# THE CHANGE OF COVID-19 COVERAGE IN AMERICAN, GERMAN AND JAPANESE DAILY NEWSPAPERS: A COMPUTER-ASSISTED TEXT ANALYSIS AND COMPARISON

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During the COVID-19 pandemic, news media fulfill a vital role of disseminating information to the public and shaping public opinion for example on governmental responses to the outbreak. Responses to the pandemic and news coverage on it varies across countries. This paper examines a random sample of newspaper articles from the German Bild, the Japanese Yomiuri Shimbun, and the American USA Today, to clarify the how these newspapers reported on COVID-19 during the initial stages of the pandemic, that is from January to March 2020. It depicts first results of comparing these three newspapers' coverage in regard to (1) which actors are mentioned, (2) which regions are depicted, and (3) which themes are mentioned. The Japanese Yomiuri reports more frequently on the government's response to the pandemic, whereas the German Bild and American USA Today more frequently report on how the pandemic affected the lives of citizens and individual measures to deal with the pandemic.

**Keywords:**
COVID-19, news media, cross-cultural analysis, computer assisted text analysis, cultural analytics

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## 1 Introduction

On March 11, 2020, the World Health Organization (WHO) officially designated COVID-19 as a global pandemic. At the time of this writing, there have been over 660 million confirmed cases and 6 million deaths attributed to the virus [1]. As COVID-19 has become endemic in many countries, these numbers continue to rise [2]. To control or prevent the spread of the virus, many countries adopted non-pharmaceutical interventions (NPIs) [3]. On May 18th, the WHO propagated Public Health and Social Measures (PHSM), such as wearing masks, restricting social gatherings, closing schools and businesses, limiting domestic and international travel, as well as testing and quarantine, as a global guideline for NPIs [4]. Concurrently, governments around the world introduced policies to combat the virus, while people adapted to these new rules and guidelines, or autonomously adopted new behaviors meant to protect themselves and their communities.

How countries or citizens reacted to the spread of the virus and which measures they adopted varies, due to differences in the political and economic systems, laws, and culture [5]. For example, in countries such as South Korea or Japan, requirements to use face masks in public, a practice already common before the current pandemic, did meet with no noticeable resistance, whereas such requirements evoked protest in many Western countries and the use of masks quickly receded after the relaxation of guidelines [6]. Restrictions on national or international travel also varied widely, as some countries remained open to travel, whereas others demanded varying periods and forms of quarantine, testing, or vaccination, or outright banned international travel altogether [7].

During the pandemic, news media served a vital function in disseminating information on COVID-19 and related government measures to the public, but also in shaping national and international discourse on how to respond to the spread of COVID-19 [8]. The media coverage affects not only how the public understand the pandemic, it also influences the decision making processes of politicians, corporations and scientists [9]. As the highly diverse range of media outlets and channels in current society can lead to the rapid spread of false or misleading news, an "infodemic" [10], people (re)turned to traditional news channels such as TV and newspapers to receive reliable information [11]. To understand the differing responses to COVID-19 across countries, and to contrast different ways of

disseminating information during times of crisis such as the current pandemic, it is necessary to examine how the pandemic and related measures were portrayed in the media and how this differed between countries and media outlets.

Previous comparative studies on the media coverage of COVID-19 tend to focus either on quantitative (monolingual) comparisons [8, 12, 13] or are narrow in their thematic scope [14-16] and do not consider changes in the coverage over time. In contrast, this study examines how COVID-19 is portrayed in the most widely circulated national newspapers in Germany, Japan, and The United States of America (see Figure 1) in the respective original language. We study the period from January to March 2020 to clarify differences between the newspaper coverage per selected newspaper and over time.

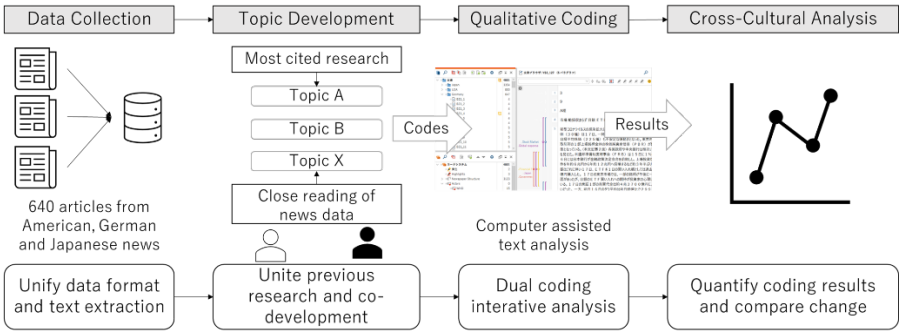



**Figure 1: Overview of research**
Source: own.

First, we collected a simple random sample of newspaper articles (n=600) that include the term COVID-19 or a synonym from the German newspaper Bild, the Japanese Yomiuri Shimbun and the American USA Today for each month: January, February, and March 2020. Through a compilation of categories used in or resulting from previous studies, and close readings of the collected data, we defined 45 categories to identify (1) who, (2) where, and (3) what is mentioned in news articles, and how this changes from January to March 2020.

By comparing which actors are mentioned or cited in the newspaper articles, which localities are observed, and which topics are discussed, it becomes possible to grasp differences in national discourses on the pandemic, how it was portrayed in the

media, as well as how, which, and whose, information and opinions on it were disseminated. This can provide insights into how differences in media coverage reflect (or affect) varying responses to the pandemic, as well as input into discussions on how public health and policy related information should be communicated to the public. The present paper is intended as a step in a larger project towards a comparative analysis of the discourses on global crises.

## 2 Background

As of January 2023, there are more than 5 million research articles on COVID-19 indexed on Google Scholar, with more than 2 million also including the term "news". While unsurprisingly, Kousha and Thelwall [17] identify clinical and medical studies on COVID-19 as the most cited research items in the beginning of the pandemic, COVID-19 has provided an incentive for research in various fields.

Researchers' focusing on media content in specific countries have investigated how news related to the virus are framed in different types of media [12, 18-21], what kind of health, medical, and political information the media covered [22-25], the sentiment of the news [13], as well as a quantitative analysis of online news coverage through text mining, topic analysis, and sentiment analyses [8]. Others analyzed the coverage of COVID-19 in relation to specific themes, such as "tourism", "digital contact tracing", "residential care" or "older people" [14-16, 26]. Analyzed languages and regions include English (USA, UK, Canada, New Zealand, Australia), Chinese, German (Germany, Austria, Switzerland), Korean and Spanish. Most studies focus on one or two regions/languages, while broader comparative studies either are limited to English material or focus on a narrow topic, such as the portrayal of German chancellor Angela Merkel, and former and current Presidents of the United States Donald Trump and Joe Biden [8, 18]. Through these approaches key themes to examine the coverage on COVID-19 have become evident.

For example, Hubner [21] categorized 10 news source categories by recording individuals and their organizations, along with 27 news topics, each supported by 5 to 6 keywords, in American news media. Gozzi et al. [27] compared the differences in multiple topics on Reddit and traditional media. Ophir et al. [20] presented 12 topic labels along with top 10 key words by investigating COIVD-19 in Italian media. Mach et al. [25] conduced a cross-cultural study of news on public health and

policy information by comparing 5 major topics in American, British and Canadian news media.

However, while the development of labels to understand the news coverage on COVID-19 is a necessary endeavor to clarify what is reported in the news and how, these categories are usually not connected or utilized for further, in particular cross-regional comparative, research. As such, this paper reports on a comparative content analysis to clarify how topics in the COVID-19 related news coverage vary in different regions, by investigating news articles in national daily national newspapers, from Germany, Japan, and the USA in their original language. In a previous report [28], Sato shows that the threat of the virus was downplayed in the three newspapers in early January. By extending the scope of analysis until March 2022, we can examine and compare the changes in news coverage with the growing awareness of the extent of the virus' spread.

## 3 Method

We collected all newspaper articles including the term COVID-19 or a synonym published in the German Bild, the Japanese Yomiuri Shimbun, and the American USA Today between January 1 to March 31, 2020. In consideration of feasibility, we then drew a simple random sample for each newspaper and month (see Table 1) for the analysis. The three newspapers were chosen to represent each region, as, at the time of data collection in April 2022, they were the most widely circulated daily national newspapers in Germany, Japan, and the USA respectively [29-31]. Data was collected from Nexus Uni and the Yomiuri Database Service and compiled into a spreadsheet. We utilized the search query "covid OR coronavirus OR (corona AND virus)" in English and German, and "'*corona uirusu*' [in Japanese characters] OR COVID" in Japanese. Data collected includes the year, month, and day it was published, page number, section, author, title and sub-title, and finally the article's main text. We chose the period from January to March 2020 to examine how the media covered the spread of the virus from the initial outbreak in January 2020, up until the WHO declared COVID-19 a "Global Pandemic" in March 2020.

The articles were imported into the qualitative data analysis software MAXQDA. MAXQDA is a tool for conducting computer-assisted qualitative and mixed-method data analysis, that enables researchers to intuitively create, assign, organize, and

count codes and categories representing a segment of text (see Figure 2). It also provides an environment for collaboration between researchers during the coding of data.

**Table 1: Overview of the collected data**

| Newspaper | | Bild | Yomiuri Shimbun | USA Today | TOTAL |
|---|---|---|---|---|---|
| Country | | Germany | Japan | USA | |
| No. of articles | 1/2020 | 11 | 129 | 13 | 153 |
| | 2/2020 | 52 | 801 | 45 | 898 |
| | 3/2020 | 247 | 1,778 | 445 | 2,470 |
| | Total | 310 | 2,708 | 503 | 3,521 |
| Random Sample | 1/2020 | 11 | 70 | 12 | 93 |
| | 2/2020 | 39 | 127 | 35 | 201 |
| | 3/2020 | 94 | 139 | 113 | 346 |
| | Total | 144 | 336 | 160 | 640 |

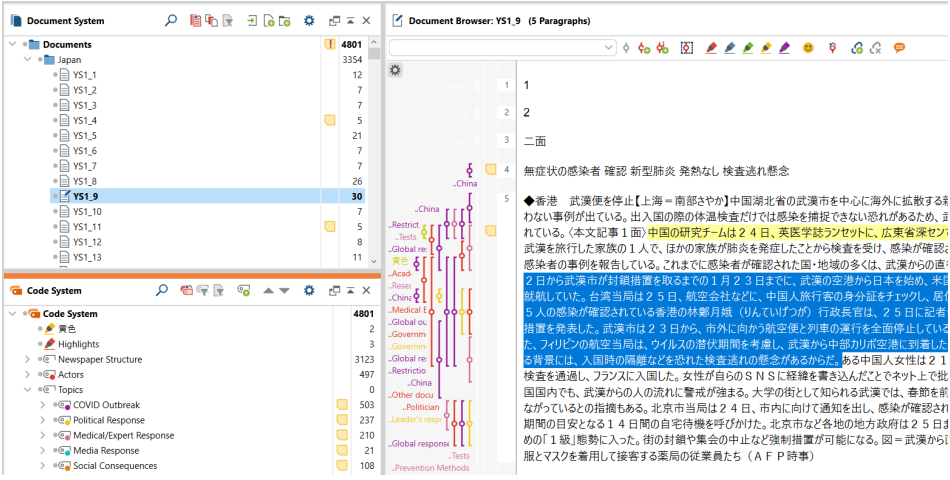



**Figure 2: An overview of MAXQDA's interface we utilized for this paper**
Source: own.

Through a first round of close readings of the articles in the sample and based on a synthesis of previous studies [20, 21, 25, 27] we then developed a set of 45 categories to analyze (1) which actors (see Table 2) are mentioned in the articles, (2) which regions are discussed in the articles (see Table 3) and (3) what topics are mentioned (see Table 4). The authors, fluent in English, German and Japanese then assigned these categories to each news article in a second round of close readings. Discussion

between the authors ensured that the same criteria were used to code all articles during the analysis, revising the code system when necessary. Similar to content analysis [32], we then counted the frequency with which each category was applied to the articles, counting each category only once per article.

**Table 2: Overview of actor categories**

| Actor Category | Definition |
|---|---|
| WHO | The World Health Organization and its staff |
| Media | Media organizations |
| Academica | Researchers, scholars, and experts with affiliation to academic institutions |
| Politicians | Politicians not directly part of the government |
| Government | Government, ministries, and their staff |
| Industry | Companies, industry organizations, their staff |
| NGOs | Think tanks, public interest groups, foundations |
| Medical Experts | Persons affiliated with medical institutions |
| Health Officials | Public health agencies or institutions |
| Sports | Sport clubs, sport-related organizations (e.g., UEFA) and their staff |
| Celebrities | Celebrities, e.g., actors, singers, etc., including royalty |
| Citizens | Ordinary citizens |

**Table 3: Overview of location categories**

| Region Category | Definition |
|---|---|
| **Response Reports** | **Regional responses reported in the news articles** |
| Japan | Responses in Japan |
| USA | Responses in the USA |
| Germany | Responses in Germany |
| China | Responses in China |
| WHO | Responses by the WHO |
| Others | Responses in other countries |
| **Outbreak Reports** | **Reports on the COVID-19 outbreaks** |
| Japan | Outbreak in Japan |
| USA | Outbreak in the USA |
| Germany | Outbreak in Germany |
| China | Outbreak in China |
| Cruise Ship | Outbreaks on cruise ships |
| Others | Outbreaks in other countries |

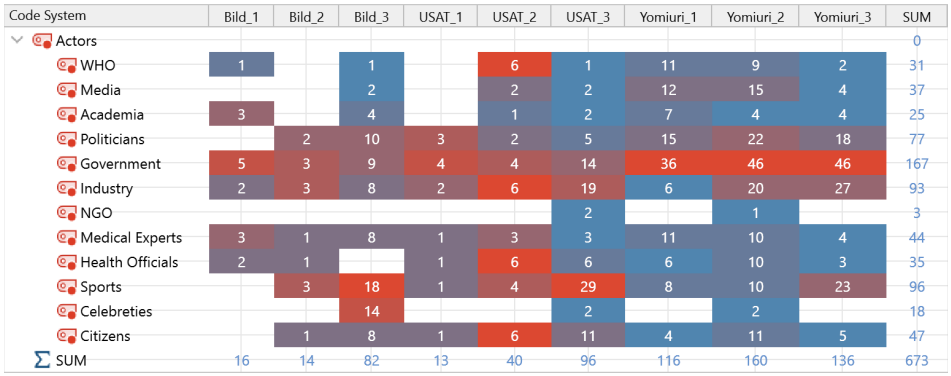
**Table 4: Overview of topic categories**

| Topic Category | Definition |
|---|---|
| **Cases and deaths** | Infection numbers and deaths, portrayal of cases |
| **Restrictions** | Travel restrictions and lockdowns |
| **Political Response** | **Responses of the government and political leaders** |

| Topic Category | Definition |
|---|---|
| Leaders' Response | Actions of political leaders directed at the person (e.g., Angela Merkel) |
| Governmental Response | Actions of governmental departments and staff |
| Financial Support | Governmental financial support plans and actions |
| **Medical/Health** | **Medical handling of COVID-19** |
| Preventing Spread (Official) | Political actions to prevent COVID-19 |
| Preventing Spread (Personal) | Wearing masks, washing hands, social distancing |
| COVID Tests | Virus tests on COVID-19 |
| Treatment | Treatments of patients in hospitals and patients |
| Research | Research on virus and vaccines |
| **Role of the Media** | **Function of the Media during the pandemic** |
| Explaining COVID | Providing information on symptoms, how the virus spreads, etc. |
| Chinese Censorship | Chinese governmental control of information |
| Information Accuracy | Issues on accurate information and misinformation |
| **Social Effects** | **Effects on the society** |
| Public Events | Cancelation or restrictions on social events |
| Work | Effects on working and workplace |
| Education | Effects on education |
| Olympics | Issues regarding the Tokyo Olympics |
| Daily Lives | Effects on daily lives of the people |
| **Economic Effects** | **Economic effects of COVID-19** |
| Economy | Effect on economy |
| Business | Effect on industry and companies |
| Stock Markets | Effect on financial markets |

## 4 Results

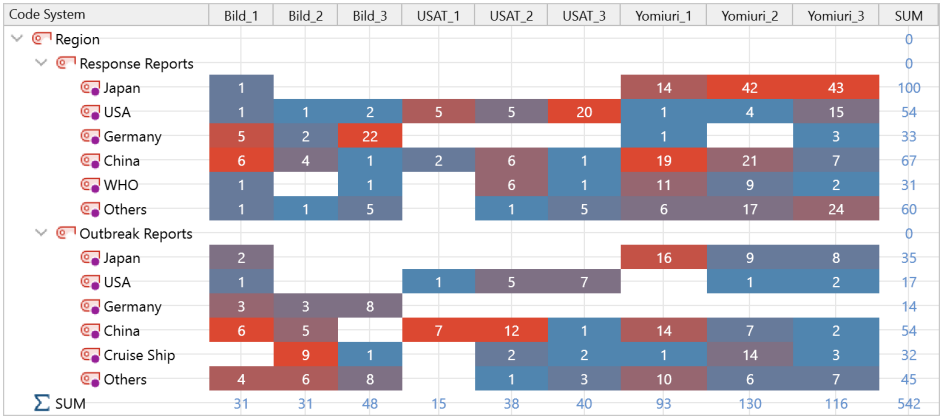
Below, we detail the results of our analysis. Figures 3-5 depict heat maps, based on the frequency of assigned categories per newspaper and month. The heatmaps are calculated per column, that is, red indicates a high frequency of a category within that particular newspaper and month. Overall, a higher number of articles in the Japanese Yomiuri Shimbun, particularly in January and February, reflects a greater geographical proximity to the original outbreak of the virus.



| Code System | Bild_1 | Bild_2 | Bild_3 | USAT_1 | USAT_2 | USAT_3 | Yomiuri_1 | Yomiuri_2 | Yomiuri_3 | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| Actors | | | | | | | | | | 0 |
| WHO | 1 | | 1 | | 6 | 1 | 11 | 9 | 2 | 31 |
| Media | | | 2 | | 2 | 2 | 12 | 15 | 4 | 37 |
| Academia | 3 | | 4 | | 1 | 2 | 7 | 4 | 4 | 25 |
| Politicians | | 2 | 10 | 3 | 2 | 5 | 15 | 22 | 18 | 77 |
| Government | 5 | 3 | 9 | 4 | 4 | 14 | 36 | 46 | 46 | 167 |
| Industry | 2 | 3 | 8 | 2 | 6 | 19 | 6 | 20 | 27 | 93 |
| NGO | | | | | | 2 | | 1 | | 3 |
| Medical Experts | 3 | 1 | 8 | 1 | 3 | 3 | 11 | 10 | 4 | 44 |
| Health Officials | 2 | 1 | | 1 | 6 | 6 | 6 | 10 | 3 | 35 |
| Sports | | 3 | 18 | 1 | 4 | 29 | 8 | 10 | 23 | 96 |
| Celebreties | | | 14 | | | 2 | | 2 | | 18 |
| Citizens | | 1 | 8 | 1 | 6 | 11 | 4 | 11 | 5 | 47 |
| SUM | 16 | 14 | 82 | 13 | 40 | 96 | 116 | 160 | 136 | 673 |

**Figure 3: Heatmap depicting frequencies within the categories for "actors", between the Bild, USA Today, and Yomiuri Shimbun, from January (1) to March (3)**

Source: own.



| Code System | Bild_1 | Bild_2 | Bild_3 | USAT_1 | USAT_2 | USAT_3 | Yomiuri_1 | Yomiuri_2 | Yomiuri_3 | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| Region | | | | | | | | | | 0 |
| Response Reports | | | | | | | | | | 0 |
| Japan | 1 | | | | | | 14 | 42 | 43 | 100 |
| USA | 1 | 1 | 2 | 5 | 5 | 20 | 1 | 4 | 15 | 54 |
| Germany | 5 | 2 | 22 | | | | 1 | | 3 | 33 |
| China | 6 | 4 | 1 | 2 | 6 | 1 | 19 | 21 | 7 | 67 |
| WHO | 1 | | 1 | | 6 | 1 | 11 | 9 | 2 | 31 |
| Others | 1 | 1 | 5 | | 1 | 5 | 6 | 17 | 24 | 60 |
| Outbreak Reports | | | | | | | | | | 0 |
| Japan | 2 | | | | | | 16 | 9 | 8 | 35 |
| USA | 1 | | | 1 | 5 | 7 | | 1 | 2 | 17 |
| Germany | 3 | 3 | 8 | | | | | | | 14 |
| China | 6 | 5 | | 7 | 12 | 1 | 14 | 7 | 2 | 54 |
| Cruise Ship | | 9 | 1 | | 2 | 2 | 1 | 14 | 3 | 32 |
| Others | 4 | 6 | 8 | | 1 | 3 | 10 | 6 | 7 | 45 |
| SUM | 31 | 31 | 48 | 15 | 38 | 40 | 93 | 130 | 116 | 542 |

**Figure 4: Heatmap depicting frequencies within the categories for "regions", between the Bild, USA Today, and Yomiuri Shimbun from January (1) to March (3)**

Source: own.

Figure 3 depicts the frequency with which a particular actor was mentioned in the news coverage per newspaper and month. In all three newspapers, mentioning governmental institutions was most frequent in the Japanese Yomiuri Shimbun, as members of the government are often cited when reporting on the spread of the virus and possible and actual countermeasures. Politicians aside from members of the government are also frequently mentioned in the same light. While industry actors were mentioned in all three newspapers, usually in concert with depicting the economic outfall of the pandemic, this was comparatively more frequent in the USA

Today, especially in March. In contrast, the categories "Sports" and "Celebrities" were most frequent in the German Bild, possibly indicating a stronger focus on human interest stories. Health officials are not mentioned frequently in the Bild, although academics are mentioned in a similar function to the mention of health officials in the other two newspapers, that is to provide expertise on the spread of the virus. In March 2020, the USA Today mentions the WHO comparatively frequently, regarding the designation of COVID-19 as a global pandemic.

The heatmap in figure 4 depicts the frequency with which a particular region was mentioned in the news coverage of each newspaper in each month. Broadly speaking, aside from reporting on the outbreak and response within the country they are based in, each newspaper also reported on the original outbreak in China and the response of the Chinese government. The USA Today in particular mentions the outbreak in China in reports on US citizens stranded there. In comparison to the Bild and USA Today, the Japanese Yomiuri Shimbun reported more frequently on how other countries responded to COVID-19, including Germany and the USA. As citizens of the respective country were involved, the Yomiuri and Bild more frequently mentioned COVID-19 outbreaks in cruise ships.


**Figure 5. Heatmap depicting frequencies within the categories for "topics", between the Bild, USA Today, and Yomiuri Shimbun from January (1) to March (3)**

Source: own.

Figure 5 shows the code frequencies of three newspapers in the Topic category from January to March. Common topics throughout the three periods and newspapers were reports on the number of infections and deaths, as well as research on the virus and its effect on the economy. Restrictions, discussed and gradually put in place over the early stages of the pandemic, were frequently mentioned in Germany, especially in March, whereas they were not mentioned in the USA Today and comparatively less frequently in the Yomiuri Shimbun. The effects of the pandemic on work and education did not receive widespread attention until March. In comparison to the Bild, the Yomiuri and USA Today more frequently mentioned the fallout of the pandemic in respect to the overall economy, specific businesses, and the stock market. Each newspaper shows a specific tendency to focus on particular topics throughout the three months observed. The Bild frequently reported on public events and the restrictions placed on them, as well as the daily lives of citizens during the pandemic. The USA Today less frequently mentions official efforts to prevent of the virus, but in turn, more frequently reports on how to prevent a further spread or infection through personal measures such as wearing a mask or disinfection. The Yomiuri focuses more strongly the response of the Japanese government and officially introduced methods of prevention.

## 5 Discussion and Conclusion

This study compared the mentioned actors, localities, and topics in American, German, and Japanese newspaper articles in their respective languages aiming to clarify the differences across newspapers and over time during the beginning of the pandemic from January to March 2020.

From January 2020, the German Bild, Japanese Yomiuri Shimbun, and American USA Today reported on the outbreak of COVID-19. The Yomiuri Shimbun shows a strong focus on the government's response to the outbreak and official measures to prevent the spread of the virus, whereas the USA Today and Bild appear more concerned with the effect of the pandemic on citizens' daily lives and public events. At least in March, concrete reports on treatments of COVID-19 are comparatively less frequent in the Yomiuri Shimbun than in the Bild or USA Today. Overall, this could be an expression of a more paternalistic approach towards the virus in Japan, or at least in the Yomiuri Shimbun, than evident in the other two newspapers. In contrast to the Yomiuri Shimbun, the USA Today reports frequently on personal

measures to prevent the spread of the virus, but less frequently mentions government response to the virus. This might however also be a result of the lower overall number of COVID-19 infections and related deaths in Japan up until March 2020 when compared to the US or Germany.

Furthermore, in contrast to the Bild, the USA Today and particularly the Yomiuri Shimbun frequently mention the pandemic's effects on businesses, whereas the Bild focuses more on human interest stories. This could be interpreted as a result of the newspapers' different readerships and journalistic approaches, with the German Bild as a tabloid focusing more on the social fallout of the pandemic, whereas particularly the Yomiuri Shimbun carters more to businesspeople.

Overall, although by March 2020, cases of COVID-19 were confirmed in each country, newspapers tended to report less frequently on the concrete health hazards of the pandemic, and more frequently on the economic and societal effects of the pandemic. Furthermore, although the virus continued to spread, the frequency of articles providing the public with concrete information on how the virus spreads, what symptoms it can evoke, and how it can be treated, does not noticeably change over time.

## 6 Limitations, Further Work and Reflections on Methodology

This paper presents selected first results of a cross-regional comparison of the media coverage on COVID-19 in Germany, Japan, and the USA, based on a random sample of articles from the period of January to March 2020. While this allows us to identify salient differences in the news coverage, it does limit the use of quantifying the results of our coding analysis. In addition, our selection of the most widely circulated newspaper in each country for inclusion in this analysis also led to a narrow sample of articles per country, as differences in journalistic approach, target readership, and political leanings between the newspapers accentuate differences in the articles.

In further work, we plan to extend the analysis of articles to all articles published in 2020, and to include further newspapers for analysis to provide a comprehensive and quantitatively interpretable comparison of the news coverage on COVID-19. Our rationale for using a random sample of articles from a limited number of

newspapers as a first step was to identify salient categories in the articles and create a first system of codes and thematic categories. Further analysis of a larger corpus of data requires the use of automatic coding, for which the codes and categories established here provide a first basis.

As a next step, we first plan to continue qualitative analysis, as depicted in this paper, for a larger random sample of articles published up until December 2020. This serves to further establish a system of thematic codes that enables us to efficiently grasp the articles' contents. Based on this extended code system, we then aim to create a dictionary for automatic coding analysis, that is we compile a list of search terms linked to the codes and categories, that we automatically assign to the overall corpus. Finally, we will conduct a qualitative in-context analysis of these automatically coded text segments. This combines qualitative and quantitative analysis in that categories are based on human interpretation of the data, which is then used as a basis for a quantitative comparison of articles, that is however in turn also again subjected to qualitative analysis. In contrast to methods of text mining or topic modelling, this allows for a more theoretically informed and interpretable analysis of textual data and can be used in contexts aside from the analysis of newspaper articles.

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