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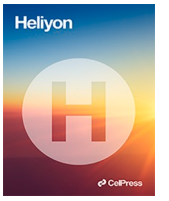

Research article

Fake news, real needs: A qualitative study on Sino-Japanese theurgy fighting

Qing Gao *, Qianqian Fu

School of Psychology, Qufu Normal University, Qufu, China

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ABSTRACT

Mainstream fake news research has previously mostly focused on authenticity but often overlooked the individual psychological needs and actual social issues behind fake news. These limitations impede a profound understanding of its societal intricacies. This study aims to excavate deeper into the latent significance of fake news, peering through its lens to unearth hidden group psychology and realistic needs. Comments about "Sino-Japanese theurgy fighting" (purportedly a fight between Chinese Taoist priests and Japanese Yin-Yang masters) on Chinese TikTok was selected to conduct content analysis and erect a theoretical model using Grounded Theory. Based on the analysis of 1933 valid comments from 29 videos, it is found that support for fake news correlates not just with judgment of authenticity, but also with psychological needs such as emotional catharsis and position identification. This shift in research perspective enriches our comprehension and offers a novel angle for addressing fake news. This finding reflects the attitudes and behavior patterns of social groups in specific situations and are of great significance for understanding the formation and dissemination of public opinion. Thus, in this special "post-truth" era, emotion regulation and fact clarification are equally essential.

1. Introduction

Fake news, defined as news not in line with facts and disseminated via mass media [1], has become a prominent issue recently. Although not new, it has gained significant attention due to its severe consequences. Its spread has a substantial impact on journalism and the public, yet efforts by the government, industry and academia have been ineffective in curbing it [2]. With the prevalence of Internet life, fake news has become even more widespread [3]. This study reveals the hidden group psychological needs and social significance behind fake news by focusing on the real psychological needs rather than merely authenticity, thereby filling a significant gap in existing research and offering a novel perspective for understanding and addressing this complex issue.

The rise of social media has enabled people to spread information widely, strengthening their belief in lies and willingness to share [3]. Actions, such as liking, favoriting, reposting, following, commenting and sharing are considered support for fake news, facilitating its spread. The Internet traffic economy of social media platforms is an attention economy, where more traffic and user activity lead to more advertising and revenue [4]. In this context, fake news, along with controversial headlines and seditious statements, is tacitly approved and encouraged as an effective means to attract users and traffic [5]. Hence, it is necessary to study the psychological motivations behind supporting fake news online.

Most research on fake news focuses on critiquing its lack of authenticity [6], analyzing causes [7] and proposing governance

* Corresponding author.
E-mail addresses: gaoqing3213@163.com (Q. Gao), 304633818@qq.com (Q. Fu).

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strategies [8], but fails to comprehensively explore the deeper connotations such as social mentality and realistic demands. In contrast, our study, from a media psychology perspective, centers on the real psychological needs behind the spread of fake news. Using online comments about "Sino-Japanese theurgy fighting" as data, we apply content analysis and Grounded Theory to uncover the motivations for supporting and sharing disinformation. By doing so, we are able to dig deeper into the latent meaning of fake news and unearth the hidden group psychology and realistic needs that have been overlooked in previous research.

1.1. Psychological theories of spreading fake news

One widely accepted explanation for trusting fake news is Thinking Theory, based on Dual-system Cognitive Process Theory [9]. Numerous empirical studies show that the heuristic style is often linked to inaccurate cognitive beliefs like conspiracy theories and paranormal phenomena, while those with analytical habits are more receptive to scientific arguments [8,10,11]. In most cases, people's behavior is dominated by heuristic thinking, which has an advantage over analysis in seeking thinking fluency [12]. When people think less analytically, they are more likely to support fake news. However, reflecting on intuition does not always correct intuitive errors. Those already inclined to believe fake news may still believe even after rational analysis. This can be further explained by Motivation Theory.

Motivation Theory, based on Cognitive Coordination Theory, posits that people think with a self-protective motive [13]. Their first consideration is whether the news aligns with their positions, beliefs, and ideologies rather than its truthfulness [14]. When pre-conceived biases exist, driven by the pursuit of cognitive coordination, people focus on favorable views and evidence, and ignore or reject contrary ones [15]. Those more inclined and able to think analytically are more likely to use their knowledge to reinforce their views and protect their positions. Some studies indicate that highly educated and knowledgeable individuals are better at selectively using and interpreting evidence to support their conclusions and maintain their initial judgments when evaluating information openly [16,17].

Another perspective considers individuals in social groups. Social cascades, echo chambers and information cocoons, which repeat and reinforce the same information, are forms of conformity [18]. Other ideas and attitudes have difficulty entering. Some research suggests that the threat of social costs and the pressure to follow the crowd influence people's motivations to share fake news [19,20]. In the Internet era, individual informatization and labeling lead to highly customized information pushing, and big data algorithms exacerbate this trend. One consequence of conformity is group polarization [21], where people become more extreme in disseminating relevant news and more difficult to rethink and correct.

1.2. The proposing of questions

Contrary to many scholars' view of fake news as evil, it can offer various valuable functions for people. For example, a news story might help protect social identity or enhance one's status in a group, making it beneficial to share [17]. In such cases, people may not emphasize accuracy as much. Moreover, since people mainly support fake news in online social environments, it is important to study the interaction between group-level factors and individual motivations. People derive their self-worth not only from their own traits but also from the groups they identify with [22].

Researchers may not need to rush to find ways to eliminate fake news, as past experiences of countries suggest it is nearly impossible [23]. In fact, the public is not always easily deceived by fake news, especially in the information explosion era with numerous information sources. However, sometimes a detail-oriented, shrewd and discerning audience may be convinced by news that can be proven false with a little analysis [24]. Evidence shows that people respond to support their position rather than truly believing everything they share [25]. So, must people support and share fake news only if they believe it? Besides the mainstream critical discussion and authenticity study [26], are there other overlooked research values in fake news? Can we explore the group psychology and social problems beyond the authenticity framework? This study aimed to answer what the real psychological needs are behind supporting fake news.

1.3. Sino-Japanese theurgy fighting

The topic of "Sino-Japanese theurgy fighting" gained popularity on the Internet in summer 2022, involving multifaceted conflicts of science, religions, nation, history and culture [27–29]. An introduction to the event is as follows: At 18:00 on July 25, 2022, rainbows, roseate clouds and lightning appeared over Zhengzhou. Soon, heavy rain poured, and the sky turned green. On July 25 and 26, many places reported unusual weather. Subsequently, some netizens related it to the Japanese Summer Festival in Nanjing on July 17, the memorial tablet dedicated to Class A war criminals in Xuanzang Temple on July 22, Japan Sakurajima volcanic eruption on July 24, and other events. Discussions about "Sino-Japanese theurgy fighting" emerged on the Internet. Some we-media even provided what they claimed to be detailed insider information, such as the two parties involved being Chinese Taoist priests from Longhu Mountain and Japanese Yin-Yang masters from the Jiuju Sect [30,31]. Many comments were left under related videos in a short time.

Taoists refuted the rumor, and more importantly, there were scientific explanations for the abnormal weather [32]. Thus, "theurgy fighting resulting in unusual weather" was considered fake news. Compared to political and entertainment news, social news with broader civic engagement reflects more realistic public psyche [33]. People are both receivers and spreaders of fake news, which involves their perceptions, thinking, positions, and motivations. The extensive public discussions reflected vivid social psychology, including attitudes and reasons for supporting fake news, providing rich material for studying the group psychology behind the spread of fake news. Therefore, it was chosen as a case study to explore the mass psychology behind the support of fake news.

1.4. The present study

The spread of fake news is a serious and escalating problem, highlighting the necessity to understand why people support and share it. While some studies indicate that judgments about news accuracy can predict the willingness to spread [19,34], we contend that authenticity has less influence in this case. Moreover, compared to external motives such as social costs and conformity pressure [19], we assumed that internal motives like position identity and emotional expression were crucial for supporting fake news. In contrast to previous studies, this study emphasized more on interpreting news content and considered the interaction between individual needs and group context.

Therefore, this study aims to achieve the following objectives. First of all, through an in-depth exploration of the real psychological needs behind people's support for fake news, beyond the traditional focus on authenticity, we reveal the hidden psychological factors of the group. Secondly, by applying the Grounded Theory, we construct a theoretical model that systematically explains the psychological characteristics of users in the process of spreading fake news. This model not only considers individual psychological factors but also their interaction with the social context, providing a more holistic understanding. Finally, the paper analyzes the impact of the spread of fake news on society, including the impact on public cognition, social opinion and group relations, so as to provide theoretical basis and practical guidance for dealing with fake news.

We utilized comments about "Sino-Japanese theurgy fighting" on Chinese TikTok for content analysis. Subsequently, through Grounded Theory, we constructed a theoretical model to explain the psychological characteristics of users during the spread of fake news. Content analysis helps to discover trends and patterns in the data, and Grounded Theory applies to digging deeper into the essence behind the phenomenon. The materials of this study reflected the psychology and stance of Chinese Internet users. The unique Chinese social and cultural context and online public opinion environment distinguished this study from others. This is expected to better explain the function and value of fake news, reduce its harm and clarify the media environment. It should be noted that we do not aim to glorify fake news but analyze and reflect on it neutrally.

2. Methods

2.1. Data collection

TikTok, Chinese largest short-video social platform [35], was selected for data collection. As a social news topic, Sino-Japanese theurgy fighting has unique ethnic, cultural, historical and metaphysical elements, making it highly likely to attract netizens' attention and discussion. The push algorithm mechanism of TikTok can easily create explosive events and prompt a large number of users to leave rich comments. Thus, we chose the TikTok platform, believing its data could well represent people's views, attitudes and psychological needs regarding this event.

We searched for videos on Chinese TikTok with the keyword "Sino-Japanese theurgy fighting" (中日斗法). Videos unrelated to the event were excluded, and the top 29 non-repetitive videos recommended by the platform were chosen, including live footage of thunderstorms, disclaimers from Taoist priests and disclosures of relevant events. From the 30th video onwards, the content was similar to the previously selected videos. And after coding the comments of these 29 videos, theoretical saturation was reached, so no further sampling was done [36].

The video comments were then manually screened to exclude irrelevant statements and those only mentioning friends or collapsed by the platform. As a result, 1933 comments suitable for analysis were obtained. Along with the comment content, the nickname, IP address, comment time, video link, and other background information were recorded to establish a database. All these data are publicly available on the TikTok platform and can be considered as public data in public databases. The data were collected from July 26 to August 4 in 2022, a time frame that covered the period from the rise to the fall of the "Sino-Japanese theurgy fighting". It provided a time dimension to study the change of public psychological needs in the process of fake news dissemination. The primary data was recorded, coded, classified, counted and analyzed with the help of Excel 2019 and NVivo 14 software.

2.2. Content analysis and Grounded Theory

Content analysis and Grounded Theory are two commonly utilized methods for analyzing qualitative data. Content analysis, a quantitative approach based on qualitative research, objectively and systematically dissects, codes, and categorizes text content to obtain statistical data about the text [37]. This offers a reliable research tool and boosts the credibility and persuasiveness of research results [38]. Grounded Theory is apt for exploratory research and can construct a substantial theoretical model incrementally from actual observations through the induction and deduction of raw data [39].

Both methods were employed to analyze different aspects of this dataset. We initiated with descriptive statistics on comment time and IP address to determine the time and geographical distribution of comments. Subsequently, high frequency words were extracted from the text content to grasp the focus and attention of the comments. The content analysis outcomes demonstrated trends and quantitative differences in discussion topics [40]. Content analysis helped us discover underlying themes and patterns in large amounts of text data [37], providing important clues and a basis for understanding the psychological mechanisms behind the spread of fake news.

Thereafter, we acquired primary nodes via open coding, generalized advanced nodes through axial coding, and constructed a theoretical model through theoretical coding [39,41]. The ultimate aim of Grounded Theory is to generate substantive theories that enhance our comprehension of the nature of the phenomenon under study [42]. The coding and analysis of comment data revealed the

deep psychological needs behind people's support for fake news. In this study, a psychological model was gradually constructed through these coding processes of comments, which effectively explained people's behaviors and motivations in supporting fake news. Consequently, these two methods were highly suitable for this study. A flowchart (Fig. 1) was provided to depict the steps of data collection and analysis.

3. Results

3.1. Time and geographical distribution of comments

The sample time distribution was from July 26 to August 4 (Fig. 2). The number of comments peaked on July 27, then dropped rapidly. It increased again after July 29 and peaked a second time on July 30. After August, the news interest declined gradually. Interestingly, the two peaks represented different focuses. On July 27, the discussion centered on truth debate, with people expressing their views on believing the news. On July 30, the proportion of position-based arguments increased significantly, with opposing views among different positions. This reflected the rapid shift in public attention focus. People's need for truth evolved into position identification, echoing the earlier question: Do people spread fake news to support their position, even knowing it is false?

The comment sources covered most of Chinese provinces and regions (Fig. 3). The largest percentages were in Jiangsu, Guangdong, Henan and Shandong, followed by Zhejiang, Sichuan, Hebei and Anhui. This could be due to the base proportion of Internet users because of economic and demographic factors. Also, cities related to the event had more active topic discussions, like Nanjing (in Jiangsu) and Zhengzhou (in Henan). Obviously, the closer to the event center, the more likely to be affected. Even on the Internet, message pushing algorithms followed this pattern. The above findings reveal the temporal variation and geographical distribution that characterize the spread of fake news.

3.2. Analysis of high frequency words

The high frequency words with a weighted percentage greater than 0.10 % (Table 1) indicated that comments mainly focused on the authenticity of events (e.g., believe, explanation), religious beliefs (e.g., Taoism, metaphysics), national positions (e.g., country, Huaxia), ethnic sentiment (e.g., Summer Festival, culture) and natural phenomena (e.g., lightning, rain). The most frequent words were "science" and "believe". These terms merely represented a category, not an opinion or position. Since both support and opposition of science were included in "science", and "disbelieve" also incorporated "believe". Additionally, the word "doge", a dog-headed emoji, deserved attention as it was often used in online communities to express joke or humor. Although the frequent words did not reflect actual attitudes, they signaled the focus of attention, providing clues and a framework for subsequent analysis. Simple content analysis was insufficient to understand the specific real thoughts in the comments, so we proceeded to the next step of coding analysis.

3.3. Open coding

As most comments were brief single sentences, we took each comment as an analysis unit. Following the traditional Grounded Theory coding approach of inductive coding based on qualitative data semantics [41,42], we mainly answered two questions at this stage: (a) What does this sentence express? and (b) How does it relate to our research topic? For example, "*It makes my blood boil. I have always believed in Taoism myself.*" indicated excitement and emotional attachment, along with a belief in and support for Taoism. So we coded it as "emotional", "believe" and "support Taoism". Another comment, "*Do not follow the crowd. Someone over-interprets Taoism, intentionally killing our Taoism. We must pay attention to the unseen bad guys are committing sabotage.*" Here, "Do not follow the crowd" and "must pay attention to the unseen bad guys" called for rationality and warn against being influenced by inflammatory remarks to prevent being used by those with ulterior motives. "Over-interprets Taoism, intentionally killing our Taoism" expressed concern and worry about potential bad actors using public opinion to harm Taoism. So we coded it as "guide rationality" and "worry".

We looked for possible themes through repeated and powerful comments, and found larger analytic stories. Spontaneous memo writing was done throughout the sampling and coding process to preserve the meaning of comment views. After 600 samples, no new nodes or opinions emerged, we thus considered the sample had reached theoretical saturation [36]. However, to ensure the coding reference point showed comparable quantitative trends, we coded all samples, which exceeded three times the theoretical saturation

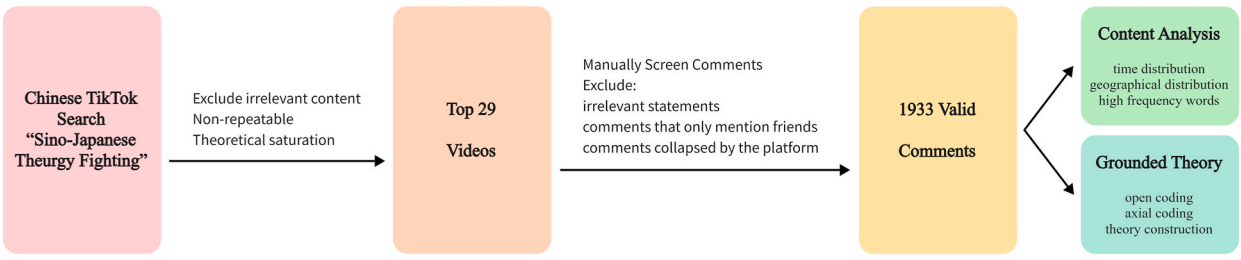

Fig. 1. Flowchart of data collection and analysis.

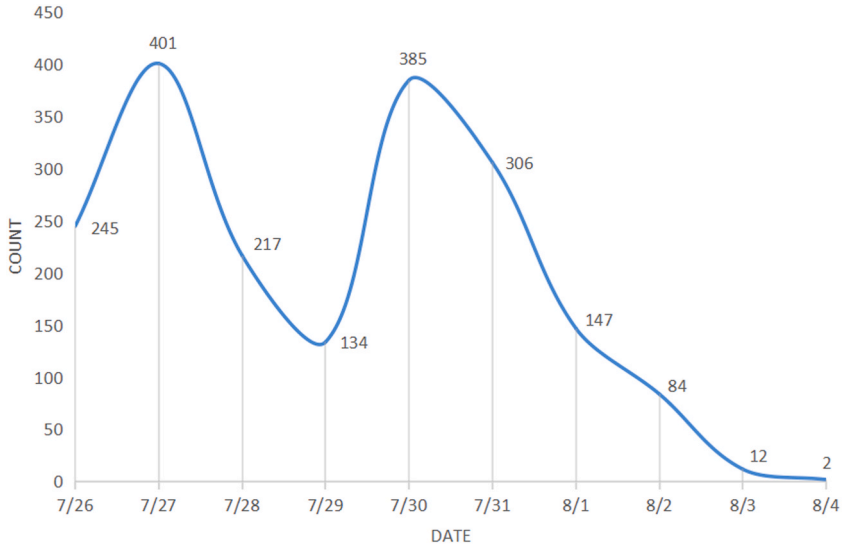

Fig. 2. Time distribution of comments published.

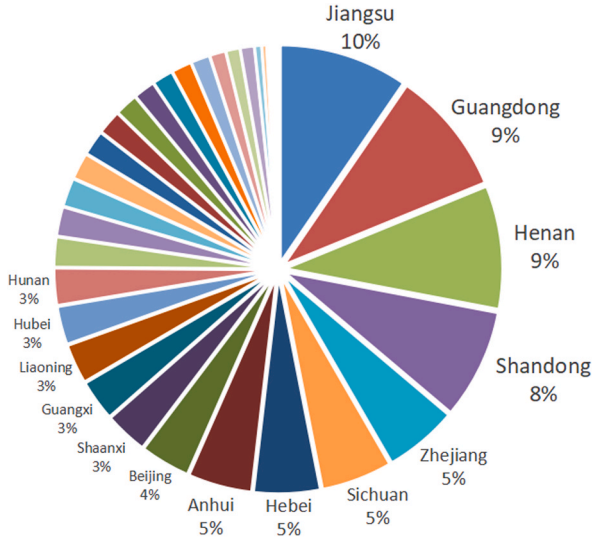

Fig. 3. Geographical distribution of comment sources.

sample size. After open coding, 27 primary nodes were generated, which reflected the multiplicity of public responses to the incident. A code table (Table 2) is provided to describe node names, concepts and examples.

3.4. Axial coding

The category analysis continued on the basis of 27 primary nodes. Through inductive thinking, we related coding categories and attributes [41,43]. In this phase, we attempted to understand: (a) what is the connection between the nodes? (b) what theoretical categories does these particular data suggest? As a result, 4 new advanced nodes were generated, and playing with memes was retained as an advanced node (Fig. 4). These nodes exposed the psychological and behavioral characteristics of the public in the dissemination of fake news from different perspectives, and are interrelated to jointly influence the public's attitude towards fake news.

3.4.1. Emotional catharsis

Emotional catharsis entails the expression or release of strong feelings related to the topic. Many people expressed their emotions, containing 557 reference points. Online communication and interaction induced emotional catharsis, making people eager to express feelings rather than think. The emotions were rich, including national confidence, excitement, worry, patriotism and enmity.

Table 1
High frequency words with weighted percentage greater than 0.10 %.

Words	Count	Weighted Percentage	Words	Count	Weighted Percentage
science	435	2.63	refuting rumors	30	0.18
believe	370	2.24	doge	29	0.18
Taoism	128	0.77	see	29	0.18
Taoist priest	82	0.50	culture	28	0.17
metaphysics	58	0.35	Buddhism	27	0.16
China	56	0.34	Chinese nation	25	0.15
explanation	52	0.31	Huaxia	25	0.15
Japanese Summer Festival	49	0.30	weather	25	0.15
know	46	0.28	flourishing	24	0.15
end	42	0.25	in the sky	21	0.13
Japan	42	0.25	magic arts fighting	21	0.13
superstition	37	0.22	feeling	20	0.12
thunder	35	0.21	civilization	20	0.12
Taoist	35	0.21	on the ground	19	0.11
lightning	33	0.20	nature	19	0.11
immeasurable	31	0.19	Zhengzhou	19	0.11
country	30	0.18	raining	18	0.11

People with similar feelings tended to gather together, forming in-groups. This process was driven by the need for empathy, as individuals sought to find others who shared their feelings. Emotional expression thus served as a means of maintaining social interdependence, highlighting the importance of emotions in the context of online communication and the support of fake news. Strong emotions expressed in emotional catharsis, such as patriotic feelings and ethnic hatred, help to strengthen in-group bonds, allowing individuals to develop a clearer positional identity in emotional empathy and to jointly express support for or opposition to a position.

3.4.2. Position identification

Position identification reflects individual stances on topic-related aspects, embodying beliefs, values and identity. With 1049 reference points, position expressing comments were most numerous. Many supported Taoism and disparaged Buddhism. Views on science and superstition polarized into camps like plea for science or being skeptical about science, supporting metaphysics or countering superstition. Some incited antagonism between nations, but others tried to refute rumors, guide rationality and criticize conformity.

As the discussion focus shifted over time, initial individual expressions became group resonance. “I think” evolved into “We feel”. Position identification was the ultimate and most significant demand in this incident. The choice of position was predominantly inclined towards the just side, but there were also rational voices. Individuals within the group did not appear as extreme as initially anticipated. Rationality endeavored to reconcile the differences among various positions. Position identification tends to influence people’s judgment of authenticity. People are inclined to accept information that is consistent with their own position as true and are skeptical of information that is contrary to it, thus making selective judgments about news authenticity on the basis of positional identity.

3.4.3. Judgment of authenticity

Judgment of authenticity assesses the truth of a situation or information. A large number of people (592 reference points) expressed their views on news truthfulness. When exposed to fake news, an intuitive response first occurred, followed by a preliminary judgment. Then, rational thinking used evidence like knowledge and memories to support or refute it. Authenticity judgment included thinking that something was hidden, disbelieving, being willing to believe, believing, asking questions, and being indifference. These ideas and cognition represented an individual perspective.

Interestingly, due to social approval, the tendency to believe was often linked to a strong identity sense. As a result, more people showed a propensity to believe or at least a willingness to believe compared to those who completely disbelieved. However, the most prevalent view was that something was hidden, suggesting a perception of a conspiracy theory or an unknown truth behind the incident. This indicated that people were not simply divided into believers and non-believers, but held a more complex and skeptical attitude towards the authenticity of the news. This finding supported the notion that people’s support for fake news was not necessarily based on believing its authenticity but rather on expressing their own positions.

3.4.4. Play with memes

Playing with memes is an expression form with meanings like a joke or an ironic statement [44]. It is a unique coping style. Since the meaning of the message expressed through memes was unclear, it was not further classified into explicit attitudes. To avoid over-inferences, it was retained as a whole category for analysis, having 349 reference points. Playing with memes as a unique form of expression can be a relaxing way of emotional catharsis, expressing emotions through humor, and may also influence position identification to a certain extent, attracting people with similar emotions and positions, and at the same time reflecting a relatively diluted attitude towards news authenticity, with a greater focus on interaction and social effects.

Table 2
Results of open coding.

Primary Node (Reference Point)	Description	Example
play with memes (349)	Express in a joking or humorous manner related to the topic, often utilizing internet buzzwords or memes	You let us believe in science. Do not suddenly one day promote immortality cultivation. If you all fly in the sky while leaving me on the ground.
support Taoism (276)	Demonstrate approval and support for Taoism	Praise for Chinese Taoist priests.
something being hidden (241)	Indicate that there are concealed aspects or secrets relevant to the situation	See through without speaking. They are clear in their minds.
antagonism between nations (188)	Express hostility or opposition between different countries, typically referring to China and Japan in this context	Expel the Japanese, close down Japanese schools, and eliminate all traitors.
eyewitness description (149)	Describe personal experiences and observations of events	I have never witnessed anything like that day in Henan before. Black clouds gathered rapidly within a minute. Then it took more than 20 min of lightning before it started to rain.
plea for science (134),	Advocate for a belief in science	We must believe in science.
national confidence (119)	Express confidence in one's own national culture	It is okay to believe in horoscopes. But is it wrong to believe in 5000 years of Chinese heritage?
emotional (116)	Display strong excitement related to the topic	I have been browsing videos all day today, which has made me extremely excited.
worry (114)	Express concern or anxiety regarding certain aspects	There may be some people who use this to lead the public to disbelieve in science and over-exaggerate Taoist superstitious cultivation of immortality as a means to disrupt our country.
patriotic (104)	Demonstrate love and loyalty towards one's own country	Is it wrong to assimilate native culture for minors and adults and rally patriotic consciousness? Something is better than nothing.
enmity (104)	Show hatred or ill will, usually towards Japan	Remembering the blood feud with Japan is the default setting for every Chinese.
disbelieve (99)	Express a lack of belief or disbelief in something	It must be a lie.
support metaphysics (91)	Demonstrate support for metaphysical concepts or ideas	It is better to maintain an awe of metaphysics. Some things really cannot be explained by science.
willing to believe (91)	Indicate a willingness to believe in something, even without conclusive evidence	No explanation needed. I only believe what I want to believe.
believe (83)	Express a firm belief in something	Anyway, I believe it. I truly believe it is true.
refute rumors (82)	Act to deny or disprove rumors	Do not spread rumors. There is no such thing as sabotaging battle formation.
guide rationality (77)	Encourage and guide others to be rational and not be misled	Thunder is just a natural phenomenon. Do not be misled.
disparage Buddhism (74)	Express a negative or critical view of Buddhism	The temple secretly hides monuments for bad guys.
skeptical about science (53)	Express doubts or skepticism about scientific principles or explanations	The world is so vast that there is more than you know. Science is nothing more than materialism that can be dialectically analyzed within human cognition.
ask question (47)	Raise questions about the topic or situation	What are those flying in the sky?
dissemination of remarks (44)	Spread or share statements or comments related to the topic	I heard that the Taoist Master Mansion in Longhu Mountain dispatched six yellow-robed Taoists, and more than 2000 Taoist priests from the north and south joined forces.
criticize conformity (39)	Criticize the tendency of people to conform or follow blindly	Once a joke is told too often, some people really believe it and become blind followers.
counter superstition (35)	Act to oppose or refute superstition	Feudal superstition is not acceptable. Nonsense and demonic words mislead the public.
indifference (31)	Express a lack of interest or concern, being indifferent to the topic	Believing or not believing will not change anything.
expose Summer Festival (24)	Reveal or bring attention to the issues related to the Japanese Summer Festival	The Japanese Summer Festival in Shangrao, Nanning and Suzhou has changed its name and been reorganized. Please help spread the word.
associate paranormal events (20)	Make connections or associations with paranormal or supernatural events	When I was a child, I saw a black dragon on a bright day with lightning, thunder and heavy rain.
attention to other hot spots (6)	Direct attention to other important issues	People no longer pay attention to detrimental textbooks.

Although playing with memes might seem a simple joking act, it had deeper implications. Memes in language carried more than humor value. What this society found funny through memes could reflect underlying meaning. In this case, when people engaged with news through playing with memes, news authenticity became less important. Instead, the focus was on the enjoyment and social interaction provided by playing with memes. The meme-playing group used this form to attract those with similar ideas, feelings and positions, thereby creating a sense of empathy and identity [44]. This behavior was a way to avoid intense arguments and conflicts, using humor as a social interaction tool.

3.4.5. Objective discussion

Objective discussion involves discussions based on objective facts and observations related to the topic. People tried to share eyewitness descriptions to make the event more convincing, or associate paranormal events to show unexplainable aspects. There were also dissemination of remarks, Summer Festival exposure and attention to other hot spots. Compared to the three types of subjective

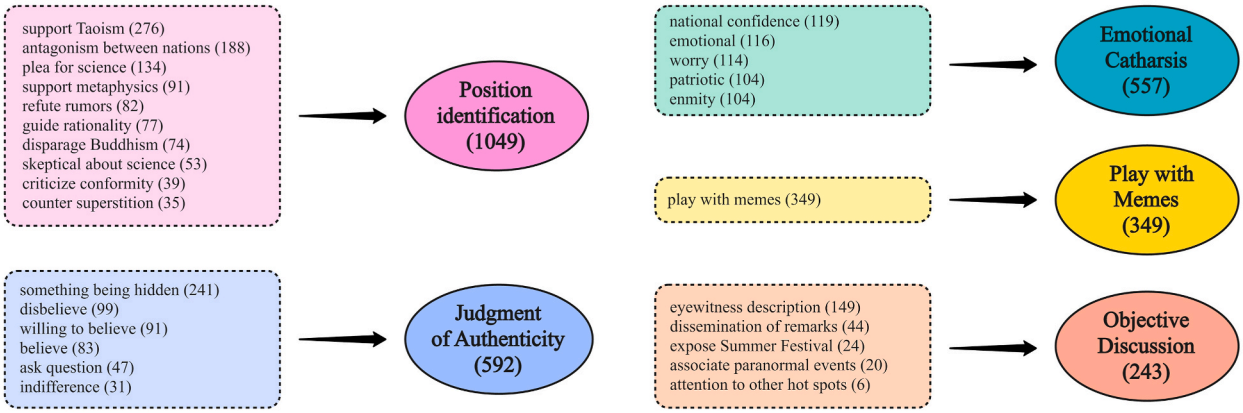

Fig. 4. Results of axial coding.

expression — position identification, judgment of authenticity, and emotional catharsis — the number of objective discussion was the lowest, with only 243 reference points. This indicated that people were not as enthusiastic about the real situation.

3.5. *Theory construction*

In this section, existing literature, comment materials, coding nodes and memos were integrated into a relevant framework [39,42]. We then expanded advanced categories to encompass the broader topic. A core concept emerged — the psychological needs for supporting and spreading fake news. To explore these real needs, we utilized Satir's iceberg metaphor, a valuable analytical method for researching potential demand [45].

The human mind is a complex structure, and behavioral manifestations reflect the unique inner world of each individual. The personal inner iceberg model consists of seven levels: behavior, coping stances, feelings and emotions, thoughts and beliefs, expectations and demands, longing, and spirituality and essence [46]. Through iterative comparison of concept relationships and incorporation of source materials, a psychological model for supporting fake news was developed (Fig. 5).

Our coding results can be mapped to five levels of the iceberg model. Observable behavior (above the surface) includes supporting fake news and engaging in objective discussion. Hidden psychological needs (below the surface) involve emotional catharsis, authenticity judgment, position identification and real motivations. In the model, support for fake news was the research phenomenon, while psychological needs provided an explanation for it. All other concepts arose from the inductive coding of primary sources (axial coding on the left, open coding on the right).

Support for fake news and objective discussion correspond to the behavior level. Liking, favoriting, reposting, following, commenting, and sharing are the most visible manifestations of individual interactions with fake news content. Playing with memes reflects an effort to engage with the fake news topic in a more humorous and less confrontational way. People may share eyewitness

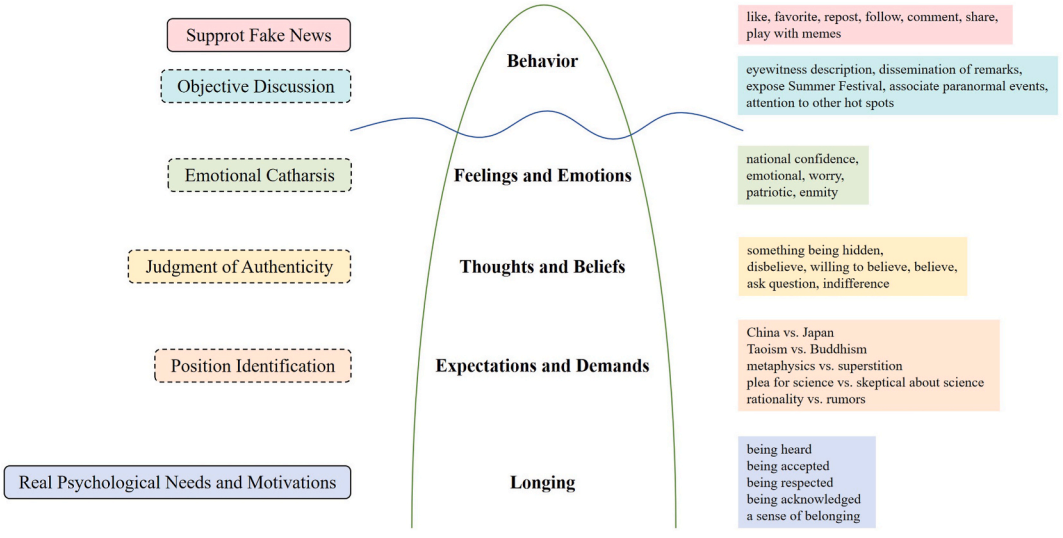

Fig. 5. Psychological model for supporting and sharing fake news.

descriptions, disseminate remarks, or associate with paranormal events. This indicates that, to some extent, individuals attempt to incorporate objective elements into their discussion of fake news, although not as a dominant factor in their overall reaction.

Emotional catharsis is related to the feelings and emotions level and is a crucial hidden psychological need. People express feelings such as national confidence, excitement, worry, patriotism and enmity. These emotions act as strong internal drives that influence individual attitudes towards fake news. People with similar emotions tend to gather together, forming in-groups, which reflects the need for emotional connection and empathy.

Authenticity judgment corresponds to the thoughts and beliefs level. People hold various views, such as being skeptical, willing to believe, or indifferent. This aspect is related to cognitive processes and belief systems. The perception of authenticity affects whether an individual is more likely to support or question fake news.

Position identification relates to the expectations and demands level. It reflects the stance on various aspects related to the topic. People may support Taoism or disparage Buddhism, have different views on science and superstition, and even incite antagonism between nations. This is a vital factor as it often determines the overall attitude and behavior towards fake news and is the core motivation behind many related reactions and behaviors.

Real psychological needs and motivations correspond to the longing level. People hope their voices will be heard, that others will approve of their feelings and ideas, and that they belong to a group that respects them. This mirrors people's deepest desires: to be accepted, acknowledged, and have a sense of belonging.

Although the primary nodes of the model originate from the specific case studied, the advanced nodes generated from it have conceptual applicability and can provide a certain explanatory effect for fake news in general. This model elucidates the psychological features and real needs behind people's reactions when they encounter fake news. The psychological model constructed on the basis of the coding results links the behavior of supporting fake news with psychological needs, explaining the deeper motivations of people supporting fake news.

3.6. Reliability test

To ensure consistency in text comprehension, topic extraction, content analysis, and interpretation, it is necessary to examine the coded data [47]. In this study, time agreement and rater agreement were used to assess coding consistency [48]. Twenty samples randomly selected from 1933 comments were recoded two months after the initial coding, and another researcher was also invited to code them. The test results showed that the test-retest reliability was 92.49 % and the inter-rater reliability was 92.03 %, both exceeding the 80 % threshold [49]. This study thus had good coding reliability, which provided credibility to the findings of the study.

4. Discussion

The previous sections have presented a detailed analysis of the data related to the "Sino-Japanese theurgy fighting" using content analysis and Grounded Theory. This has provided us with valuable insights into the phenomenon of fake news. Now, we will further explore the various factors and implications associated with it.

4.1. Triangulation of content analysis and Grounded Theory

In this study, a data triangulation approach was adopted [50]. We conducted content analysis on comment times, IP addresses and high-frequency words, and utilized Grounded Theory to code the comment content, obtaining mutually verified quantitative and qualitative results. Content analysis and Grounded Theory complemented each other. The quantitative data provided by content analysis, such as the time distribution and geographical distribution of comments, corroborate with the qualitative analysis in the Grounded Theory.

The time distribution of comments reveals the short lifespan of hot news and the rapid shift of popular concerns, which is consistent with the change in people's attitudes and psychological needs during the dissemination of fake news. The geographical distribution shows that topics can easily spread around relevant scenes due to the proximity acceptance psychology and TikTok's local push mechanism [51], indicating that regional clustering may lead to the spread of fake news among those with similar judgments or emotions [15]. The time distribution shows the change of news heat and public focus of attention, which provides a temporal order basis for the dynamic development of nodes in the rooting theory. For example, in the early stage of the event, there were more nodes related to truth debates, and with the passage of time, the nodes related to position expression increased, which matched the shift in the focus of public attention reflected by the two peaks in the temporal distribution. Geographic distribution reflects the relevance of different regions to the event and user engagement, which helps to explain the differences in the performance of nodes in different geographic regions in the rooting theory. For example, specific nodes related to the event (e.g., support for Taoism, boycott of Japanese activities) appeared more frequently in regions directly related to the event, such as Zhengzhou and Nanjing, which provides a quantitative explanation for the geographic pattern of qualitative nodes, and collectively reveals the psychological and social factors behind the spread of fake news.

Moreover, the high-frequency words exhibit a similar trend to the nodes generated by coding in terms of content and number, providing a basis for node ordering and concept comparison. The quantitative data from content analysis, particularly the frequency counts of high-frequency words, plays a crucial role in determining the significance and order of qualitative nodes. For instance, the word "science" appears 435 times with a weighted percentage of 2.63 %, while "believe" shows up 370 times with a weighted percentage of 2.24 %. These frequencies indicate that topics related to the authenticity assessment and belief in the event are highly

prominent in the comments. Nodes such as "plea for science" and "believe" are thus given more weight in the qualitative analysis as they are strongly represented in the quantitative data. In contrast, words like "doge" with a frequency of 29 times and a weighted percentage of 0.18 % suggest a more peripheral or nuanced aspect of the discussion. This quantitative information helps in ranking the qualitative nodes, with those having higher frequencies and percentages being placed higher in the hierarchy of importance during the analysis process. The theoretical model based on Grounded Theory effectively describes the public's psychological state. From the relationship between categorical concepts, we understand that most people support and spread fake news to express emotions, views and positions for group empathy, rather than for objective facts or true belief [14]. Therefore, to reduce the harm of fake news, it is necessary not only to enhance people's ability to recognize fake news, but also to address people's psychosocial needs. The combination of these two methods has proven to be effective in uncovering the hidden patterns and psychological mechanisms behind the spread of fake news. Next, we will examine how social environment factors contribute to the dissemination of fake news.

4.2. Factors of social environment

The findings from the triangulation of content analysis and Grounded Theory have set the stage for understanding the role of social environment. Now, let's turn our attention to how the social context shapes the spread of fake news and influences public behavior. In the context of intensified social conflicts, fake news can serve as a tool for social struggle [52]. Social groups may provide plausible information when confronted with specific problems [53], reflecting collective social beliefs. Due to emotional and conceptual congruence, social groups gather on social media, spreading statements favorable to their in-group to achieve identity and emotional catharsis. For example, they may express national sentiments regarding ethnic relations or show indignation at the unjust actions of some Buddhist temples. The homogenization of groups is worsening, evolving into an online frenzy that disregards the truth [54]. Social groups gather on social media due to the consistency of their emotions and perceptions when facing specific issues. For example, in the case of the "Sino-Japanese theurgy fighting", people expressed their indignation towards Japan and their support for local cultures such as Taoism based on factors such as national sentiments. As the discussion deepens, individuals are emotionally reinforced in the group, and their originally different views become more extreme in group interactions. This emotional homogenization leads to the strengthening of internal group identity and the increase of inter-group differences, which in turn evolves into cyber frenzy, causing people to neglect news authenticity in the pursuit of group identity, forming a group-polarized public opinion environment that promotes the spread of fake news.

In response to the rise of fake news, the practice of fact-checking [55] has drawn attention as a countermeasure to the spread of fake news, aiming to correct fatal error messages that erode public perceptions. However, in reality, fact-checking programs may not meet initial expectations and may even have the opposite effect. Statements declared false by official agencies may receive more social support due to increased exposure and topicality [56]. On top of that, we are in a post-truth era, a period of rapid change and restructuring of traditional power and order [57]. The authority that once defined and represented the truth has weakened and declined, which led to an epidemic of fake news. And the proliferation of fake news in turn led to a perception that the truth no longer matters, further exacerbating the symptoms of post-truth [58]. In the dissemination of information, truth and logic are ignored, and emotions dominate the direction of public opinion. People's thirst for empathy even exceeds that for the truth.

However, a long-unresolved problem, must not be a problem in essence, but a specific function. Why do people support and spread what they don't fully believe in? Maybe they are eager to pursue empathy and identity through this means, which can be obtained by sharing emotions and value judgments in the majority position. So, position or truth, which is more important? The position itself is considered the truth.

4.3. Analysis of psychological theories

While the social environment provides a broad context, psychological theories offer a deeper understanding of the individual motivations and cognitive processes involved in the spread of fake news. We will now explore how these psychological theories help explain the behavior of people when it comes to believing and sharing false information. According to the dual-system cognitive process theory, people often tend to use heuristic thinking rather than analytical thinking when confronted with fake news [9]. Heuristic thinking can process information quickly and save cognitive resources in daily life, but it may lead to inaccurate conclusions when judging fake news [12]. In the case of the "Sino-Japanese theurgy fighting", for example, some strongly emotional descriptions or information that matches established beliefs easily trigger people's heuristic thinking, causing them to quickly believe and spread the fake news, with less in-depth analysis and verification. This way of thinking makes emotions dominant in the dissemination of fake news, and specific emotions such as national sentiment and patriotic fervor are reinforced, which in turn promotes the expression of positions related to these emotions. People interact with each other in groups, and emotional resonance further strengthens the recognition of specific positions, leading to the rapid spread of fake news driven by emotions, and the related emotions and positions are continuously strengthened in the process of spreading.

From the perspective of cognitive coordination theory, people have a strong motivation to maintain cognitive coordination in the social media environment. When confronted with fake news, they will selectively accept information that is consistent with their existing positions, beliefs, and values, because such information can enhance their sense of self-identity and security, and avoid the discomfort of cognitive conflict [13]. In the "Sino-Japanese theurgy fighting", people are more inclined to accept information supporting Taoism and boycotting Japan-related activities based on their own national sentiments and religious beliefs, while ignoring or rejecting views that are contrary to them. This selective acceptance of information further strengthens their positional identity and at the same time provides a direction for emotional catharsis. In order to protect their stance and beliefs, people are driven by

psychological defense motives to actively support and spread fake news that agrees with their own viewpoints, thus promoting the spread of fake news on social media.

Motivation theory helps to explain the behavioral motivations of echo chambers and group polarization phenomena in the spread of fake news [16,18]. Group polarization refers to the phenomenon where, within a group, the initial tendencies of members become more extreme after discussion and interaction. In the context of fake news dissemination, motivation theory offers valuable insights into its mechanisms. When individuals are driven by the need for social belonging and identity, as posited by motivation theory, they tend to align with the dominant views within their group. For example, in the case of the "Sino-Japanese theurgy fighting" fake news, those who initially held certain positions regarding national sentiment or religious beliefs became more extreme in their stances when interacting with like-minded individuals. This occurs because individuals seek validation and reinforcement of their views from the group, and in the process, the group as a whole moves towards more extreme positions. In the social media environment, users have a strong need for group belonging. When fake news matches the consensus of a certain group, sharing such fake news becomes a way for users to maintain their group identity and sense of belonging. For example, in the "Sino-Japanese theurgy fighting", some groups formed a negative view of Japan-related events based on national sentiment, and when fake news matching this view appeared, group members tended to share it in order to strengthen the consensus within the group and show their loyalty to the group. This behavior creates an echo chamber effect within the group, causing the same views and information to be repeated and reinforced, further exacerbating group polarization. In their pursuit of group identity, group members may choose to support and spread fake news out of fear of being ostracized by the group, even if they have doubts about its veracity, thus promoting the widespread dissemination of fake news in a given group.

In summary, the psychological theories of dual-system cognitive process, cognitive coordination, and motivation theory comprehensively explain the cognitive processes and behavioral motivations of individuals when dealing with fake news. These theories highlight the role of heuristic thinking, the pursuit of cognitive coordination, and the need for group belonging in promoting the spread of fake news. However, understanding these psychological mechanisms alone is not sufficient. We must further explore the implications of these findings in both theoretical and practical aspects.

4.4. Research implications

The analysis of social environment and psychological theories has shed light on the complexity of fake news. Based on these findings, we can now discuss the significance of this research in both theoretical and practical terms.

4.4.1. Theoretical significance

Traditional research on fake news mainly focuses on its authenticity [6]. However, through the analysis of comments related to "Sino-Japanese theurgy fighting", this study shows that people's support for fake news is not only based on believing its authenticity. Instead, it is affected by multiple factors such as emotional catharsis and position identification. The psychological factors of emotional catharsis and position identification revealed in this study fill a gap in this area. This finding challenges the traditional view and provides a more comprehensive understanding.

The study enriches the theoretical understanding of fake news by revealing the hidden group psychology and realistic needs behind it. It indicates that individuals may support and share fake news to express their attitudes, pursue empathy and identity, and satisfy their spiritual needs. This emphasizes the importance of considering social and psychological factors in the study of fake news, and provides new theoretical support for the future governance of fake news, suggesting that the governance strategy should be shifted from purely focusing on fact-checking to taking into account the public's psychological needs.

Subjective assessments of accuracy and partisan polarization are generally regarded as predictors of fake news behavior [59]. However, the mechanisms of fake news dissemination hypothesized in existing literature may not be applicable to East Asia [34]. Our research emphasizes the crucial role of position in a broader sense for the spread of fake news, which can be explained by social identity theory: Individuals identify with their group through social categorization and increase their self-esteem by achieving or maintaining a positive social identity [60]. This offers new perspectives on the differences in fake news research between Western countries and East Asia.

4.4.2. Practical significance

The findings provide some implications for fake news governance. Despite the discovery of certain values in fake news in this study, its harmful effects cannot be ignored. Rigorous censorship of journalistic authenticity remains necessary. Additionally, a combination of fact clarification and emotion channeling, along with a balance of freedom of expression, should be thoroughly considered. This is because people may support fake news even when they know it is false, indicating that addressing only the factual aspect may not be sufficient.

At the same time, this study has a guiding significance for media practitioners. We highlights the necessity of understanding the audience's psychological and social needs when dealing with news. It suggests that media should not only focus on providing accurate information but also consider how the news may affect the audience's emotions and identities.

4.5. Limitations and Future Study

Despite the valuable insights gained from this study, it is important to acknowledge its limitations. These limitations also point to the need for further research in this area. We will now discuss the areas where future studies can build upon and improve our

understanding of fake news. There are some limitations in this study. First, the data from Chinese TikTok comments on the specific event of "Sino-Japanese theurgy fighting" limits the generalizability of the findings. Given Chinese unique cultural, social and political context, and the specific nature of this event, the results may not be directly applicable to other countries or different fake news events. Second, content analysis might oversimplify complex psychological and social phenomena, and Grounded Theory could be influenced by the researcher's subjective interpretations during the coding process. Last, the study focused on a limited number of factors related to the support of fake news, such as emotional catharsis, position identification and playing with memes. There could be other important factors not explored in this study that might potentially affect the understanding of the phenomenon.

The "Sino-Japanese theurgy fighting" is rooted in the complex historical relationship and cultural differences between China and Japan. Historically, there have been many conflicts and contradictions between China and Japan, and these experiences have affected the national sentiments of the two peoples to a certain extent. In terms of culture, religious cultures such as Taoism and Buddhism, as well as traditional cultural elements such as Feng Shui and Yin-Yang techniques, were mentioned in the incident, reflecting the diversity and uniqueness of the two countries in terms of cultural traditions. This unique cultural and historical background makes the incident strongly symbolic and easily triggers popular reactions based on national emotions, such as patriotic fervor and antipathy toward certain Japanese behaviors. However, this also leads to some limitations on the generalizability of the results of this study. Due to the strong regional and ethnicity of the particular cultural and historical context of the event, it may be difficult to directly generalize its findings to other cultural and social environments. In future research, differences in the spread of fake news in different cultural contexts need to be taken into account in order to improve the generalizability and applicability of the study's findings.

In response to these limitations, future research could conduct cross-cultural studies to compare fake news support and spread in different contexts, determining cultural consistencies or differences. Additionally, longitudinal studies could track changes in attitudes and behaviors towards fake news over time, providing deeper understanding of its evolution and influencing factors. It might also explore additional factors like personality traits, media literacy levels and the role of social media algorithms in shaping exposure and interaction.

5. Conclusions

This study aims to explore the psychological needs behind people's support for fake news, construct a theoretical model and analyze its social impact. By analyzing the comments related to the "Sino-Japanese theurgy fighting", we found that people support fake news for various reasons, not only because they believe in its authenticity, but also to satisfy psychological needs such as emotional catharsis and positional identity. This finding fits with our research goal of digging deeper into the individual psychological needs behind fake news. The psychological model we constructed links the behavior of supporting fake news with psychological factors such as emotional catharsis and positional identity, effectively explains the psychological characteristics of users in the process of fake news dissemination, and achieves the goal of constructing a theoretical model. In addition, the results of the study reveal the impact of fake news dissemination on society, such as reflecting social contradictions and influencing public opinion, which provides a theoretical basis and practical guidance for dealing with fake news.

CRediT authorship contribution statement

Qing Gao: Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Data curation, Conceptualization. **Qianqian Fu:** Writing – review & editing, Supervision.

Data availability statement

The datasets used and analyzed during the current study available from the corresponding author on reasonable request.

Ethics declarations

All the research meets ethical guidelines and adheres to the legal requirements of the study country.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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