MEDIA BIAS IN CLIMATE CHANGE REPORTING: SENTIMENT AND EMOTIONAL TONE ACROSS POLITICS

Introduction

Climate change is one of the most critical issues of our time, yet media outlets often present it in dramatically different ways. If reporting differs significantly by political leaning, it could contribute to misinformation, polarization, or differing levels of climate action across party lines. This project explores how left-leaning and right-leaning media outlets differ in their emotional portrayal of climate change. By analyzing emotional sentiments like fear, anger, and sadness, as well as using VADER sentiment analysis for positivity and negativity, we aim to uncover how emotional tones in news coverage may contribute to polarized opinions on climate action.

Key Questions:

1. How does the sentiment (positive vs. negative) of climate change reporting vary between left-leaning and right-leaning media outlets?
2. What are the dominant emotions (fear, anger, sadness) present in climate change articles from different political perspectives?

Data and Methodology

We randomly selected 30 left-leaning and 30 right-leaning news outlets, as determined by the Ad Fontes Media Bias Chart. Using Google RSS feeds, we collected the 20 most relevant climate change news articles published within the past two years from each outlet. From this pool, we randomly selected 5 articles per outlet for sentiment and emotional tone analysis, resulting in a total of 150 articles per political leaning and 300 articles overall. **Analyzed in Python:**

- Google RSS Feeds were used to identify climate change-related news articles from the selected outlets.
- Selenium (web scraper) was employed to scrape the full content of the articles.
- BeautifulSoup removed scripts, ads, and non-content elements while verifying whether an article was climate-related through keyword matching.
- VADER Sentiment Analysis scored the positivity and negativity of the article text.
- DistilBERT Emotion Classifier (transformers) quantified and scored the articles' emotional tones such as fear, anger, and sadness.

Comparing Sentiment and Emotional Tone

- Left-leaning news outlets scored higher on DistilBERT's fear-based and sadness-based language analysis, with mean scores of 0.13 and 0.12, respectively, compared to 0.10 for both in right-leaning outlets.
- Right-leaning news outlets scored higher for anger-based language in DistilBERT, with a mean score of 0.31, compared to 0.27 for left-leaning outlets.
- Both left-leaning and right-leaning outlets showed similar results in VADER sentiment analysis. The average positive scores were 0.085 for left-leaning and 0.09 for right-leaning outlets, while the average negative scores were 0.056 and 0.057, respectively.
- Despite differences in anger scores, *both sides appear to have high levels of anger-based language relative to other emotions.*
- Both left and right-leaning news outlets have similar shapes and spread in their sentiment score distributions.
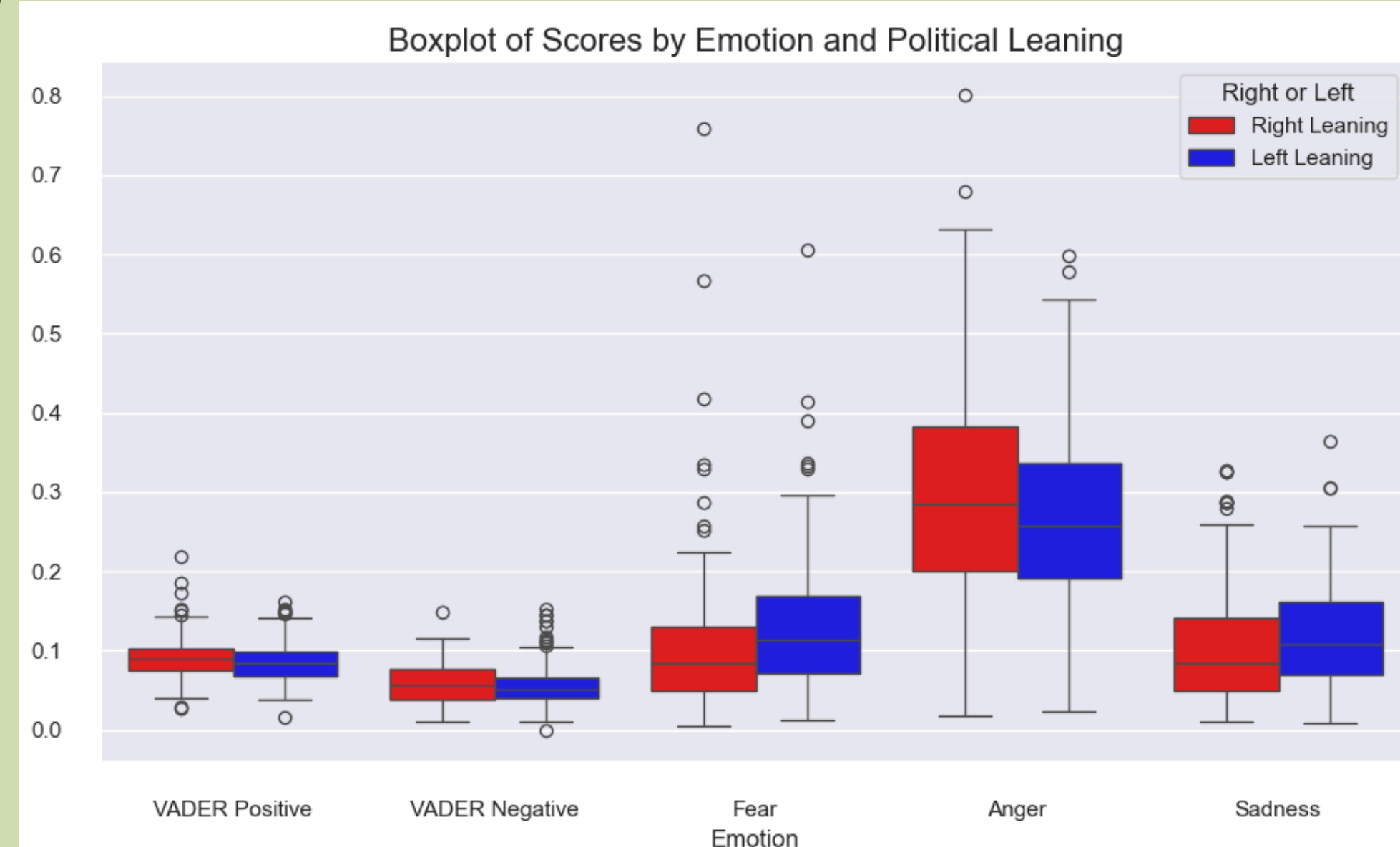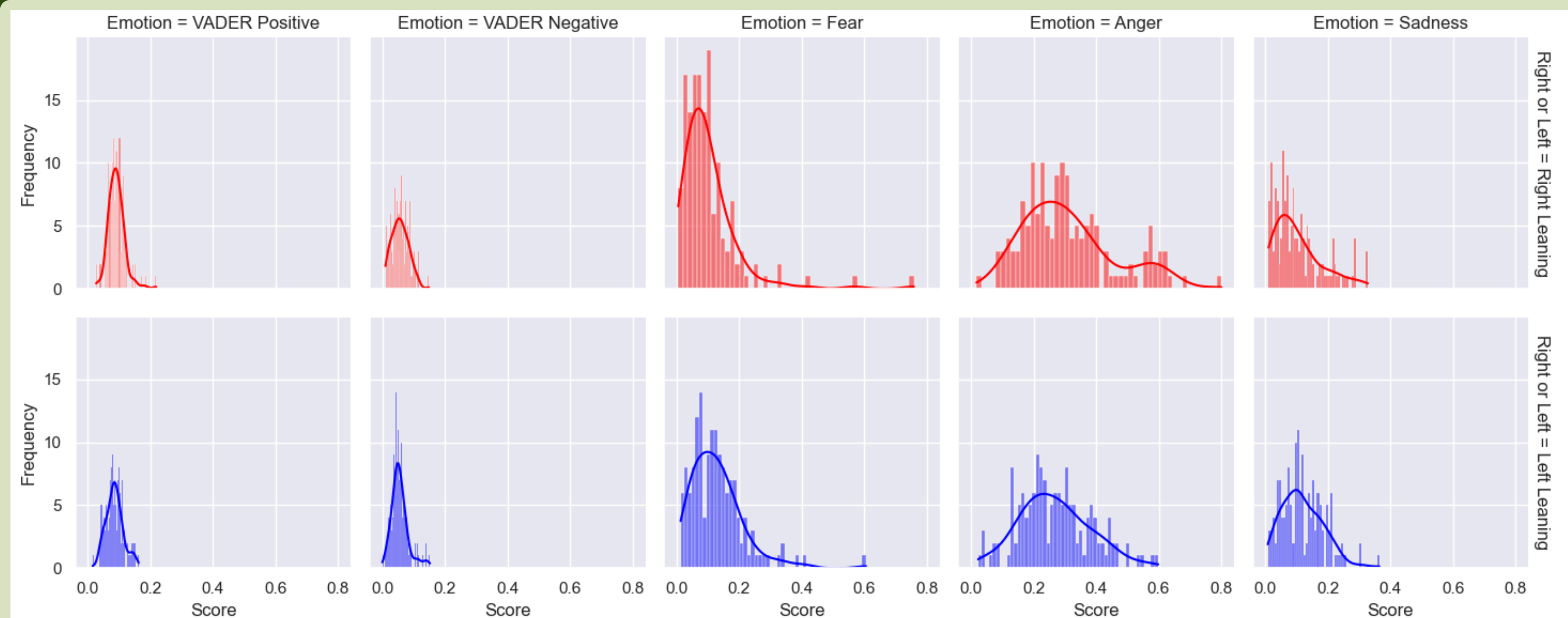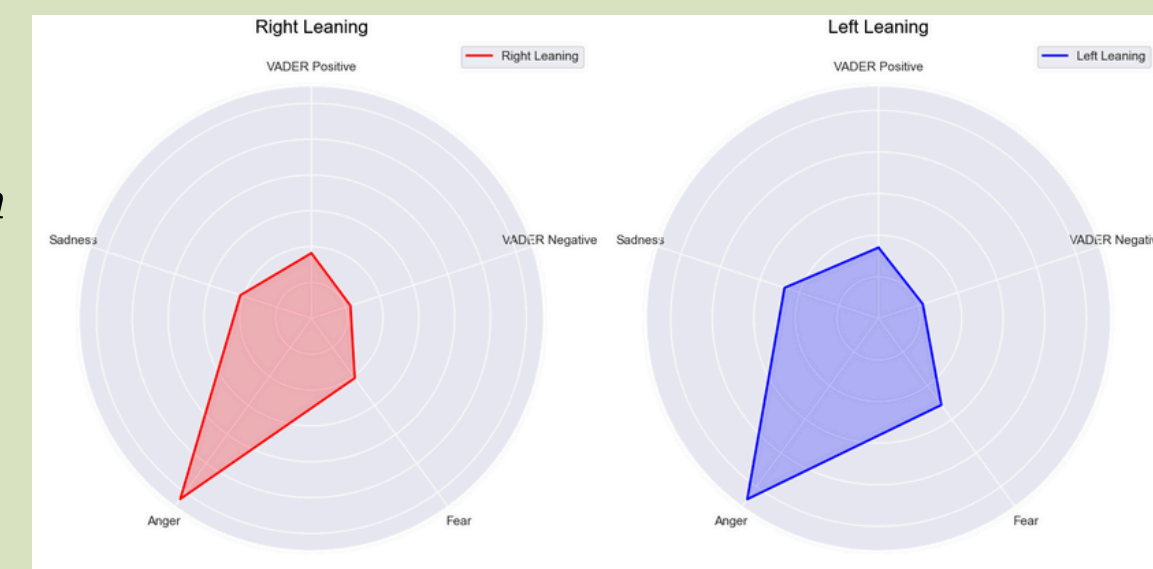
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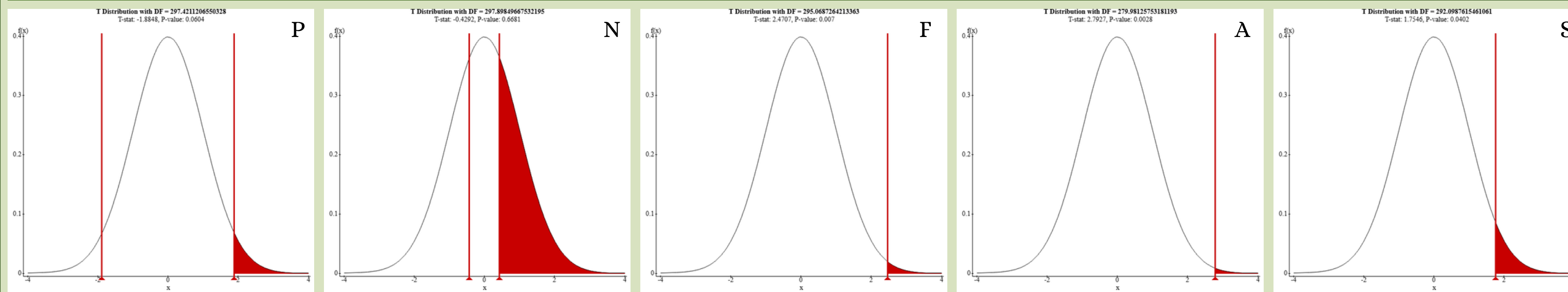
$$H_0 : \mu_{left,M} = \mu_{right,M} \qquad H_A : \mu_{left,F,S} > \mu_{right,F,S} \qquad H_A : \mu_{right,A} > \mu_{left,A} \qquad H_A : \mu_{right,P,N} \neq \mu_{left,P,N}$$

Where M represents any given metric, F represents fear, S represents sadness, A represents anger, P represents positivity, and N represents negativity.

- *We are assuming all conditions are met, μ is the true mean score of left and right leaning news outlets given any metric*

With a p-value of 0.0604, 0.6681 > α (0.05), we fail to reject H0. We did not find statistically significant data that suggests that left-leaning and right-leaning news outlets frame climate change differently in terms of positive and negative sentiment.

With a p-value of 0.007, 0.0028, 0.0402 < α (0.05), we reject H0. We found statistically significant data that suggests that left-leaning news outlets frame climate change with more sadness and fear-based language, while right-leaning news outlets frame climate change with more anger-based language.

Conclusion and Implications: The findings suggest that emotional framing in climate reporting may contribute to political polarization. Fear and sadness in left-leaning media could drive concern but also anxiety, while anger in right-leaning media may fuel distrust. These differences shape public engagement and highlight the need for media literacy and balanced climate communication.

Limitations: Our study relies on the Ad Fontes Media Bias Chart for outlet classification, which may not capture all nuances of political bias. Additionally, article selection via Google RSS feeds may introduce sampling bias.

Future work: How do these emotional framing patterns influence public perception and policy attitudes? What patterns will we see if we conducted this study for news outlets in other partisan based countries?