CONGRESSIONAL POLARIZATION
EXAMINING RHETORIC ON C-SPAN

PURDUE UNIVERSITY | The Data Mine

CCSE Center for C-SPAN Scholarship & Engagement

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Overview

Increasingly Americans are concerned about polarization on Capitol Hill, especially with respect to the rhetoric seen on C-SPAN.

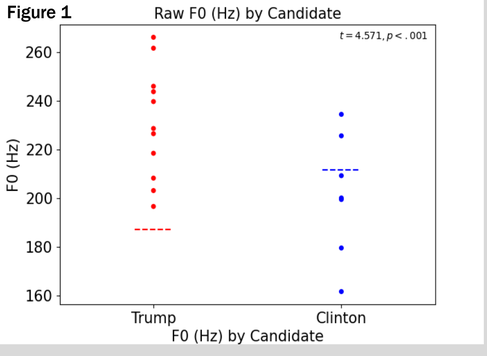
Objectives:
- Measure sentiment over time using text and audio analysis methods
- Test whether this is applicable to important issues like hate speech
- Create interactive graphics of results for public consumption

Central Questions:
- Has congressional rhetoric become more negative in the Biden vs. Trump administrations?
- Is this relationship generalizable to discussions of immigration, inflation, and hate speech?

Pitch is Fundamental

Vocal pitch, also known as the fundamental frequency (F0), has been found to reflect the emotional state and intensity of a speaker [1].

Figure 1



Result 1: Trump displays higher intensity in his speeches relative to Clinton, implying more heated rhetoric.

A Not-So-Sentimental Journey

Dictionary (spaCy)
- Uses pre-computed sentiment scores for each word
- Very simple to implement
- Only analyzes at word level, misses nuance

TextBlob (TextBlob)
- Uses NLP techniques to compute subjectivity and polarity
- Has use cases beyond sentiment
- Easy to use but slow

VADER (vaderSentiment)
- Analyze sentiment for social media
- Handles slang and nuance well
- Immediate deployment with efficient analysis
- Not as suitable for politician speeches

Result 2: Under the Biden admin, immigration sentiment appears to be more compassionate.

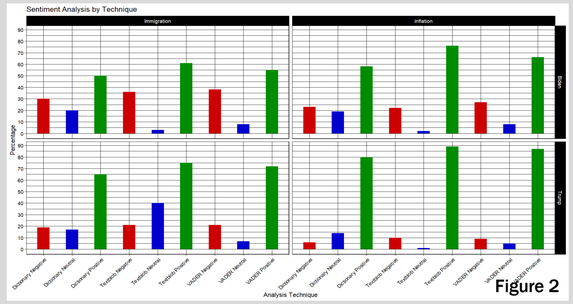
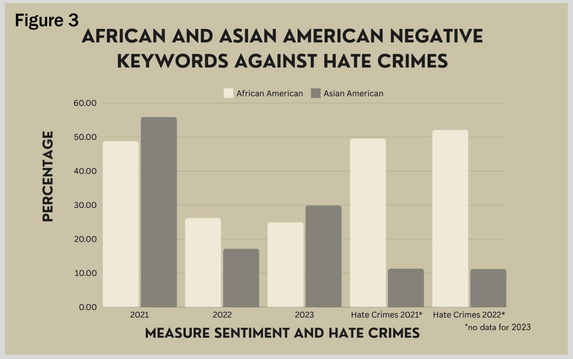


Figure 2

Result 3: Hate crime rates are related to sentiment toward Asian-Americans, but not for African-Americans.

Figure 3



Developing a Sentiment Dictionary

Given that there is no dictionary related to hate speech towards Asian- and African-Americans, we created a custom dictionary:
- Identified a total of 11 relevant journals and articles
- Within articles, found 33 keywords surrounding negative sentiment against Asian- and African-Americans.
- Assessed keywords within journals and congressional speeches using word clouds [2].

Result 4: Keywords related to hate crime vary by group.

Figure 4(a)

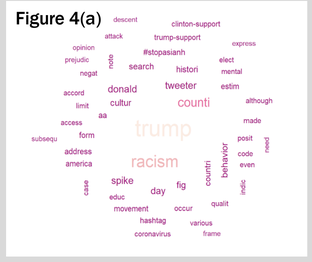
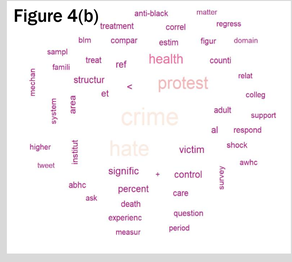


Figure 4(b)



Interacting with Rhetorical Polarization

Used D3.js and Plotly.js to create interactive graphics to give average citizens the data and findings of our studies.

Web-Based Graphics Demo:
https://jag111202.github.io/CSPAN_Rhetoric/

Future Goals

The initial work from each of the sub-teams can form the basis for future research:
- Further pitch analysis can be conducted on different elections between different candidates
- Trends can be established between rhetoric on Capitol Hill from a yearly basis to statistics related to discriminatory hate speech and hateful acts.

Figures

Figure 1: Whisker plot of vocal pitch from Trump and Clinton speeches from the 2016 campaign.
Figure 2: Comparing various sentiment analysis methods for the Biden and Trump admins for immigration and inflation using different sentiment techniques [3].
Figure 3: Sentiment towards Asian- and African-Americans in congressional speeches during Biden administration compared to FBI hate crime rates [4].
Figure 4: Word clouds used to create hate speech dictionary for Asian-Americans

References

1. Dietrich, B. J., Hayes, M., & O'Brien, D. Z. (2019). Pitch Perfect: Vocal Pitch and the Emotional Intensity of Congressional Speech. American Political Science Review, 113(4), 941–962.
2. Heimerl, F., et al. (2014) Word cloud explorer: Text analytics based on word clouds. 2014 47th Hawaii International Conference on System Sciences. IEEE, 2014.
3. Reagan, A.J., et al. (2017). Sentiment analysis methods for understanding large-scale texts. EPJ Data Science 6(28): 1-21.
4. Federal Bureau of Investigation Crime Data Explorer. cde.ucr.cjis.gov. (n.d.). Retrieved April 1, 2024, from https://cde.ucr.cjis.gov/LATEST/webapp/#/pages/explorer/crime/hate-crime

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