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“Just a virus” or politicized virus? Global media reporting of China on COVID-19


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ABSTRACT

This study examines how China was covered and framed in global media reporting during the early stage of the coronavirus pandemic. Relying on a global multilingual COVID-19 online news narratives dataset, we propose multidimensional indicators to assess cross-country and cross-period variations in media discourses on China throughout the year of 2020. We derive and assess two hypotheses to explore factors accounting for the variations. The ideology-conflict hypothesis argues that the ideology distance from China determines the media attention and framing toward China in terms of COVID-19 reporting, while the crisis-mitigation hypothesis emphasizes that the domestic pandemic situation is associated with media discourses on China. Empirical analysis based on data compiled from various sources finds no evidence for the ideology-conflict hypothesis and moderate support for the crisis-mitigation hypothesis. Changes in the coronavirus situation and policy reactions are associated with changes in media coverage of China and the use of politicized terms over time. We conclude by discussing the implications of using online media data to understand the COVID-19 *infodemic* and its contribution to the emerging field of computational sociology.

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"I think that this is just a virus that doesn't care who you are, does not observe party line, does not observe state line ..."

Gretchen Whitmer, Michigan Governor, USA.

Introduction

The coronavirus pandemic has raised substantial concerns about discrimination against specific countries and ethnic groups (Devakumar et al. 2020; He et al. 2020; Lin et al. 2022; Ma and Zhan 2022; Wu, Qian, and Wilkes 2021). As the disease quickly spreads, misinformation on the virus diffuses in the digital communities and leads to so-called *infodemic* and social crises, such as increasing anti-Asian attacks and political polarization (Zarocostas 2020). On September 23, 2020, the World Health Organization (WHO) urged the international society to combat the COVID-19 *infodemic* by mitigating the adverse impacts of misinformation, disinformation, and fake news (WHO 2021). One important feature of the *infodemic* is the politicization of COVID-19 targeting China, which reported the first confirmed coronavirus case on December 31, 2019. A recent global survey by Pew Research Center shows unfavorable views toward China have reached record highs in Australia (81%), the United States (73%), the United Kingdom (74%), and many other Western countries (Silver, Devlin, and Huang 2020). Along with the recording-high negative views of China, hate speech and crimes against Chinese and other Asian groups have been more frequent than ever before (Gover, Harper, and Langton 2020; Tessler, Choi, and Kao 2020).

The media plays a crucial role in reporting the news to the public and in influencing public perceptions (Entman 1989; Gunther 1992). News reporting is not neutral (Lee 2013). Cross-country and cross-period variations in coverage and framing are likely to exist among foreign reporting on China in terms of the pandemic. Variations in information and framings delivered by the media outlet, in turn, may lead to observed differences in public attitudes toward China across countries (Huang, Cook, and Xie 2021). Previous research has focused solely on the media coverage of and public attitudes toward COVID-19 in specific countries, such as the United States, and rarely in the global setting (Hart, Chinn, and Soroka 2020; Pickup, Stecula, and van der Linden 2020; Wei, Yao, and Zhang 2021). We lack a critical understanding of whether and why the coverage and framing of China vary across reporting countries. Understanding the trends and factors accounting for the cross-country and cross-period news reporting on COVID-19 is crucial in combating the *infodemic* in the global context.

This study aims to explore the global media reporting of China during the early stage of the pandemic. Since the outbreak of the novel coronavirus, people have relied and continue to rely heavily on web news to obtain up-to-date information on COVID-19 (Nielsen Company 2020). While the origin of the coronavirus has not been scientifically confirmed, a conspiracy theory that the virus originated from a China lab has appeared frequently in foreign media reporting (Bolsen, Palm, and Kingsland 2020). The spread of biased reporting and views on the origin of the coronavirus has facilitated the formation of hostile attitudes toward China. However, how the global media reports China since the pandemic remains unclear.

Combining computational techniques and a massive online news archive, we construct multidimensional measures of media discourses on China throughout the year of 2020. Previous literature focuses on one specific aspect of media reporting (Binder 1993; McCarthy, McPhail, and Smith 1996). We take these aspects into account simultaneously. Using a compilation of COVID-19 news related to China from media sites in more than 100 countries published during 2020, we document cross-country and cross-period variations in media coverage of China and usage of politicized terms related to China in terms of the coronavirus. Moreover, relying on structural topic modeling, we show that topics in the COVID-19 news reporting in China were not static but closely related to the pandemic situations of the media site's country throughout the year of 2020.

Further, we propose and test two hypotheses explaining the variations in media coverage and usage of politicized terms: the ideology-conflict and crisis-mitigation hypotheses. The former argues that a country's media discourses on China are determined by its ideological differences with China, while the latter posits that the degree of the COVID-19 health crisis in one country is associated with the coverage and framing of China by its media sites. Combining data with extensive measures from various sources, our regression analysis finds little evidence for the ideology-conflict hypothesis and shows moderate support for the crisis-mitigation hypothesis. We further examine how the changes in the COVID-19 situation relate to the media coverage and COVID-19 politicization. The increase in death cases is associated with an increase in media reporting in China. The increase in coronavirus cases and implementation of policies to combat COVID-19 are associated with decreases in media coverage and the frequency of using politicized terms in China. We conclude with a discussion of the implications of the findings for future studies aiming to understand how media outlets report on China in relation to COVID-19.

Theoretical framework

Multidimensional measures of media discourses

We aim to provide a holistic picture of how China is mentioned and framed in the international news.

Media coverage is not neutral but rather exhibits bias. Two external forces are used to explain media bias. The first comes from the demand side, that is, the audience. Media outlets tend to cover negative events and adopt negative framings to attract public attention (Rozin and Royzman 2001). This is also the case with international news, as the public is generally more interested in the negative news involving foreign countries than other news (Wanta, Golan, and Lee 2004). Therefore, when reporting on China, it is likely that media outlets prefer negative discourses to meet the demands of the public. The second stems from the supply side, i.e., the political elites. Political institutions serve as one of the most important information sources for media outlets. Hence, media outlets may selectively cover COVID-19 events related to China to appease audiences and political power elites.

The politicized terms around COVID-19 deliver misinformation to the public. For instance, the previous global public health threat, SARS, has seen the threat of disease metaphor to specific social groups, particularly in China (Wallis and Nerlich 2005). During the early pandemic, the influence of politicized terms about the coronavirus could become more dangerous as the rise of online media speeds up the diffusion of politicized metaphors. Particularly, when opinion leaders use such metaphors to blame China, a certain proportion of people and media outlets follow these leaders and spread them across online platforms or the offline world. Regardless of the incentives, using such metaphors may build a biased figure of China in public and lead to the misperception of the pandemic.

Unlike metaphor use, news framing offers a more comprehensive understanding of what topics media outlets tend to report on in relation to China. Applying topic modeling to text data is a popular approach in the social sciences (Karell and Freedman 2019; Kinney, Davis, and Zhang 2018). In the current study, identifying the topics of the news articles on China associated with COVID-19 is crucial to understanding the focal issues in the international news reporting on China.

Cross-country and cross-period variations in media discourses on China

Both the theoretical literature and empirical studies imply that the media discourses on China during the pandemic could be different across countries

and periods. First, with an emerging transnational media market (Schiller 1993), understanding purposive news production should not be constrained within specific national settings and domestic media outlets (Reese 2001). However, the international exchanges in global news do not necessarily constitute a field because there are distinct journalist traditions across different cultures and countries. Hence, the structure of international information is not balanced. This implies that cross-country variation in media discourses on China in relation to COVID-19 may exist.

Second, several recent studies have shown the variation in public attitudes toward China across countries. The Pew Research Center posits that the public views of China vary across countries and that many countries held their highest unfavorable views in 2020 (Silver, Devlin, and Huang 2020). If public opinions are indeed shaped by media discourses, it is reasonable to expect cross-country variation among the media reporting practices toward China. Moreover, research on the issue-attention cycle indicates that media attention is not static over time. As COVID-19 has spread throughout the entire world, attention to this specific issue has constituted a substantial share of the total news agenda (Boydston, Hardy, and Walgrave 2014). Such a “media storm” may rapidly evolve in line with a dynamic model of the issue-attention cycle. Hence, attention to China in the news is not consistent and may reveal cross-period changes over time.

Hypothesis 1. There are cross-country and cross-period variations in the foreign media discourses on China in relation to COVID-19.

Two perspectives explaining cross-country variations

Evidence of the cross-country variations in media discourses on China raises the question of which particular factors account for such variations. From the related literature, we derive two possible explanations.

Ideology-conflict hypothesis

Social psychologists argue that people generally favor their own group members over outsiders (Riek, Mania, and Gaertner 2006). For instance, in a cooperation game, participants tend to cooperate more with members of their own group than with members of other groups (Brewer 1979; Yamagishi and Mifune 2009). One of the earliest explanations of this, the realistic group conflict theory, proposes that the competition for scarce resources may result in negative outgroup attitudes (Sherif and Sherif 1969). However, this explanation does not deal with the fact that outgroup bias may exist regardless of actual conflicts. Therefore, some scholars propose the symbolic threat theory as an explanation,

emphasizing the importance of conflicting values and beliefs rather than actual competition (Kinder and Sears 1981). This suggests that inconsistency in beliefs and values across social groups may explain the racism, discrimination, and other negative attitudes toward outgroups that exist without actual conflicts between groups.

Scholars have applied the ingroup-outgroup approach to understanding how ideology shapes group attitudes. Based on the existing social and political psychology literature, Brandt et al. (2014) proposed the ideology-conflict hypothesis, which argues that people tend to be intolerant of groups whose values and beliefs are inconsistent with their own. This hypothesis also posits that people may adopt strategies to maintain their worldviews, including motivated information processing and defense against worldview-conflicting groups.

The ideology-conflict hypothesis is well-suited to explaining the influence of ideology conflicts on international reporting bias. In terms of the news reporting of foreign countries, media sites may defend their own ideologies by selective reporting and biased framing of other countries with different types of ideologies. Consider the spread of COVID-19 as an example. Because of the centralization system, China quickly responded to the novel coronavirus and effectively controlled the domestic spread of COVID-19 in early 2020. However, the policy responses to COVID-19 lagged behind China in most democratic countries, such as the United States. From the viewpoint of ingroup-outgroup relations, the ideological differences between these countries and China may have influenced their media sites to adopt a bias and defend their own ideologies by negatively reporting China.

Hypothesis 2. A higher level of inconsistency in ideology between China and another country is associated with more frequent use of politicized terms in the news reporting on China from the media sites of that country.

Crisis-mitigation hypothesis

The crisis-mitigation hypothesis focuses on how a country uses scapegoating as a strategy to mitigate its domestic crises. Scapegoating is used in blaming and often punishing a person or a group for a negative outcome that is largely due to other causes (Rothschild et al. 2012). Allport, Willard, and Pettigrew (1954) argue that individuals or groups seek to symbolically purge their own feelings of inferiority, guilt, and self-hatred by perceiving a target individual or an outgroup as immoral or dangerous. Scholars have proposed various theories to understand this phenomenon (Roulet and Pichler 2020). Among them, Rothschild et al. (2012) proposed a dual-motive model, arguing that group members seek to maintain a perceived moral value by minimizing their feelings of guilt

around their responsibility for a negative outcome. This explanation is similar to the realistic group conflict theory because both theories address the influence of real situations on group attitudes. The difference is that studies on scapegoating emphasize that one group blames another group for the stress resulting from a negative outcome rather than for competing for scarce resources.

Compared with the ideology-conflict hypothesis, studies on scapegoating lead to a different explanation of how the international media report on China, which is the crisis-mitigation hypothesis. This hypothesis evaluates the influence of a country's COVID-19 crisis on its media discourses in relation to China. As the country first reported confirmed cases of COVID-19, China has been framed as the origin of the novel coronavirus (Bolsen, Palm, and Kingsland 2020). China is therefore likely to be the “scapegoat” of the COVID-19 crisis that a country experiences. Thus, as the levels of crisis due to COVID-19 are different across countries, these differences may lead to variations in the media discourses around China. In terms of temporal changes, as the country took action to deal with the crisis, media attention to China and the inclination to blame China would decrease over time.

Hypothesis 3. A higher level of COVID-19 crisis a particular country experiences is associated with more frequent use of politicized terms in the COVID-19 news reporting on China from the media sites of that country. As the government took the action against COVID-19, the usage of politicized terms from the media sites of that country would decrease.

Data, measures, and method

Primary data source

We used the global multilingual COVID-19 online news narratives dataset (GMCN) as the primary data source (The GEDLT Project 2020). There are two major features of this dataset. First, the GMCN dataset is one of the most comprehensive online news article collections on COVID-19, and it has compiled 169 million COVID-19-related news articles worldwide across 65 languages since 2020 with machine translation by GDEL T. The breadth of the GMCN allows us to track the cross-country variation in how the web news framed China in terms of reporting COVID-19 after the outbreak. Second, the dataset provides the details regarding the publication date, title, URL, and contextual text surrounding “COVID-19” or “virus” for each article. This allows us to extract information for understanding how each news article from a certain online media site has reported on China in terms of topics and the use of politicized terms.

We restricted our attention to online news articles mentioning COVID-19 events occurring in China published from January 1 to December 31 in 2020. The filtering is based on the fact that the GMCN dataset identifies the location of the event that each news article reported. We identified all news articles reporting events located in China. To validate the accuracy of event locations identified by the GDELT, we randomly selected 600 news articles on China reported by media outlets from China, India, Italy, South Korea, the United Kingdoms, and the United States and conducted an accuracy check manually. We first recruited two students with fluent English skills and read each of the news texts. They were asked to annotate whether the news article indeed reported events in China. Next, we identified the news articles in which two students' annotations were not consistent. The third student annotated these news articles and made the final decision. [Supplementary Appendix Figure A1](#) presents the percentage of news articles that indeed reported China and the tone of which are about COVID-19 in China by countries of media sites. The accuracy of identified event locations in the sample ranges from 98 to 100%.

We chose the 2020 whole-year period as our study window for two main reasons. First, this restricted sample helped us deal with some issues of coverage bias in the GMCN dataset. The dataset includes all online news articles mentioning “virus” to maximize the extent of COVID-19 coverage. To decrease the risk that the results are driven by unrelated news reporting, we only focused on the articles published since January 2020. Second, the major events related to COVID-19 occurred in the first half of 2020. Particularly, media attention toward China around COVID-19 decreased rapidly after China claimed its successful control of the pandemic. To include most media sites and countries throughout the period, we only focused on the news articles published before 2021. This ensured that most media sites and countries remained in the sample until the end of the sample period. Based on the URLs of the articles, we extracted the domain names and then identified the domain countries based on the domain name list that the GDELT provides. Our analytical sample included 10.69 million online news articles from 186 countries.

Multidimensional measures of media discourses

We used three measures to capture the multidimensional nature of media discourses on China in relation to COVID-19: coverage, use of politicized terms, and news topics.

Media coverage is measured as the count of news articles at the country level, which is the aggregate of media mentions on China by all online media sites of one country in our database.

The measure of politicized terms is calculated as the number of racial slurs appearing in the news articles published by one media site or country. We identified the related politicized terms from two sources. First, we conducted the text analysis of former U.S. President Donald Trump's tweets and extracted the terms he used to describe the coronavirus. We used this method because Trump, as one of the most influential national leaders in the world, actively used social media to blame China for COVID-19 from the early stages of the pandemic. Second, following previous research (Lin et al. 2022), we appended the politicized terms by checking popular Google search terms and trending Twitter hashtags in early 2020. As a result, we focused on three terms and their variants: "China virus," "Wuhan virus," and "Kung flu." Table 1 summarizes the searched politicized terms. After this, we conducted the bigram model on all news articles in the analytical sample and calculated the count of each politicized term in each news article. In the final step, we aggregated the count information to calculate country-level measures of the politicized terms. All three types of media discourses above were measured at year and week levels.

The topics in the news articles were identified based on the Structural Topic Model (STM), a probabilistic text analysis that discovers the themes running through the text of massive documents (Blei 2012). One advantage of using STM in our study is to incorporate document-level metadata into model estimation, such as time (Roberts, Stewart, and Tingley 2019). We estimated a 50-topic STM for several important countries in our analytical sample, controlling for the month effect. Our topic K selection is based on our substantive interpretation of a series of modeling results. We present the results from the topic modeling on online news for six selected countries. We chose the United States because it plays an influential role in the world of politics and reports one of the largest numbers of confirmed COVID-19 cases globally. South Korea was also selected because it is close to China and reported large numbers of confirmed cases in the early stages of the COVID-19 spread. India was chosen as another country close to China that is reporting a huge number of confirmed cases in the later stages of the pandemic. Italy was chosen because of its early severe coronavirus outbreak. The United Kingdom was also included in the study

Table 1. The list of searched politicized terms.

Category	Search terms
Wuhan virus	"wuhan virus"; "wuhanvirus"; "wuhan-virus"; "wuhan coronavirus"
Chinese virus	"china virus"; "chinavirus"; "china-virus"; "chinese virus"; "chinese-virus"; "chinesevirus"; "chinese coronavirus"; "china coronavirus"; "ccpvirus"; "ccp virus"; "ccp-virus"
Kung flu	"kung flu"; "kungflu"; "kung-flu"

because it is an important country that criticized China for the coronavirus. These selected countries reflect, from a comprehensive perspective, how the foreign media have reported on China in relation to COVID-19 in terms of news framing. We calculated the proportional changes on the top five topics to show how the themes of the news articles on China evolved with the COVID-19 spread across countries. In [Supplementary Appendix A3 and A4](#), we report the topics and their shares among media reporting of China from some other countries with a large amount of news on China in terms of COVID-19 during 2020.

We also measure news attention using media tone from the GDELT project and report it in [Supplementary Appendix B](#) as a robust test. Media tone is the average tone of all news articles reporting events related to COVID-19 occurring in China at the country level. We adopted the tone measure calculated by the GDELT Project, using sentiment analysis, which ranges from -100 to 100 for each news article. The calculation is based on the appearance of positive and negative words in the news articles.

Explanatory variables

The explanatory variables for examining the ideology-conflict hypothesis mainly come from the Varieties of Democracy (V-Dem) project (Coppedge et al. 2021; Pemstein et al. 2021), a dataset widely used by sociologists and political scientists (Davis and Zhang 2019; Zhang, Thorgusen, and Fan 2022). We focused on four indicators of the democracy index: electoral process, participatory politics, egalitarian values, and liberal ideology. We generated an aggregate ideology conflict index by calculating the mean value of absolute differences with China for these four indexes. Quantifying ideology conflict across countries is difficult. However, given that democracy levels reflect the essential beliefs of political ideologies, we believe this measure captures a large extent of a country's ideology conflict with China. [Table 2](#) presents the statistics of the separate democracy index, differences from China for each separate democracy index, and the aggregate ideology conflict index.

The explanatory variables examining the crisis-mitigating hypothesis consist of two sets. The first set measured the degree of public health crisis and included the COVID-19 infection and death cases. The COVID-19 confirmed, fatal, and recovered cases are from the WHO Coronavirus (COVID-19) Dashboard (WHO et al. 2020). WHO collects information on confirmed COVID-19 cases and deaths through official communications and complements the numbers by monitoring the official ministries of health websites and social media accounts. For each measure, we calculated the number of cases per 1,000. The second set of variables measured the potential economic and social disruptions caused by COVID-19. Given

Table 2. Ideology conflict index ($N = 149$).

	Mean	S.D.	Min	Max
Democracy index				
Deliberative democracy index	0.418	0.250	0.013	0.871
Liberal democracy index	0.421	0.262	0.012	0.878
Electoral democracy index	0.533	0.257	0.016	0.910
Participatory democracy index	0.346	0.200	0.010	0.787
Diff. from China in democracy index				
Deliberative democracy index	0.322	0.231	0.002	0.760
Liberal democracy index	0.379	0.260	0.001	0.835
Electoral democracy index	0.295	0.197	0.003	0.734
Participatory democracy index	0.459	0.255	0.005	0.835
Aggregate ideology conflict index	0.364	0.233	0.024	0.775

Data source: V-DEM dataset v11.

that it is difficult to obtain accurate and direct measures for this set of variables, we propose several measures to indirectly quantify the potential influences. Due to the pandemic, many countries have adopted policies of social distancing and international travel bans. Hence, it is reasonable to assume that countries with a higher service industry share in their GDP, a higher unemployment rate, and a larger international migrant stock may have a higher level of economic and social crisis (World Bank 2021). We obtained the available measures for these characteristics for the latest years. The service industry share in GDP was measured for 2019, the unemployment rate in 2020, and the international migrant stock in 2015.

We controlled a series of variables to reduce the risk of spurious associations in the regression analysis. Previous media tone was measured as the average tone of all news articles on China from 2016 to 2019. We relied on the main archive of the online news database from the GDELT Project to calculate this measure. First, we identified all news articles exclusively on China reported by all media sites in our analytical sample. Second, we calculated the mean tone of the news articles from 2016 to 2019 at the country level. Similarly, media coverage in the previous years is the count of all news articles on China from 2016 to 2019, with the logarithm transformation. We also controlled for the logged GDP per capita (2019) and logged population size (2019) (World Bank 2021).

Given that the relationship of a given country with China could be a potential factor in explaining its media discourses on China, we added an extra variable by identifying whether a country received foreign aid from China. The main data source was AidData's Global Chinese Official Finance Dataset, 2000–2014 (Dreher et al. 2017). We could only track 4,373 known projects of overseas Chinese official finance between 2000 and 2014. Foreign aid reflects the unique features of a country's relationship with China. Based on the geocoded location of each project, we calculated the number of such projects in a particular country. We coded those countries without any aid projects from China as 0.

Moreover, we compiled week-level measures of media discourses, COVID-19 infections, and policy responses to examine the relationship between COVID-19 infections and policies and media discourses on China over time. Policy against the pandemic represents the government's effects to deal with the public health crisis. We obtained policy responses from the COVID-19 government response tracker database compiled by the Blavatnik School of Government, University of Oxford (Hale et al. 2021). We aggregated the measure at the week level and denoted 1 as the existence of the policy for a given country and a given week and 0 for otherwise. We focused on two main policy responses: stay-at-home restrictions and international travel restrictions. Stay-at-home restriction represents the social distancing policy, while international travel restriction represents the policy response to reduce imported COVID-19 cases.

Analytic strategy

The main analysis consisted of three parts. First, we documented the cross-country and cross-period variations in media discourses on China in terms of COVID-19. Second, we employed linear and negative binomial regression models to examine the ideology-conflict and crisis-mitigation hypotheses. This analysis was based on the cross-section data aggregated for the whole year of 2020. Lastly, to examine the relationship between the changes in COVID-19 infections and policies and the changes in media discourses over time, we employed the week-level fixed-effect model for the time-varying variables. The dependent variables are the measures of media coverage and use of politicized terms, separately. The time-varying independent variables include the measures of COVID-19 infections and policy responses.

Findings

The temporal and spatial variation in media attention to China on COVID-19

Figure 1 presents the trend of media coverage of China. Panel A shows the weekly trend of online news coverage on China in terms of COVID-19 by global media outlets during 2020. Panel B shows the monthly trend of media attention to China from the GDELT main archive for comparison. The interpretation of Figure 1A supports hypothesis 1 and yields two major findings. First, the temporal patterns for media coverage in China show distinct trajectories. Since China first reported its confirmed COVID-19 cases, the weekly number of news articles mentioning China and the novel coronavirus increased dramatically to more than 100,000

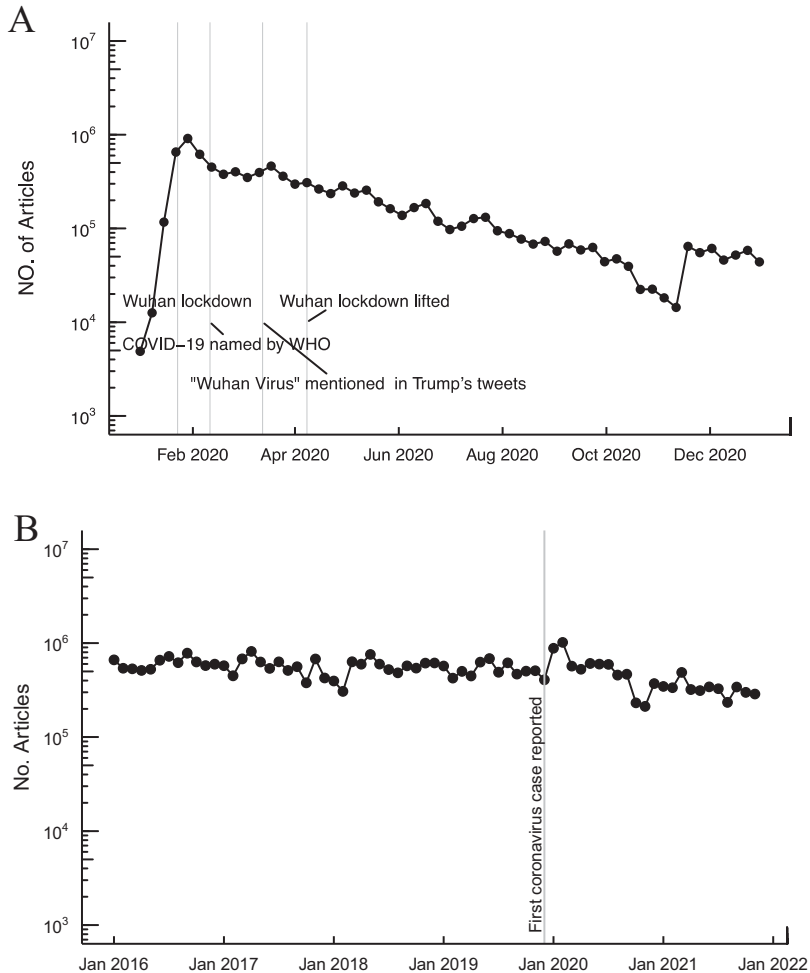


Figure 1. Trend of media coverage from reporting on China. *Notes:* (A) presents the weekly trend of media coverage of China on COVID-19 during 2020 in the GMNC database. (B) Presents the monthly trend of global media coverage of China in the GDELT main database.

and reached a peak by the end of January, at which point the media attention to China gradually decreased. After the middle of November 2020, there was a bump in the media attention toward China. One possible explanation is that discourses on China during the U.S. presidential election campaign may have attracted international media attention to China in terms of the COVID-19 origin and spread. Second, the temporal variation in media coverage of China correlates with several important events, such as the Wuhan lockdown policy. For instance, the decrease in media attention after March was paired with the global spread of the

coronavirus, which led the international media to shift their attention from China to their own countries or other Western societies. After the United States surpassed China in confirmed cases in late March, the global media coverage of China decreased rapidly.

It is likely that the trends in [Figure 1A](#) are kept for a long period before 2020 and are not driven by the outbreak of COVID-19. If that is the case, we would observe the decreasing volume in China for the period before 2020. Thus, we turn to the main archive of the GDELT project to analyze the trends of coverage in China from 2016 to 2021. In Panel B, we show the sharp increase in volume in China in the first two months of 2020. This confirms that the trends we observe in [Figure 1](#) are not the natural momentum but are driven by COVID-19. This pattern is also consistent with the sentiment toward China on social media platforms, such as Twitter (Cook, Huang, and Xie [2021](#)).

[Figure 2](#) reports the weekly trends of coverage for the selected countries. We added the trends of news articles by China's domestic media as a reference. The trends of coverage across countries are pretty similar to the overall pattern in [Figure 1](#). In the first two months, the COVID-19 news articles on China increased dramatically and then decreased over time in general. The first row in [Table 3](#) presents the summary statistics by country for the whole year and further confirms the cross-country variation in coverage.

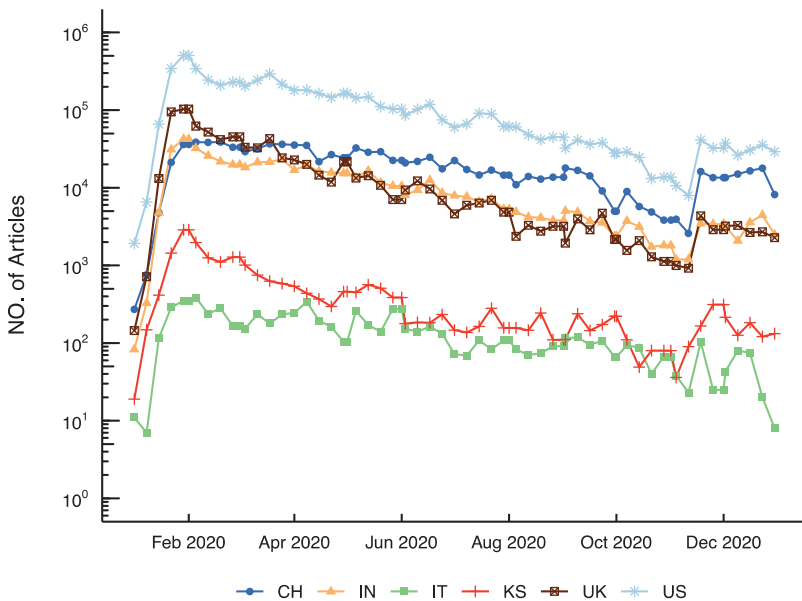


Figure 2. Trends of coverage of reporting on China for selected countries, weekly. Data source: GMCN.

Table 3. Summary of media coverage and politicized term for selected countries.

	China	India	Italy	South Korea	UK	USA	Overall (S.D.)
No. articles (1,000)	1,019	544	7	22	806	5,699	52 (426)
Politicized term	24,128	35,633	250	1,881	62,479	47,7983	4,041 (35,942)
China virus	14,598	23,270	93	538	39,496	276,772	2,340 (20,854)
Wuhan virus	8,978	11,686	157	1,320	20,817	186,744	1,591 (14,023)
Kung flu	552	677	0	23	2,166	14,467	111 (1,089)
Politicized term per article	0.024	0.065	0.035	0.084	0.078	0.084	0.047 (0.056)

Data source: GMCN.

Figure 3 shows the trends of global news articles mentioning politicized terms by week. It yields three findings. First, the counts of the politicized terms mentioned show two peaks before April. The first one was in late January when the Wuhan lockdown policy was in place. This peak was accompanied by a dramatic increase in news articles on China by the global media. Interestingly, the second and highest peak occurred in late March, when both the count of news items mentioning the politicized terms and the average instances of the terms per news item reached their peak. To be noted, on February 11, the WHO criticized the use of politicized terms and officially named the new coronavirus COVID-19. Why did the highest peak occur after the WHO's depoliticization and naming of COVID-19? We found that this peak period corresponded to Trump's first mention of the politicized term, "Wuhan virus," in his tweets on March 14 (Trump 2020). Second, Panel A shows three peaks in terms of the average times of mentioning the politicized terms. The first and last peaks occurred in January and September when the news reporting on China was not that frequent. The second peak in late March occurred along with the peak in media coverage and politicized terms. Third, Panel B presents the trend of each politicized term over 2020 by week. "China/Chinese virus" is the most frequent term among all these three. Also, the "Wuhan virus" was frequently used during the first half of the year. This is probably because Wuhan was the center of China's efforts against the virus spread during this period. After it successfully controlled COVID-19 in April, the practice of using the term "Wuhan virus" rapidly dropped. Moreover, the last five rows in Table 3 include the summary statistics of politicized terms by country and indicate that the practice of using politicized terms varies across countries. The United States and the United Kingdom are the two countries in which the media used the most politicized terms among all the selected countries. In terms of Italy, the news articles on China by its media sites rarely used these terms, even compared with China's media. Particularly regarding the term "Kung flu," no Italian news outlets in our GMCN database mentioned it in the entire year.

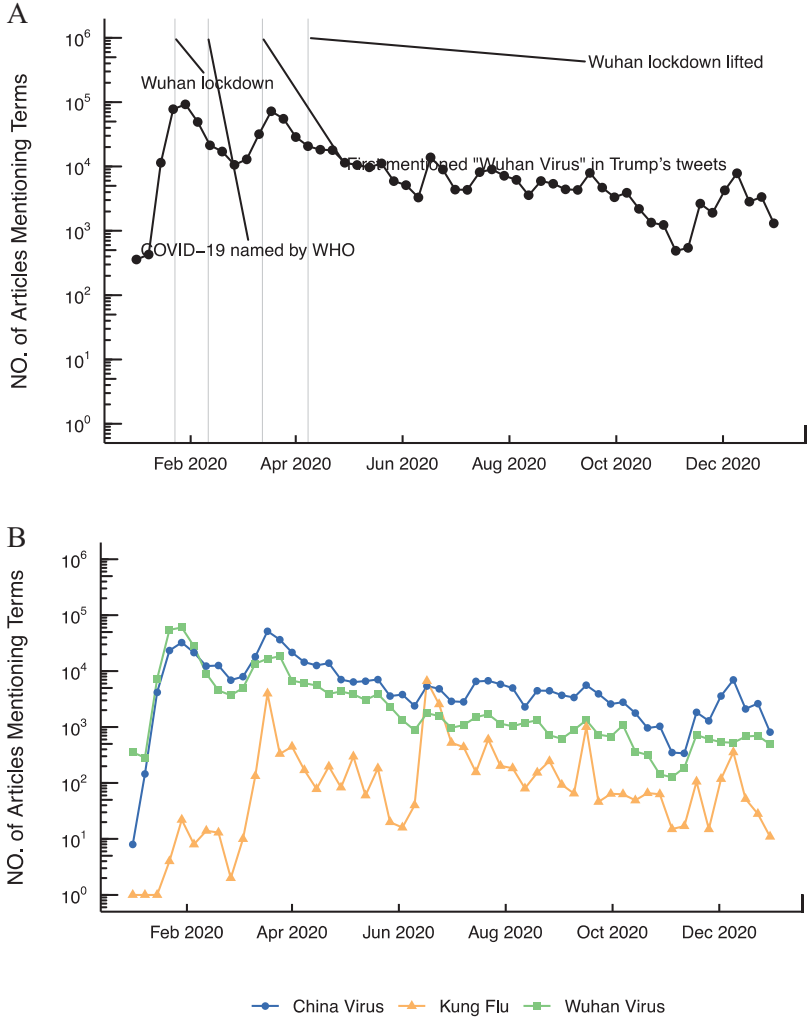


Figure 3. Trends of politicized terms of reporting on China, weekly. Data source: GMCN. (A) All politicized terms. (B) Separate politicized terms.

To be noted, for China, we also observed the frequent use of these terms. One explanation is that China's media cited these terms to criticize the politicization of COVID-19 in the global media news. To examine it, we randomly selected 600 news articles on China, which mentioned any politicized term, reported by media sites in China, India, Italy, South Korea, the United Kingdoms, and the United States and calculated the proportion of news articles citing the terms to criticize the politicization of COVID-19. Similar to the annotation practice stated in the data section, the students were asked to label the news articles de-politicizing COVID-19 by citing the politicized

terms. The results are visualized in [Supplementary Appendix Figure A2](#). We find that about 20% of news articles from China's media sites cited the terms to criticize the politicization of COVID-19. However, for the rest of the five countries, the percentages are about or below 5%. Especially for the media sites from the United States, there is no news in the sample which cited the politicized term to de-politicize COVID-19.

Next, we present the findings from the analysis of the news content. We focus on the selected countries and present their expected proportion shares and the top 20 words for the estimated 20 topics, as shown in [Figure 4](#). There are three main findings. First, the topics with high proportions in our GMCN database are relatively consistent across the countries and mainly document the fact of the coronavirus spread. This finding indicates that news reporting on the coronavirus spread in China was the most important topic over the year. Second, the economy was another important topic when the global media reported the COVID-19 spread in relation to China. For instance, for topic 30 in the United States, the most frequent words include "company," "product," and "industry." The top words of the topic with the highest expected proportional share include "market," "volume," and "revenue." Taken together, these findings reflect the concern about the potential impact of the new coronavirus on the global economy.

[Figure 5](#) further shows the trends of the expected proportional shares for the top five topics by month. We coded these topics in the following categories: viewpoint expression, global health crisis, COVID-19 death toll, COVID-19 origin, international/domestic politics, international/domestic economy, and policies reacting to COVID-19. One major finding is that the major topics in the COVID-19 news on China were not consistent over time. A general trend is that the share of topics on COVID-19 death tolls decreased. Besides this shared feature, each country has its own focus on reporting China in terms of COVID-19. We take Italy as an example. Although the economy topic (Topic 1) represented the highest share over the whole year, this share experienced a rapid shift over time. It began with a low share for the first three months and then increased to a high proportion from April to November. In terms of the COVID-19 death toll (Topic 8), the trend of this topic declined rapidly after March. To be noted, Italy controlled the first wave of the coronavirus spread in April. This implies that the proportions of the topics in the COVID-19 news are closely related to the pandemic situations in the media site's country.

Taking these findings together, we can make two conclusions. First, temporal variations existed in media coverage, politicized terms, and

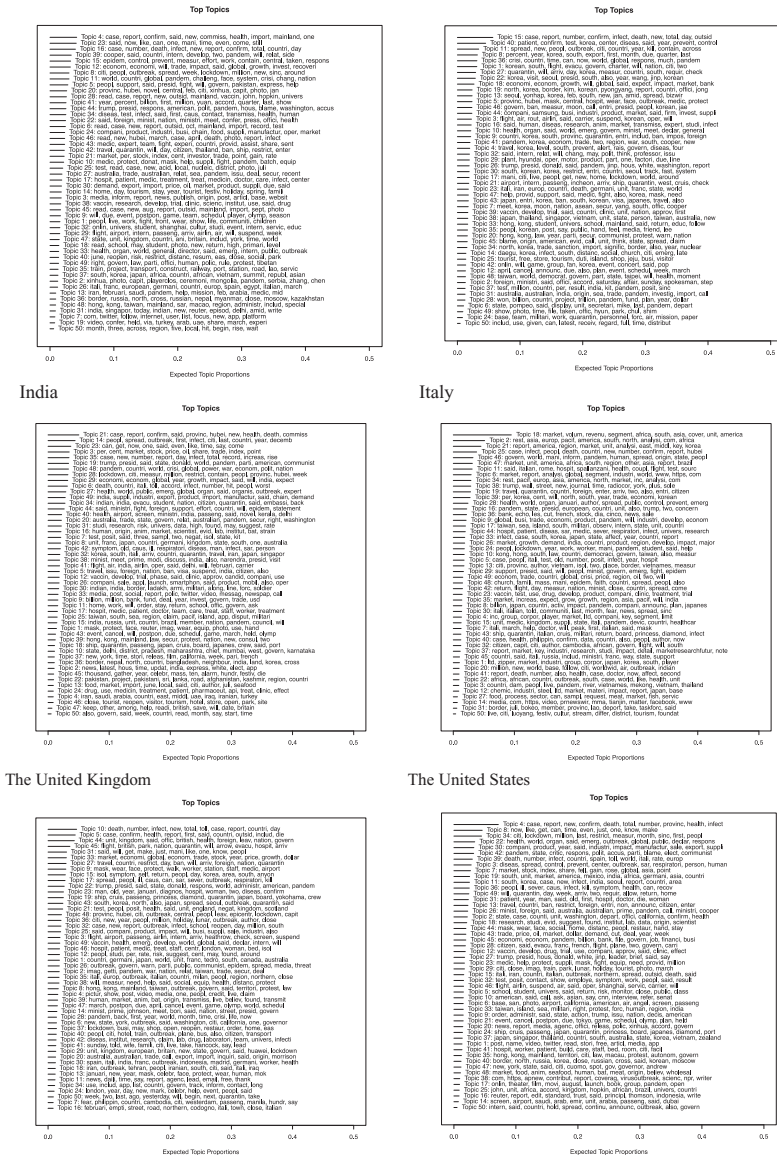


Figure 4. Summary of topics among reporting on China for selected countries. Data source: GMCN.

topics among the COVID news discourses on China. For instance, the volume of media attention to China in COVID-19 reporting rapidly reached the peak in the first two months of 2020 and then decreased gradually. More importantly, we show the usage of politicized terms even after WHO named the novel coronavirus. Second,

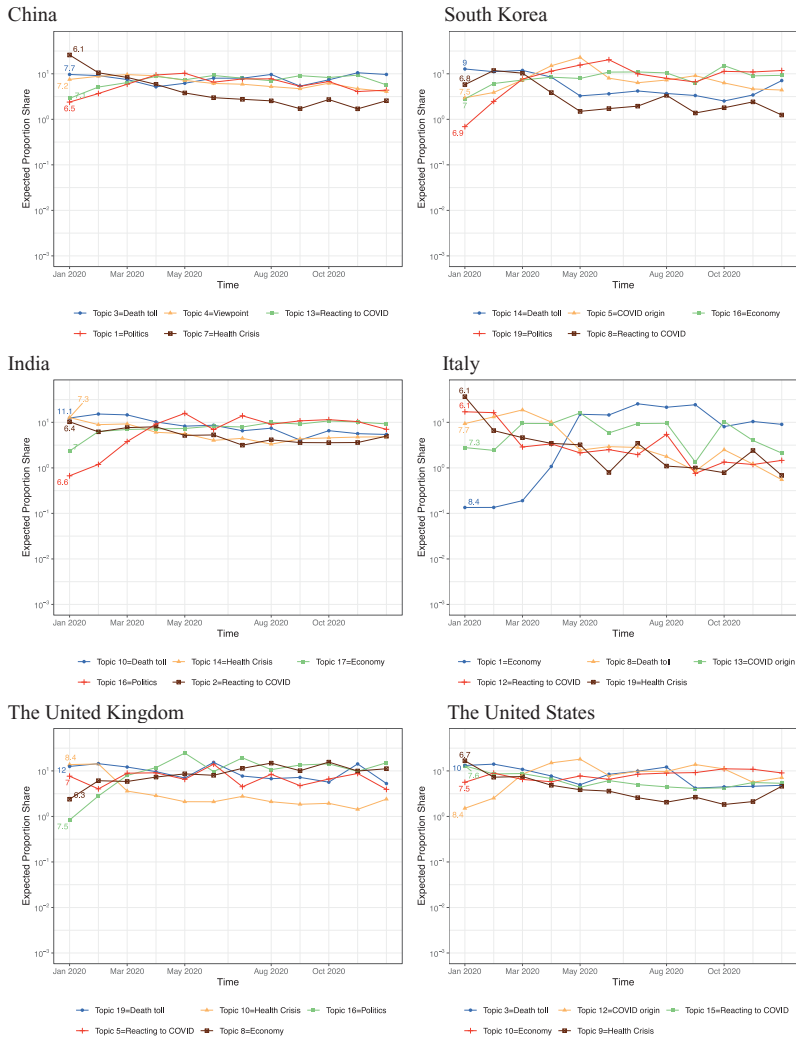


Figure 5. Trends of top five topics among reporting on China for selected countries. Data source: GMCN.

cross-country variations existed during 2020, particularly for politicized terms, which cannot be fully explained by ideology or other simple political factors. For instance, although all the selected countries are democratic, the United States and the United Kingdom had the most frequent use of politicized terms, while Italy exhibited relatively less use of politicized terms. The analysis of the selected countries raises an important question: What factors can help explain the cross-country and temporal variations in media discourses on China?

Table 4. Coefficient estimates of regression on political and non-political covariates, country-level.

Variables	No. COVID-19 articles Negative binomial	Politicized terms Negative binomial
Political-conflict covariate(s)		
Difference in democracy index	1.371 (0.748)	1.507 (0.807)
Crisis-mitigation covariate(s)		
International migrant stock (logged), 2015	−0.003 (0.109)	0.128 (0.125)
Unemployment rate (%), 2020	0.013 (0.020)	−0.038 (0.026)
Service industry share in GDP, 2019	0.040* (0.018)	0.039 (0.022)
Confirmed cases per 1,000	0.022 (0.013)	0.015 (0.014)
Deceased cases per 1,000	−2.494*** (0.603)	−1.967** (0.676)
Recovered cases per 1,000	−0.004** (0.001)	−0.005*** (0.001)
Controls		
Media tone, 2016–2019	0.003 (0.118)	−0.090 (0.148)
No. articles (logged), 2016–2019	0.956*** (0.105)	1.046*** (0.122)
Population (logged)	0.182 (0.131)	0.064 (0.161)
GDP per capita (logged)	−0.091 (0.160)	−0.356 (0.202)
No. projects aided by China, 2000–2014	0.006† (0.003)	0.007 (0.005)
Constant	−5.272* (2.146)	−6.311* (2.471)
Observations	135	135

Standard errors in parentheses are clustered at the country level.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Regression analysis

Table 4 presents the results of the country-level regression analysis. For media coverage and politicized terms, we used negative binomial models by taking the overdispersion issue into account. We reported standard errors clustered at the country level for most models. In terms of fixed-effect negative binomial models, we reported bootstrapped standard errors.

We find little evidence for the ideology conflict hypothesis. That is, the ideology conflict with China was not statistically significantly associated with the media discourses on China at the .05 significance level. One possibility is that using the aggregate ideology conflict index may overlook the significant associations between some of the four democracy indexes and dependent variables. To test this possibility, we use the distances of China from foreign countries in four separate democracy indicators as a robustness test. For each dependent variable, we run four regressions, each for one distance measure in the democracy index as an independent variable, using the same set of variables in Table 4. Supplementary Appendix Figure A5 presents the coefficient estimates of the distance measures. The coefficient estimates of distance in the deliberative democracy index for media mention and usage of politicized terms are positive and statistically significant ($p < .05$). This indicates that the difference in deliberative democracy with China leads to a higher volume of news reporting on China in terms of COVID-19 and more usage of politicized terms. Besides these two exceptions, all other coefficient estimates are not statistically significant.

In addition, the results show mixed findings for the crisis-mitigation hypothesis in Table 4. For instance, the service industry's share in the GDP was a statistically significant predictor of media coverage. A higher proportional share of the service industry is related to a higher number of COVID-19 news articles on China. In addition, the measure of deceased cases per 1,000 people was a statistically significant predictor of media coverage and politicized terms. A higher number of deceased cases per 1,000 is associated with a lower level of COVID-19 news coverage in China and a lower level of politicized terms. This finding is not consistent with the prediction of the crisis-mitigation hypothesis, which suggests that a higher level of crisis is related to more media coverage and more frequent use of politicized terms in China. As we aggregated the media discourses on China for the whole year, our cross-section analysis might have overlooked the question of whether and to what extent changes in the COVID-19 crisis led to changes in the media discourses on China. One possible explanation for this inconsistency is that temporal changes in the crisis are more important in terms of predicting the media discourses on China than aggregate measures of crisis. To examine this possibility, we turn to the panel data analysis based on the time-varying measures of the COVID-19 crisis and media reporting features.

Table 5 presents the coefficient estimates of the country-level, week-fixed effect models. In terms of COVID-19 infections, an increase in weekly confirmed cases is associated with a decrease in the volume of news articles on China and a decrease in the frequency of using politicized terms. Only the coefficient estimate for the model on media coverage is statistically significant ($p < .05$). In terms of the death toll, an increase in COVID-19 deaths leads to an increase in news articles and a decrease in the frequency of using politicized terms in COVID-19 news on China. Similarly, only the coefficient estimate for the model on media coverage is statistically significant ($p < .05$). In terms of weekly recovered cases, the relationships with the weekly measures of media discourses are weak. In terms of policy response to the pandemic,

Table 5. Coefficient estimates of week fixed effect regression on COVID-19 and policy covariates, country-level.

Variables	No. COVID-19 articles on China Negative binomial FE	Politicized terms Negative binomial FE
New confirmed cases per 1,000, weekly	-0.303*** (0.055)	-0.324 (0.176)
New deceased cases per 1,000, weekly	5.042* (1.999)	-0.585 (4.646)
New recovered cases per 1,000, weekly	0.011 (0.126)	0.010 (2.417)
Staying at home requirement	-0.205*** (0.054)	-0.284** (0.102)
International travel restriction	-0.190* (0.085)	-0.250 (0.143)
Constant	0.370*** (0.061)	-1.024*** (0.110)
Observations	5,502	5,216
Number of countries	138	118

Bootstrapped standard errors in parentheses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

the implementation of stay-at-home requirements and international travel restriction policies leads to a decrease in media attention to China and a decrease in the frequency of using politicized terms. As governments take more actions to combat COVID-19, the inclination to blame China for the crisis might decrease.

Taken together, the findings provide merely no evidence for hypothesis 2 and mixed findings of hypothesis 3. That is, the ideological distance between foreign countries and China is not associated with the media coverage and usage of politicized terms on China. Overall, a higher level of potential economic disruptions due to COVID-19 is associated with more COVID-19 reporting on China, but more deceased cases per capita are significantly associated with less news reporting on China and less usage of politicized terms from media of that country. In terms of temporal change over time, we find that as the government took actions against COVID-19, particularly staying-at-home requirement, the news coverage of China and usage of politicized terms significantly dropped.

Discussion and conclusion

This study explored the global media reporting on China in relation to COVID-19 and tested two hypotheses, the ideology-conflict hypothesis, and the crisis-mitigation hypothesis, that may explain the variations in media attention. International news reporting is one of the major sources for learning about global events, and international reporting bias may lead to the public misperception of foreign countries. As COVID-19 has spread throughout the world, the prevalence of misinformation and biased reporting has drawn particular attention.

Our analysis has three main findings. First, we show cross-nation and cross-period variations in the international news reporting of China in relation to COVID-19. Benefiting from the multidimensional measures, we find that the trends of media coverage in China fluctuated over time. COVID-19 reporting on China reached its peak in January and then decreased. Second, the analysis of politicized terms indicates the existence of racial discrimination in international news reporting. One surprising finding is that the use of politicized terms continued to exist and did not decrease significantly after the novel coronavirus was named as COVID-19 by the WHO in February. Even if it is true that a certain proportion of the news articles mentioning politicized terms just cited rather than agreed with the terms, they still served as a channel for transmitting racial slurs to the public. Third, our regression analysis shows that the level of the domestic COVID-19 crisis in countries of media sites, instead of the ideology difference with China, partially explains the cross-country variations in media discourses on China to a moderate

extent. Weekly panel data analysis also shows that government policies against the pandemic are associated with the decline of coverage of China and the usage of politicized terms. These findings indicate the importance of the pandemic crisis rather than the ideological conflict with China in explaining the variations in media discourses. However, this analysis is only exploratory.

There are several limitations to this study. First, although we have run several cross-validation tests, we might still underestimate the total number of media coverage and politicized terms due to the number of media sites and the accuracy of location classification in the GMCN dataset. Second, GMCN might not represent the population of online media sites all over the world and this might bias our results. For a given country, if the English media sites report on China according to different features than the non-English sites, our analysis here might not be based on unbiased measures of media discourses on China. Third, the measure of the use of politicized terms might not reflect how politicized the media are. As stated above, one possible scenario is that the news media might cite the politicized terms for the purpose of criticizing their usage. To eliminate the influence of this issue, we conducted a manual check based on a sample of news articles mentioning the politicized terms. Future studies should revisit the conclusion here using a more in-depth news content analysis. Lastly, it should be noted that our examination of the two hypotheses requires more evaluation in future studies. Particularly for the measures of ideology variables and social and economic crisis, we relied on indirect rather than direct measures.

Despite these limitations, our research still advances our research in the areas of media discourses and COVID-19. First, we employed a novel approach to investigating the cross-country and cross-period variations in the international reporting of China in relation to COVID-19, covering the early stages of the COVID-19 spread and the later global pandemic stage. Relying on a large-scale dataset containing COVID-19 news articles from media sites worldwide, we extended the literature of media sociology and proposed the scheme of multidimensional measures, including media coverage, use of politicized terms, and topics among the COVID-19 news reporting, to understand international media discourses on China.

Second, we provided a global and dynamic image of China from the viewpoint of foreign media in relation to the public health crisis due to COVID-19. Country image is an important issue for policymakers and academia. Although recent studies have provided an empirical analysis of how the public perceives foreign countries based on attitude surveys and social media data (Silver, Devlin, and Huang 2020), very few studies pay attention to international news reporting, one of the major information sources for the public. The country images and attention the media

transmits to the public serve as an essential mechanism for explaining the *infodemic* during the COVID-19 pandemic. Our study appends the literature on the country's image from the view of international news reporting and suggests the existence of cross-country and cross-period variations in the framing of China by international media.

Third, our study has important implications for the public debate on the influence of ideology conflict in terms of the international media bias against China. Our analysis posits that this conflict in ideology might not be the only major driver of cross-country variations of media discourses on China, at least in the news reporting on COVID-19. In our weekly fixed effect country-level analysis, we found that changes in a country's COVID-19 situation and policy responses are significantly associated with that country's media reporting on China. Although this finding alone cannot deny the influence of ideology conflict on media reporting, we argue that future studies should pay attention to both political and non-political factors to understand the international news reporting on China.

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