Climate change discourse in the U.S. media

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SUMMARY

The New York Times and Fox News may not be as 'poles apart' in their discussion of climate change, but the former covers a broader range of themes and emphasizes America's struggles of taking climate leadership. Since the latter does make reference to credible scientific research, America's partisan divide in climate change beliefs may be explained by self-confirmation bias and selective exposure to climate-related news.

RESEARCH OBJECTIVE

For many decades, climate scientists have long warned us of the irreversible impacts of climate change (Carrington et al., 2023). Notwithstanding these wake-up calls, efforts to combat the climate crisis have fallen short of global targets. The climate crisis is indeed a herculean, cross-national issue that requires fundamental changes to our economy and ways of living, but barriers to achieving net-zero are more *political* than anything else, when it comes to the U.S. context: Despite *mounting* and *unequivocal* evidence of global warming - climate change remains a highly contentious issue in the United States. Public opinion is dichotomized strictly along political ideology, with individuals on the political right more likely to underestimate the severity of the climate crisis and discredit claims by climate experts (Isaacs-Thomas, 2023; Montanaro, 2023). Moreover, divergence in public opinion is exacerbated by the partisan divide in Americans' media consumption behavior (Jurkowitz et al., 2020; Mitchell et al., 2014).

Hence the purpose of this (descriptive/exploratory) research was to explore Americans' media exposure to climate change issues, by comparing how such issues are framed across liberal vs. conservative news providers. Given human inclination toward confirmation bias and already politicized nature of the climate change debate, understanding the most frequently exposed topics among the two ideological groups can inform us of the 'climate change in the American mind', environmental policies that have the potential to garner bipartisan support, as well as the interventions needed for tackling potential misinformation or disinformation.

DATA SOURCES

I examined two sources of data: the 1) New York Times (https://www.nytimes.com/) and 2) Fox News (https://www.foxnews.com/), each of which represents liberal and conservative ends of the political spectrum. The choice of media outlet was based on 1) demographic characteristics of media viewership/readership and 2) levels of trust demonstrated by readership of ***opposing*** political views (Jurkowitz et al., 2020; Mitchell et al., 2014). The latter ultimately guided the choice of news provider, because the more *cohesive* it is in drawing readership of the *same* political ideology while

being more *exclusive* toward its *out-group*, the more insights it provided in understanding partisan divide on climate change.

To gauge the latest media discourse on climate change, I examined articles that were published within the last 5 years (2018-2022). Using an API for the New York Times and dynamic web scraping for Fox News, I accessed the title, abstract, date, section, and the URL. Documents were analyzed at the *abstract* level.

Given the number of climate-related articles and limited daily API call limit, I was unable to search the New York Times based on keywords. Instead, I accessed their entire archive based on year and month and then removed all articles that were irrelevant to climate change. As for Fox News, I scraped all article metadata that were posted on their 1) US climate 2) World climate and 3) Climate science section.

Since the focus of this analysis is on the *media providers'* framing of the climate change issue, articles that represented *individual* opinion (i.e. Op-eds) were excluded from the study. Upon removal of video transcripts, podcasts, and Op-eds, I was left with 2327 articles for NYT and 1644 for Fox News.

Figure 1 and **Figure 2** show the distribution of abstract length for the New York Times and Fox News, respectively. Abstract lengths of both sources display a roughly symmetric distribution, with a mean of 22.4 words for the New York Times and 26.4 for Fox News. Since abstracts are by definition short, their word counts range from as few as single digits to 70s.

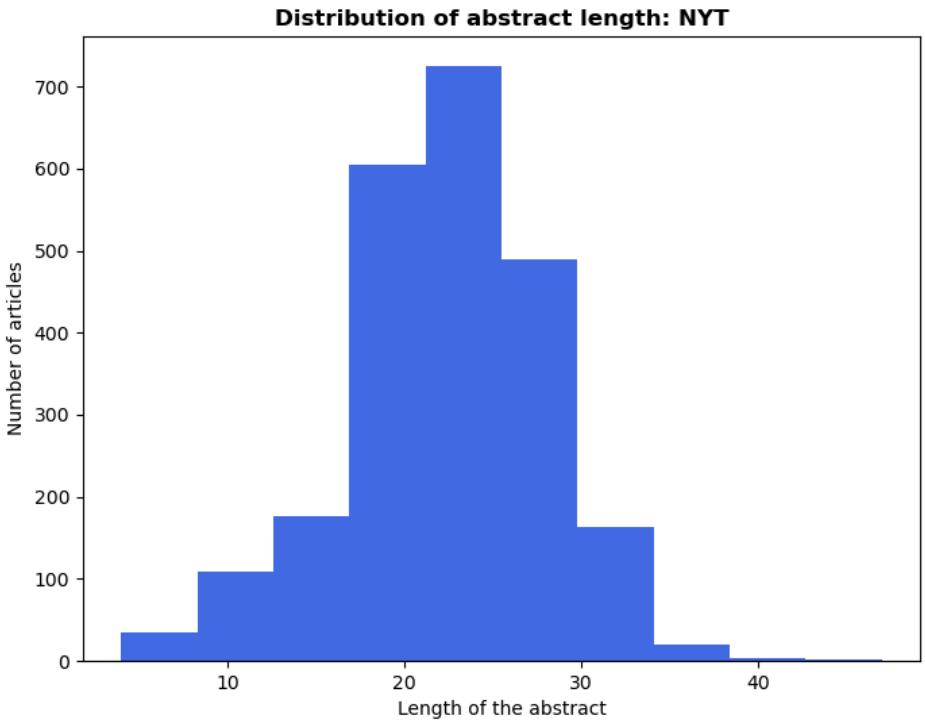

Figure 1. Abstract lengths of climate-related articles on the New York Times

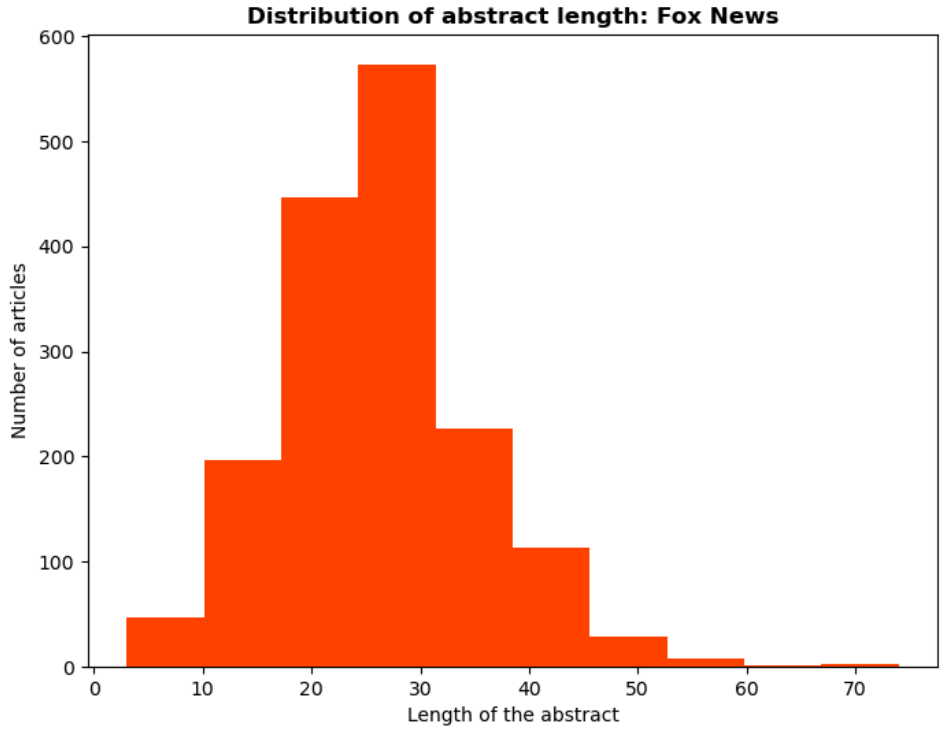

Figure 2. Abstract lengths of climate-related articles on Fox News

Figure 3 shows the most frequently cited words in the entire collection of climate-related news articles, throughout the last 5 years. Interestingly, the two sources make frequent reference to the *opposing* political party: 'Trump' makes it to the top 15 ranking on the New York Times while 'Biden' nor 'Democrats' make it to the list. Conversely, 'Biden' is cited more so than 'Trump' or 'Republicans' on Fox News.

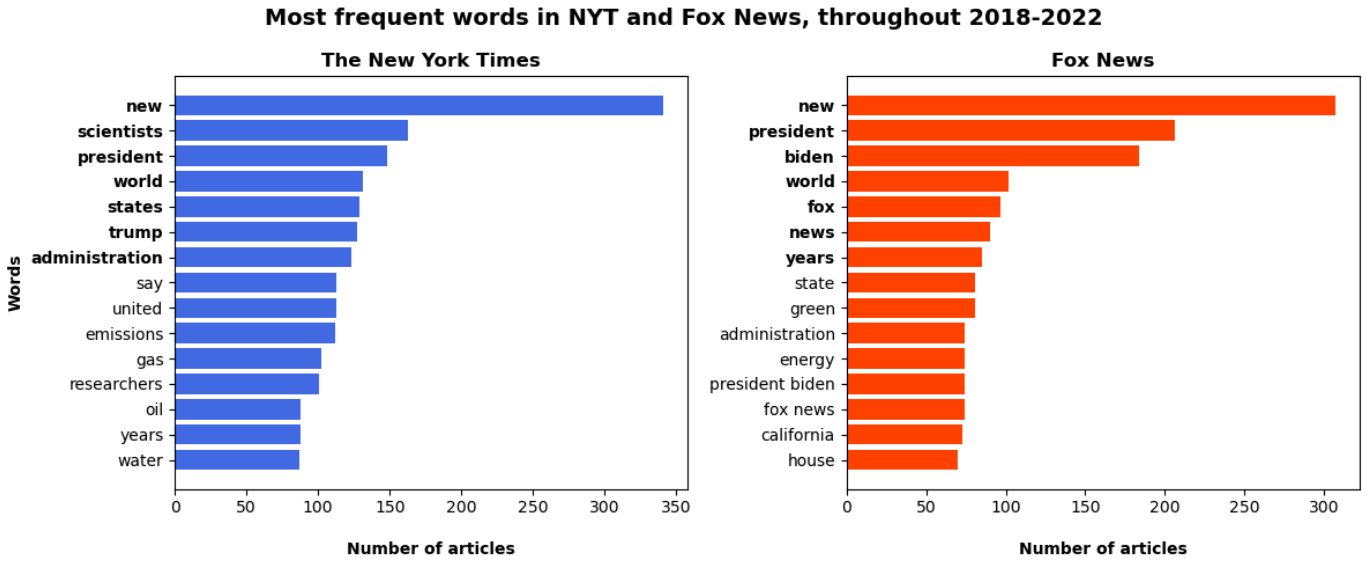

Figure 3. 15 Most important words in terms of the entire climate news coverage

Another notable difference is that the New York Times relies much on scientific research, whereas Fox News tends to be more 'self-absorbed', making frequent reference to itself. However, of interest to both sources of media is 'fuel' and 'energy'.

TECHNIQUES APPLIED

To analyze topics that are frequently discussed within the context of the climate crisis, I employed a combination of TF-IDF, N-gram approach, and Latent Dirichlet Allocation (LDA). TF-IDF is useful for keyword extraction as it allows us to calculate the importance of a word within each article, relative to the entire collection of articles. I applied the standard TF-IDF (without any scaling or normalization), because the variance in abstract length was small and there was minimal repetition of words within the same document, given its length (**Figure 1; Figure 2**). Further, the use of N-grams (a successive sequence of N number of words) was important in enriching our understanding of the issue, since keywords such as 'United Nations', 'Conference of the Parties', 'developing countries', 'Paris Agreement', 'Green New Deal', and the 'Great Barrier Reef' take on distinct meanings that are not applicable to the general context. To account for the fact that articles may touch upon multiple topics, LDA was used to assign each word to the probabilities of belonging to each topic. Selection of the number of topics was guided by both the *perplexity* and *coherence* scores, given the tradeoff between the two. The optimal number of topics was determined where the increase in coherence scores started leveling out, but before perplexity scores began to plummet.

To detect any differences in connotation/tone, I also performed an 'emotion' analysis. Since conservatives tend to underestimate the impacts of global warming (Tyson et al., 2023), it could be that Fox News portrays climate change in a more positive light than the New York Times. Since the climate change crisis is inevitably negative, I opted for the NRC Lexicon, which offers a more *fine-grained* analysis (8 emotions: fear, anger, anticipation, trust, surprise, sadness, disgust, joy; and 2 sentiments: positive, negative) than the standard, binary framework and associates each word in the dictionary with one or more emotions/sentiments. Based on the frequency of each emotion/sentiment category, relative weights of each were examined.

FINDINGS

On average, the New York Times posted 38.8 articles on climate change, every month. Fox News published fewer posts, with 27.4 per month, which shows large fluctuations over the years. In the early phases of the scope of our analysis (2018-2022), Fox News' coverage of the issue was clearly outnumbered by that of the New York Times. But lately, Fox News has been devoting just as much or if not more, of its news on climate issues as the New York times (**Figure 4**).

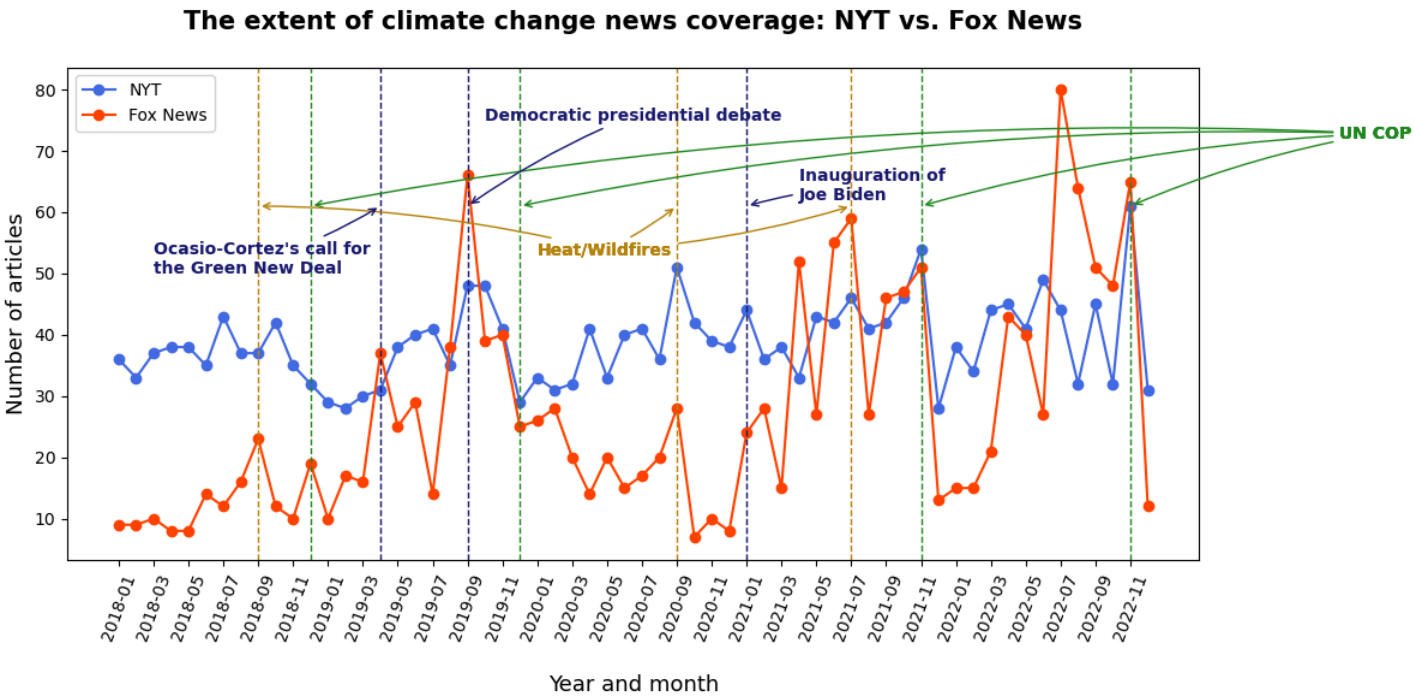

Figure 4. The extent of climate news coverage, from 2018 to 2022

Findings reveal that the New York Times and Fox News may <u>*not*</u> be such *diametrical* opposites, as had previously been thought:

- The importance of *collective*, *multilateral* climate action seems to have been recognized only as of late: Until 2019, rarely did *both* the New York Times and Fox News make reference to the United Nations Climate Change Conference (otherwise known as the Conference of Parties; COP hereafter) (**Figure 5-a**). Since 2021, however, the COP has earned considerable attention (**Figure 5-b**): we see a surge in the overall number of climate related news coverage throughout the weeks leading up to the summit, followed by a noticeable dip immediately afterwards (**Figure 4**). Usually, the two sources of media exhibit divergence in the extent of climate news coverage, but it is only at the time of the UN COP that the graph converges.
- Every summer (July/August as well as September), both the New York Times and Fox News increase their coverage of wildfires and extreme heat waves across the country (**Figure 4**). In comparison, extreme weather events that occur typically in the winter are not as frequently featured in the news.

However, Fox News tends to be more sensitive to 'political' events than the New York Times. In fact, Fox News shows greater sensitivity to the news of the *opposing* party line, than one's own (**Figure 4**): abrupt increases in climate news coverage coincide with key dates for or announcements made by the Democrat party, such as the reintroduction of the Green New Deal, Democratic presidential

primary, and the inaugural of Joe Biden. This could be indicative of 1) the lack of climate mitigation/adaptation agenda on the Republicans' part and/or 2) the intent to criticize the Democrats by bringing their climate agenda to the fore.

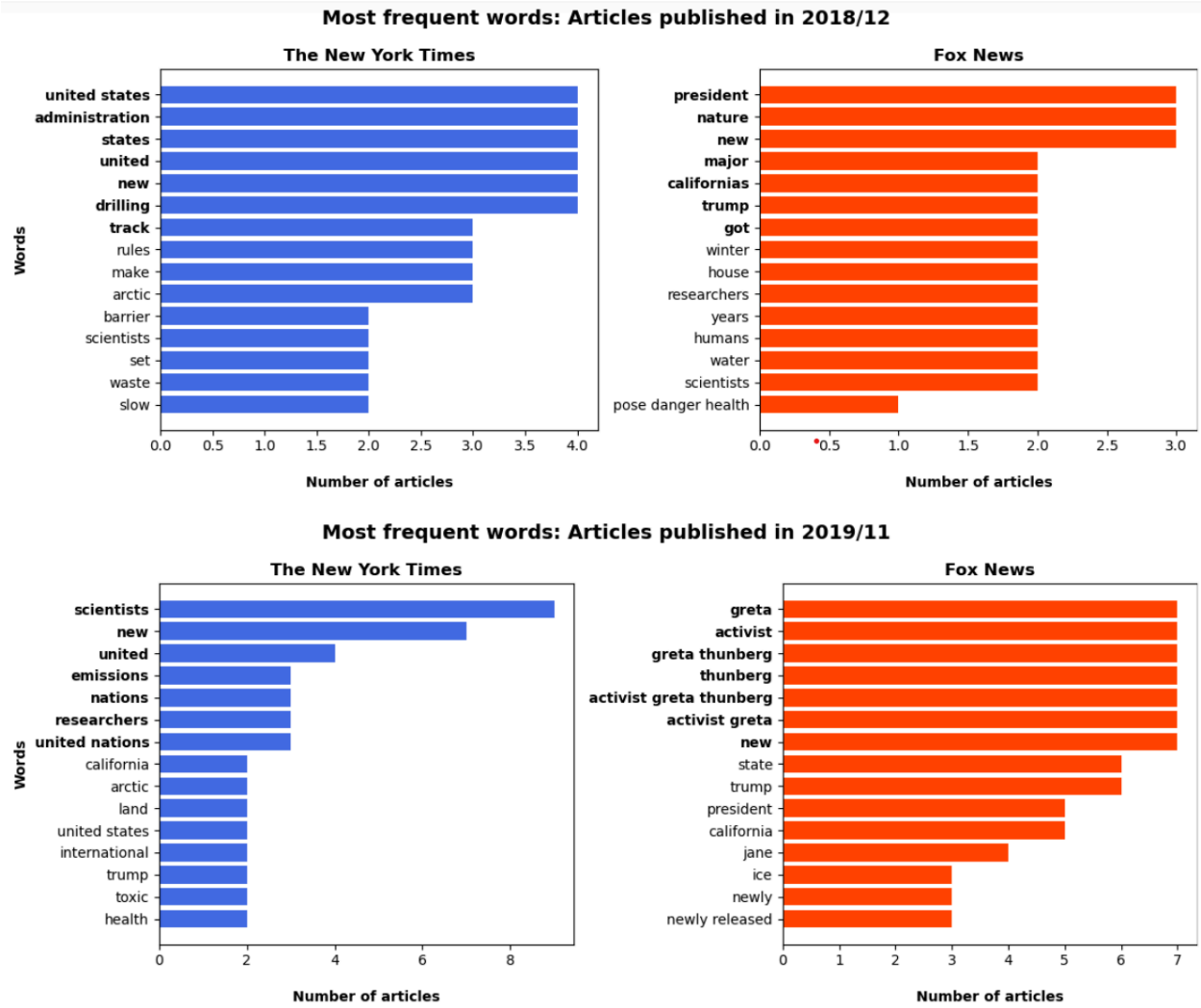

Figure 5-a. 15 Most important words during the month of the COP, in 2018 and 2019

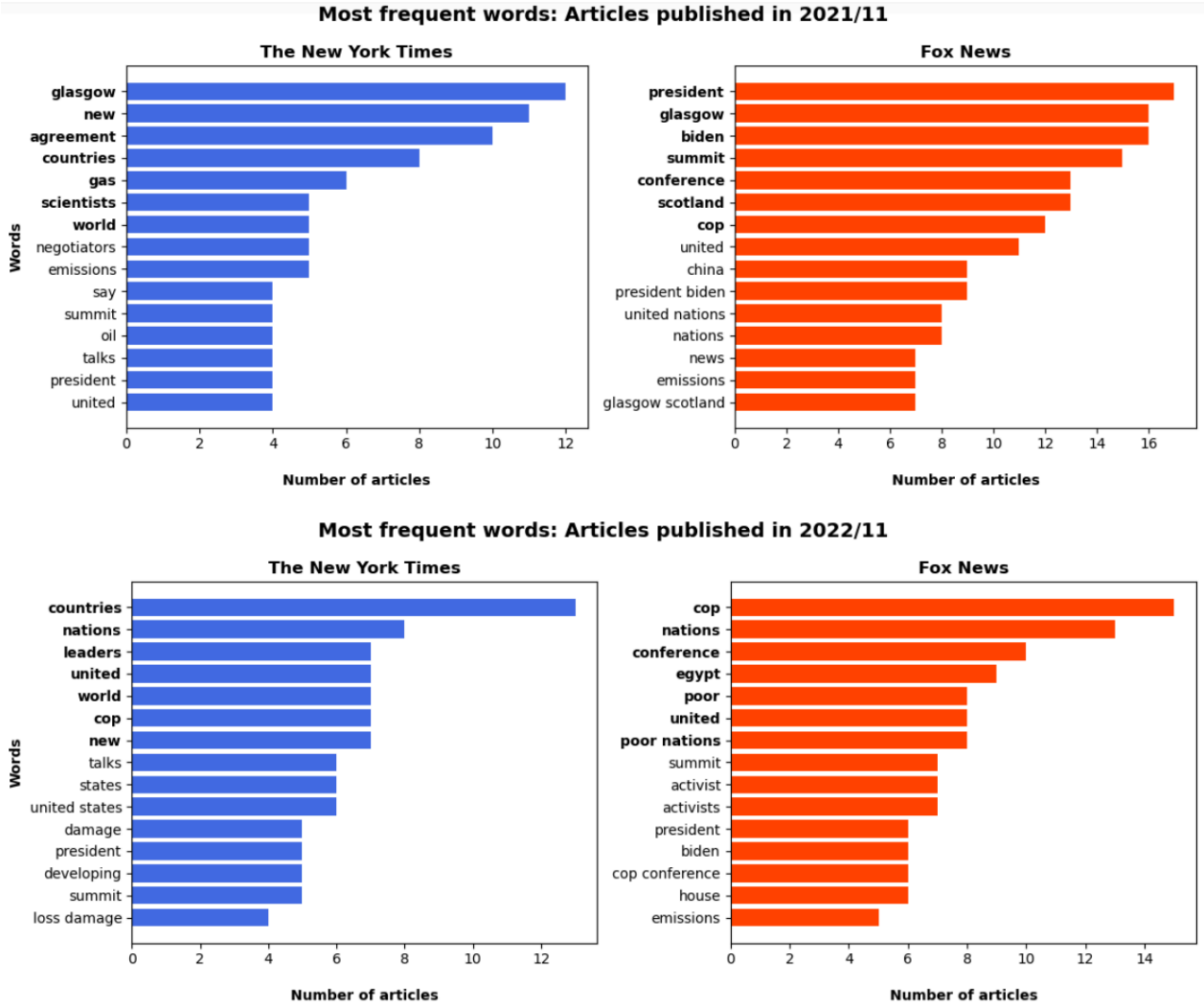

Figure 5-b. 15 Most important words during the month of the COP, in 2021 and 2022

LDA analysis for the New York Times resulted in 12 topics, in the order presented in **Figure 6**:

- Multilateral climate action
- Energy conservation and the use of renewable energy at the individual/household level
- Environmental policies and the economy
- Electric vehicles
- The dangers of climate change
- Pollution from heavy-duty vehicles and power plants
- Wildfires
- The need for systemic changes
- Energy crisis and fossil fuels
- The difficulty of moving America's climate agenda forward due to political/economic tensions (e.g. US-China, Russia-Ukraine)

- Vulnerability to extreme weather and health
- Court rules and compensation for losses

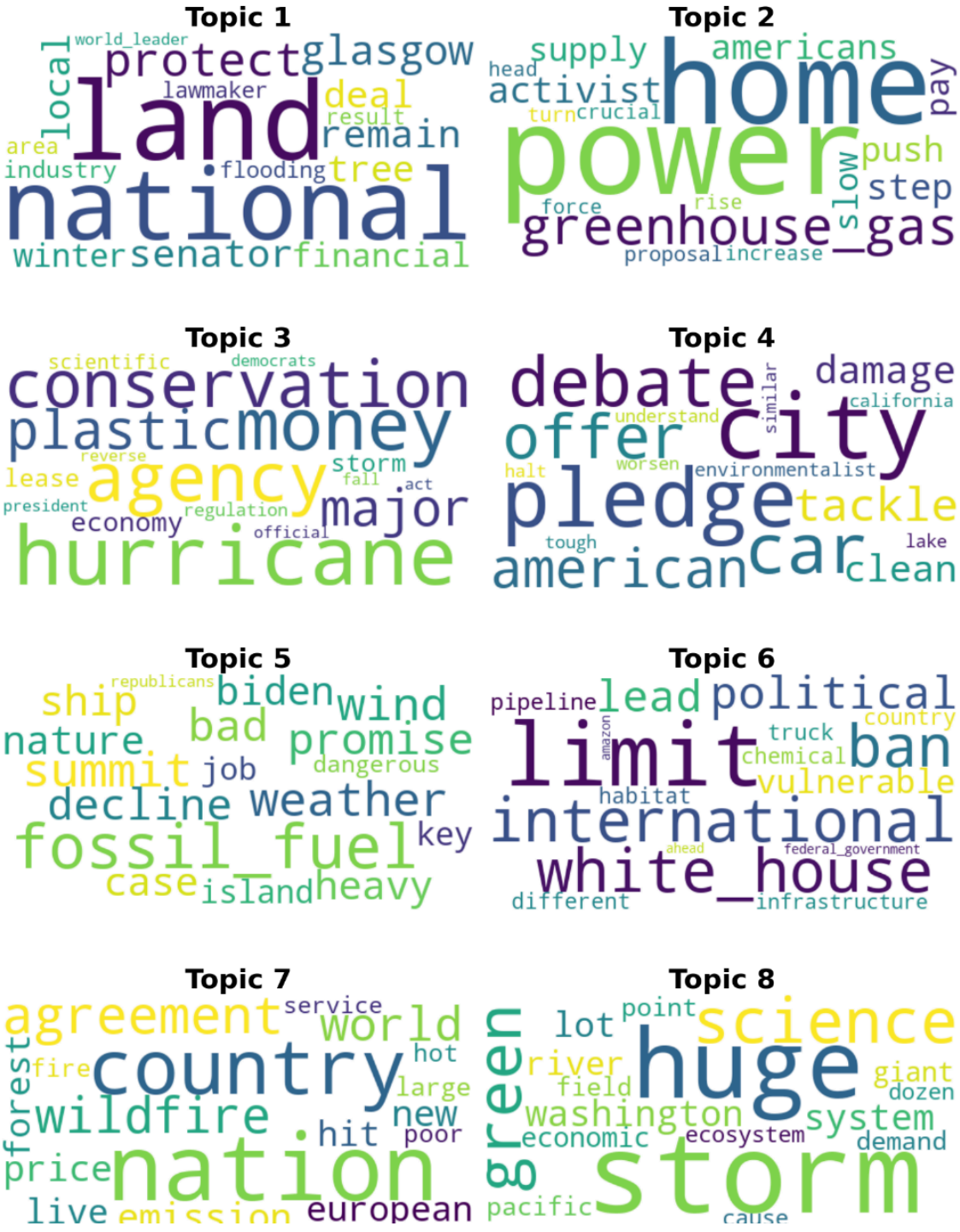

Figure 6. Key topics for the New York Times

Figure 6 (Continued). Key topics for the New York Times

The New York Times covers a wide range of climate-related topics. With regards to U.S. domestic policy, wildfires, energy, and public health hazards seem to be of top concern. Compared to Fox News, the New York Times highlights America's struggles of achieving decarbonization and taking climate leadership on the global stage.

LDA analysis for Fox News resulted in 6 topics, also in the order presented in **Figure 7**:

- Marine disasters
- Wildfires/heat
- Climate activism around the world
- Glaciers, ice sheets, and warmer seasons
- Changing climate in the U.S.
- Law, regulation, and illegal activities

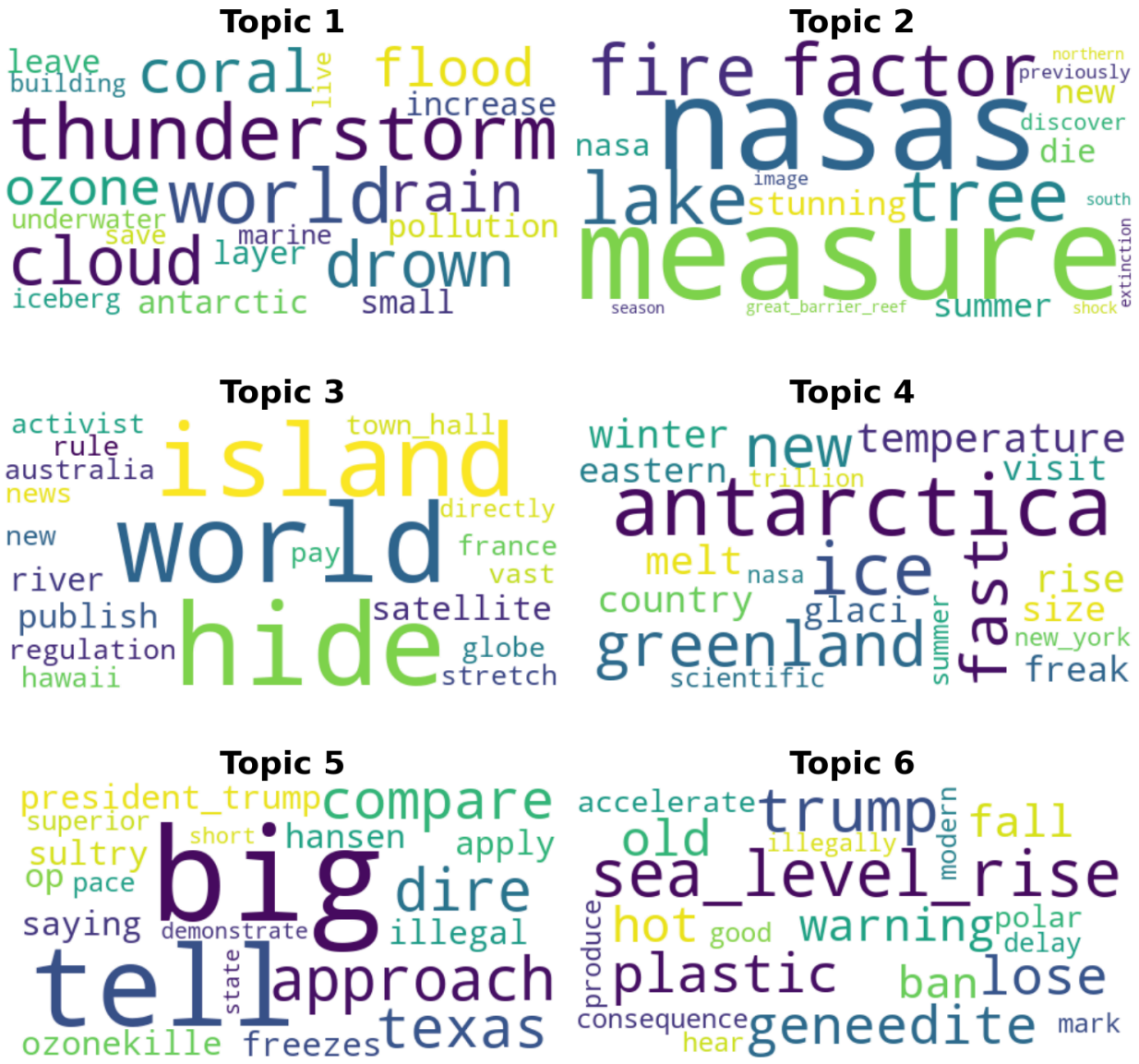

Figure 7. Key topics for Fox News

Fox News' coverage of climate change is more limited in scope, focusing on heat-related weather events. Occasionally, Fox News cites expert opinion (for articles under the 'Science' section), such as NASA and James Hansen (former Director of NASA and a renowned climate scientist whose work focuses on raising awareness of global warming). If Conservative Americans underplay the impacts of climate change despite being a consumer of Fox News, it could be due to *selective* consumption of the news.

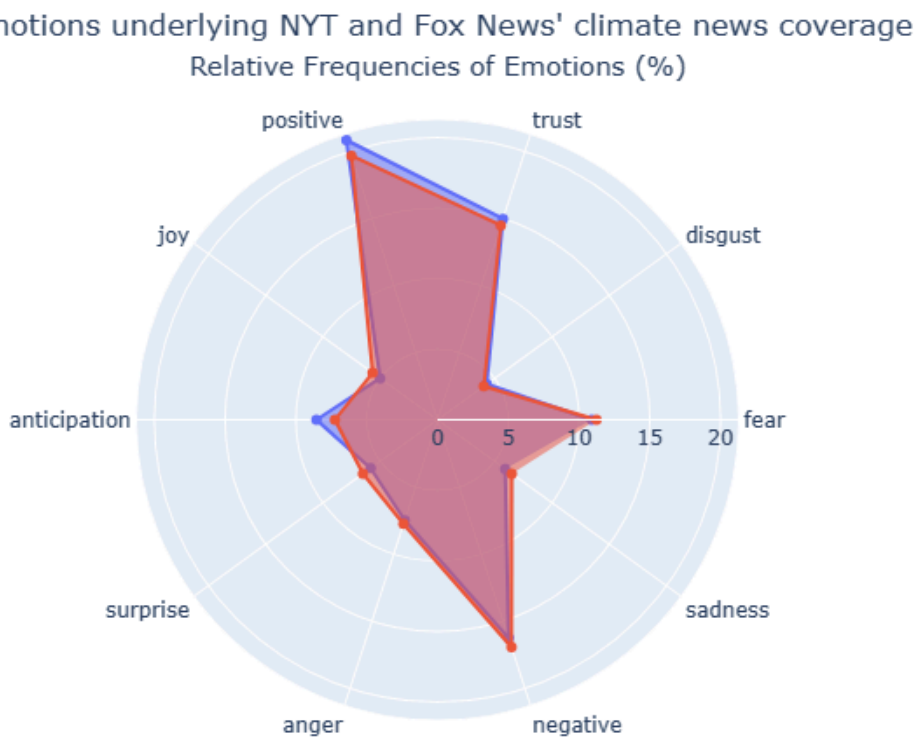

Figure 8. Emotions underlying the climate change discourse in U.S. media

Relative to Fox News, articles published on the New York Times exhibit higher levels of *anticipation* as well as *positivity* and *trust* (albeit to a minuscule extent). Interestingly, however, results of the emotion analysis suggest that articles posted on the New York Times and Fox News may not differ as much in their connotation. According to **Figure 8**, there is almost a perfect overlap across all of the 10 emotion/sentiment categories. As expected, *negative* sentiments are predominant in climate-related articles. Since the climate change debate is nothing new, there seems to be low levels of *surprise* involved, although the portrayal of the crisis involves modest levels of *fear*. That *positivity* and *trust* feature prominently in climate-related news requires careful interpretation; The results are most likely to be attributable to the structure of the lexicon. For example, words such as *legislature*, *policy*, *president*, *expert*, *scientist*, *investigate*, and *united* are associated with *trust* and/or *positive*. To the extent that climate change is discussed within the context of policy/politics, with reference to climate scientists and research findings, and in light of U.S. domestic affairs, the share of 'positive' and 'trust' will inevitably be overestimated. Based on findings listed heretofore, results of the emotion analysis seem to reflect the politicized nature of the climate change discourse and the news providers' focus on the U.S., rather than the *substantive* meanings of the text itself.

LIMITATIONS & PATHWAYS FOR FUTURE RESEARCH

Notwithstanding these takeaways, current research is not without limitations. Since the abstracts were extremely short (less than 100 words), LDA may not have been well-suited for detecting *multiple* topics within each abstract. With respect to emotion analysis, a custom dictionary designed specifically for *climate/environment-related texts* would have provided a more nuanced picture of the differences in issue framing.

Taken together, this research suggests that the New York Times and Fox News may not be so 'poles apart' in the climate change debate, which is somewhat contrary to expectations, but that climate change is frequently discussed within the policy context. To be able to ascertain these claims, future research should hone in on the subtleties of the language, as current findings may have been an artifact of using LDA on short texts and/or lack of domain-specific lexicon.

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