

Capitol Letters: Detecting Differential Attitudes in Legislator Communications Using NLP

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Motivation

Look at legislator communications to determine if there is varying emotion by political party. And consider how legislators' emotions change over time.

Introduction

- Varying communication styles by political parties (Monroe, Colaresi and Quinn, 2008; Schonhardt-Bailey, 2008; Jost and Sterling, 2020).
- McMahon (2018) finds differences in past tense and future-tense verbs.
- Differences in topics the parties cover (Tsur, Calacci and Lazer, 2015; Engel-Rebitzer et al., 2022; Hofmann et al., 2020; Denny, 2018).

Emotion and Sentiment in Text

- Emotionality spikes during times of war (Gennaro and Ash, 2022).
- Emotionality higher for Democrats, for women, for ethnic minorities and others (Gennaro and Ash, 2022).
- Sentiment varies on Twitter for the public by party identification (Sylwester and Purver, 2015).
- VADER (Hutto and Gilbert, 2014) for use on social media data.

VAC Framework

- VAD Framework introduced by Mehrabian and Russell (1974).
- Modified to VAC framework by Clarke et al. (2023).

Valence is how positive or negative a word or phrase is

Arousal is how excited or calm a word or phrase is

Confidence is how confident or assured a word or phrase is

Sympathy and Empathy

Sympathy suggests sincere concern for someone who is experiencing something difficult or painful

Empathy indicates true understanding and shared emotional experience.

- Empathetic legislators are more likely to get elected (Ridhahani, 2017).
- Democrats considered more empathetic than Republicans (Hayes, 2005; Benoit, 2004; Holian and Prysby, 2014; Bittner, 2011).

Legislator Communications

Congressional communication methods are divided into two methods: **mediated methods** and **directed methods**.

Twitter

Twitter is an example of a directed method.

Launched in 2006, and by 2013 all 100 Senators had Twitter accounts.
And by 2021 almost all Congresspeople had a Twitter presence.

C-SPAN

C-SPAN is an example of a mediated method.

C-SPAN began broadcasting House floor debates in the late 1970's which was found to lead to an increase in emotionality on the House floor (Gennaro and Ash, 2022).

In 2010, all video records from 1987 to present day became available online.

One-Minute Speeches

- One-minute speeches occur on the House floor.
- One-minute speeches are used most commonly for policy positioning (DeGregorio, 2010).
- Party leadership coordinates Member one-minute speeches (Harris, 2005).
- Republicans and Democrats vary in the topics they discuss in one-minute speeches (Wilkerson and Casas, 2017).

Scraping: Twitter Data

- All tweets sent by legislators for 115th, 116th, and 117th Congresses.
- Collected using academictwitterR package (Barrie and Ho, 2021).

	115th House	116th House	117th House
Total Number of Tweets	725,840	1,016,907	741,961
Total Number of Tweets Without Retweets	520,491	744,054	580,442
Number of Unique Twitter Handles Scraped	422	475	407
Number of Democrats	207	272	212
Number of Republicans	215	201	195

Table 3.1: Descriptive Information on Twitter Data.

Scraping: C-SPAN Data

- Collected transcripts of House floor speeches using C-SPAN API.
- Requires query, then can add time window to search, and limit the video type, i.e. House sessions

Test this function

query required

limit

personid

date

maxdate

mindate

page

videotype

```
https://api.c-spanarchives.org/2.0/mentions?  
query=one+minute+speeches&limit=&personid=&date=&maxdate=2023-  
01-03&mindate=2021-01-03&page=&videotype=25
```

Test Function

C-SPAN Data: One-Minute Speeches

Data returned as a json

```
{
  "totalfound": 348,
  "nextpage": 2,
  "results": [
    {
      "id": "900805830",
      "person": "Unidentified Speaker",
      "personid": false,
      "begintime": "2022-12-23T14:04:22.000Z",
      "length": 15,
      "link": "https://www.c-span.org/video/?525045-1&mention=900805830&mentionSearch=one%20minute%20speeches",
      "text": "THE CHAIR WILL NOW ENTERTAIN REQUESTS FOR ONE-MINUTE SPEECHES. FOR WHAT PURPOSE DOES GENTLELADY FROM TEXAS SEEK RECOG",
      "programid": 622093,
      "programPublicId": "525045-1",
      "programTitle": "House Session, Part 1",
      "videoTypeId": 25
    },
    {
      "id": "900803859",
      "person": "Unidentified Speaker",
      "personid": false,
      "begintime": "2022-12-22T21:20:12.000Z",
      "length": 47,
      "link": "https://www.c-span.org/video/?525024-1&mention=900803859&mentionSearch=one%20minute%20speeches",
      "text": "THE CHAIR WILL NOW ENTERTAIN REQUESTS FOR ONE-MINUTE SPEECHES.",
      "programid": 622064,
      "programPublicId": "525024-1",
      "programTitle": "House Session",
      "videoTypeId": 25
    }
  ]
}
```

C-SPAN Data: One-Minute Speeches

	115th House	116th House	117th House
Total Number of One-Minute Speeches	2,632	3,818	3,094
Percent Republican	51.8%	43.3%	48.0%

Table 3.2: Descriptive Information on C-SPAN Data.

Data Cleaning: Twitter

I removed all punctuation and numbers, which do not relay emotion or sentiment, as well as emojis.

I also removed stopwords using the natural language toolkit (nltk) package (Bird, Klein and Loper, 2009).

Data Cleaning: C-SPAN

Some cleaning necessary to isolate just one-minute speeches.

Other than that, kept the C-SPAN data in its original form as it will be fed into a LLM, and if I were to remove stopwords, punctuation, the LLM would not be receiving natural language input.

Control of House, Senate, and Presidency

	House	Senate	Presidency
2017-2019 (115th)	R	R	R
2019-2021 (116th)	D	R	R
2021- 2023 (117th)	D	D	D

Table 3.3: Party Control of House, Senate, and Presidency 2017-2023.

Hypotheses: Twitter

- (1) Republican sentiment will be higher than Democratic sentiment for the 115th Congress.
- (2) the sentiment of Democrats will be higher than that of Republicans for the 117th Congress.
- (3) the sentiment of Democratic legislators will be lower than that of Republican legislators during the 116th Congress. Due to natilizaed political environment and focus on Presidency.

Hypotheses: One-Minute Speeches

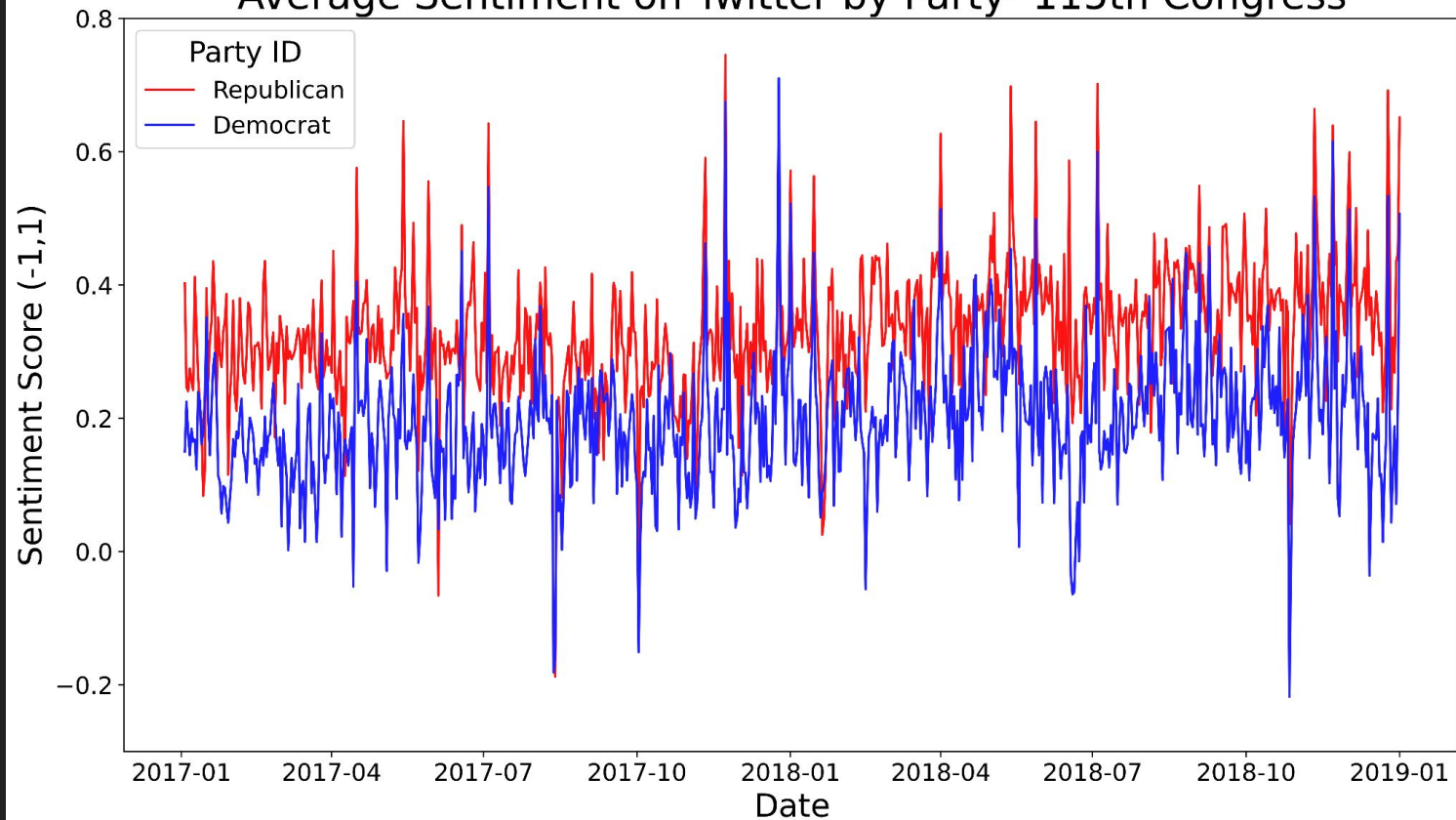
- I expect those in the majority party will have higher valence and confidence than those in the minority party, and these results will be mixed when the government is divided.
- I anticipate no difference in arousal.
- Expect Democrats to have higher empathy and sympathy regardless of party control.

Sentiment Analysis

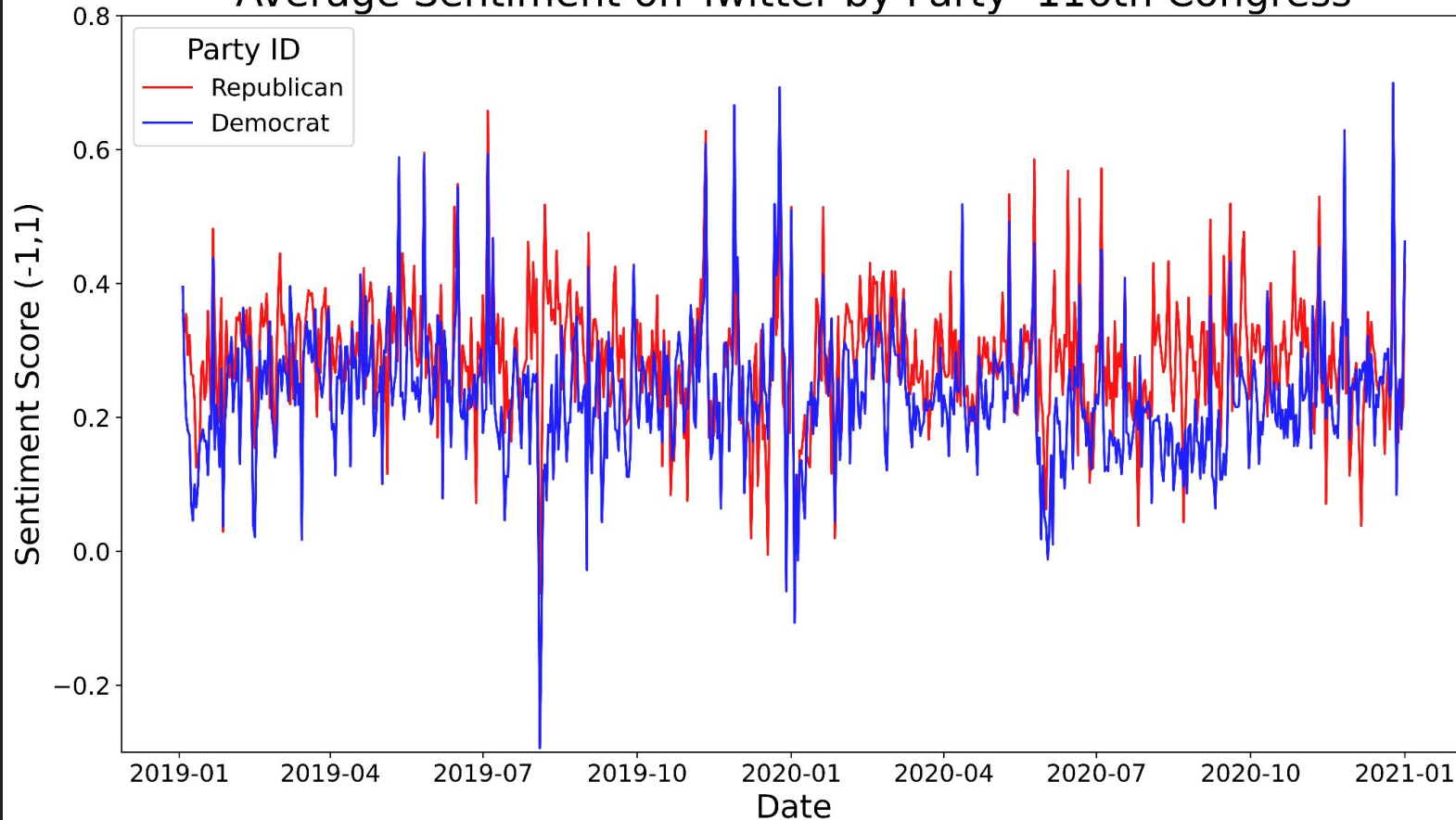
	115th House	116th House	117th House
Mean Sentiment	.230	.240	.249
Republican Mean Sentiment	.329	.286	.162
Democrat Mean Sentiment	.175	.219	.304

Table 4.1: Descriptive Information on Twitter Data Sentiment.

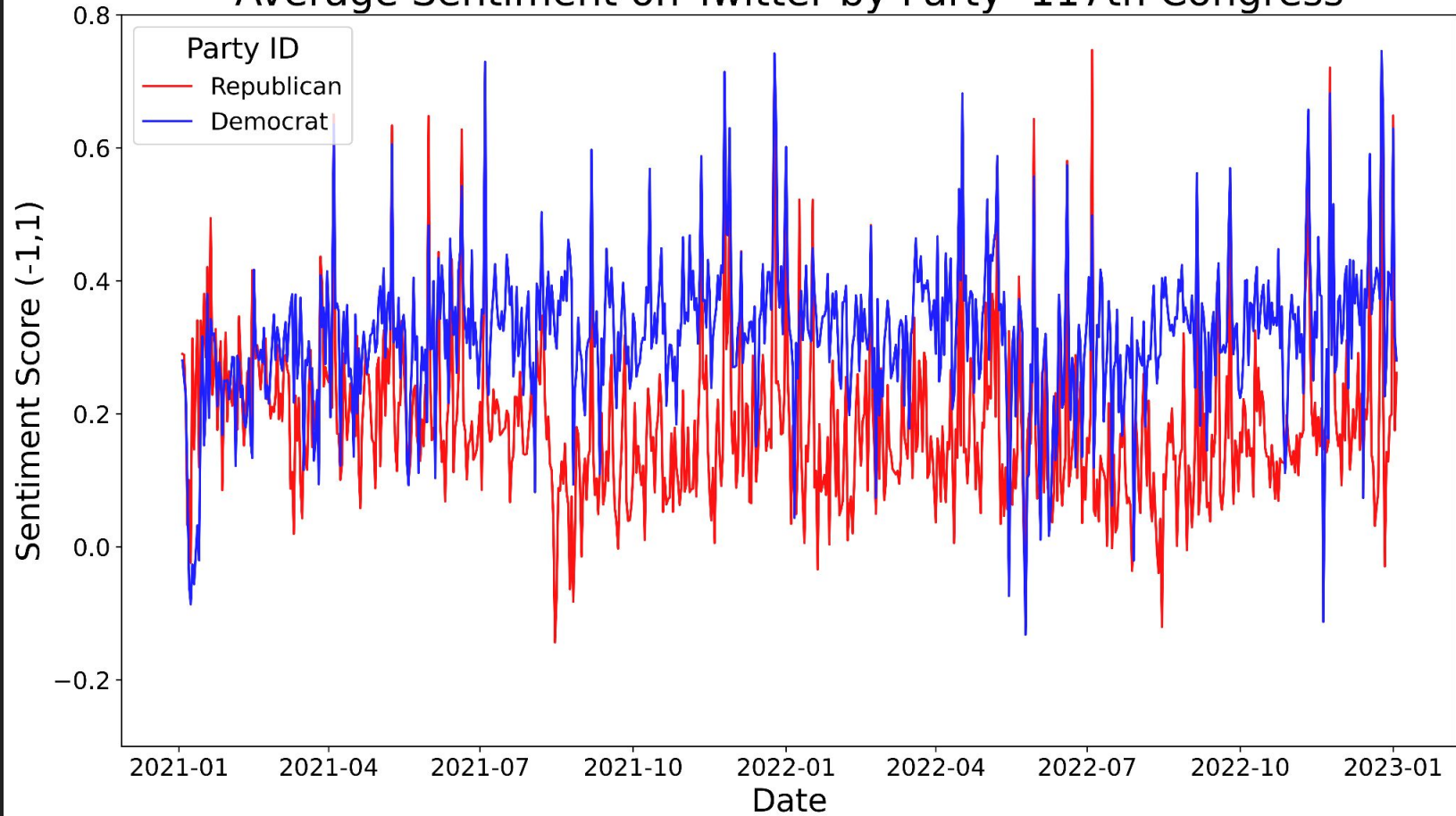
Average Sentiment on Twitter by Party- 115th Congress

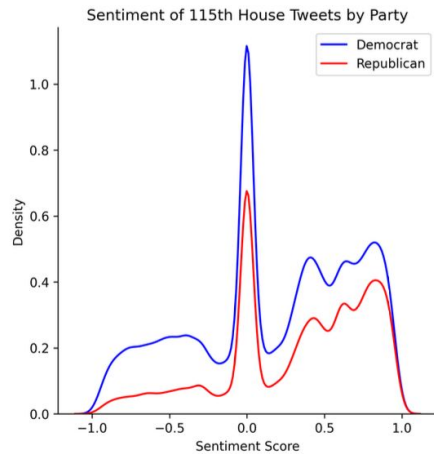


Average Sentiment on Twitter by Party- 116th Congress

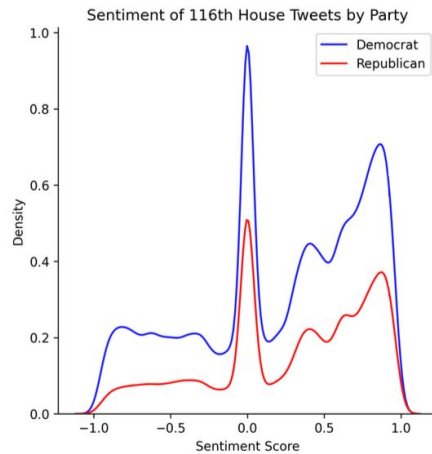


Average Sentiment on Twitter by Party- 117th Congress

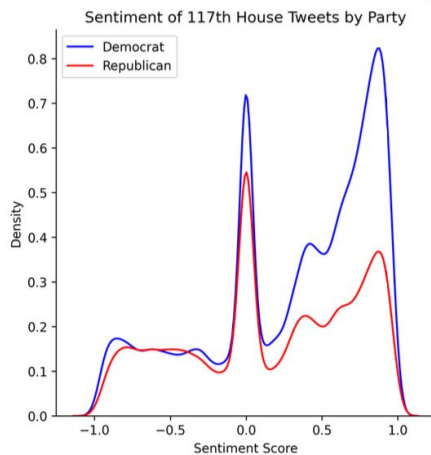




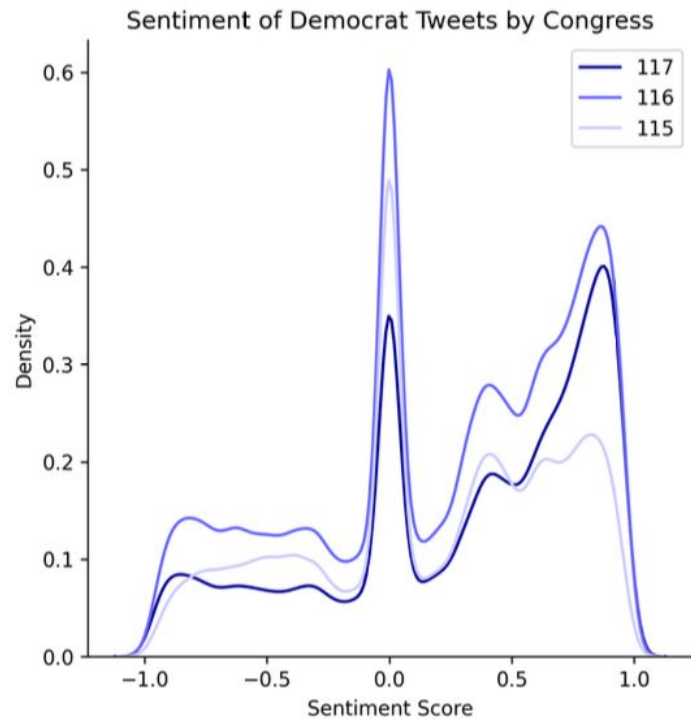
(a) 115.



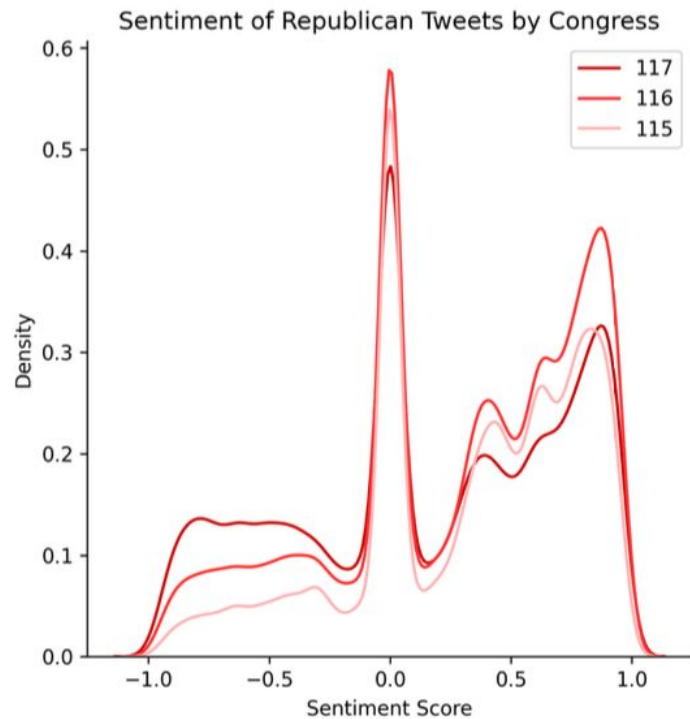
(b) 116.



(c) 117.



(a) Democrats.



(b) Republicans.

Methods: One-Minute Speeches

- I used OpenAI, specifically gpt-3.5-turbo, to score the one-minute speeches along each dimension of VACES.

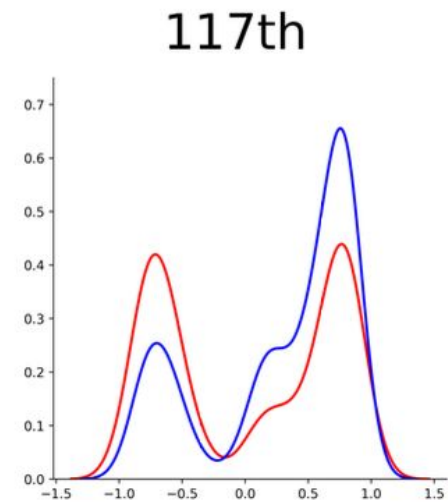
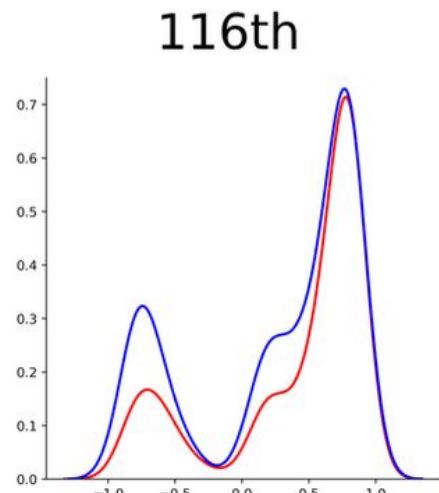
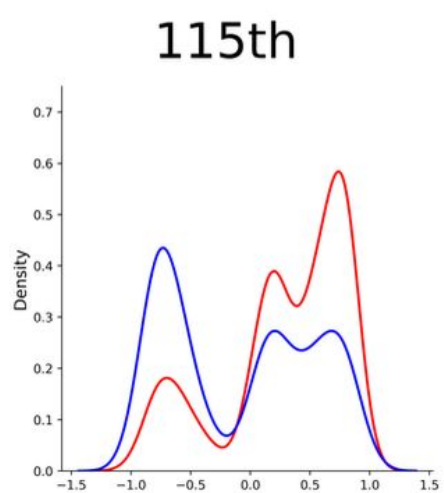
You are a helpful assistant for labeling text data.

The following is part of a congressional speech.

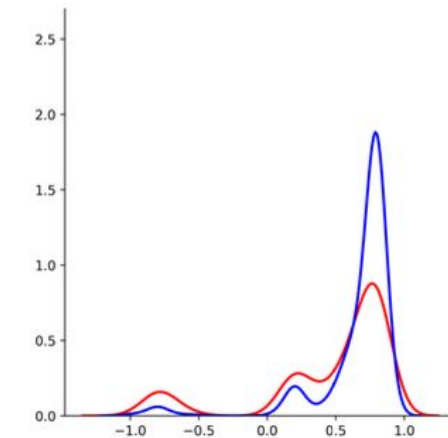
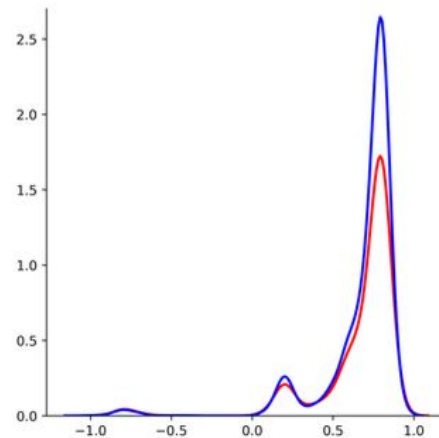
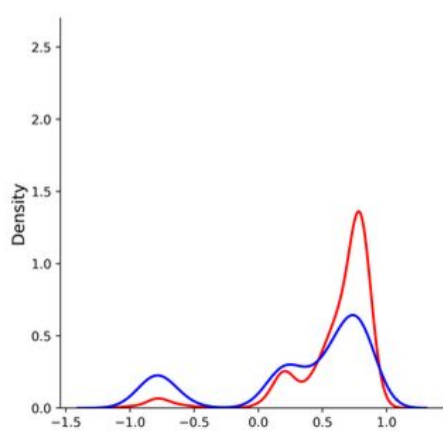
Given this definition of valence: '{valence}' and this text: '{text}', provide a score for the valence of the text between -1 and 1.

Please give me ONLY a number between -1 and 1 as your response.

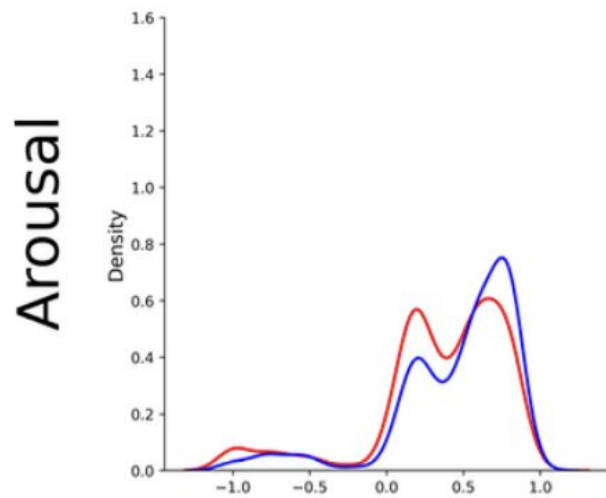
Valence



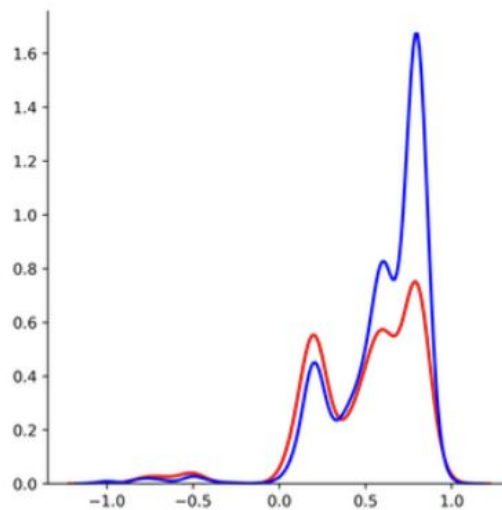
Confidence



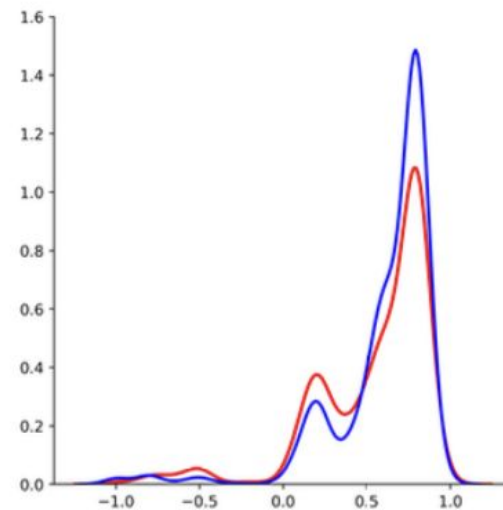
115th



116th



117th

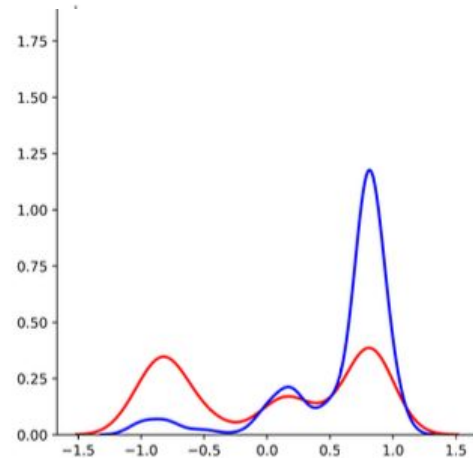
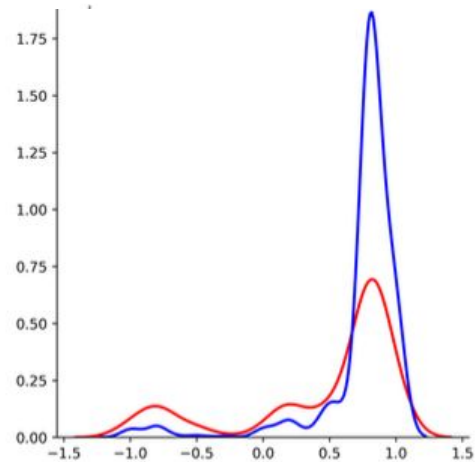
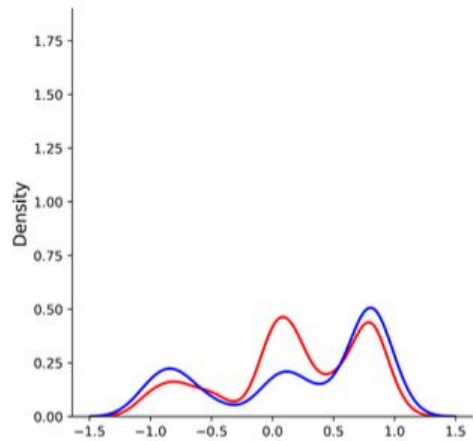


115th

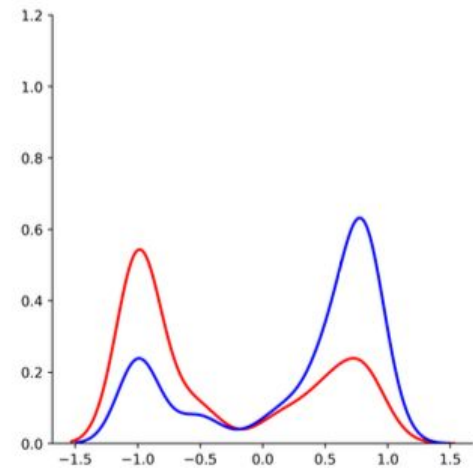
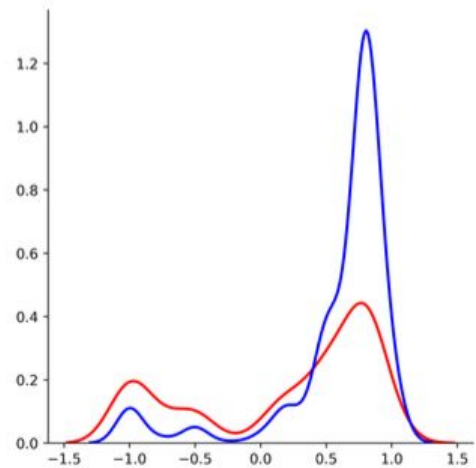
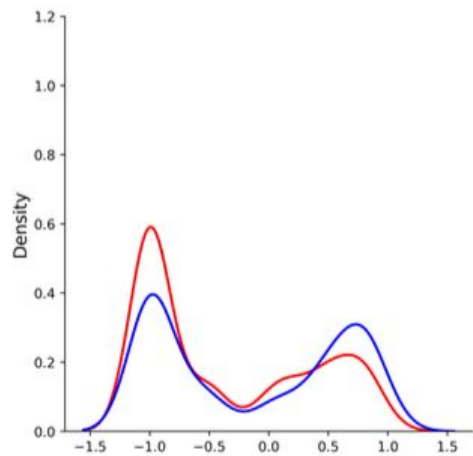
116th

117th

Sympathy



Empathy



Results: K-S Tests

	115th House	116th House	117th House
Valence	6.3e-62	5.5e-27	4.3e-44
Arousal	6.2e-25	5.0e-36	3.2e-22
Confidence	7.2e-45	.112	1.4e-45
Sympathy	4.4e-27	1.3e-65	3.1e-101
Empathy	4.5e-28	8.8e-85	2.6e-101

Table 5.1: K-S Test p-value Output for Valence, Arousal, Confidence, Empathy, and Sympathy for 115th-117th House One-Minute Floor Speeches.

Conclusion

- Party control of the government does impact legislator sentiment on Twitter.
- Specifically, the legislators in the party which has control has more positive sentiment than the party which does not have control.
- Divided government results in divided sentiment, but appears to be led by control of Presidency.

Conclusion

- Party control of the government does impact legislator emotion in one-minute speeches.
- Specifically, the legislators in the party which has control have higher valence and confidence scores than the party which does not have control.
- Democrats consistently have higher empathy and sympathy than Republicans.

Future Work

- Explore larger time series for emotions in one-minute speeches.
- Do a comparative analysis of audio, video, and text data to see if more information is added by the addition of more complex data sources.
- Explore sentiment/arousal for a specific issue, say gun violence, and see if money can buy positive speech.

THANK YOU

BONUS

	Democrat AUC <0	Republican AUC <0
115th	.380	.267
116th	.350	.304
117th	.291	.390

Table 4.3: Area Under the Curve (AUC) Less Than Zero, Indicating Negative Sentiment, For 115th-117th Congresses by Party.

BONUS

	115th House	116th House	117th House
p-value	0.0	0.0	0.0
statistic	.124	.059	.131
statistic location	-0.003	-0.001	.3814
statistic sign	-1	-1	1

Table 4.2: K-S Test Output for Sentiment on Twitter for 115th-117th Congresses.