

Commenting on PM Trudeau's COVID-19 daily briefing in Canada: data mining public opinions and concerns on YouTube

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Commenting on PM Trudeau's COVID-19 daily briefing in Canada: data mining public opinions and concerns on YouTube

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Abstract

Background: During the COVID-19 pandemic in Canada, Prime Minister Justin Trudeau has provided updates on the novel coronavirus and government's responses in his daily briefings from March 13 to May 22, 2020, delivered on the CBC official YouTube channel (Canadian Broadcasting Corporation).

Objective: This study aims to examine and track YouTube users' comments on PM Trudeau's COVID-19 daily briefings in Canada over time.

Methods: We used machine learning techniques and longitudinally analyzed a total of 46,732 English YouTube comments retrieved from 57 videos of PM Trudeau's COVID-19 daily briefings from March 13 to May 22, 2020. The natural language processing, Latent Dirichlet Allocation (LDA) model was used to choose salient topics among the sampled comments in each of the single days. Thematic analysis was used to classify and summarize these salient topics into different prominent themes.

Results: We found 11 prominent themes, including "strict border measures," "public responses to PM Trudeau's policies," "essential work and frontline workers," "individuals' financial challenges," "rental and mortgage bursary," "quarantine," "government financial aid for enterprises and individuals," "PPE," "Canada and China relationship," "vaccine," and "re-opening."

Conclusions: The present study is the first to longitudinally investigate public discourse and concerns of PM Trudeau's COVID-19 daily briefings in Canada. This study contributes to the establishment of a real-time feedback loop between the public and public health officials on YouTube. Hearing and reacting to real concerns from the public can enhance trust between the government and the public to prepare for a future health emergency.

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Original Manuscript

Commenting on PM Trudeau's COVID-19 daily briefing in Canada: data mining public opinions and concerns on YouTube

Abstract

Background: During the COVID-19 pandemic in Canada, Prime Minister Justin Trudeau has provided updates on the novel coronavirus and the government's responses in his daily briefings from March 13 to May 22, 2020, delivered on the CBC official YouTube channel (Canadian Broadcasting Corporation).

Objective: This study examines YouTube users' comments on PM Trudeau's COVID-19 daily briefings in Canada and tracks these comments to extract the changing dynamics of public opinions and concerns over time.

Method: We used machine learning techniques and longitudinally analyzed a total of 46,732 English YouTube comments that were retrieved from 57 videos of PM Trudeau's COVID-19 daily briefings from March 13 to May 22, 2020. The natural language processing, Latent Dirichlet Allocation (LDA) model, was used to choose salient topics among the sampled comments for each of the 57 videos. Thematic analysis was used to classify and summarize these salient topics into different prominent themes.

Results: We found 11 prominent themes, including "strict border measures," "public responses to PM Trudeau's policies," "essential work and frontline workers," "individuals' financial challenges," "rental and mortgage bursary," "quarantine," "government financial aid for enterprises and individuals," "PPE," "Canada and China relationship," "vaccine," and "re-opening."

Conclusions: The present study is the first to longitudinally investigate public discourse and concerns of PM Trudeau's COVID-19 daily briefings in Canada. This study contributes to establishing a real-time feedback loop between the public and public health officials on social media. Hearing and reacting to real concerns from the public can enhance trust between the government and the public to

prepare for a future health emergency.

Introduction

The World Health Organization declared COVID-19 as a global public health emergency on March 11, 2020 [1]. Canada confirmed its first coronavirus case on January 25, 2020, and a total of 189,387 cases of COVID-19 in Canada as of October 14, 2020 [2]. Till March 12, 2020, Quebec was the first province that declared a state of emergency [3] and took preventive measures, such as transportation restrictions, quarantine rules, and social distancing [4, 5]. In Canada, Prime Minister Trudeau has started his daily briefing for the government's updated policies and actions for stopping the spread of COVID-19 since March 13, 2020. For example, PM Trudeau announced the interest-free moratorium for the student loan and US_Canada border closure on March 18, 2020; announced Canada Emergency Response Benefit (CERB) on March 25; and announced Canada Emergency

Student Benefit (CESB) through the independent public entities (e.g., lowering the interest rate by Bank of Canada) or the federal government programs (e.g., CERB and CESBm) on April 22 [6].

Since the COVID-19 outbreak, social media has become the most accessible source for obtaining news, health information, and exchange opinions. Given the self-isolation situations, people extensively post their opinions, express emotions, and exchange ideas about COVID-19 related policies online [7]. This study analyzes the YouTube comments under PM Trudeau's daily briefing video. YouTube is the first online video sharing platform. With more than two billion users and one billion hours of videos watched every day, YouTube has become one of the largest video sharing platforms worldwide and played an essential role in the public communications of the epidemic outbreak [8]. Comments on YouTube have provided rich data for public discourse and sentiment research. Existing studies examine the impact of YouTube videos and comments on epidemic diseases (e.g., Ebola, Zika) and show that YouTube videos and comments are essential channels for disseminating health information [9-11]. Basch et al. (2015) coded the source and contents of the 100 widely viewed videos about the Ebola virus disease on YouTube. They found that these videos have been viewed 73 million times and included contents about the death toll and how the virus was transmitted. Pathak et al. (2015) evaluated 198 YouTube videos about the Ebola outbreak in 2014. They found that most of them were useful and demonstrated YouTube as a useful health information source during global health emergencies. In contrast, Bora et al. (2018) concluded that videos could potentially spread misinformation during global public health emergencies, and trustworthy videos from health organizations or universities were scarce. Khatri and colleagues (2020) [12] analyze the content about coronavirus on YouTube by reviewing 72 videos in English and 42 videos in Mandarin and demonstrated that YouTube is an important platform for health information dissemination.

There are two goals of this study. First, it examines whether YouTube comments are a useful source of public opinions and priorities on coronavirus. Second, it identifies public responses and

discourses for PM Trudeau's coronavirus policies in Canada over time. According to Bora et al. (2018), we purposively select trustworthy videos published from the CBC official YouTube channel. More specifically, the present study examines and tracks public discourse under PM Trudeau's COVID-19 daily briefing videos posted on YouTube (n=57) from March 13 to May 25, 2020, in Canada. This paper contributes to understanding the under measured public responses to PM Trudeau's COVID-19 related policy in Canada. Real-time and longitudinal analysis of public responses and concerns can help public health authorities recognize Canada's involving public priorities.

Methods

We followed the text mining pipeline, including data preparation and data analysis [7]. Data preparation included data sampling, collection, and preprocessing. Data analysis included unsupervised machine learning and thematic analysis. The unit of analysis was each unique comment posted under PM Trudeau's daily briefing videos from March 13 to May 25, 2020.

Sampling

We used a purposive sampling approach. Our sampling frame was PM Trudeau's COVID-19 daily briefing videos published on the CBC official Channel on YouTube. PM Trudeau's daily briefings have been published on the CBC official YouTube channel¹ (Canadian Broadcasting Corporation) from March 13, 2020. Our sampling frame included 58 daily briefing videos posted from March 13 to May 22, 2020 (n = 57 included comments, n = 1 did not have any comments).

We presented these videos' characteristics in Appendix 1, including publish dates, titles and descriptions of the videos, and numbers of views, likes, dislikes, and comments associated that each video has received up to May 25, 2020. For example, on March 22, 2020, the daily briefing with the title "PM Trudeau announced that the \$82-billion financial package was just the first step, and more financial funds will come" received the highest number of comments (n=2,413) compared to other

¹ COVID-19: Trudeau's daily briefing. (n.d.). Retrieved from <https://www.youtube.com/playlist?list=PLeyJPHbRnGaYxLybblXjMbgiPdt6hhO7U>

daily briefing videos published in March. The video titled “The term ‘New Normal’ to describe daily routine during the COVID-19 pandemic and the numbers would take months of continued, determined effort” had the highest number of comments ($n = 2,087$) in April. The video titled “Trudeau urged world leaders to pull together for the COVID-19 vaccine” received the highest number of comments ($n = 2,653$) in May.

[Insert Appendix 1]

Data collection

The study’s dataset was all the comments posted by YouTube users under each of these 57 videos. We used YouTube’s open API, collected all the comments under each of PM Trudeau’s daily briefing video, and retrieved them on May 25, 2020. We coded the information retrieval script in Python V3. We retrieved a total of 47,149 comments from these 57 videos. After removing 1,017 non-English and duplicate comments, 46,732 comments remained as our final dataset, shown in Figure 1. The following information was collected associated with each of the 46,732 comments, including (1) a unique ID related to each comment; 2) full comment texts; 3) metadata associated with each comment, such as “reply count (number of replies that comment received),” “likeCount (number of the likes that comment received),” “published date and time of the comment,” and “de-identified username.” The collected 46,732 non-English comments included both first level comment and their associated “replyTo” (comment replied to another comment) from 17, 211 YouTube users.

We treated the comments published under each video as a separate document for the topic modeling (e.g., document 1, 2, 3 ...57). Thus, we had a total of 57 documents for topic modeling.

[Insert Figure 1 here]

Preprocessing of the raw data

We preprocessed the raw data to ensure data analysis quality. Pre-processing was an important task for analyzing YouTube comments as it cleaned the data by diminishing its complexity for better results [13]. Our data pre-processing included the following steps.

1. We removed handles(@user) and their content as they did not contribute to the analysis.
2. We removed all non-English characters (non-ASCII characters) because this study focused on English messages.
3. We removed the words that are not making any sense. For example, “#newYork sdaaawd asjdasd @!!!!” We used “Nostrill” [14] to detect nonsense comments and pronunciation. “Nostrill” incorporated a large table of n-gram frequencies to support its probabilistic assessment of text strings. For the comments labeled as “nonsense” by Nostrill, we also checked their pronunciations (i.e., vowel and phones). The detected nonsense comments were removed from the analysis.
4. We removed stopwords to ensure better results [15]. Stopwords (e.g., the, a, an, in) were frequently occurring words that did not carry any information and orientation. We used the Natural Language Toolkit (NLTK) suite of python libraries to filter out the stopwords to save space in our database and processing time.
5. We applied a stemmer. Stemmer was a rule-based process of stripping the suffixes (“ing,” “ly,” “es,” “s,” and more.) from a word. A large number of conjugates were removed.

Data analysis

Unsupervised machine learning. We used the Latent Dirichlet Allocation [16] for generating prominent topics. LDA was a generative probabilistic model based on the hierarchical Bayesian, mining the underlying set of topics on a corpus of text. LDA has been applied to COVID-19 relevant topics on social media. For example, Xue et al. [7] examined Twitter posts related to the COVID-19 pandemic. Obadimu and colleagues [17] applied LDA to recognize the toxicity comments on YouTube. The present study treated the collected YouTube comments as a document and applied the LDA topic modeling with the gensim Python library. For each identified topic, we used WordNetLemmatizer to extract popular unigrams and bigrams. The pyLDV was used to visualize the findings.

Qualitative analysis

The thematic analysis allowed us to interpret the patterns, topics, and themes from the unsupervised machine learning processes [18, 19]. Two authors independently assigned topics based on the bigrams and representative comments related to each of the videos. Then, they reviewed all identified topics and their representative unigrams, bigrams, and comment examples from the 57 videos and assigned themes across these topics. The research team examined the initial coded themes and considered whether they reflected these identified topics. The team discussed the themes and provided names to ensure they reflect the identified salient topics.

Results

Descriptive results of the videos

Our sampling frame included 57 Trudeau's daily briefing videos published on the CBC YouTube channel between March 13 and May 22, 2020. We described the videos' statistics in Table 1, including the number of views, likes, dislikes, and comments of the 57 videos. For example, on average, these videos have been viewed 364,487 times and received an average of 830 comments and 1,826 likes.

[Insert Table 1 here]

Figure 2 showed the view counts of Trudeau's daily briefing over time. The view counts peaked on March 20 and gradually decreased since April 2020 when PM Trudeau declared that the government would close the border to stop the spread of COVID-19².

[Insert Figure 2 here]

Figure 3 showed that the numbers of likes were higher than dislikes on most of the days, except May 4 and May 9, 2020. The daily briefing on May 4 urged all world leaders to work together and fought for a COVID-19 vaccine. Besides, this video also received the highest number of

² <https://www.cbc.ca/news/politics/trudeau-covid19-coronavirus-medical-equipment-1.5504149>

comments. PM Trudeau stated that Canadians would receive more financial benefits on May 9, 2020, which received more dislikes than likes.

[Insert Figure 3 here]

Prominent topics in the comments

We retrieved and downloaded the associated 46,732 comments for each of the 57 videos as our final dataset. We identified 1 to 3 salient topic(s) for each of the documents (#1 to # 57) associated with each daily briefing video, resulting in 168 topics. We presented the topic modelling results for each of the 57 documents in Table 2, including publish dates of the video, prominent topics for the document, popular bigrams in the topics, and representative comments on the topic. For example, document #1 included all posted comments under PM Trudeau's daily briefing on March 13, 2020. We identified two prominent topics from document #1, including "border measures" and "comment on the government." Popular bigrams were "close the," "dam border," "international travel," and "prime minister." The representative YouTube comment was, "CLOSE THE BORDER!!!! Wake up Trudeau... close the god dam border Now. Stop all flights from Italy and Europe NOW."

[Insert Table 2 here]

Prominent themes

Table 3 showed the salient themes, description of the themes, topic (bigrams), and representative comments. We identified 11 themes from the prominent 168 topics, including "Strict border measures," "Public response to PM Trudeau's policies," "Essential work and frontline workers," "Individuals' financial challenges," "Rental and mortgage bursary," "Quarantine," "Government financial aid for enterprises and individuals," "PPE," "Canada and China relationship" "Vaccine," and "Re-opening." For example, "Public response to PM Trudeau's policies" was a prominent theme, exemplified by topic (uni)bigrams of "government," "Prime Minister," "Justin Trudeau," "Canada," "officials," "liberal," "government" and "rightwing." One comment example

was, “Respect and listen to the Prime Minister, he is trying his best with the Government to keep everyone in our Country safe from Covid19.”

[Insert Table 3 here]

Figure 4 showed the number of occurrences of the prominent themes between March 13 to May 22, 2020. For example, the theme “public responses to PM Trudeau’s policies” was the most popular theme, followed by “government financial aid for enterprises and individuals,” and “individuals’ financial challenges.”

[Insert Figure 4 here]

Themes over time

In addition to counting the number of occurrences, we also tracked the prominent themes over time, shown in Figure 5. We divided each month into three periods: early-month (day 1 - day 10), mid-month (day 11 - day 20), and late of the month (day 21 and after). There were ongoing public concerns for “public responses to PM Trudeau’s policies” and “individuals’ financial challenges” since they appeared multiple times from March to May. For example, the theme “Public responses to PM Trudeau’s policies” have been continuously discussed by the public since March (except mid-May). The theme “strict border measures” mainly occurred from mid - March to mid - April. However, it was discussed again in Mid - May. Themes “Vaccine” and “Re-opening” were mainly discussed since late - April.

[Insert Figure 5]

Popular comments

We selected the Top 50 comments with the highest number of likes and the Top 50 comments with the highest number of replies. We presented 19 comments that ranked the top 50 liked and replied in Table 4. It showed the contents of these 19 comments, published dates, categorized themes, the number of replies, and the number of likes. For example, the single comment posted on March 28

received 488 likes from other YouTube users and had received 104 replies. This comment reflected the theme of “strict border measures.” Among the selected 19 popular comments, we found that five comments were about the theme “quarantine,” and three comments reflected the theme “open government.” The theme “quarantine” was about quarantine-related measures as the public sought more strict quarantine measures when they commented and responded to PM Trudeau’s daily briefings. “Open government” was about the public’s request for a more open government and public interaction dynamics.

[Insert Table 4 here]

Discussion and implications

Principal results

The present study is the first to investigate and track public opinions and reactions to PM Trudeau’s daily briefing for COVID-19 in Canada. This study uses a machine learning approach and longitudinally examines public discourse about PM Trudeau’s daily briefings over time. Results reveal several prominent themes over time, including “strict border measures,” “public responses to PM Trudeau’s policies,” “individuals’ financial challenges,” “government financial aid for enterprises and individuals,” and “essential work and frontline workers.” In addition, the themes of “vaccine” and “re-opening” are highly discussed since late April. The study demonstrates YouTube comments as a useful source of public opinions and priorities during global health emergencies.

Theme 1 Strict border measures

This theme refers to the comments that discuss topics such as border entry policy, international traveler, and border screening measures. The majority of the comments in this theme are requesting the government implement stricter border measures to prevent transmission from carriers who have or don’t have COVID-19 symptoms, exemplified by the comments “CLOSE THE BORDER... Stop all flights from Italy and Europe NOW.” Public discourse on this topic started in mid-March and remained a hot topic until mid-April. Results confirm that Canada's government

announced a policy on March 18, 2020, which implements a ban on all foreign nationals entering Canada, including restrictions on all non-essential travel at the Canada-US border. Discussions of border measures were not prominent in late April and early May and re-appeared in mid-May, consistent with the border closure agreement between the Canada - US border that was valid until May 21.

Our results suggest that the “border policy issue” has continuously been a concern for Canadians who support strict border measures to prevent the spread of COVID-19 in Canada. Previous studies demonstrate that air transportation has the potential to spread influenza disease like A(H1N1) [20], and enhanced precautions should be given to travelers to the countries with increasing cases of respiratory diseases -MERS [21]. Brown and colleagues [22] showed that airport exit and entry screening at international borders facilitates the rapid detection of illness and the implementation of appropriate public health control measures to prevent the spread of Ebola. Our results suggest that future research may provide empirical evidence for the public and policymakers regarding the effectiveness of border measures to prevent the spread of COVID-19 since it has been a primary public concern over time.

Theme 2 Public responses to PM Trudeau’s policies

Public responses to Prime Minister Trudeau’s policies refer to public opinion comments on the Canadian government, parties, and or PM himself. The majority of comments include opinions of the government's performance and policies during the COVID-19 pandemic. One representative comment is, “Respect and listen the Prime Minister, he is trying his best with the Government to keep everyone in our Country safe from Covid19 with emergency funds for those that need it.” Compared to other themes, this theme is the most popular one and continuously receives public attention from mid-March to late-May. The theme's popularity is due to the positive interaction dynamic between the general public and the government of Canada, which encourages people to communicate with government organizations on social networks. It traces back to 2011, when

Canada acknowledged the need to use social media to interact with the public for the first time [23]. Social media users in Canada are primarily interested in communicating with the government and obtaining customized information [24]. One study [25] show that social media engage the public to foster participatory dialogues and discussions of policy development and implementation. In addition, we also find criticisms related to the government's COVID-19 relevant policies, such as "Government Health Officials WHAT? They are months behind! Recommended NO MASKS only because they did not prepare, and they hadn't enough masks." Previous studies have examined mixed sentiments towards governments' policies in emergencies. During the 2009 H1N1 influenza pandemic, more than half the US population had positive emotions to the government's policy responses while a certain amount of people did not [26].

Theme 3 Individuals' financial challenges

Financial challenges refer to the comments that include people's discussion, concerns, or policy proposals related to financial loss during the pandemic, such as "having no income for essential living costs due to lost jobs." One representative comment is stated as, "I'm more worried about the financial issue than the health one right now. We are doing everything we can health-wise in this family, but my son is now out of work, and we know hubby will be soon." Results show that the public has been highly and continuously discussing financial related topics since the first PM Trudeau's daily briefing. The assessment of the impacts of COVID-19 on the labor market in Canada shows that COVID-19 drove a 32% reduction in aggregate weekly hours worked from February to April 2020, along with a 15% reduction in employment [27]. As indicated by Canada's Statistic, the average net saving for all Canadian households was \$852 in 2018 [28], which suggests that people may be unable to afford the essential living costs if they don't have a basic income.

We find a positive correlation between the government's policies supporting individuals and public attention to the financial challenges. Since the *Canada Emergency Response Benefit* was launched on April 6, 2020, nearly 3.5 million Canadians have applied for this benefit in the first

week and increased to 7.12 million on April 24, 2020 [29]. More than 7 million people have received \$2,000 from the government in April, which explains a temporary decrease in the public attention for financial challenges in early May.

Theme 4 Government financial aid for enterprises and individuals

Discussion about the enterprise and individual financial aid plan is prominent from March to May. This theme includes discussions of government financial aid plans or programs supporting either enterprises or individuals, such as Canada Emergency Response Benefit (CERB), Canada Emergency Student Benefit (CESB), Canada Emergency Wage Subsidy (CEWS), Canada Emergency Business Account (CEBA). This theme is different from theme 3, *Individuals' financial challenges*, which focuses on individuals' concerns and discussions for their financial obstacles during the outbreak. Since late-March, this theme became prominent when the government administration firstly announced a number of the economy stimulation programs, exemplified by a comment, "If your business/source of income was interrupted due to COVID-19, whether you lost your business or not, you could still try to apply, as you would be in true need of help at this point." Our results confirm previous research on urgent individual financial aid during the pandemic and the importance of the business's financial aid programs [30, 31]. The longitudinal discussions on the plan of financial aid suggest that financial aid during the COVID-19 is critical for the public, and further research is suggested to assess the needs and evaluate the implementation of financial aid programs.

Theme 5 Essential work and frontline workers

Essential work and frontline workers have been a prominent theme in the comments related to PM Trudeau's daily briefings, such as the welfare system in Canada, incentive pay for essential works, and protection of frontline workers. One representative comment is stated, "The government should be incentivizing those who have to work during a pandemic, even a \$500/month incentive." It was a trendy public discussion topic in Mid March and lost public attention for 20 days, and then became prominent again since mid-April. Our results are consistent with an earlier study that shows

that frontline workers should be supported, and public supports to frontline workers are related to India Prime Minister's speech [32]. Our findings suggest that PM Trudeau's daily speech advocating for frontline workers also results in support and attention from the general public. For example, PM Trudeau mentioned essential work and frontline workers several times during his daily briefings, especially on April 29 and May 7. Our study suggests that political efforts in acknowledging essential workers may substantially impact the general public's awareness. It is worth examining whether public acknowledgment influences people's behaviors, such as following strictly social isolation and quarantine measures.

Theme 6 Vaccine

Public discussion of vaccines is another prominent theme merged since April. We classify all relevant topics in this theme, such as the development of vaccines, exemplified by a comment, "It could take years to come up with a vaccine, you've been doing a good job, Trudeau. Don't it up by making statements you can't back up." Previous studies analyzing Tweets related to COVID-19 found that vaccine was also a highly discussed topic [7]. Our findings provide further evidence among Canadian that vaccine is one of the significant public concerns during the COVID-19 outbreak. However, we also find misinformation of vaccines on social media where some voices support that vaccine is some kind of conspiracy. Findings suggest that the Canadian government administrations should provide more resources to the public to dispel the vaccine's misinformation. Proper public education is essential to raise public awareness, mobilize, and engage people in communities in Canada.

Limitations

There are several limitations in the study. First, this paper is not based on random sampling. We purposively collected comments that are posted by YouTube users under PM Trudeau's video. They only represent a portion of the public opinions for PM Trudeau's daily briefing during the COVID-19, which causes biases. Second, our sample size is relatively small compared to the big

data on Twitter. Third, we treated secondary comments (i.e., comment to comment) the same as the first-level comments for the study aims. This study has limitations in presenting the structural relationship between first-level and second-level comments. Finally, we retrieve all videos, comments, and associated data on May 25, 2020, three days after the last day of PM's daily briefing. It is noted that the evaluations could be different from the increased number of comments added over time.

Conclusion

The present study is the first to analyze and track the public discourse of Canada PM Trudeau's daily briefing for COVID-19 on social media. Machine learning to 46,732 English YouTube comments from 57 videos from March 13 to May 22, 2020, suggests that several prominent themes should be noted by the public health agencies and policymakers, such as "strict border measures," "public responses to PM Trudeau's policies," "individuals' financial challenges," and "government financial aid for enterprises and individuals." Recommendations for future work include (1) further validate YouTube comments as a source of information on COVID-19; and (2) strategies that can be considered by government and public health agencies to strengthen a real-time feedback loop between them and the public on YouTube. Hearing and reacting to real concerns from the public can enhance trust between the government and the public to prepare for a future health emergency.

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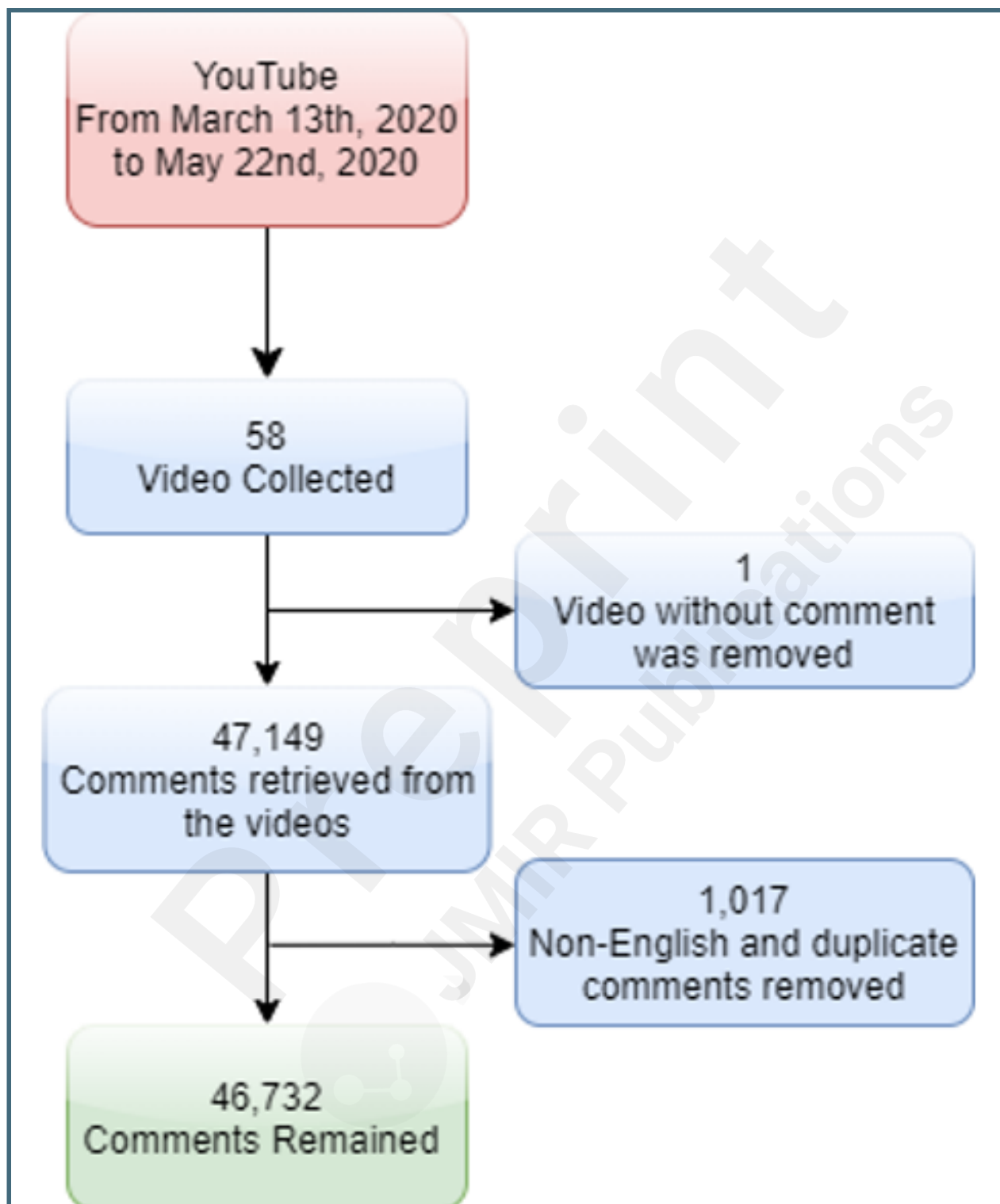
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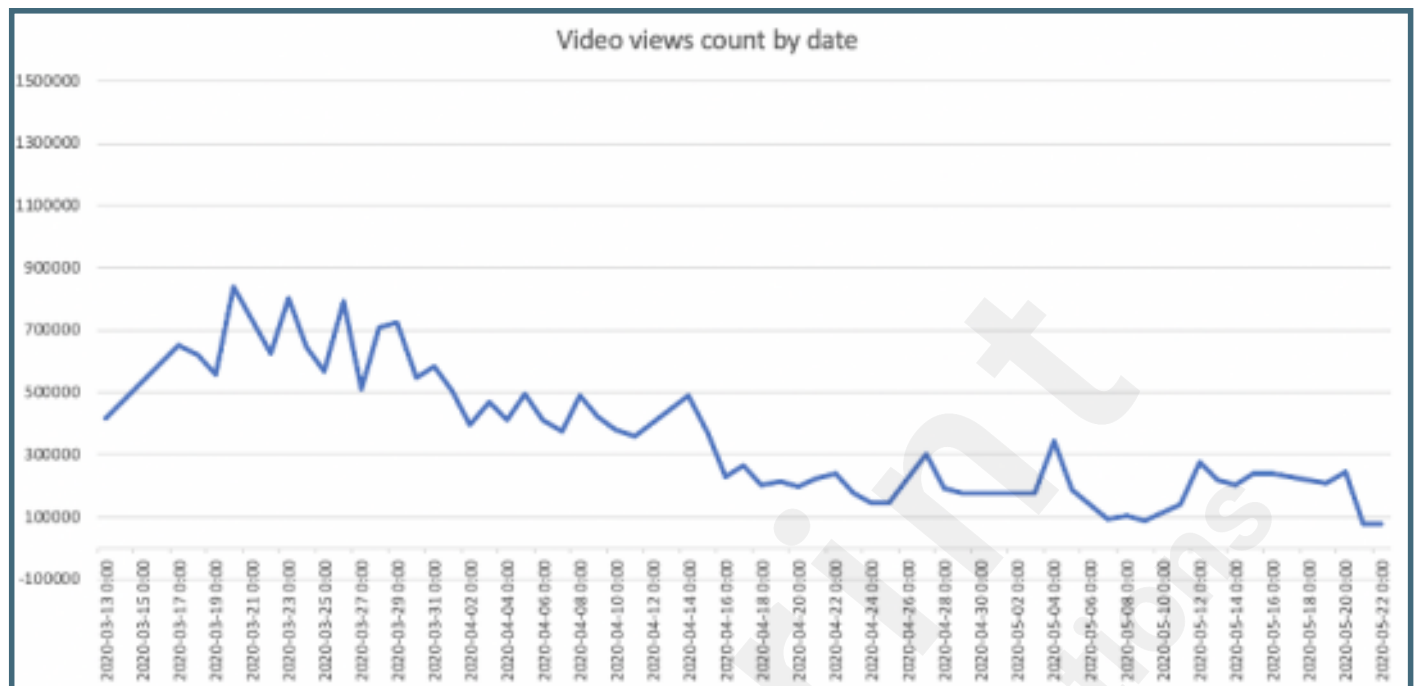
Supplementary Files

Figures

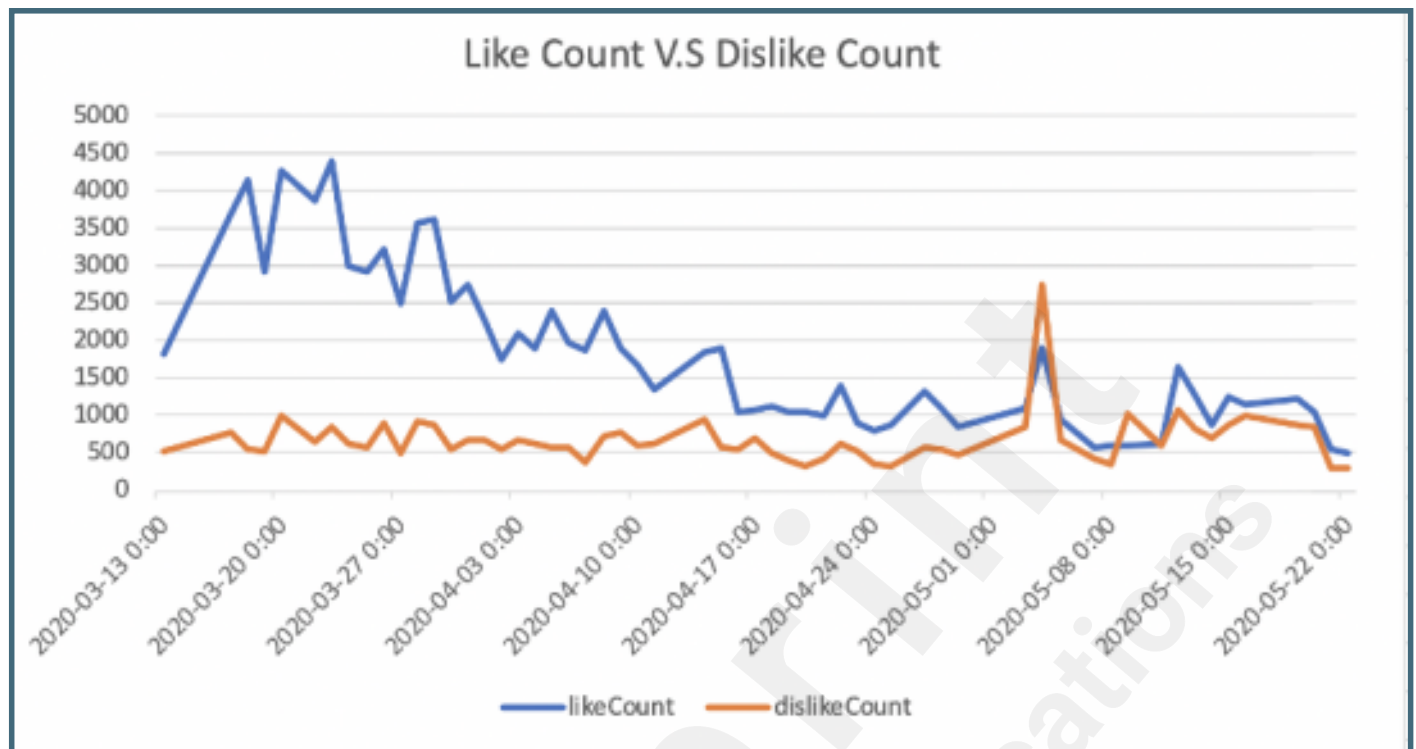
Data pre-processing chart.



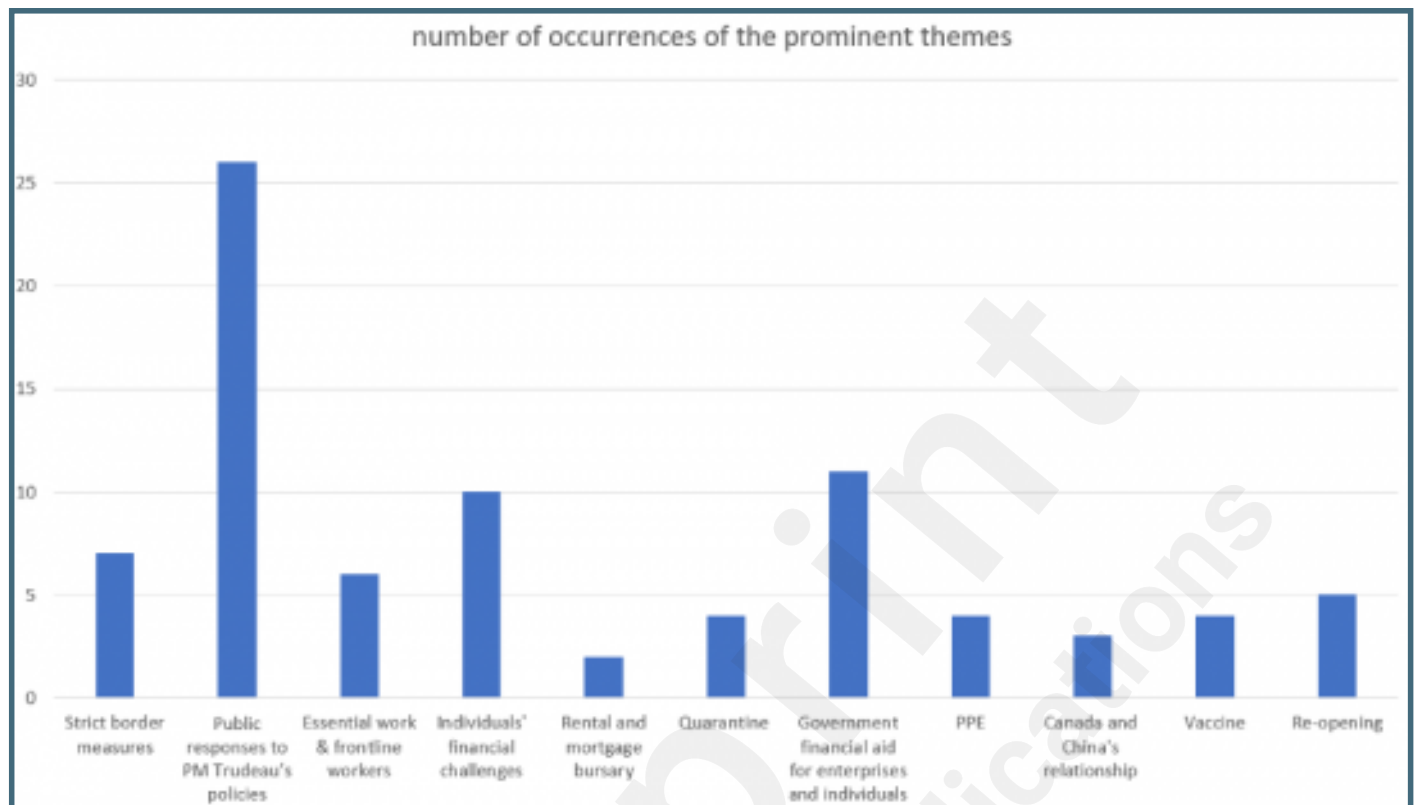
The number of views for the sampled daily briefing videos over time (n=56).



Like counts and dislike counts for the sampled daily briefing videos over time.



Counting the occurrences of each theme from March 13 to May 22, 2020.



Counting the occurrences of each theme from March 13 to May 22, 2020.

