

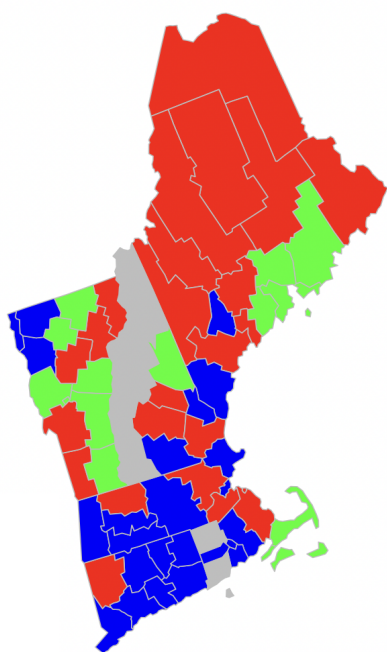
## Latent Political Structures in New England Congressional Elections

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The structure of political opinion is a core question in political science, although it often is treated as secondary to voter party affiliations. However, in the US, where single district plurality ensures that the two-party system predominates, our focus on party affiliation may obscure more complex structures of political culture. In this project I attempted to infer the structures of these underlying latent political cultures by examining data from historical congressional elections. Here, we assume a culture to be a common association in voting patterns from across elections.

I worked through the raw data of total votes from every New England county between the years of 1880 and 1960 to format the raw totals as (effectively) referendum elections; people who voted for the candidate of the party that had the majority in the house in that election had recorded votes of yes and the remaining votes were recorded as no votes. This resulted in a table with total numbers of yes and no votes for each county in New England in every Congressional election cycle in the study period. I cleaned the data by creating scatter plots which compared the proportion of yes votes for each county in two consecutive elections in order to remove data points that seemed to be incorrectly recorded vote totals. I then applied an algorithm called k-medoids, which allowed me to create a reasonable starting point for understanding latent structures by choosing clusters of counties to minimize the distance of all points in a cluster from the center of that cluster. I chose that number of clusters by comparing clustering structures for numbers of clusters ranging from 2 to 20 and made an approximate judgment of the number of clusters based on where the image stopped dramatically changing. In the data I studied, this generally ranged from 3 to 6 clusters.

Finally, I produced maps of New England in which each cluster is assigned a color for every election, and the counties are colored according to which cluster they belong to. The 1928 map is shown below. These maps show the New England cultures to be relatively consistent across time. The clustering structure was found for each 20 year time frame, and applied individually to each election cycle. The fact that the clusters remain consistent throughout these separately calculated structures suggests that this clustering is reflective of the characteristics of the counties.



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