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# Panacea or Pandora's box: diverse governance strategies for conspiracy theories and their consequences in China

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This study examines the Chinese government's strategies for managing conspiracy theories (CTs) on social media. While previous research has primarily considered how authoritarian regimes disseminate CTs for political purposes and has often viewed the public as fully receptive to propaganda and easily manipulated, our research explores a broader spectrum of state strategies including propagation, tolerance, and partial rebuttal. Based on social network analysis, topic modeling, and qualitative analysis of 46,387 Weibo posts from 3 cases, we argue that the Chinese government's manipulation of CTs is multifaceted and carries significant audience costs. Our findings indicate that state-led CTs can indeed mobilize public opinion, but they also risk expanding beyond state control, which can lead to unintended consequences that may undermine state interests and limit policy flexibility. This research contributes to our understanding of the tactical and operational complexities authoritarian regimes face when leveraging CTs, while highlighting the intricate balance between state control and public agency.

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## Introduction

In the contemporary landscape, social media platforms have fundamentally transformed how information is disseminated, which has led to a significant proliferation of conspiracy theories (CTs). This rise poses a substantial threat to public perception and understanding. Contrary to the prevailing assumption that democratic states, with their relatively lenient regulatory frameworks, are the primary incubators for CTs, recent evidence has shown that authoritarian regimes with stringent media controls are equally susceptible to this phenomenon (Barberá et al., 2024; Nefes, 2017). The inherent lack of transparency in authoritarian states catalyzes public speculation and the formation of conspiracy narratives (Cheng et al., 2022; Mölder & Sazonov, 2019).

Recent research has increasingly focused on the dynamics of CTs within authoritarian contexts. These studies indicate that authoritarian states strategically use CT to achieve specific political goals. This approach extends beyond mere censorship to encompass strategic manipulation and framing of information for political goals (Hagström & Gustafsson, 2021; Lu & Pan, 2021; Pan et al., 2022; Jaworsky & Qiaoan, 2021; King et al., 2013, 2017). However, significant gaps remain in the understanding of CTs in authoritarian states. Previous research has largely focused on the state as either a gatekeeper (Lahoud, 2023) or promoter of CTs (Chen et al., 2023; Cheng, 2022), often neglecting the possibility of more diverse roles. Additionally, the effectiveness of authoritarian states' employment of CT strategies to achieve political objectives remains unclear and is subject to ongoing debate (Chen et al., 2023; Wang & Huang, 2021).

Our study joins this debate by adopting a mixed-methods approach to examine the varied governance strategies of authoritarian regimes, with a specific focus on China's governance strategies for CTs. We reveal the multifaceted strategies employed by the authoritarian state, encompassing promotion, tolerance, and partial rebuttal—that is, informational denial with behavior aligning with CTs. Furthermore, this study underscores the pivotal role of public agency in the interpretation and dissemination of CTs in the authoritarian context.

To this end, we meticulously analyze three distinct cases: the narratives surrounding a US biological laboratory, the Korean cult phenomenon, and Chinese national security concerns related to Apple devices. These cases are examined through their propagation and discourse on China's Twitter-equivalent social media platform, Sina Weibo. Our findings demonstrate that public discourse transcends the initial narrative parameters set by the state, occasionally leading to unintended outcomes, such as interpreting government policies and behaviors from a CT perspective. Moreover, our analysis highlights the instrumental role of nationalism in swaying public belief regarding certain CTs. Nationalism or an intergroup attitude not only serves as a mobilizing tool for the regime's stability but also emerges as a constraining factor for the state in its efforts to clarify or debunk these theories (Cichocka et al., 2016; Mao et al., 2024). Nationalism's dual role reflects the complex interplay between state propaganda, public perception, and the dynamics of belief formation in authoritarian contexts.

Our contribution to the literature about CTs in authoritarian states is twofold. First, our study provides a detailed and nuanced analysis of the varied strategies employed by authoritarian regimes, with a particular focus on China. This analysis enhances the traditional understanding of authoritarian states as either promoters of or gatekeepers for CTs (Alyukov & Zavadskaya, 2024; Chen et al., 2023; Cheng, 2022; Lahoud, 2023; Nefes, 2017; Yablokov, 2015). Second, our research directly engages with the debate concerning the use of CTs as a tool for manipulating public opinion. Our findings suggest that states may indeed

leverage CTs to achieve specific mobilization objectives, which aligns with the account of effective propaganda (Cheng, 2022; Chen et al., 2023). However, our results also reveal that this approach can lead to unintended consequences. Public discussions can extend beyond the issues and scope defined by the state, and the state's rebuttals are constrained by the intragroup identity they promote, which is ultimately detrimental to the state's interests. As Wang and Huang (2021) demonstrated, public support for the government diminishes when the state asserts falsehoods as truths. Our study complements this finding by showing that the backlash effect persists even when the information in question eludes verification.

## Weaponizing conspiracy theories

Conspiracy Theory (CT) can be defined as the endeavor to interpret specific events or practices through the prism of covert operations conducted by influential individuals, who strive to mask their involvement until their objectives are realized (Douglas et al., 2019; Sunstein & Vermeule, 2009). This interpretative framework is frequently underpinned by three fundamental assumptions: the notion that occurrences are never coincidental, the belief that appearances can be deceiving, and the conviction that all events are interrelated (Puschmann et al., 2022). These assumptions are encapsulated within a wider interpretive lens that perceives history as being deliberately and clandestinely shaped by a select, powerful cadre of conspirators who possess the capacity to influence the trajectory of events over an extended period (Puschmann et al., 2022). The impact of CTs extends far beyond mere speculation and presents tangible challenges to public health, the integrity of democratic governance, and various other facets of society (Chen et al., 2023; Douglas et al., 2019; Jia & Luo, 2023).

The strategic dissemination of CTs is an integral component of authoritarian information statecraft that underscores the state's rationale in propagating specific narrative constructs. This tactic transcends conventional methods of information management, such as censorship and surveillance, as delineated by King et al. (2013), and encompasses a more sophisticated manipulation of information to achieve political ends. Authoritarian regimes, as Roberts (2018) notes, adeptly increase the difficulty and complexity of accessing particular information, thereby subtly molding the informational environment accessible to the public. Moreover, these regimes ingeniously manipulate economic news. For instance, economic growth is frequently credited to the leadership's competence, while economic downturns are ascribed to external adversaries (Rozenas & Stukal, 2019). This approach, which is subtler than blatant censorship, effectively conceals the underlying manipulation and renders it less perceptible to the general populace (Roberts, 2018). The broadcasting of CTs extends beyond mere manipulation of domestic public opinion; it is also strategically employed by authoritarian states in international public diplomacy to influence the perceptions of the global public (Yablokov, 2015). Through this nuanced understanding of information manipulation, we can shed light on the variations in the state's information control in authoritarian regimes, where the dissemination of CTs is a covert tool for shaping public perception and maintaining political dominance.

The evidence of the strategic employment of CTs across different regimes as a deliberate tactic to further their political agendas is also abundant. A poignant historical example is Nazi Germany, a totalitarian regime, which used CTs to justify its anti-Semitic policies (Bronner, 2003). Similarly, Nefes (2017) illustrated how the Turkish government in 2013 used CTs to undermine protests, thus inducing political fragmentation and

altering public attitudes. CTs also function as a diversionary strategy. Barberá et al. (2024) found that during periods of social unrest, leaders intensify their social media activity and shift the focus from domestic to foreign policy issues, with these effects being more pronounced in democracies. In a related observation, Blaydes et al. (2021) note that authoritarian regimes tend to amplify negative news about adversaries, particularly during periods of regional tension. This trend is echoed in the findings of Koehler-Derrick et al. (2021), who reported a heightened prevalence of CTs in state media narratives during national crises between 2015 and 2018 in Egypt. The dynamics of great power competition and global health crises, such as the United States–China confrontation and pandemics, also create a conducive environment for authoritarian states to engage in the dissemination of misinformation, disinformation, and CTs. These tactics are employed not only for domestic influence but also to reshape global public opinion (Hagström & Gustafsson, 2021).

This analysis highlights the strategic deployment of CTs by authoritarian states. However, authoritarian states may adopt more diversified governance strategies toward CTs beyond the dichotomy of promotion and block. For instance, the state may also be a passive observer of CTs emanating from foreign sources. An illustrative example is the widespread CT in democratic societies alleging global control by a select elite group (Uscinski & Parent, 2014), which is also discussed in authoritarian states without provoking governmental response.<sup>1</sup> Existing research has also predominantly focused on the state's informational response to CTs, while largely neglecting the state's behavioral reactions. It is important to clarify that we are not asserting that the state's behavior is a direct result of believing the CT. Rather, the state instrumentally employs the CT as “solid” evidence to justify its actions. An authoritarian state might publicly refute a CT while simultaneously implementing actions or policies that align with the narrative of that theory. For instance, a state might deny allegations that a pandemic originated from a laboratory leak, yet concurrently intensify laboratory security measures.<sup>2</sup> Crucially, these strategies significantly influence how CTs are disseminated and debated among the public in authoritarian regimes.

Empirical evidence on the effectiveness of CTs in achieving political goals is mixed. Cheng (2022) observed that China employs a rhetorical strategy focused on denying accusations and politicizing issues in the context of international confrontation. Chen (2023) also emphasized that states can harness nationalism to shape public reception of CTs, especially those targeting foreign adversaries, while Lahoud (2023) provides insights into the tactics used by Arab states, highlighting their ability to counter and silence CTs that conflict with their political agenda. In addition, Wang and Huang (2021) found that public trust in the government decreases when the news initially labelled as false by authorities is later verified as true, which suggests a potential for backlash against the state's use of CTs.

### Diversified strategies and the agency of public

The foregoing discussion identifies two primary gaps that this study aims to bridge. First, the role of the state in propagating CTs is arguably more intricate than current narratives suggest. A pivotal question emerges: How efficacious are authoritarian regimes in leveraging CTs to fulfill their political objectives? Essentially, this inquiry probes whether authoritarian governments can effectively cultivate public support for CTs they endorse and, conversely, diminish public belief in such theories when they counter them. Cénat et al. (2023) postulated that proactive government interventions in debunking can significantly reduce public belief in CTs; however, the applicability of this assertion in authoritarian contexts remains to be explored.

Second, existing research has often emphasized how authoritarian regimes can manipulate the public's thoughts and attitudes using CTs (Cheng et al., 2022) while overlooking the public's active role in this process (Taylor, 2022). This leads to a critical question: Does the public consistently interpret and embrace CTs as the state intends? This facet of the investigation examines the dynamics of state-disseminated conspiracy narratives and their impact on public perception in greater depth. It challenges the prevailing assumption of a unidirectional influence flowing from the state to the public while suggesting a more complex interplay between governmental messaging and public reception.

This study bridges these gaps by exploring the state's diversified governance approach toward CTs and the role of the public agency in influencing the discourse and dissemination of these theories. A notable oversight in the existing body of research on CTs in authoritarian states is the unintended consequences of such strategies. We argue that social media platforms are a dual-purpose tool for states in disseminating CTs. On the one hand, through active engagement on social media, states can reach the public to propagate disinformation and CTs efficiently and cost-effectively. On the other hand, unlike traditional media, which is more conducive to indoctrination, social media offers a more varied information environment. This diversity enables the public to seek out information and access counter-arguments to CTs despite prevalent censorship and surveillance (Duggan & Smith, 2016; Theocharis et al., 2023). Even on heavily censored social media platforms, the public employs various strategies to challenge and resist official narratives (Wu, 2018). Therefore, while social media sites facilitate state propaganda, they simultaneously empower public discourse and resistance, creating a dynamic interplay between state control and public agency in the context of CTs.

The contagious nature of CTs presents significant challenges for authoritarian regimes, especially in achieving targeted outcomes without unforeseen repercussions. The theory of CT contagion suggests that belief in one CT often increases the likelihood of believing in others (Goertzel, 1994; Imhoff & Bruder, 2014). This tendency is particularly pronounced in authoritarian contexts, where public susceptibility to CTs is generally higher (Mölder & Sazonov, 2019). Consequently, a state's promotion of a specific CT may inadvertently trigger belief in additional, unrelated CTs among the public. In essence, the state's dissemination of a particular CT can result in unintended outcomes whereby public discussions expand beyond the original state-sponsored CT to encompass other CTs or social issues. This proliferation of CTs also may trigger suspicion that manifests in opinions and discussions that are misaligned with the state's interests, such as the interpretation of the state's formal policies through the lens of CTs. The public's process of linking state-endorsed CTs with other conspiracy issues also leads to a complex dilemma. This “improvisation” is challenging to monitor and control, especially when CT hashtags initiated by the state are used by the general public to promote other unrelated CTs. Addressing this problem may require the state to retract or abandon its original state-led conspiracy narrative. This dynamic illustrates the intricate and often uncontrollable nature of CTs within the framework of state-led information strategies.

The narrative strategies of authoritarian states, particularly the reliance on CTs to mobilize public support, can paradoxically impose limitations on the state's governance capabilities. Research has demonstrated that states often use nationalism to influence public receptivity to CTs (Chen et al., 2023; Cheng et al., 2022). Nationalism, while a potent tool for molding public opinion, also presents significant audience costs, particularly in the context of implementing desired foreign policies and shaping public attitudes toward specific actors, issues, and events (Li &

Chen, 2021; Weiss & Dafoe, 2019). Moreover, it is increasingly apparent that the overuse of nationalism can be counter-productive and fail to align with the strategic interests of the state (Xiaolin, 2017). In other words, nationalism in authoritarian regimes is both a tool for mobilizing public support and a set of binding norms that the state must respect and comply with.

This study therefore argues that while authoritarian states may leverage the propagation of CTs to fulfill specific political objectives, this approach is not without potential unintended consequences. The decentralized nature of social media platforms, coupled with the public's active role in steering the discourse surrounding CTs, can diminish the effectiveness of these theories as a universally manipulable tool. The complexity and unpredictability inherent in social media interactions can dilute, or even counteract, the intended manipulative power of CTs propagated by authoritarian regimes.

Our study zeroes in on the dynamics of issue diffusion and the concept of audience cost in the authoritarian governance of CTs. We dissect this premise through an in-depth analysis of three distinct CT cases in China. Each case encapsulates a unique strategy employed by the state in its management and use of CTs. These case studies offer insights into how the state navigates the intricate balance between controlling and exploiting conspiracy narratives, as well as the varying degrees of success and challenges encountered in these endeavors. The exploration of these cases illuminates the nuanced and often precarious nature of CT governance within authoritarian regimes and provides a comprehensive understanding of the strategic use and limitations of CTs in statecraft.

## Methodology

**Case selection.** In this study, we sought to provide a comprehensive analysis of the Chinese government's strategies in the use of CTs by focusing on three distinct cases: a US biological lab producing COVID-19, the sacrifice of a South Korean cult, and Apple as a national security threat. These cases were meticulously selected to represent different management strategies: active propagation, passive tolerance, and partial rebuttal, respectively. This selection ensures representativeness and diversity—encompassing biological weapons, religious issues, and technology—thus enhancing the robustness and external validity of our research. While discussions on CTs are relatively sparse online, these widely discussed cases reflect the necessity and relevance of our study by highlighting the ongoing interaction between state strategies and public discourse on social media. They are invaluable instruments for our exploratory study and shed light on the similarities and differences in CT dissemination networks and discussion content under varying governance approaches. Collectively, these cases demonstrate a broader pattern of state management strategies rather than isolated incidents, which provides a comprehensive overview of the state's varied approaches to managing CTs.

The first case is the unsubstantiated claim that US biological laboratories produced COVID-19, which exemplifies the role of the Chinese state in promoting this CT. The ambiguous origins of COVID-19, which was first identified in Wuhan, have fueled international political tensions and misinformation (Kovalevskaia et al., 2021; Zhu et al., 2023). In the United States, terms like the “China virus” led to travel bans and anti-China sentiment (Ding et al., 2021), while 64.6% of Chinese respondents believe the virus originated in the United States or Europe (Zhu et al., 2023). This dispute has strained United States–China relations and exacerbated xenophobia against Asians (Uji, 2020). China's state media and diplomatic channels, notably through the allegations of Zhao Lijian, have propagated CTs about US labs and gained traction on

platforms like Weibo, which led to campaigns demanding investigations by WHO into US labs that have garnered significant public support (Cheng et al., 2022). This CT resurfaced during Russia's invasion of Ukraine, with Russia accusing the United States of developing biological weapons there, a narrative echoed by China at the United Nations despite international rejection (Leitenberg, 2020). Such disinformation efforts by China reflect its broader strategy to craft CTs pre-emptively to shape public perception and international discourse.

The second case illustrates the CT of cults in South Korea. There are about 14 million Christians in South Korea, encompassing about 26% of its population (Lee, 2019). Among them, many are influenced by religious groups with fringe beliefs and unorthodox practices. Around two million people are involved with these fringe churches. These organizations are financially supported by major corporations, which allows them to host events in large stadiums and build huge churches (Lee, 2019). Cults originating in South Korea are highly active in other regions such as China and Japan. In the past decade, fringe religious groups have been closely connected to a host of scandals, including the Sewol ferry disaster, the impeachment of President Park Geun-hye, the outbreak of COVID-19, and the tragic Seoul Halloween crush (Power, 2020). Starting from the Sewol ferry capsizing off South Korea in April 2014, the CT about Korean cults has garnered attention both within and beyond South Korea. In this tragic event, 304 people lost their lives, most of them young students. It was revealed that the ship's actual owner was the leader of a controversial religious sect, and his profit-motivated modifications to the ship, intended to increase its passenger and cargo capacity, ultimately led to its fatal sinking. In a similar vein, fringe religious groups have also been implicated in other public scandals that have sparked widespread outrage. The CT, which has generated buzz on Chinese social media—especially during the Sewol ferry disaster in 2014 and the Seoul Halloween crush in 2022—centered on the purported “sacrificial” rituals associated with the cult group. The CT also posits that diverse tragedies have sprung from the dysfunction of the South Korean government, ostensibly influenced by this cult.

The third case of CT is targeted to the American company Apple, Inc. This CT posits that Apple poses a threat to Chinese national security by secretly collaborating with the United States without any concrete evidence. This is based on the public sentiment that rejecting Apple products is equated with a display of patriotism, symbolizing support for China in opposition to the United States. The secret restriction of Apple product in some departments or institutions related to the Chinese government is revealed by Reuters (2023), *The Wall Street Journal* (Kubota, 2023) Bloomberg News (2023), and *The New York Times* (Bradsher et al., 2023). However, the Chinese government refuted a speculated ban on Apple products through its spokesperson in the Chinese Ministry of Foreign Affairs and government media, which aims to maintain the confidence of international companies on Chinese market. However, CTs about Apple motivate netizens to appeal openly for a ban on Apple products, and, more radically to attack the spokesperson as a traitor, thus undermining the government's “doing with saying” approach.

## Analytical method

We chose Sina Weibo (hereafter Weibo) as our observation platform; it is one of China's most popular social media platforms with over 500 million users and an average of 260 million daily active users as of September 2023 (Weibo Cooperation, 2023). However, it is worth noting that discussion patterns for CTs might vary across platforms, particularly on knowledge-seeking platforms like Zhihu, where there may be a greater emphasis on



the quality of evidence in discussions of CTs. Nevertheless, given the presence of major state media agencies and celebrities on Weibo, the platform offers valuable insight into the spread of CTs and the interactions among various types of users.

We tailored web-scraping codes in Python to collect both post- and user-level data based on specific keywords (detailed in Appendix Part A). After multiple rounds of data cleaning, web scraping yielded a total of 43,172 posts. Based on these posts, we further collected the Weibo account information of the post authors, totaling 19,907 users. To classify the users, we developed a codebook based on Zhu and Fu (2022) that combined both usernames and Weibo verification statutes such as “government.” We further refined their keyword list and conducted manual validation. Finally, all users were classified into three types: Government (government account and government media), Influencer (commercial media and self-media), and (ordinary) Netizen (full keyword list in Appendix Part B).

We then employed a mix method integrating social network analysis, topic modeling, and qualitative discourse analysis. First, we conducted social network analysis to identify the interaction pattern between different actors within the CT discussion networks. We analyzed all three discussion networks in Gephi and applied ForceAtlas2 (Jacomy et al., 2014) as the layout algorithm with overlap prevented. Nodes are users involved in the discussion, and edges represent mentions between users. Based on our codebook (Appendix Part B), we classified government accounts and government media accounts as governments; influencer and commercial media as influencers; and others as ordinary netizens. The users mentioned (@) by these colored users are shown as gray edges. The size of these nodes is proportional to their degree in networks.

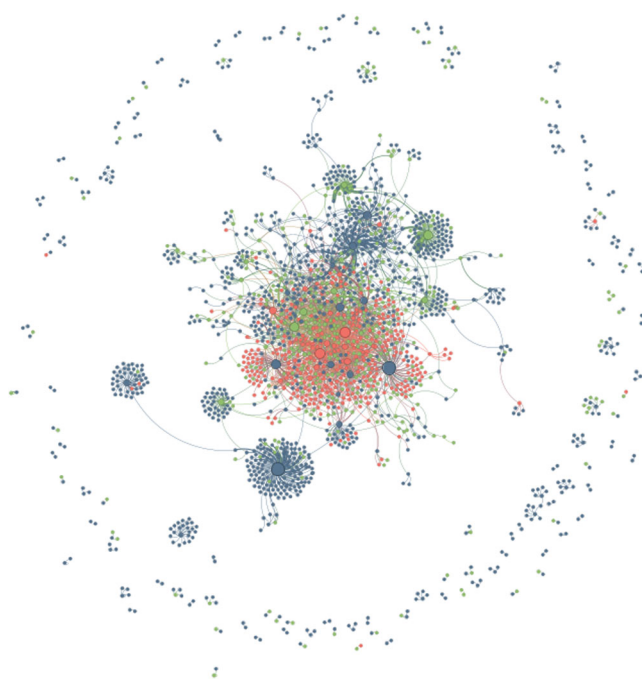
We then conducted topic modeling (Appendix Part C) to investigate how the discussions differ between government agencies, influencers, and ordinary netizens. We used BERTopic for topic modeling (Grootendorst, 2022), as it is suitable for analyzing short texts and capturing the semantic relationships between items and their context (surrounding words), outperforming traditional bag-of-words approaches. The process adhered to standard text cleaning and preprocessing methods. We then determined the optimal number of topics (K) by assessing keyword exclusivity and perplexity until a consensus was reached among the authors.

Finally, our qualitative analysis focused on the most liked posts for each CT. This approach enhanced our comprehension of the rhetorical characteristics, sentiments, and positions of users within the CT discussion networks. We randomly selected 100 posts from our dataset to uncover a broader range of discussions that may not be revealed by algorithms. Throughout our analysis, consistent inter-researcher agreement in interpreting qualitative data reinforced the reliability of our findings.

### Three case analyses

**“U.S. biological laboratory produced COVID-19”.** The first case examines the dynamics of CT surrounding U.S. biological laboratories, focusing on how these narratives, initially framed within a limited scope by the state, expanded to unrelated topics and led to unintended consequences. It also illustrates the interplay between nationalism and CT propagation, uncovering how rhetorical strategies, fabricated details, and public sentiment drive the dissemination and discussion.

The social network analysis of the discussion of the U.S. biological laboratory on Weibo shows an explicit pattern: the state is the core advocate, influencers are promoters, and the general public responds intensively. Government accounts (coral pink) led the discussions about a US biological laboratory



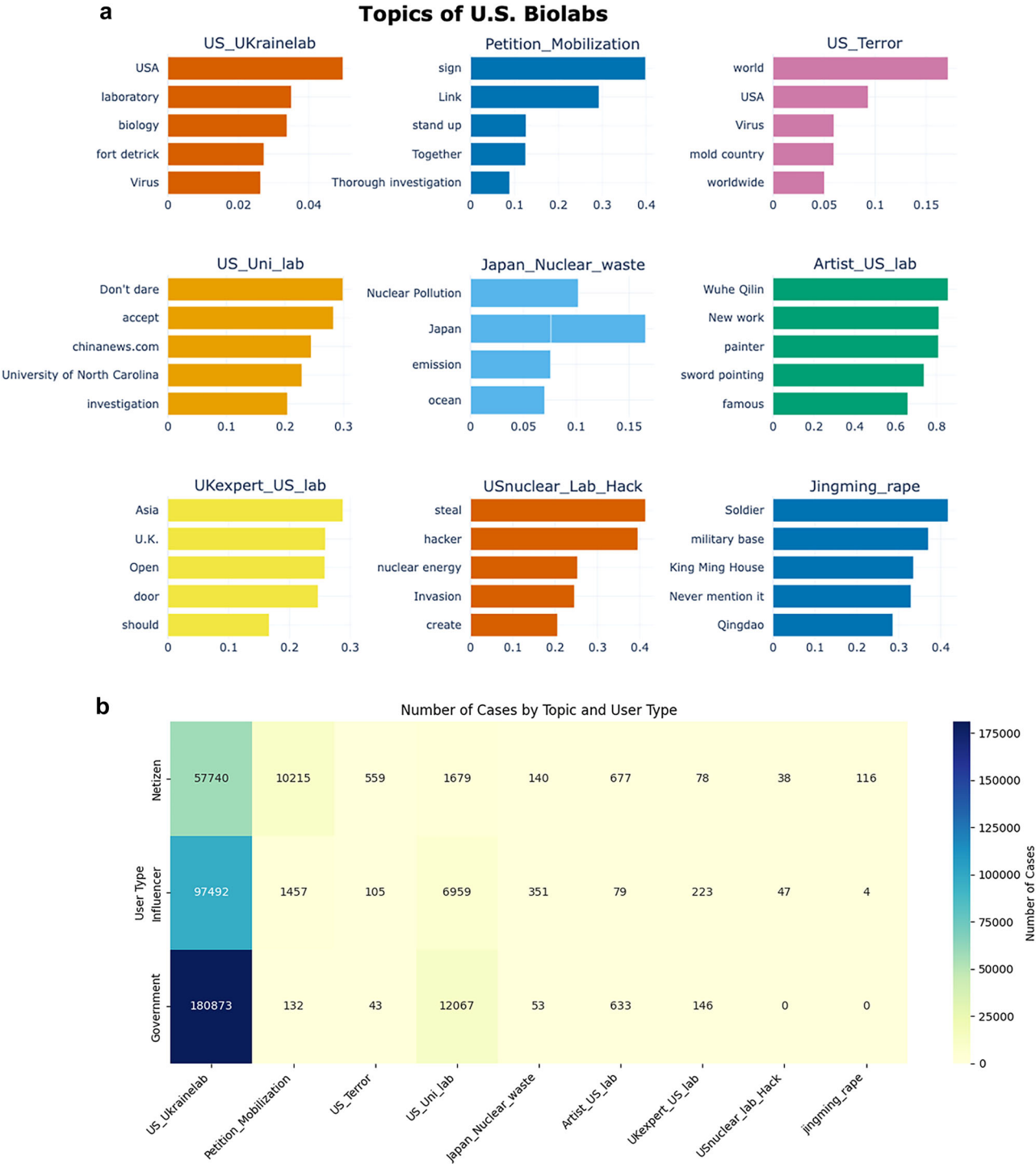
**Fig. 1 Social network analysis: US bio lab.** Accounts of government, influencer, and netizen are respectively colored coral pink, olive green, and gray-blue.

producing COVID-19, as evidenced by their central position and the large node size. The whole discussion network includes 1924 nodes (users) and 281 edges (mentions). Among the users within the discussion network, 18.35% represent governments, 21.99% are influencers, and 59.67% are ordinary netizens. The active participation of these government accounts underscores their role in driving the conversation. Fig. 1

The topic modeling results indicate a complex landscape in the discussions of US bio labs (Fig. 2a). The keywords of the “US\_Ukrainelab” topic represent the main target of the biology weapon, Fort Detrick in the United States and its overseas biological laboratories in Ukraine. The keywords of the “Petition\_Mobilization” topic indicate the remarkable online mobilization participation channel of the biological laboratories CT (i.e., click the link to sign and share the link broadly). Within this mobilization process, in addition to the state’s active role, the topic “Artist\_US\_lab” indicates some famous painters also contributed to the mobilization by using their expertise. As this CT is state-led, we have illustrated how different types of users engaged in discussions of topics other than “US\_Ukrainelab” for convenience of visualization. Figure 2b reveals that official accounts abstain from participating in discussions on the “US\_nuclearlab\_Hack” and “Jingming\_rape” topics.<sup>3</sup>

The propagation of the U.S. biological lab CT exemplifies the issue contagion phenomenon. While state narratives primarily concentrated on the Fort Detrick laboratory, the social media discourse extended these theories and linked them with various other CTs and historical events. This is in line with the literature on CTs: people who subscribe to one CT are likely to believe in others as well (Chen et al. 2023). Our investigation corroborates this pattern; discussions that originated with the Fort Detrick laboratory swiftly expanded to encompass a broader array of topics.

When the state-led CT implicated the Fort Detrick biological laboratory as relevant to the origin of the pandemic, users proposed that the “University of North Carolina at Chapel Hill’s biological laboratory, which has been conducting gain-of-



**Fig. 2 Topic modeling: US Bio Lab.** This figure presents the results of topic modeling of the case about “U.S. biological laboratory produced COVID-19”. **a** Barplots illustrating the proportion of keywords associated with each identified topic. **b** Heatmap illustrating the number of discussion cases by topic and user type, with color intensity indicating case volume.

function experiments on coronaviruses since 2015,” could be another possibility. Based on the image of the United States as depicted in this public crisis, some users also speculated that “Japan’s discharge of nuclear-contaminated water into the sea was orchestrated by the United States.” Following the speculation of the cause of COVID-19, a further connection was made: one user drew a parallel between COVID-19 in 2019 and the large-scale rhinitis outbreak in Inner Mongolia, China, in 2016, and suggested that the latter was also caused by biochemical weapons in Ukraine.

It is crucial to recognize that the public discussion of CTs does not invariably align with the interests of the state. It can, at times, have unintended consequences. A case in point is the promotion of the Sinovac vaccine by China, hailed as a pinnacle of domestic scientific achievement. However, the dissemination of CTs regarding American laboratories led to an unforeseen turn. Some users on Weibo began associating the Sinovac vaccine with these American laboratory CTs, as illustrated in the following excerpt:

I was very healthy before! Afterwards, I constantly felt lethargic and weak! I went to the hospital for a blood test and found my platelet count had dropped to 80! The doctor advised me to rest. A few months later, in July 2022, my platelet count dropped to 35! The doctor told me I was in life-threatening danger and advised me to get examined and hospitalized at a major hospital! However, due to poor family conditions, I couldn't afford the high cost of medical examination and treatment! Some people who went to Sinovac were stopped by the police! Others who petitioned in Beijing were intercepted and sent back by local authorities! Later, I accidentally came across a news piece saying that the Bill & Melinda Gates Foundation had signed a strategic cooperation agreement and confidentiality agreement with Sinovac 10 years ago! The registered location of Sinovac is abroad, and most of its shareholders are foreigners! The U.S. and the Bill & Melinda Gates Foundation support biological laboratories all over the world! Many of these labs have unspeakable purposes, like the virus laboratories in Ukraine! They even use psychiatric patients for dangerous virus experiments! There is evidence that they are researching biological weapons! Russia has even found evidence of the U.S. researching and manufacturing new coronaviruses! And the Gates Foundation aims to reduce the world population by 10 to 20 percent through vaccines and health measures—just thinking about it is frightening!

The use of incendiary rhetoric and the integration of fabricated details have notably intensified the impact and perceived credibility of CTs in the context of mobilization. During the propagation of laboratory-related CTs, for instance, numerous evidence-based terms such as “solid proof,” “truth,” “expose,” and “indeed” were frequently employed. These terms significantly swayed public perception of authenticity, particularly when paired with purported “details” (Miani et al., 2022). The fabrication of such details was often grounded in Russian disinformation campaigns. A notable example is a claim circulated by a Weibo user, asserting that:

U.S. President Biden's son is linked to Ukrainian biological laboratories. On March 24, the Russian Ministry of Defense claimed the Rosemont Seneca Partners investment fund, co-founded by Hunter Biden, son of U.S. President Biden, and the Open Society Foundations established by George Soros, were implicated in financing biological weapon research facilities in Ukraine.

This exemplifies how CTs are not only crafted with strategic language to enhance their believability but also are laced with intricate, fabricated details to further bolster their persuasive power.

Another important aspect is the deep intertwining of nationalism in the dissemination of CTs, where the us-versus-them dynamic, rather than the content of the CTs themselves, becomes a key driver for the spread of the topic. In the context of escalating tensions between China and the United States, CTs targeting the United States have been observed to stoke nationalist sentiments among some Chinese citizens. This phenomenon is fueled by a recurring theme in state media propaganda, which frequently casts blame on the United States. Nationalistic fervor drives these discussions, with criticism expressed through both direct insults and sarcasm. An illustrative example is a user's comment facetiously suggesting that the Nobel Prize in physiology or medicine be awarded to US biological labs for allegedly developing bioweapons globally.

Many netizens engaged with this CT as part of a broader narrative war between nations. For instance, a Weibo user's

comment, “He (the rival states) spreads rumors to defame you, so you spread rumors to defame him, fight magic with magic,” indicates an understanding that the US laboratory CT is a form of state retaliation for international blaming. The user participates and views this participation as a method of countering US narratives. Another user's statement suggests that, in the realm of public opinion, China should abandon its concern for “saving face” and adopt more unrestrained tactics to match the perceived shamelessness of its adversaries. This sentiment implies that some netizens believe China should engage more aggressively and less ethically in the information war against the United States to gain an advantage. It is important to note that we do not assert that the public is fully aware that their own government's statements may be unreliable.

### “Sacrifices by South Korean cults”

This case explores how CTs about South Korean cults have permeated public discourse, linking various tragic events to cult influences. These theories, largely driven by netizens and influencers without direct government involvement, highlight how such narratives are used to interpret both foreign and domestic incidents, often fueling criticism of government transparency and effectiveness.

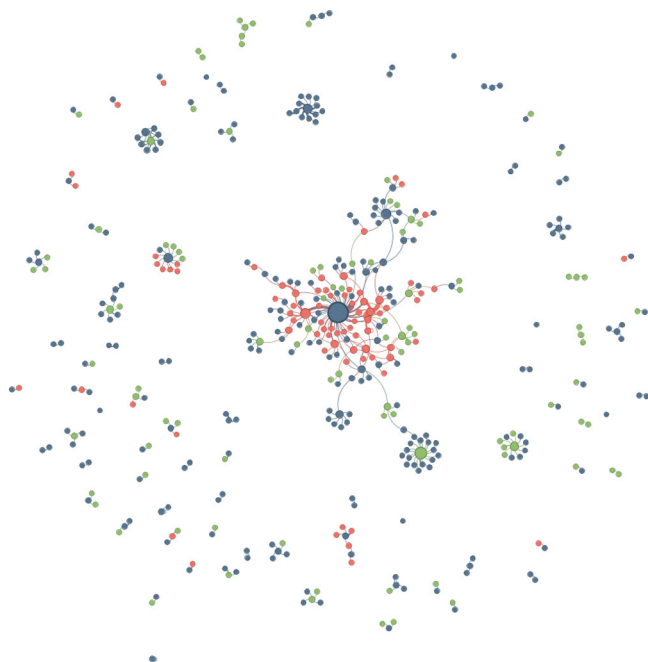
The role of government accounts (coral pink) in the discussion of Korean cults is best summarized as tolerance because the discussion is primarily driven by influencer nodes (olive green), which form distinct clusters and drive the conversation. Netizen nodes (gray-blue) interact within these clusters, which highlights the localized discussions around key influencers. The whole discussion network surrounding Korean cults involves 428 users and 383 mentions. Among the users, 18.46% represent governments, 23.13% are influencers, and 58.41% are ordinary netizens. We identified 33 key discussants and 35 mentions after filtering for those who interacted 5 times or more. Our review suggests that: (a) most discussions happen among influencers and netizens, (b) higher-level anti-cult (反邪教) government agencies receive notifications from subordinates about Korean cults as key discussants, and (c) no account belonging to the Chinese central government appeared as the initiator (Fig. 3).

The topic modeling analysis above reveals several key points about the discussions surrounding the Korean cult and the differing perspectives of various groups. Primarily, the discussions are centered around CTs related to events labeled as “Seowl\_sacrifice,” “Pandemic\_Korea,” “Cult gathering,” and “President\_Scandal.” Notably, official accounts do not appear to be engaged in this CT discourse. In contrast, general users, including both netizens and influencers, are heavily involved, especially in discussions about CTs related to South Korean cults, with netizens focused more on political events linked to the cult. The analysis also suggests that the state has not significantly led this CT discussion. There is also a spillover effect in the topics of conversation, expanding from “Seowl\_sacrifice” to broader issues of “President\_Scandal” and “Pandemic\_Korea” (Fig. 4a, b).

In this CT discussion without state engagement, Weibo users also spontaneously join the discussion by directly linking disasters to sacrifices by South Korean cults. They concurrently assume that the Seoul Halloween crush was attributable to the cults.

I always feel that even if the CT that the Sewol ferry disaster was a sacrifice by South Korean cults seems reasonable, otherwise it just shows the extreme incompetence of South Korea. It's baffling that despite the ability to conduct rescue operations, having received early warnings, and with media coverage at the time, no rescue efforts were made.

Furthermore, another user posited that the Seoul Halloween crush shares similarities with conspiracy to the ferry disaster. The



**Fig. 3 Social network analysis: South Korean Cult.** Accounts of government, influencer, and netizen are respectively colored coral pink, olive green, and gray-blue.

user suggested that since the crush targets an unspecified group of people, it can be inferred that it's another cult ritual of human sacrifices, like the Sewol Ferry incident. It took place at a U.S. military base, with the perfect convergence of time, location, and people. Some users even provided reasoning to logically ground the plausibility of the CT. For instance, one user noted that doubts about this incident are increasing and, just like the Sewol Ferry case, there are many logical inconsistencies.

When things are abnormal, there must be something amiss. If the South Korean government is truly ineffective, then this incident wouldn't be the biggest since the Sewol Ferry, but rather, like in India, there would be incidents every few months. Therefore, this accident must have been meticulously orchestrated by someone with immense power, causing all relevant departments to be paralyzed. Hence, I agree with two conspiracy theories: 1. Yoon Seok-Yeol's human sacrifice, 2. Samsung Chaebol's revenge.

In addition to discussing the connection between disasters and cults, the discussion of the CT concerning South Korean cults expanded to discussions among the public regarding the alliance between the United States and South Korea. In these discussions, Chinese netizens view the United States–South Korea alliance as being in opposition to Chinese national interests. They often criticized South Korea for what they perceived as a lack of national sovereignty and concerns related to the influence of cults. For example, one user stated, “South Korea is going to be destroyed by cults this time. The U.S., chaebols, cults, and the government—even with the separation of these four powers, it's shocking that the government is actually the weakest.” Other users also commented that South Korea is “sacrificing itself to the United States,” thus implying that South Korea lacks sovereignty and is in submission to the United States in a way similar to cult sacrifices. This perspective reflects a view that South Korea is not acting independently but is rather entangled in the geopolitical strategies of the United States against China.

Surprisingly, this CT without state leadership results in intended consequences. The notion of a “sacrifice CT” resonated among some Chinese citizens as a lens through which they view and interpret domestic affairs. While discussing the CT about South Korean cults causing tragedies with hundreds of casualties, Chinese netizens also drew connections to the Chinese local government's handling of similar tragic events and expressed dissatisfaction with its transparency. For instance, the collapse of the Qiqihar school gymnasium on July 23, 2023, resulted in the deaths of 11 individuals and injuries to 4 others. This tragic incident occurred at No. 34 Middle School, located in Qiqihar, Heilongjiang Province, China. Most of the victims were members of the school's girls' volleyball team, who were practicing in the gym when it collapsed. There was a significant public outcry after this tragedy with a particular focus on the authorities' failure to provide timely and transparent communication. Some users linked this event to those in South Korea, “The northeast has been deeply infiltrated by South Korean cults. It is not surprising that incidents similar to the Sewol Ferry tragedy are recurring. Sacrificing athletes, girls aged 15–16. Born after 2000, it's horrifying,” and “the incident in Qiqihar, following a procedure eerily similar to that of the South Korean Sewol Ferry incident, is strikingly familiar.” The public grievances against local governments challenge the government's lack of openness and transparency in handling such incidents, while applying pressure on the government to be accountable for this tragedy.

In this discussion, the state account did not directly lead or get involved in the CT discussion but released warnings about the penetration of South Korean cults. The government account Hefei Anti-Cult (@合肥反邪教) posted:

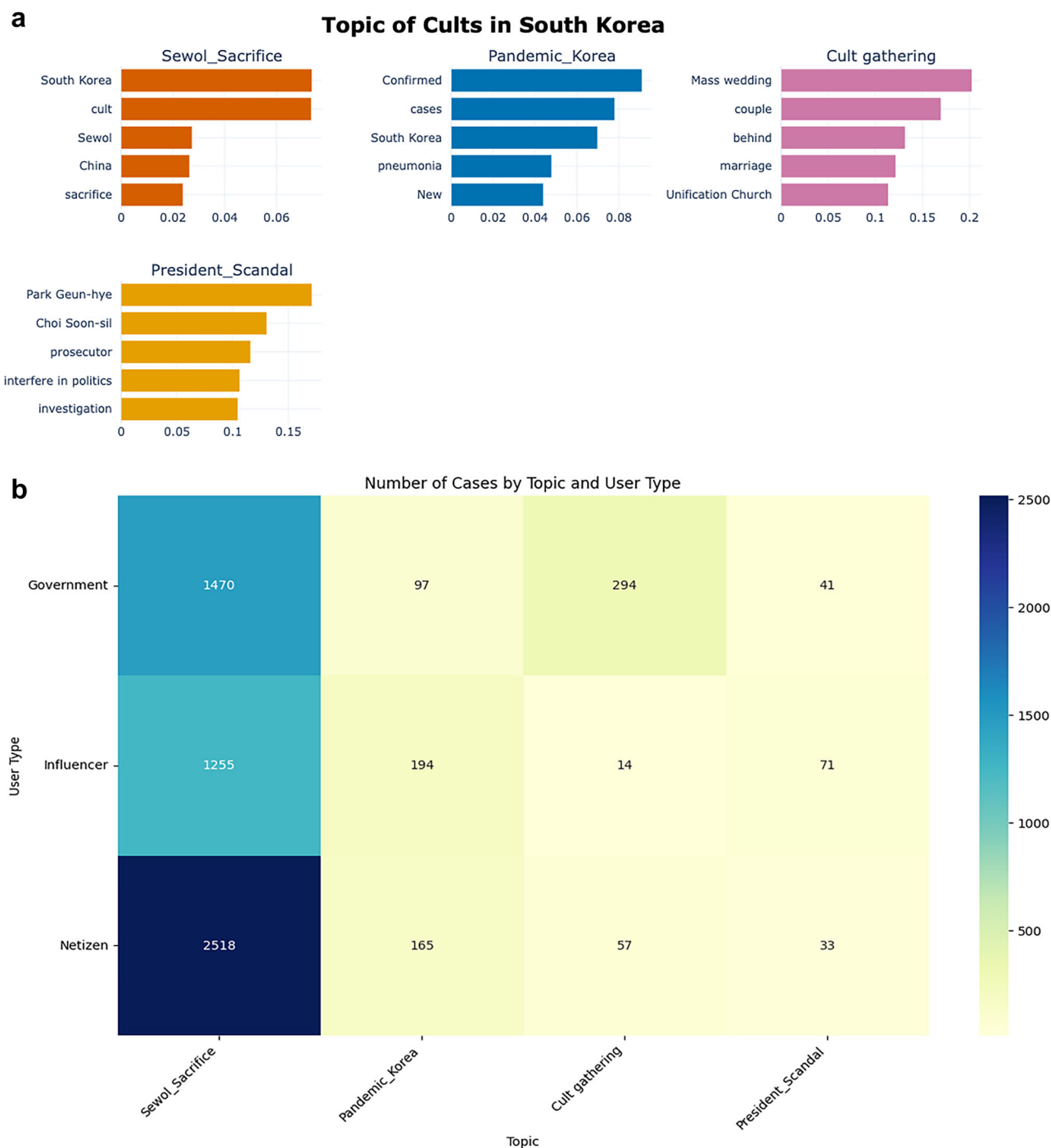
#AntiCultMovement# [Beware of 'Foreign Cults' Traps]  
The South Korean cult “Providence Church” was established by Jung Myung-seok in the 1980s in South Korea. Jung Myung-Seok fled South Korea in 1999 before being formally charged with sexually assaulting female followers. Since 2002, Jung Myung-seok has been wanted by Interpol. During the heyday of Providence Church, it exploited religion to amass wealth and manipulate women, which is outrageous.

Anti-cult accounts managed by local governments also occasionally mention the accounts overseen by higher-level government authorities or the China anti-cult account. The state has thus presumably noticed the CT discussion but appears to be taking an onlooker role in the conversation. Even if the state remains a bystander, the public discussion has expanded from CTs about Korean cults to encompass criticisms of the alliance between the United States and South Korea. Users who subscribe to CTs about the cult that resulted in tragedy are also making connections between China and South Korea to criticize the effectiveness of Chinese local governments in managing catastrophic events. It can be inferred that these citizens hold the cult responsible for brainwashing official leaders in local government and that this contributed to the tragedy while also voicing grievances about the government's inability to prevent the influence of the cult. Even when the state is perceived as an observer in CT debates, its role can still provoke unintended consequences.

### “Apple as a national Security threat”

In China, a CT about Apple posits that the company poses a national security threat by allegedly collaborating with the United States in espionage activities against China. While the Chinese





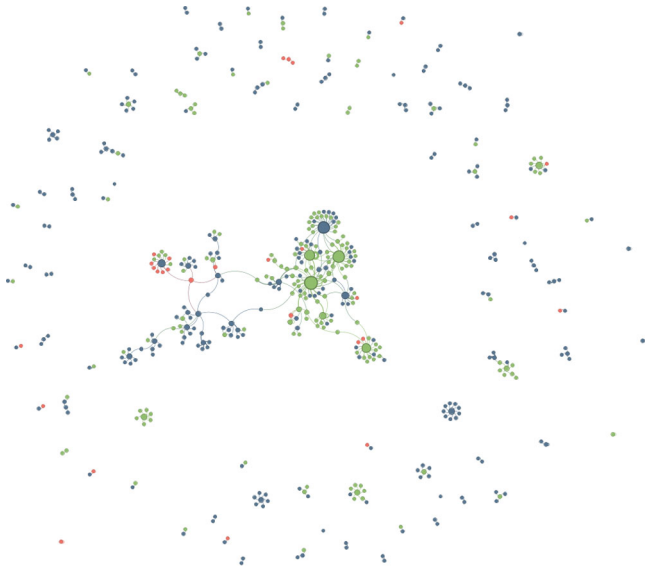
**Fig. 4 Topic modeling: South Korean Cult.** This figure presents the results of topic modeling of the case about “Sacrifices by South Korean cults”. **a** Bar plots illustrating the proportion of keywords associated with each identified topic. **b** Heatmap illustrating the number of discussion cases by topic and user type, with color intensity indicating case volume.

government did not initiate the CT, it has imposed *de facto* restrictions on Apple products within government agencies, i.e., a “doing without saying” approach. However, many netizens on Weibo refuse to accept the state’s open dismissal of the CT. Rather, they call for a complete national ban on Apple products against the government’s approach.

This network contains 479 users and 432 mentions. Among the users, 5.85% represent governments, 37.16% are influencers, and 56.99% are ordinary netizens. Filtering users with 4 or more interactions with others yields 46 key discussants and 34 mentions. Government accounts (coral pink) are noticeably absent from

central roles, which indicates that they did not prompt the discussion. Instead, influencer nodes (olive green) are the main anchors, forming distinct clusters and driving the conversation. The network is characterized by several specialized sub-networks, each with its key influencers. Netizen nodes (gray-blue) participate actively but are primarily engaged with influencers rather than government accounts. These patterns collectively suggest that the discussion of the Apple CT is more of a decentralized, grassroots movement than a centralized, state-driven top-down agenda (Fig. 5).

Topic modeling revealed distinct dynamics in the discussion of CTs related to Apple among three groups of participants—



**Fig. 5 Social network analysis: apple security.** Accounts of government, influencer, and netizen are respectively colored coral pink, olive green, and gray-blue.

government accounts, influencers, and ordinary netizens—and four main topics. The first two topics, “APPLE\_safety” and “Server\_attack,” focus on allegations of Apple’s data leaks and their implications for national security; these directly engage with the CT about Apple as a potential threat to national interests. The other two topics concern a cultural controversy triggered by an image on Apple’s official website; the image depicted a Native American with braids but was mistakenly interpreted as a cultural appropriation of Chinese imagery. While the discussions about Apple’s security issues mostly concern influencers and netizens, those on Apple’s “cultural appropriation” occurred almost entirely among influencers and netizens (Fig. 6a, b).

Many users on Weibo, including commercial media, ordinary netizens, influencers, and state media, have raised concerns about the security risks of Apple products. One user indicated that China Central Television had revealed that iPhones collect users’ geographical data even when location services are turned off and that officials and classified staff should be banned from using iPhones. Likewise, China’s National Security Agency warned against smartphones with security risks and leaking secrets on Weibo, as highlighted by a major commercial media, Daily Economic News (@每日经济新闻). Concern about Apple’s data security was also considered in the context of geopolitical competition between China and its “brotherhood country” Russia against the United States. For example, a prominent journalist on Weibo also mentioned that the Russian State Duma passed a decree banning the use of Apple products, effective from January 2015, because the iCloud “spy program” can transmit users’ information to US intelligence agencies. As such, he suggests that the Chinese state may consider limiting the use of Apple products to protect China’s national security. The report by Russian media site *Sputnik* was also quoted by the Military Channel of China Central Television (@央视军事): “US intelligence agencies have exploited software vulnerabilities of iPhones to steal vast personal data from users without their consent.”

A significant public sentiment within the Apple-related context suggests that rejecting Apple products is equated with a display of patriotism, symbolizing support for China in opposition to the United States. Many Weibo users directly wrote against Apple given the prevailing nationalistic propaganda by blaming US behaviors. For example, a user stated that the nature of Apple’s

insults of China is undoubted, a reflection of the deep-rooted racism in the United States and the West, just like the US government’s persistent rumors about “genocide in Xinjiang.” Apple is also suspected of working with the US government against Chinese national interests, so its various practices are subject to public suspicion. Private firms have reportedly implemented policies that bar employees who use Apple products from promotion opportunities. These boycotts, as highlighted by mainstream media posts on Weibo such as China Consumer Journal (@中国消费者报), are presented as an effort to “strive together with the Chinese people to win the final victory in the China-U.S. trade war.”

Amid this CT, *The Wall Street Journal* and *Reuters* revealed (both on September 6, 2023) that China had prohibited government officials from using iPhones at work, and the ban was widening.<sup>4</sup> On September 12, 2023, *The New York Times* also reported US President Biden’s comments that limiting the use of the iPhone demonstrated that China was changing the rules of international trade.<sup>5</sup> Bloomberg News (2023) also reported that China expands iPhone restrictions in government and state-owned enterprises. However, the Chinese government refrained from criticizing Apple’s national security threat to China directly and refuted the suggestion of a ban. For example, the Chinese Ministry of Foreign Affairs formally refuted the speculated ban on Apple products on September 13, 2023:

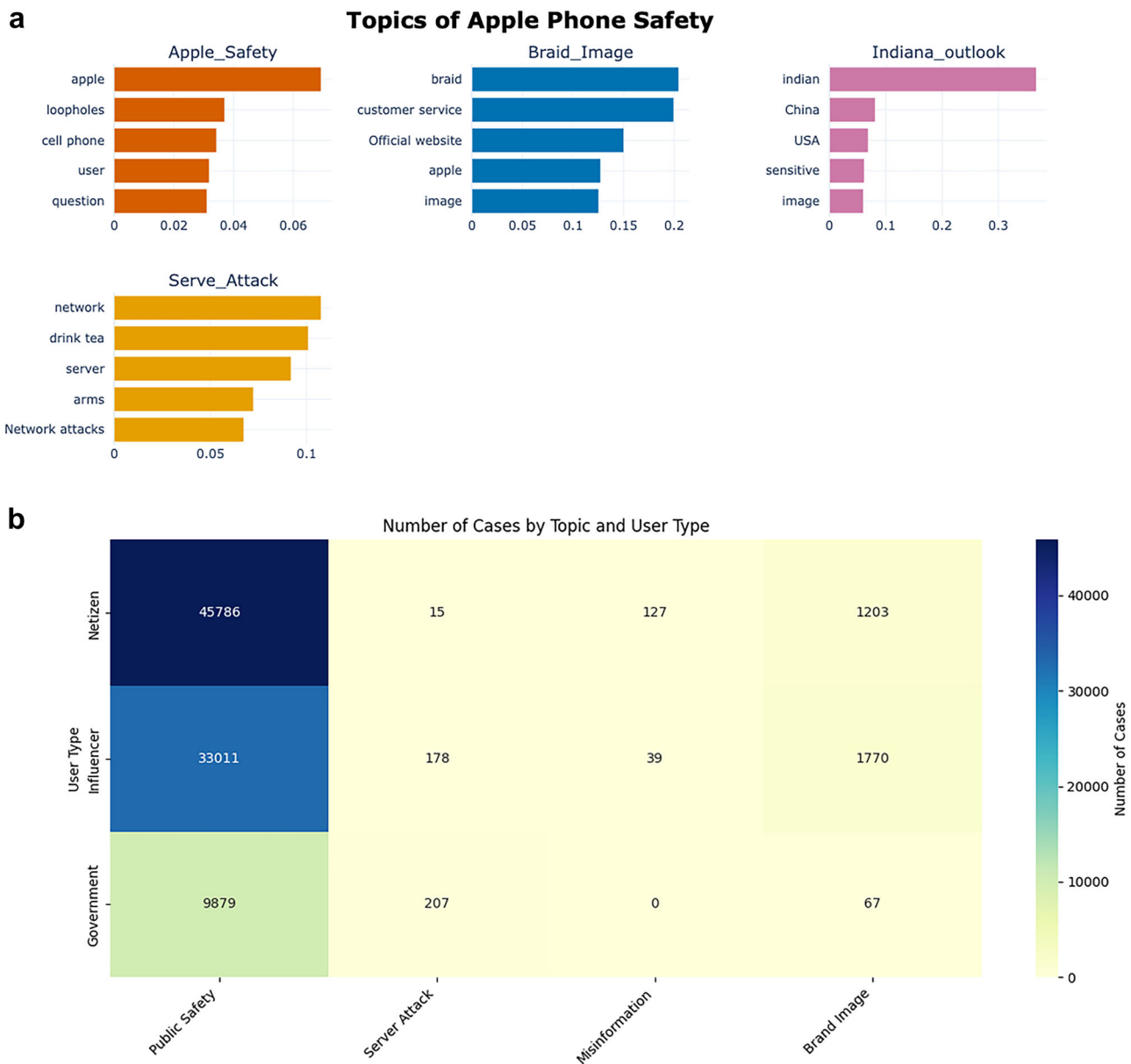
China is committed to advancing high-level opening up... We always treat foreign companies with openness and welcome them seizing the opportunities presented by China’s development and sharing in the outcomes of China’s economic growth.

China did not issue any law, regulation or policy document that bans the purchase and use of cellphones of foreign brands, such as iPhone.<sup>6</sup>

The Chinese government’s mouthpiece *Global Times* also denied the iPhone ban, claiming that “as long as Apple abides by Chinese laws and regulations... it would not face any policy barrier in China” (*Global Times*, 2023).<sup>7</sup> The conditional statement reassured stakeholders while subtly asserting China’s regulatory authority. Through these statements, the Chinese government hoped to demonstrate its commitment to attracting investment from foreign companies and fueling its economic growth, as highlighted by major government and commercial media (@南方日报; @凤凰卫视欧洲台). Some state media outlets (e.g., @法治日报, @南方日报) and official accounts of government institutions (e.g., @浙江省地震局, @三台县公安局) participated in the informational rebuttal of a ban on Apple. However, their posts garnered only a low number of likes and comments.

In contrast to this informational rebuttal, the posts reveal that the Chinese government departments have *de facto* banned the use of Apple products in government: while the official denials are not taken seriously, the public continues to believe the ban is justified, and the state agencies indicate an unofficial but effective ban in practice. More recently, a Bloomberg report on December 15, 2023, reaffirmed that multiple state enterprises and government departments across at least eight provinces have secretly directed their employees to switch their smartphones to Chinese brands.

Weibo users also spontaneously and openly called for the ban of Apple products, a development falling outside state control. Some users believe that because the US government is monitoring Apple phones, the Chinese government departments have required their staff not to bring Apple products into their offices. Others also said that despite the government’s denial, consumers



**Fig. 6 Topic modeling: Apple Security.** This figure presents the results of topic modeling of the case about “Apple as a national Security threat”. **a** Bar plots illustrating the proportion of keywords associated with each identified topic. **b** Heatmap illustrating the number of discussion cases by topic and user type, with color intensity indicating case volume.

should maintain a strong and clear stand against Apple products. Banning Apple is also considered retaliation for the ban on Huawei by the United States. Many posts even appealed to the Chinese government for a national ban on Apple devices for the whole of Chinese society; for example: “beware of the U.S. stealing scientific research data. All researchers should be prohibited from using iPhones!” and “Apple iOS must be prohibited in China... The U.S. could potentially disable all electronic devices in China, including mobile devices, with just one click.” Some radical users also argued that Apple has been banned and dismissed the state’s rebuttal as “only showing weaknesses.”

Finally, while the spokesperson of the Chinese Ministry of Foreign Affairs openly denied the ban on Apple, netizens even proposed investigating whether the spokesperson was in fact a spy. Motivated by this CT, the public appeal to ban Apple products was not expected by the state and undermined its “doing without saying” approach.

## Discussion and conclusion

Our analysis above revealed that authoritarian states may strategically use CTs on social media to achieve political purposes. By combining computational social network analysis, topic modeling, and qualitative case studies, our findings demonstrate that the state’s engagement in CTs varies across different contexts, especially when these theories align with the state’s political goals to varying degrees. In addition to promoting or spearheading CTs (Chen et al., 2022; Chen et al., 2023), the state also used strategies of partial rebuttal and tolerance for these theories.

Our study also indicates that while the state could effectively mobilize the public through CTs for certain political goals, this activity could also produce unintended public reactions beyond the state’s expectations, particularly given the likelihood that belief in one CT often leads to belief in others. It even potentially fuels grievances and criticism against the state or undermines the state’s strategy. The variety apparent in the discussions about CTs

also demonstrates that despite censorship and monitoring by the authoritarian state (King et al., 2013), the public can still voice opinions that differ from the state's. While existing research in democracies often emphasizes individual-level factors influencing the public's reception of CTs (Cookson et al., 2021; Douglas & Sutton, 2011), our study underscores the critical role of governance institutions in CT dissemination and outcomes. This perspective offers a valuable comparative dimension and bridges insights between authoritarian and democratic settings while fostering a more comprehensive understanding of CT dynamics.

In authoritarian contexts, the pervasive influence of long-standing nationalistic propaganda profoundly shapes the public discourse on CTs. A notable consequence is the predominance of a nationalistic stand over objective facts in public discussions. This trend becomes particularly pronounced when the CT narratives resonate with these ideological divides. For instance, in the Chinese context, the United States and South Korea are often perceived as competitors—or even adversaries—to the Chinese nation. As a result, promoting unsubstantiated claims about US biological laboratories producing COVID-19 and the national security threat posed by Apple products are frequently equated with patriotism, while refusing to endorse such CTs can lead to accusations of being a traitor. This dynamic bolsters public support for CTs targeting “hostile foreign nations” and promotes alternative “facts” among nationalists.

Our study further suggests that CTs under authoritarianism can emerge as a double-edged sword. On the one hand, CTs are a potent tool for authoritarian states to mobilize and unify their citizens, as has been widely noted by scholars (Barberá et al., 2024; Chen et al., 2023; Koehler-Derrick et al., 2021). On the other hand, CTs can empower the populace to engage in political discussions and appeal to political requests in ways unintended by the state. The populace may not always conform to the state's desires, particularly in scenarios in which the state's direction shifts. For instance, Chinese President Xi Jinping initiated a rapprochement with US President Joe Biden in November 2023, signaling a strategic diplomatic engagement. Concurrently, the Chinese government was actively attracting foreign investment and revitalizing its economy after mid-2023. However, this period witnessed a paradoxical situation in which open criticism directed at Apple by Chinese netizens conflicted with the regime's intention to bolster the confidence of foreign companies about operating in China, and radical netizens directly accused the state of being overly dovish. Thus, CTs can also have a significant audience cost for authoritarian leaders, which could potentially compromise the state's ability to adapt to adverse conditions effectively.

CTs can also be a force against rational state policies. Authoritarian regimes relying on CTs bear the backlash. CTs are intergroup (i.e., Chinese people) beliefs that assume a powerful or hostile outgroup is conspiring against the perceiver's ingroup (Van Prooijen & Douglas, 2018). Studies have found that nationalist opinions are a powerful escalator for China's foreign policy (Gries et al., 2016) and that Chinese netizens and younger generations may be more hawkish in their foreign policy beliefs than the general population (Weiss, 2019). We therefore believe that this dynamic interplay offers a rich field of study for political communication, particularly in understanding how authoritarian regimes interact with and are adversely influenced by the very nationalist sentiments they seek to cultivate.

As an exploratory study, our research inevitably has certain limitations. Because we used a retrospective web crawler to collect data, there is a possibility that some posts that were censored and removed could not be requested, thus affecting the representativeness of our data. Nevertheless, our validation revealed that despite the presence of stringent censorship, voices critical of the

government persist, and the pre-censored public reaction unintended by the Chinese government may be even stronger. We also considered the potential influence of bots and trolls on engagement with CTs within digital political discourse. However, there is scant evidence of information automation on the Weibo platform (Bolsover & Howard, 2019). Echoing this methodological approach, we meticulously checked our dataset and found that merely 17 users had either posted or reposted content more than 50 times; none seemed to behave like a bot. We then conducted a thorough examination of the personal account information of these users and the content of their previous posts. Notably, our investigation did not uncover any indications of these users being affiliated with the “50 cent army” or operating as bots, which bolsters our confidence in the reliability and validity of our research findings.

Analyzing an observational social media dataset presents challenges in accurately accounting for the diverse responses to CTs within an authoritarian context. Previous studies have demonstrated that the belief in CTs is more likely to be associated with prior political orientation (Nefes, 2017; Uscinski & Parent, 2014). For now, it is hard to examine whether the massive compliance with CTs among the public is due to their belief in CTs or if they are using CT dissemination as an opportunity to express patriotism and collective identity. These reflect different motivations behind seemingly similar behaviors (Hart, 2008). Future research could benefit from collecting more diverse sources of data and employing more sophisticated methodologies, which would help clarify the multifaceted motivations behind public engagement with CTs in authoritarian contexts.

## Data availability

Data is available in the folder “Replication\_data” uploaded.

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## Notes

- 1 See Weinland, D., & Zhou, E. (2020). Conspiracy theories flourish as coronavirus resurfaces in China. *Financial Times*. <https://www.ft.com/content/ba1be5f9-a237-4d3b-95a0-41aa9554d9b>. Accessed May 17, 2023
- 2 See “China vows to enhance bio-lab safety”, *Global Times*, 2020, <https://www.globaltimes.cn/content/1188085.shtml>. Accessed 19 May 2024
- 3 The topic “US\_nuclearlab\_Hack” refers to the cyberattack on a U.S. nuclear research laboratory, resulting in the breach of personal data for hundreds of thousands of individuals. The topic “Jingming\_rape” pertains to the 1948 Jingming Building incident, in which U.S. Air Force personnel were involved in the gang rape of Chinese women in Hankou, China.
- 4 Kubota, Y. (2023, September 6). China bans iPhone use for government officials at work. *Wall Street Journal*. <https://www.wsj.com/world/china/china-bans-iphone-use-for-government-officials-at-work-635fe2f8>. Reuters. (2023, September 6). China bans government officials from using iPhones for work, *Wall Street Journal* reports. <https://www.reuters.com/world/china/china-bans-govt-officials-using-iphone-work-wsj-2023-09-06/>.
- 5 Bradsher, K., Chu, B., & Mickle, T. (2023, September 11). Chinese warnings on iPhones tap deep strain of security concerns. *The New York Times*. <https://www.nytimes.com/2023/09/11/business/apple-china-iphones.html>.
- 6 The Ministry of Foreign Affairs of the People's Republic of China. (2023, September 13). Foreign Ministry Spokesperson Mao Ning's Regular Press Conference on September 13, 2023. [https://www.mfa.gov.cn/eng/xwfw\\_665399/s2510\\_665401/2511\\_665403/202309/t20230913\\_11142374.html](https://www.mfa.gov.cn/eng/xwfw_665399/s2510_665401/2511_665403/202309/t20230913_11142374.html)
- 7 *Global Times*. (2023, 14 September). GT Voice: Hype on iPhone ‘ban’ shows US has a guilty conscience. <https://www.globaltimes.cn/page/202309/1298224.shtml>

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### Author contributions

Overall, All authors contributed equally. All authors collaboratively conducted the study and revised the paper. All authors approved the final version.

### Competing interests

The authors declare no competing interests.

### Ethical approval

As a purely observational study with no human participants, no ethical approval is required.

### Informed consent

The Weibo user's username is anonymized, and our data is only analyzed without individual information. Given the nature of observational study and practices in similar research, no informed consent is required.

### Additional information

**Supplementary information** The online version contains supplementary material available at <https://doi.org/10.1057/s41599-024-04350-1>.

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