Congressional Speech Networks as a Window into Agenda Setting

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Introduction to Congressional Speech Analysis

- Members of Congress leverage floor speeches to articulate policy priorities, advocate for issues, and influence legislative agendas.

- Analyzing these speeches through network analysis unveils patterns of leadership, ideological alignment, and the dynamics of legislative debate

Objectives

- Our work aims to create and analyze networks of congressional speeches to identify influential figures, understand the impact of ideology, rural/urban, and gender on speech patterns, and provide insights into policy formation through legislative discourse

Data Source & Collection

- We compiled a dataset from the Congressional Record, covering speeches from the 97th to the 114th Congress, to analyze the lexical relationships and thematic engagements among Members of Congress over time.

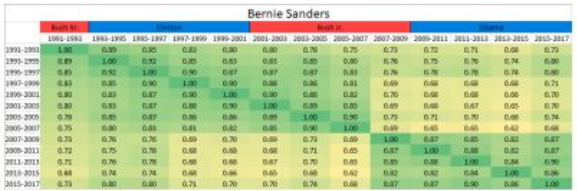
- Pull from govinfo/lexisnexis

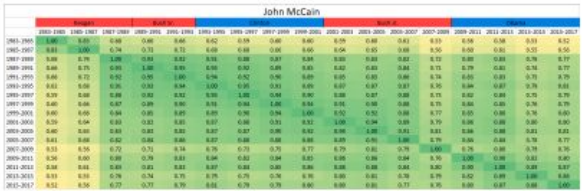
Early Analysis

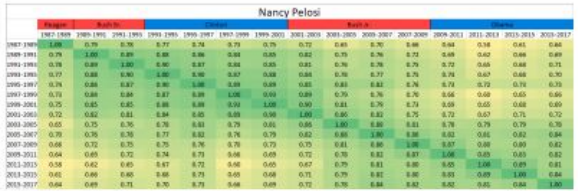
Results and Discussion

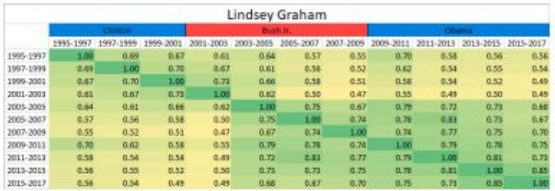
Cosine Similarity Matrices

Applying a heatmap to further highlight differences in cosine similarity scores over time, we see that congressmembers tend to have a consistently high cosine similarity between all terms, especially when examining those directly preceding or following. However, we also see that there are terms where there are significant changes which are then generally adhered to in subsequent congresses. Interestingly, in the case of Lindsey Graham, we see a decrease in score followed by an increase shortly thereafter. This suggests that certain issues or opinions were changed for a time, then reverted after several terms. The largest changes tend to appear to happen directly before or after presidential elections, with some of the most significant changes appearing during Bush Jr.'s presidency.









Methodological Framework

- **Text Analysis:**
  - Applied Term Frequency-Inverse Document Frequency (TF-IDF) to quantify the importance of words within the corpus, highlighting themes and topics.
  - Preprocessed text to normalize data: converted to lowercase, removed stop words and non-alphabetic characters.
- **Network Construction:**
  - Constructed speech networks based on lexical similarities, using cosine similarity as a metric.
  - Treated each congress member's aggregated speeches per session as a single document to create weighted word vectors.
- **Network Analysis:**
  - Analyzed the constructed networks to identify central nodes and clusters, employing measures like degree centrality and betweenness centrality.
  - Utilized community detection algorithms (e.g., Louvain method) to identify thematic clusters within the network.

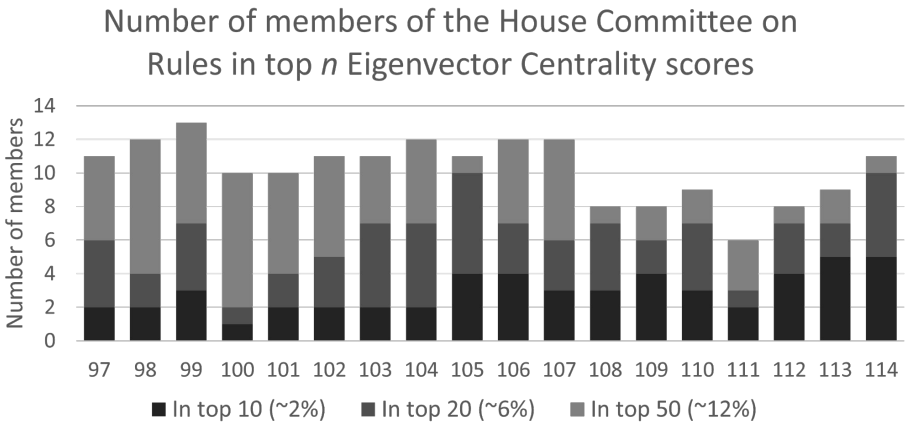
Modelling

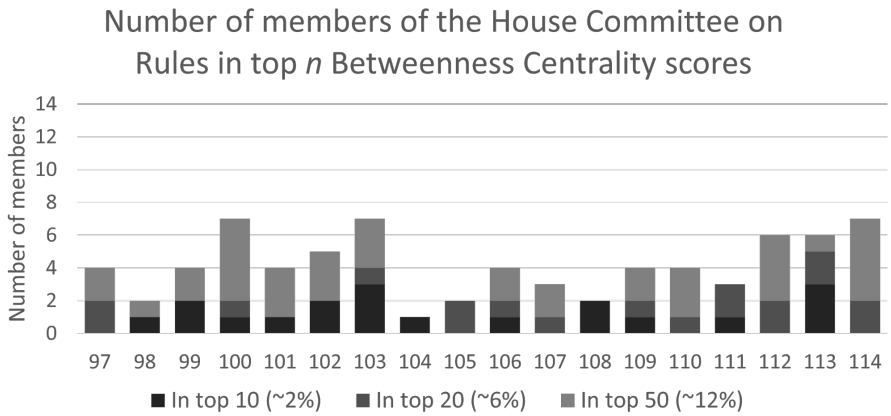
- Applied Exponential Random Graph Models (ERGMs) and Temporal Exponential Random Graph Models (TERGMs) to understand network evolution over time and the influence of exogenous variables.

- Modeled the probability of network ties considering factors such as partisanship, ideology, and demographic characteristics of congress members.

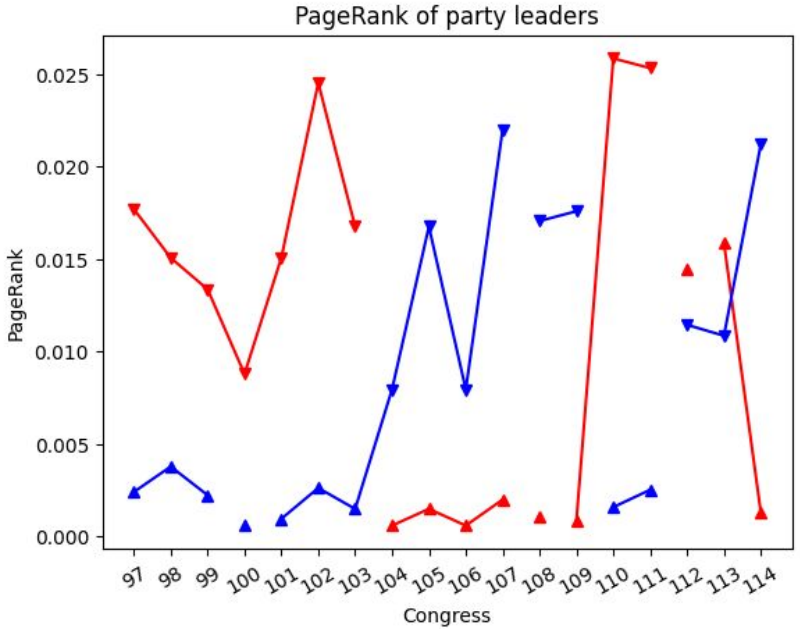
- **Key Variables Considered:**
    a. Ideology (liberal-conservative spectrum based on NOMINATE scores).
    b. Demographics (race, gender).
    c. Political variables (party affiliation, committee memberships).

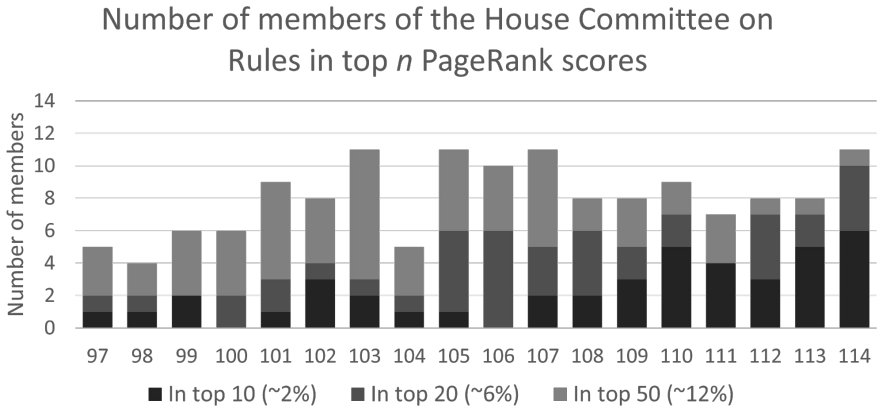
Committee Memberships



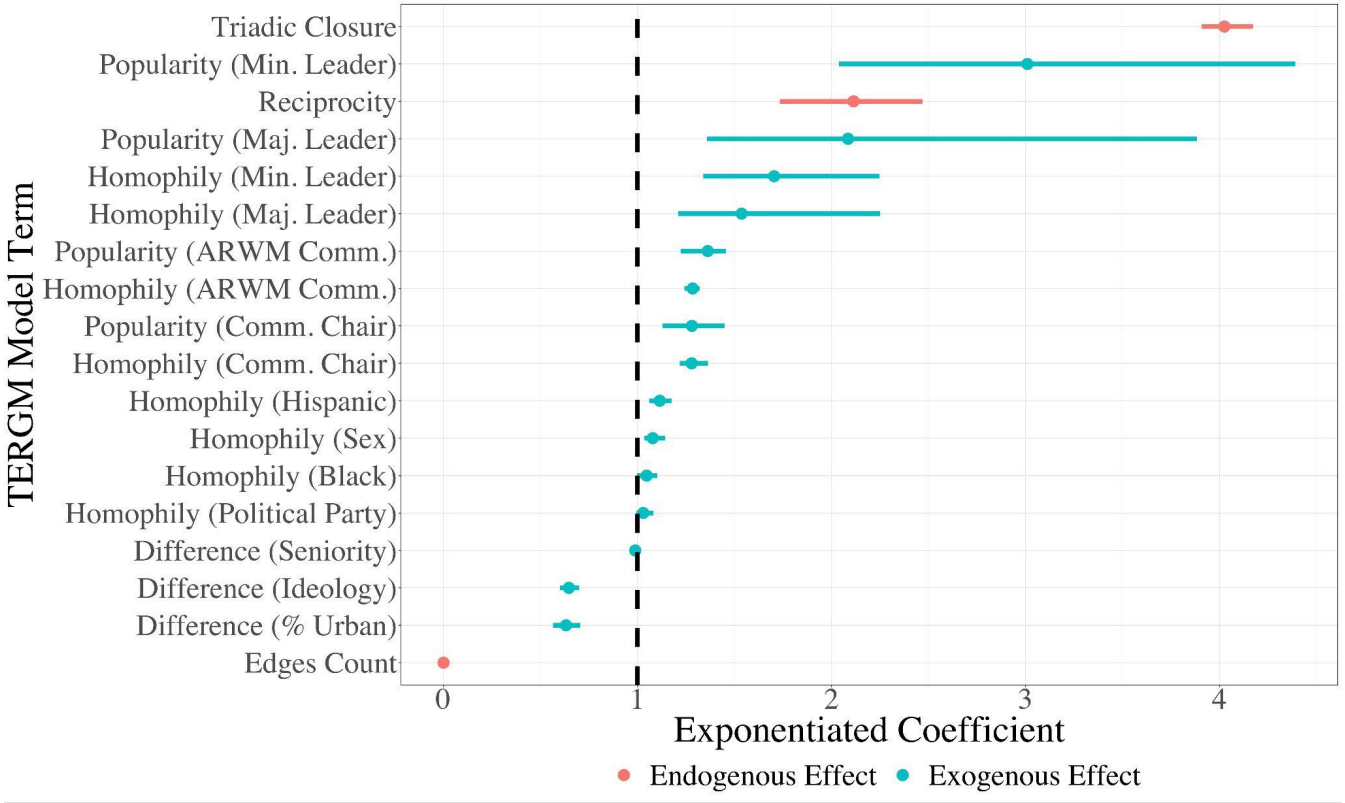


Party Leader Pagerank





Modeling Congressional Speech Networks



Key Findings & Insights

- Identification of speech leadership patterns within Congress.

- Significant influence of ideological alignment and demographic factors on network centrality.

- Stability of speech similarity over time, with noted variations across political divides.

Discussion

- Speech networks offer early indicators of policy priorities and legislative agendas.
  - Validating party leader importance

- Understanding of speech leadership can inform strategies for policy advocacy.

- Expansion to include sentiment analysis and external factors for deeper understanding of speech impact