

Lines versus Legislation: The Evolution of Gerrymandering

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BACKGROUND

The phrase “one man, one vote,” has been a key concept in the fight for equal voting rights and proportional representation. To meet this standard, the results of elections should reflect a proportionate quantity of seats held by different parties based on the percentage of votes casted (Procaccia et al. 2008). While racially based gerrymandering was outlawed following the implementation of the Voting Rights Act of 1965, there is no federal legislation explicitly regarding partisan gerrymandering, leaving the fairness of district boundaries up in the air in states without specific laws banning the act, partially because it can be difficult to measure how fair a district is due to wide variations in population demographics and geographic characteristics. Since tests of compactness have become a popular geographic method of whether gerrymandering is present in a district, the Polsby-Popper and Reock equations are used in this project to examine congressional districts in the United States. These two measures are beneficial for use in this research scope because they encompass the indentation and the dispersion of the districts, allowing a comprehensive measure of a district’s shape from being perfectly evenly distributed (McGlone 2016).

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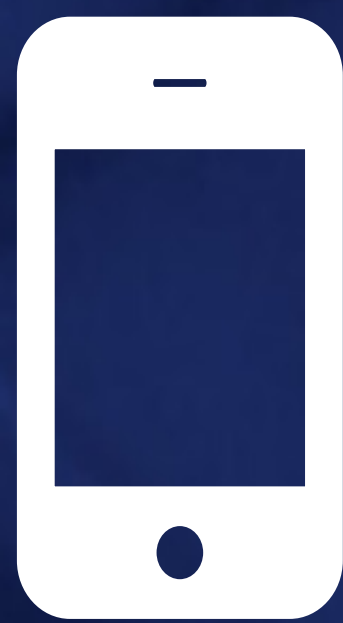
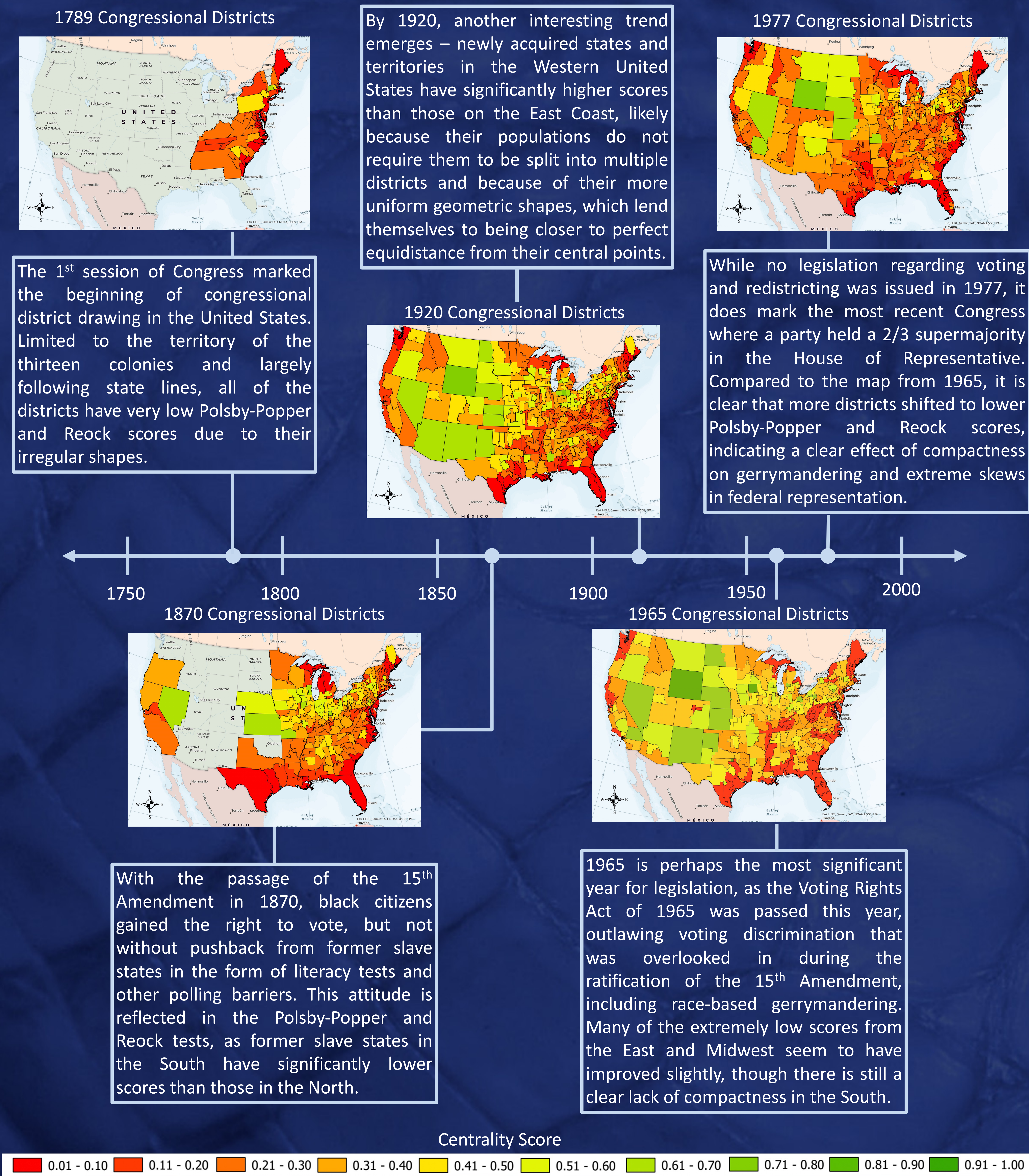
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METHODS

- The digital boundary definitions for each United States Congressional District were obtained from an open-source UCLA database.
- Two models were created using ArcGIS's integrated Model Builder:
 - The Polsby-Popper model, which calculates the ratio of a district's area to its perimeter and produces a score between 0 and 1, where 0 represents a total lack of compactness and 1 represents absolute compactness. This test uses a circle as its measure of true compactness, since it requires the least amount of variation in its perimeter and has a consistent radius.
 - The Reock model, which calculates measures the ratio between a district's area and its smallest circumscribing circle. This test also uses a circle as the image of ideal compactness but examines how a district could be enlarged to fill it, compared to the Polsby-Popper, which compares how much area could be removed to form a circle. The Reock model uses the same scoring system as the Polsby-Popper model, in which 0 is a poor score of dispersion and 1 is a perfect score.
- These scores are represented via graduated symbology during years where landmark events relating to voting and redistricting occurred.

RESULTS & DISCUSSION

As the quantity of congressional districts in the United States has increased, it seems that the extent of physical gerrymandering (in terms of compactness), has fluctuated throughout history. During eras of injustice, such as election barriers for black citizens in the late 1800s and massive congressional supermajorities in 1977, there is a noticeable increase in districts with poor compactness scores. It is also clear that western states with fewer districts due to lower population sizes have far better compactness scores than their older eastern counterparts. This trend implies that gerrymandering may just be a negative externality of population growth, as it gets more difficult to fit more districts within a state while maintaining compactness and efficiency.

Since scope of this project only covered the description of gerrymandering's evolution, there is room for future research to involve more in-depth analysis of this process, such as spatial joins of voter registrations and racial characteristics by district.