Bin further classified network derivative public opinion into five types, including unidirectional linear, composite fission, and focus convergence, based on diffusion characteristics.

Public opinion dissemination, as derivative topics that spread independently yet interact with the original topic, has led scholars to construct a double-layer coupled network dissemination model to explore the cognitive “immunity” mechanism between original and derivative topics on users.

In summary, although social media-based information diffusion research has made numerous attempts in public opinion hot event themes, communication subjects, emotion identification, and evolution patterns of secondary and derivative events of emergencies, several deficiencies remain: First, although existing research focuses on network public opinion and its secondary and derivative events, cases are mostly based on crisis events, neglecting the special type of hot events that accompany cultural content evolution and diffusion. Second, despite monitoring network public opinion theme content, communication users, and audience emotional tendencies, under this special type of event, event theme evolution is closely related to audience cultural content perception, and audience cultural identity formation is rarely studied. Meanwhile, the role of different communication subjects in the cultural evolution and diffusion process has not attracted attention.

Therefore, this study starts from social media hot events, integrates social media information diffusion research methods with cultural communication research, focusing on mining the detailed national cultural content diffusion that accompanies information diffusion processes. It constructs association relationships among different themes, national culture diffusion, and audience emotions during social media hot event diffusion, explores the temporal characteristics of national culture diffusion, and analyzes the influence of different subjects on national culture diffusion during information diffusion, thereby refining the research on national culture evolution and diffusion processes in social media contexts.

Compared with existing research, this study’s main contributions are: (1) It uses social media information diffusion research methods to operationalize national culture diffusion by constructing a cultural symbol dictionary. Simultaneously, it extends cultural diffusion research to the dual context of social media and network public opinion evolution, exploring the evolution patterns

and characteristics of national culture diffusion in hot events with high attention, wide influence, strong explosiveness, and rapid evolution based on social media channels. (2) As a special type of social media hot event, hot events accompanying cultural content diffusion also influence audience cultural identity formation through their own evolution. This study focuses on this 细分对象, calculating the association between theme contexts and national culture diffusion evolution based on event theme identification, while adding observation dimensions to national culture diffusion to further explore the influence of communication subjects with different professional types and influence levels on national culture diffusion. This provides decision-making support and reference for precisely setting topics under hot event dissemination, enhancing national culture attention, grasping public focus points and emotional trends on national culture under different themes, and promoting national cultural identity.

## Research Design

### 3.1 Research Approach and Process

**3.1.1 Research Approach** This study aims to analyze the evolutionary diffusion patterns of national culture under social media hot events, deconstruct the national culture diffusion and audience cultural perception formation that accompany event evolution, and explore the roles played by different communication subjects in the national culture diffusion process. The research approach is shown in Figure 1 [Figure 1: see original paper]. First, to examine national culture diffusion evolution under different themes of hot events, the LDA topic model is used to analyze the topic word distribution in related posts to reflect the evolution process of hot events. A cultural symbol dictionary is constructed to identify national culture diffusion, audience national culture emotional cognition characteristics are calculated, and a posting theme-national culture symbol-emotion association network is built and visualized. Temporal sequences are also generated to show the temporal characteristics of national culture diffusion under hot event diffusion. Second, based on reconstructing the national culture diffusion process in hot events, the relay of different communication subjects during hot event diffusion is explored. According to communication subject types and influence, communication subjects are categorized to deeply investigate the promoting role of different communication subjects in the national culture diffusion process.

In the national culture perception and theme association network, there are three types of nodes: theme context, national culture symbol, and user emotion, as shown in Figure 2 [Figure 2: see original paper]. An edge from node  $x_i$  to node  $y_i$  indicates the influence and association relationship of node  $x_i$  on  $y_i$ . According to the construction principle of the national culture symbol perception and theme association network, edges include: from theme to national culture symbol, from national culture symbol to user emotion, and from theme to user emotion.

**3.1.2 Weibo Posting Theme Extraction** First, based on data collected from the Weibo platform, data preprocessing and cleaning are performed, followed by Chinese word segmentation using jieba and stop word removal. Second, the LDA topic model is selected to identify theme information in Weibo posts. This model has been validated by multiple scholars and effectively avoids overfitting problems in traditional topic models. Regarding topic number determination, perplexity and coherence scores are considered to measure topic generation quality and intra-topic word similarity, while pyLDAvis is used to visualize topic extraction results and manual topic labeling is completed based on given topic words.

**3.1.3 National Culture Symbol Recognition and Associated Sentiment Analysis** To ensure accurate cultural symbol recognition, a cultural symbol dictionary is constructed referring to the “Representative List of the Intangible Cultural Heritage of Humanity” and place name lists to guarantee accurate word segmentation and cultural symbol identification. To identify Weibo users’ cultural perception sentiment orientation, users’ cultural symbol expressions are first located, and the Baidu API is called to analyze users’ cultural symbol sentiment tendencies.

**3.1.4 National Culture Diffusion and Emotional Perception Under Different Theme Contexts** The construction of national culture diffusion and emotional perception networks under different theme contexts aims to explore the association relationships between national culture diffusion mechanisms and audience emotional perception under different hot topics. Referring to B. Yang et al.’s method for calculating association relationships among different dimensional data, first, a directed acyclic graph is constructed to represent the association among national culture perception data, highlighting cultural symbols.

Second, the probabilistic relationships among national culture symbol perception data are estimated based on text content. The ability of node  $x_i$  to influence node  $y_i$  is quantified through conditional probability  $p(y_i|x_i)$ . The calculation formula is as follows:

$$p(y_i|x_i) = \frac{|\text{sentence}(y_i, x_i)|}{|\text{sentence}(x_i)| + 1} \quad \text{Formula (1)}$$

Where  $|\text{sentence}(y_i, x_i)|$  represents the number of comments containing both  $y_i$  and  $x_i$ , and  $|\text{sentence}(x_i)|$  represents the number of comment sentences where  $x_i$  appears at least once.

Finally, based on theme-national culture symbol association probability calculation, the time dimension is introduced to calculate the frequency of national culture symbols associated with different themes in different time sequences.

### 3.1.5 Communication Subject Type Classification and Influence

**Quantification** In hot event diffusion based on social media, communication subjects influence other users' behaviors and cognition by providing clues and attitude tendencies. Therefore, quantifying communication subjects' influence on national culture diffusion in hot event diffusion is important for guiding topic trends and improving national culture diffusion efficiency. According to Weibo homepage identity authentication information, key communication subjects in different professional fields are classified into four categories: celebrity accounts, enterprise accounts, media accounts, and grassroots accounts. Celebrity accounts refer to those with “influencer” marks on their homepage; enterprise accounts refer to those affiliated with specific enterprises; media accounts refer to those with media marks in their identity authentication information; and grassroots accounts refer to unauthenticated accounts. Based on follower counts, communication subjects are divided into five categories: Weibo accounts with fewer than 500 followers are ordinary users; those with 500-5,000 followers are micro communication subjects; those with 5,001-50,000 followers are medium communication subjects; and those with more than 50,000 followers are large communication subjects.

According to cultural symbol frequency, Weibo posts are screened, and posting subjects are selected and mapped based on communication level and posting influence (see Formula 2).

$$DE = Pu_i \cdot AP_i \quad \text{Formula (2)}$$

Where DE refers to the dissemination effect of different types of subjects;  $Pu_i$  refers to the proportion of type  $i$  subjects among the overall users of that type; and  $AP_i$  refers to the average participation frequency of type  $i$  subjects, i.e., the total number of comments, likes, and forwards.

### 3.2 Research Object

As one of the most representative cases of social media hot events in late 2020 and early 2021, short videos of Ding Zhen's smile spread rapidly across the internet after being forwarded, liked, and commented on. Baidu Index shows that during the “Ding Zhen Event” 舆论热潮, the characteristic culture of Ganzi Prefecture's Litang County in Sichuan Province, closely associated with him, attracted widespread attention, and ethnic characteristic culture diffused through internet social media channels.

Sina Weibo, as one of the most popular social networking sites in China, has a huge user base and a complete content ecosystem. With its characteristic of broad participation by netizens in information diffusion, it has become the main data source for information diffusion-related research. Therefore, this study selects all user-generated content on the Weibo platform regarding the “Ding Zhen Event”—including Weibo posts and comments—as the research object to analyze the patterns of national culture diffusion in hot event diffusion.

### 3.3 Data Collection

The study searches Weibo platform user posts using keywords such as “Ding Zhen,” “Ding Zhen culture,” “Ding Zhen ethnicity,” and “Ding Zhen tourism.” Python is used to crawl the above Weibo content, blogger authentication information, posting time, comment content, and the number of forwards, comments, and likes. After removing irrelevant posts or those merely seeking attention, a total of 37,650 data entries are collected. The discussion period runs from November 11, 2020, when the first Weibo post involving the “Ding Zhen Event” appeared, to January 21, 2021.

## Research Results

### 4.1 Association Network Analysis of Event Themes, National Culture Symbols, and Emotion Diffusion

**4.1.1 Event Theme Identification** Theme 1, “Becoming Popular as an Internet Celebrity,” represents the audience’s initial perception of this information diffusion. A short video of Ding Zhen’s smile quickly attracted attention after being forwarded on Weibo, and relevant enterprises and departments also used WeChat, Weibo, and other platforms for promotion, attracting a large number of fans. Meanwhile, extensive hype led some netizens to doubt Ding Zhen’s “accidental” popularity, believing there was brokerage company or team operation behind it. In this theme, Ding Zhen, as a Tibetan, increased Lhasa’s attention. Theme 2, “Signing with a State-owned Enterprise,” is a product of the “Ding Zhen Event” having a positive impact on local cultural tourism visibility. Ding Zhen’s signing with Litang County Tourism Company sparked audience controversy. However, as the mainstream view, most audiences believed that Ding Zhen became a state-owned enterprise employee through the signing, using his popularity to bring opportunities for tourism development in Sichuan Province. Theme 3 is a further extension of Theme 2, focusing on discussions about how Ding Zhen’s related videos brought traffic to Sichuan, Tibet, and other places’ cultural tourism and his selection as one of the top ten tourism events. Theme 4 focuses on netizens’ attention to Ding Zhen’s daily life, with ethnic characteristics such as herding cattle and horse riding, as well as original and nature-returning lifestyles, triggering audience attention to national culture and yearning for free life, serving as emotional sustenance under audiences’ suppressed lives and busy work. Theme 5, “Poverty Alleviation Assistance,” is a chain reaction triggered by the Ding Zhen Event, representing a rational shift of focus to impoverished area development. Using Ding Zhen to promote Tibetan characteristic culture, while promoting regional characteristic culture, helps develop local tourism. Finally, Theme 6 concentrates on audiences’ direct perception of tourist attractions in Ganzi, Sichuan, highlighting the cultural tourism traffic attraction effect of the “Ding Zhen Event.”

From Ding Zhen’s popularity as an internet celebrity to signing with a state-owned enterprise, the 铺陈 of main Weibo posts promoted the emergence of dif-

ferent hot topics at different stages. Exploring this process can more intuitively represent the flow of information themes against the background of user-event interaction. The LDA topic model is used to calculate coherence values under 3-20 topics, selecting the topic number with the maximum coherence value as the optimal topic number. Results show that the optimal number of topics is determined to be 6. Each theme selects the most representative words from 30 significant words. As shown in Table 1, the “Ding Zhen Event” presents six hot discussion themes: becoming popular as an internet celebrity, signing with a state-owned enterprise, being selected as a top ten tourism event, Ding Zhen’s life, poverty alleviation assistance, and tourism location perception.

**Table 1 Weibo Post Theme Mining Results**

Theme	High-frequency Feature Words
1 Becoming Popular as Internet Celebrity	Ding Zhen, traffic, recommendation, behind, Lhasa, internet celebrity, WeChat, essence, live broadcast, fans
2 Signing with State-owned Enterprise	Signing, state-owned, Ganzi Prefecture, channel, legal, staff, common people, serving the people, Sichuan Province
3 Selected as Top Ten Tourism Event	Youth, national, event, top ten, selected, museum, Cangyangjia, handsome, food
4 Ding Zhen’s Life	Herding cattle, horse riding, working, world, cute, innocent, life, netizens, video, eyes, horse racing, youth, goal, pearl
5 Poverty Alleviation Assistance	Video, Weibo, Litang, Sichuan, Ganzi, tourism, hometown, Tibet, effort, Litang County, Chengdu, Tibetan, invitation, poverty alleviation, cheer up
6 Tourism Location Perception	Western Sichuan, Daocheng, Yading, beautiful, improvement, charm, daily, career, happiness

#### 4.1.2 National Culture Symbol Diffusion and Sentiment Perception

**Analysis** During information diffusion, the interaction between social media users and events extends relevant cultural symbols under original discussion topics, influencing national culture image construction and audience emotional identity formation. Cultural symbol recognition and associated sentiment results are shown in Figure 3 [Figure 3: see original paper] (displaying cultural symbols with higher mention frequencies). In the figure, circles represent cultural symbols, with size indicating frequency, and three colors representing three different emotions.

In the “Ding Zhen Event,” national culture symbols such as festival symbols, ethnic costume symbols, and figure symbols run through the event from beginning to end. First, the scenery directly related to Ding Zhen’s videos—lakes and grasslands—initially triggered audience discussion. Simultaneously, locations directly related to Tibet—Lhasa—and figures—Cangyangjiacuo—triggered associations. As the event further evolved, Tibetan costumes, headwear, colored gemstone bracelets, and other ethnic characteristic daily accessories entered the audience’s 视野. Moreover, spatial landscapes in ethnic regions such as Cuopugou, Gongga Mountain, King Gesar City, and Changqing Khor Monastery attracted more attention. Ethnic religious cultures such as Tibetan Buddhism and characteristic folk customs such as Guozhuang and Dudong also integrated into the audience’s national culture cognitive framework.

Locating cultural symbol-related statements and conducting sentiment analysis, as shown in Figure 3 [Figure 3: see original paper], positive emotions dominate Tibetan characteristic culture perception, followed by neutral emotions, with no negative emotions appearing. Positive emotional expressions mostly involve natural landscapes such as grasslands and glaciers, tourist attractions such as Daocheng and Gongga Mountain, and human landscapes such as Tibetan characteristic costumes and customs. Expressions of representative figures like Cangyangjiacuo and characteristic cultural symbols like Tibetan Buddhism present neutral emotions. Audiences’ positive emotional expressions toward Tibetan iconic cultural symbols convey yearning for romantic and comfortable life, serving as important manifestations of national culture identity bonds.

**4.1.3 Association Network of Event Themes, National Culture Symbols, and Emotion Diffusion** In the “Ding Zhen Event” communication, based on different theme representations and flow processes in Weibo posts, national culture diffusion and cognitive construction show dynamic change characteristics. As shown in Figure 4 [Figure 4: see original paper], with national culture symbols as the core, the diffusion theme and sentiment perception network is identified and constructed. Based on association probability screening, only network connections with association probabilities higher than 0.5 are presented.

Theme 1 is more connected with neutral emotions. Through social media platforms such as Weibo and Douyin releasing daily life-related promotional information, Ding Zhen’s accessories, behaviors, living environment, and associated symbols are unintentionally enhanced, creating communication potential energy that prompts audiences to actively search for Tibetan characteristic culture and further dialogue with search subjects. This breaks through passive cultural symbol transmission barriers, transforming into an audience-centered cultural perception penetration process. The theme of signing with a state-owned enterprise (Theme 2) focuses on how traffic itself assists local tourism development. Despite negative controversies about exceptional admission of state-owned enterprise employees, it also directs audience attention to spatial

tourism landscapes such as Daocheng and Kangba, as well as Tibetan folk landscapes such as Tibetan opera and horse racing festivals. Being selected as a top ten tourism event (Theme 3) is overall associated with positive emotions, with food and museum content in the theme triggering associations with internal cultural symbols such as butter tea and Daocheng. Audiences show overall positive emotional bias toward Theme 4, which involves a wide range of national culture diffusion levels, with external spatial landscapes such Shambhala and Genie Eye coexisting with internal landscape symbol diffusion such as Guozhuang and pastoral songs. Theme 5 (Poverty Alleviation Assistance) shows similar audience emotions and national culture cognition associations to Theme 4, with internal theme words such as cultural tourism and poverty alleviation directing audience attention more to characteristic ethnic cultural tourism landscape levels. Theme 6 mostly involves national culture information diffusion about Ganzi and Daocheng, triggering associations with similar cultural symbols such as Tibetan Buddhism. The fusion of theme diffusion and national culture symbols eliminates cognitive constraints and cultural isolation between communicators and audiences, promoting audiences' active interpretation of national culture symbol connotations.

To further explore the evolution patterns of national culture diffusion driven by different themes in different time periods, the time dimension is incorporated into the calculation of association probability between themes and national culture symbols. The time period of the "Ding Zhen Event" is divided into 15 equal segments, and heatmaps are drawn to display national culture symbol diffusion under six themes. Results are shown in Figure 5 [Figure 5: see original paper], where Themes 1-6 are displayed from left to right and top to bottom, the horizontal axis represents time, and the vertical axis represents the serial number of national culture symbols diffused under that theme. To highlight the appearance time of high-frequency national culture symbols, the threshold is increased, with high-frequency cultural symbols prominently displayed (black blocks) and low-frequency cultural symbols low-light processed (white blocks). Overall, national culture diffusion triggered by event themes is mainly distributed in the early and middle stages of the event, with insufficient subsequent national culture diffusion momentum and decreasing attention frequency. Examining the diffusion patterns of national culture triggered by different themes, the diffusion accompanying Themes 1 (Becoming Popular as Internet Celebrity), 4 (Ding Zhen's Life), and 6 (Tourism Location Perception) lasts relatively long, continuing from the early to middle and later stages of the event. Among these three themes, Theme 1 triggers the highest intensity of national culture diffusion, while Theme 4 involves the richest national culture diffusion content. In contrast, the national culture diffusion accompanying Themes 2 (Signing with State-owned Enterprise), 3 (Selected as Top Ten Tourism Event), and 5 (Poverty Alleviation Assistance) shows short duration and rapid disappearance.

## 4.2 Analysis of National Culture Diffusion Based on Communication Subjects

To deeply analyze the national culture diffusion process and contributing factors, communication subjects with particularly prominent influence in promoting national culture diffusion are identified. Communication subjects are classified according to follower counts, and the influence of different levels and types of communication subjects is calculated. As shown in Figure 6 [Figure 6: see original paper], based on different-level communication subject classification, grassroots accounts hold absolute advantage in influence among ordinary users, micro communication subjects, and medium communication subjects. Among large communication subjects, celebrity accounts' influence surpasses grassroots accounts, moving from the periphery to the core. Enterprise accounts are relatively active and have high participation frequency due to work needs, such as tourism companies using the event to promote Sichuan-Tibet tourism routes. Media accounts have lower participation frequency among the four account types and limited influence in the national culture diffusion process.

To further highlight the promoting role of large communication subjects in national culture communication during the Ding Zhen Event diffusion, large communication subjects' influence and identity are further subdivided. As shown in Figure 7 [Figure 7: see original paper], four different colors represent different user node types, and circle size differences represent communication subject influence differences. Among subjects promoting the "Ding Zhen Event" national culture communication, celebrity accounts account for a relatively large proportion, followed by grassroots and media accounts, with enterprise accounts contributing relatively little. In the early stage of event diffusion, communication subjects are relatively sparse but generally have higher influence than in the middle stage. During the middle stage, the number of communication subjects increases, but individual influence relatively decreases.

Tibetan characteristic culture communication is first driven by celebrity accounts, such as entertainment account "Paquan Laogui" and video blogger "Mangguo La Xinxing," with Ding Zhen's daily account posts running through the event. Simultaneously, grassroots accounts such as "Kuaishuo Yule" and "Fanquan Shisanmei" relay and boost national culture diffusion. Media and enterprise accounts contribute relatively little, with Sichuan Radio and Television Station in Ding Zhen's province participating in information diffusion to promote the province's cultural tourism influence, and enterprise accounts being related to Ding Zhen's location.

In the early stage of event diffusion, the number of communication subjects is small, and although the amount of national culture diffusion is relatively large, most are clearly representative cultural symbols closely related to Ding Zhen, such as Tibetan opera, Lhasa, and Cangyangjiacuo, which is closely related to the assistance of official accounts in the early stage. As the event evolves, the number of communication subjects surges in the middle stage, but individual

influence is small and does not bring rapid growth in national culture diffusion quantity. However, the diversity of national culture diffusion increases, with human landscape symbols such as Dudong and Guozhuang coexisting with natural landscape symbols such as Kawalori Mountain and King Gesar City. In the later stage of event diffusion, communication subjects sharply decrease, but national culture diffusion does not show a decreasing trend. Instead, under the promotion of entertainment accounts, cultural symbols such as Sapu Mountain and Genie Eye appear, which have relatively low association with the event itself and are 联想演化 based on natural landscape symbols from the early and middle stages.

## Discussion and Conclusions

### 5.1 Differences in National Culture Diffusion and Emotional Cognition Under Different Evolution Themes of Hot Events

Using the LDA topic model to extract discussion themes during the “Ding Zhen Event” diffusion reveals that multiple themes such as internet celebrity and poverty alleviation are intertwined. From appearance-based fan attraction to criticizing the capital game behind Ding Zhen, audience focus gradually returns from blindly following theme frameworks to rationality, with attention diverging from Ding Zhen as the core to local space and human landscapes, generating brand effects. Previously low-attention cultural symbols such as Tibetan costumes, horse racing, grasslands, hot springs, Litang, and butter tea have entered the audience’s 视野. This event diffusion is accompanied by the dissemination of ethnic region cultural facilities and activity information, with audiences constructing cultural symbol cognition and initially forming destination image perception through different logics and emotions, further triggering the hot discussion theme of tourism location perception. This further validates J. Manuel Hernández-Mogollón’s conclusion that structural elements and place brands positively influence destination cognitive and emotional image formation.

Simultaneously, national culture symbol identification and associated emotion diffusion analysis are not only about the production and dissemination of cultural symbols but also about sorting out the basic framework of audience Tibetan culture perception. Audience cultural symbol concerns cover all aspects of internal and external spaces of natural and human landscapes: natural landscapes such as hot springs and glaciers, cultural customs such as Dudong and pastoral songs, costume culture such as colored gemstone bracelets and headwear, and religious culture such as Tibetan Buddhism and Bon. Audiences show strong positive emotional tendencies toward natural landscapes and cultural customs, which together with natural and human landscapes constitute the framework of characteristic Tibetan culture diffusion.

Finally, based on the “Ding Zhen Event” theme and national culture diffusion and audience perception construction association network, in discussions such as becoming popular as an internet celebrity and Ding Zhen’s life, audiences obtain

cultural elements from pictures and videos and generate associated symbol cognition diffusion. Themes seemingly unrelated to Tibetan culture communication, such as signing with state-owned enterprises and poverty alleviation assistance, are directly related to natural landscapes such as Maoya Grassland and King Gesar City. Cultural value resonance provides psychological motivation support for further diffusion and extension of cultural content. Cultural symbols such as Maoya Grassland and Gongga Mountain have both Tibetan characteristics and condense Chinese civilization. As the core of cultural communication in social media, information receivers (interpreters) actively break through characteristic culture communication barriers while receiving Ding Zhen-related posts to explore common interpretants, extending symbol dissemination and enriching their understanding of cultural symbols. Additionally, in the temporal analysis based on national culture diffusion, the study finds that national culture diffusion under different themes appears at different time nodes and lasts for different durations, which is associated with differences in topic content settings and information processing methods by information receivers in different contexts.

## 5.2 Differences in Influence of Different Communication Subjects on National Culture Diffusion at Different Stages

To understand the influence of different communication subjects on national culture diffusion at different stages, this study explores key communication subjects and their influence in the “Ding Zhen Event.” Different from opinion leader identification research in the entire information diffusion process, this study identifies and screens national culture communication subjects and classifies communication subjects’ professional fields according to Weibo authentication information.

Results show that in the early stage of information diffusion, celebrity accounts such as video bloggers, Q&A bloggers, and entertainment bloggers use their influence to create a popular environment, attaching cultural content to entertainment-based information representation. By constructing discourse forms that audiences love, they mobilize large numbers of fans to pay attention and further form empathy effects in Weibo interactions. This is effective verification of the Tipping Point theory, where key user nodes, as specific individuals, package main content attached to pan-entertainment information, after which audiences follow to create popular trends. In the middle stage of information diffusion, grassroots and media accounts continue to follow up, but the influence of both types of accounts is relatively sparse, and enterprise accounts are obviously weak. However, multiple subjects can further mobilize the public’s perception emotions toward national culture symbols to construct social memory, break through topic field barriers, and trigger emotional resonance.

This study 切入 from the perspective of social media hot event diffusion, using the “Ding Zhen Event” as a case study to analyze information diffusion topics, identify national culture diffusion and associated emotions during hot event dis-

semination, construct an association network between event diffusion topics and national culture perception, analyze the interaction of different communication subjects throughout the information diffusion process, and thereby explore the underlying mechanisms of national culture diffusion.

Theoretically, by extracting audience hot discussion themes in information diffusion and capturing and condensing audience cultural content perception characteristics, this study not only portrays multi-dimensional cultural content diffusion features in information diffusion theory but also deepens cultural diffusion research based on social media environments, thereby constructing a dual proposition for quantitative research on cultural content communication from an information diffusion perspective. Practically, this research provides new ideas for optimizing national culture communication quality and promoting the digital transformation of national culture communication. It suggests that we should be adept at 挖掘 ethnic region advantages, shaping media images based on figures and events; precisely control the event evolution lifecycle, conducting differentiated media agenda settings at different stages; and utilize social media channels, relying on entertainment accounts, video accounts, and other multi-party forces to enrich the ways of telling national culture stories, thereby enhancing national cultural identity and strengthening national cultural influence.

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**Author Contributions:**

Ma Xiaoyue: Proposed research ideas, designed research plan, wrote and revised paper.

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**English Abstract:**

[Purpose/significance] With the help of the information diffusion research method, this paper explores the evolutionary diffusion patterns of national culture in social media hot events that integrate cultural content diffusion, providing a new perspective for explaining national culture diffusion rules and promoting national culture communication. [Method/process] Taking Weibo posts about the “Ding Zhen Event” as the data source, based on the LDA topic model, national culture symbol recognition and emotional analysis, an association network among theme, national culture symbol and emotion was constructed to restore the dynamic situation of ethnic culture evolution and diffusion accompanied by different theme diffusion in hot events. By quantifying the influence of different users on national culture diffusion, the

paper explored the relay process of national culture of different subjects in hot topics. [Result/conclusion] The results show that analyzing the diffusion path rules of national culture in the context of social media from two levels—the construction of theme-national culture symbol-emotion association network and the influence of diffusion subjects—can help humanities scholars accurately grasp the details and dynamic interaction characteristics of cultural diffusion.

**Keywords:** diffusion of national culture; association network; topic analysis; culture symbol; emotion analysis; diffusion subject

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

*Source: ChinaXiv — Machine translation. Verify with original.*