

Every ten years Congressional Districts are redrawn in the U.S. How these districts are drawn can have a substantial effect on the outcome of elections throughout the country. For this reason, the politicians making these district maps sometimes do so with the specific intent of giving their party an advantage in elections. This is known as partisan gerrymandering. Gerrymandering often results in “safe seats”, which are seats that are likely to win with a large majority of the votes. This can cause voters to feel like their vote doesn’t matter, and can significantly lower voter turnout (Blaskowsky, 2021). It is very important for voter turnout to be high because the integrity of democracy rests in the government accurately representing the needs and desires of the people.

With this being said, the widespread suspicion of gerrymandering in many states during the redistricting process following the 2020 census should be cause for alarm in all American citizens. In states such as Alabama, Louisiana, Kansas and Ohio, maps created by legislators were determined to likely be gerrymandered, however some of these maps were chosen to be used anyway (New York Times). In addition, maps made active by New York, Florida and Georgia received a large amount of criticism, as many believe they were made with partisan bias (New York Times). These issues, as well as many more in other states, have led many American citizens to search for a solution to the issue of gerrymandering. Unfortunately, these cries have been going on for many years, and politicians are slow to put solutions in place, as they are the ones benefiting from it. In 2019, the Supreme Court decided in the case *Rucho v. Common Cause* that questions of partisan gerrymandering are “nonjusticiable” due to a lack of a baseline for what constitutes something is gerrymandered. The courts empowered state legislatures to make decisions regarding gerrymandering. This decision therefore puts the responsibility in the hands of the American people to demand just redistricting methods, and pressure politicians to take actions that guarantee fair elections. In order to do so, citizens must first be able to determine whether the district plans created for them are gerrymandered or not. One method that has been used for decades to uncover gerrymandering is known as the efficiency gap method (Stephanopoulos, 2018). This method seeks to determine how “efficiently” a party uses its share of the votes by examining how many votes it took on average for that party to win a district, counting any vote over 50% to be “wasted”. The idea is that a party with relatively few “wasted” votes could likely have been intentionally made to do so. This method, however, has been challenged countless times for a multitude of reasons, and is considered to be ineffective by

many. Another method that has been greatly improved in recent years utilizes a computer simulation that generates an ensemble of randomly drawn district plans (Chen and Cottrell 2016; Herschlag et al. 2017; Cottrell 2019; Herschlag et al. 2020; FiField et al. 2020). These simulations use a Monte Carlo algorithm to randomly generate district plans that adhere to the criteria map makers must follow when drawing up plans, specifically, compactness of districts and limited population deviation. The election results of these plans are then calculated using the votes from a previous election. The average result of the simulated district plans is then compared to the actual result, and if there is a large discrepancy it can be assumed that the active plans are gerrymandered. The algorithm proposed by FiField et al. (2020) is very well tested and justified, and is also very easy to access and use, therefore this is the algorithm I will be using. In addition, I will be using this algorithm to test the congressional district plans of New Hampshire and Iowa. I will be testing these states due to the fact that it was easy to access and compile the data for these states that I need, as well as the fact that they are easier states for the algorithm to process and analyze, as Iowa law states that individuals can not cut counties when redistricting, and New Hampshire has relatively few precincts, which are the building blocks for redistricting, and the smallest level election data is collected.

For my research I used data from the Redistricting Data Hub (<https://redistrictingdatahub.org/welcome/>). From this source, I gathered data for both population and election results, on the county level for Iowa and precinct level for New Hampshire, as well as shapefile data that describes the shape of the states and each county/precinct in them. The voting data I used comes from the 2020 presidential election. I integrated this data into the data package created by FiField et al(2020), then using both the data I integrated and the data already in the package, set up and ran a simulation for both states. For New Hampshire, I simulated 500 plans, and compared their results to the actual results. My results show that in each of the 500 plans, the Democratic party received the most votes for both districts, and the average share of the votes for all the simulated plans was very similar to the actual result, leading me to conclude that New Hampshire's Congressional district plan was not gerrymandered. For Iowa, I originally ran 500 plans as well. However, after analyzing Iowa's data, I found that in the case of Iowa's third district, the majority of the simulated plans awarded the win to the Democratic party, while the actual map granted the Republican party a win by a slim margin. I then simulated 1,000 additional district plans in order to validate these results. These 1,000 plans returned similar

results, leading me to conclude that Iowa's congressional plan may be gerrymandered, allowing the Republican party to take control of all four of the state's districts. It is also important to note that Iowa's third district elected a democrat in its previous election cycle, when Iowa's previous plan was still in place.

Works Cited

- Blaskowsky, Alexa T. *The Effect of Gerrymandering On Voter Turnout.* : Oregon State University, 2021.
- Chen, Jowei, and David Cottrell. "Evaluating Partisan Gains from Congressional Gerrymandering: Using Computer Simulations to Estimate the Effect of Gerrymandering in the U.S. House." *Electoral Studies*, vol. 44, 2016, pp. 329–340., doi:10.1016/j.electstud.2016.06.014.
- Cottrell, D. (2019), Using Computer Simulations to Measure the Effect of Gerrymandering on Electoral Competition in the U.S. Congress. *Legislative Studies Quarterly*, 44: 487-514. <https://doi.org/10.1111/lsq.12234>
- Epstein, Reid J. "Florida Senate Passes Congressional Map Giving G.O.P. a Big Edge." *The New York Times*, The New York Times, 20 Apr. 2022, <https://www.nytimes.com/2022/04/20/us/politics/florida-redistricting-maps-desantis.html>.
- Fifield, B., Higgins, M., Imai, K., & Tarr, A. (2020). Automated redistricting simulation using Markov chain Monte Carlo. *Journal of Computational and Graphical Statistics*, 29(4), 715-728.
- Gabriel, Trip, and Michael Wines. "Ohio Congressional Map Is Illegal Gerrymander, Federal Court Rules." *New York Times*, 4 May 2019, p. A12(L). *The New York Times*, link.gale.com/apps/doc/A584314034/SPN.SP01?u=nysl_ca_colh&sid=bookmark-SPN.S

P01&xid=8bd78d9f. Accessed 18 Oct. 2022.

Herschlag, Gregory, et al. "Evaluating Partisan Gerrymandering in Wisconsin."

arXiv:1709.01596, 5 Sept. 2017.

Herschlag, G., Kang, H. S., Luo, J., Graves, C. V., Bangia, S., Ravier, R., & Mattingly, J. C.

(2020). Quantifying gerrymandering in North Carolina. *Statistics and Public Policy*, 7

(1), 30–38. <https://doi.org/10.1080/2330443x.2020.1796400>

Nicholas O. Stephanopoulos, *The Causes and Consequences of Gerrymandering*, 59 Wm. &

Mary L. Rev. 2115 (2018), <https://scholarship.law.wm.edu/wmlr/vol59/iss5/14>

Wines, M. (Aug. 8, 2022). Maps in Four States Were Ruled Illegal Gerrymanders. They're Being

Used Anyway. *New York Times*, 14 Sept. 2021,

<https://www.nytimes.com/2022/08/08/us/elections/gerrymandering-maps-elections-republicans.html>.

Wines, Michael. "State Court Rejects Kansas Congressional Map as a Gerrymander." *New York*

Times, 25 Apr. 2022,

<https://www.nytimes.com/2022/04/25/us/politics/kansas-congressional-map-unconstitutional.html>. Accessed 30 Aug. 2022.