

our collected YouTube video dataset. Other narratives served to inform viewers about the origin, spread, economics, and politicization of the disease. Videos about coronavirus deaths in the USA were not only the most popular narrative but also the most polarized, even in comparison to videos about political topics and the U.S. President. Updates on the number of coronavirus-related deaths may be watched by bipartisan viewers with a wider variety of viewpoints, as opposed to political videos, which might appeal more to a narrower audience. These highly polarized videos about the death toll decline in search results on YouTube quickly, which aligns with our observation that polarized videos are less likely to be promoted in search results over time.

In general, it appears that YouTube puts preference to less polarizing videos when returning videos for a search query. Videos promoted in search results for over three days were 37.0% less polarized than videos that do not remain in the first page of search results. YouTube may reduce the ranking for controversial content that receives more down votes and negative activity. Videos about individual interventions have the lowest polarization scores and spread, as well as the least growth in polarization over time. This may contribute to why YouTube’s ranking algorithm promotes individual intervention videos for longer periods of time than other videos.

Comparing videos from when they first appeared in search results to later scrape times shows that, as expected, engagement accumulates over time for each individual video. However, polarization also increased, which implies that older videos tends to attract watchers who disagree more with the content. When looking at the entire video data set over time, engagement decreased for non-intervention videos but increased for intervention-related videos, suggesting there is more interest in combating coronavirus through learning more about public health interventions than at the start of the pandemic. In particular, the viewership and engagement on videos about individual interventions to prevent coronavirus spread increased the most over the observed time period. While the net increase in engagement is small for medical intervention videos, we observe that relative engagement increased in the months of April and May but tapered off in June 2020. Despite this increase, videos about medical interventions are the ultimately least popular subset of the observed videos.

Videos with narratives around COVID-19 vaccine and treatment development share significant overlap with medical intervention videos. Both groups of videos have the least viewer engagement, which could stem from a lack of promotion by YouTube’s search ranking model. This finding is in conflict with observations of how video polarization inversely correlates with YouTube promotion as medical-related videos have the lowest polarization metrics across the entire COVID-19 video data set. For example, medical intervention videos decline in search result rankings at a 64.8% faster rate than government intervention videos. Videos about vaccines and treatments development dropped out of the top ten results 25% faster than videos about the U.S. coronavirus death toll, which have the highest observed video polarization scores. Medical

videos may have particularly high turnover in the search results due to constantly updating new developments. We note that political-narrative videos and economic-related videos do not seem to be adversely affected in search result rankings despite being topical as well.

For future research, we plan to refine engagement and polarization measures. Engagement does not account for how long a video has been available, so this index can be improved to factor in time as an element to identify videos that are more “viral” and attract attention in a short time span as opposed to videos that steadily receive comments and views. In addition to user interactions within the YouTube platform, integrating data from other social media sites can provide us insights into users and social networks. Our polarization index is currently calculated at the video-level, so we plan to expand the polarization index by considering the type and polarity of discussion in the comments section through sentiment analysis.

Two approaches were used for classifying YouTube videos by content—one by whether the video is related to public health interventions, and the other by identifying narratives in the video title. Both methods rely on the video title accurately describing the video content, which means that some videos may be miscategorized due to vague, unspecific, or unrelated titles. We also plan to improve video categorization by incorporating video descriptions and transcripts if available to better account for variances in video titles.

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