Degrees of Division

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Introduction:

Higher education is an undeniably contested area in American politics, with topics surrounding curriculum, student loans, school funding, and the role of the government in education points of dissension for Americans. The intersection of politics and education is firstly an economic one; while in office, President Biden approved a total of $188.8 billion in student loan forgiveness for 5.3 million borrowers according to the NASFAA (Carrasco). This has been met with criticism across the party line, with Republicans presently proposing large cuts to student loan forgiveness. The intersection is also a cultural one; with the Supreme Court ruling against affirmative action in June 2023, it is clear that politics and education remain inexorably linked in the present day. According to Gallup, education was the 6th most important issue to registered voters, with 38% of the sample rating it extremely important (Brenan). However, even within this study the disparity between Democratic and Republican voters becomes evident; while it ranks the most important issue for 40% Democrats, this is only true for 36% of Republican voters.

The current state of politics in higher education leads to the question, do Democratic and Republican voters have different views of primary and secondary schooling? If a partisan divide exists, there are implications to local school board elections, to state-level education policy, and national public school reform. A robust statistical analysis can lend to understanding the extent of these divisions, if any exist.

To answer this question, this analysis uses statistical methods to analyze survey responses from Democrat and Republican voters. Specifically, it will address differences between level of education achieved, feelings towards college professors, and approval of higher education between Republican and Democrat voters. This data seeks to examine the views of these voters towards secondary schooling, which can be extrapolated to primary schooling. Using hypothesis testing and comparison tests well suited to each data type, the effect of partisan affiliation on the perspective of higher education will be determined. This will lend a data-driven analysis to one of the 2024 election's most important issues.

Conceptualization and Operationalization with Data Understanding:

In this analysis, voters are defined as individuals eligible to participate in U.S. elections based on self-reported registration status or voting history. Partisan affiliation is measured through self-identified political alignment, with Republicans and Democrats categorized accordingly, including respondents who lean toward either party (Petrocik). The analysis focuses on three variables : level of education achieved, feelings toward college professors, and approval of higher education—chosen due to polarizing opinions in the news. Cleaning the data resulted in removing 441 observations because a party could not be determined for the voter.

These variables were measured using survey responses from the ANES 2024 Pilot Study, a trusted source of election data that has captured American political beliefs since 1948. This data serves as a valuable resource for students, policymakers, and social scientists, providing insights in the evolving landscape of American politics. Data used in this analysis is

found in the “ANES 2024 Pilot Study” collecting cases from February 20 - March 1, 2024. A total of 1,919 cases were collected over the internet by YouGov (American National Election).

Methods:

The null hypothesis for the question is that Republican and Democratic voters have the same views on primary and secondary education. To evaluate this hypothesis, three variables are chosen – education level, approval of higher education, and feeling towards college professors. A Wilcoxon rank-sum test was utilized to analyze the relationships between party affiliation and these three additional variables. In terms of I.I.D verification, the data from each sample is independent, only Republicans and only Democrats, but are drawn from identical samples within a survey conducted with non-probability sampling.

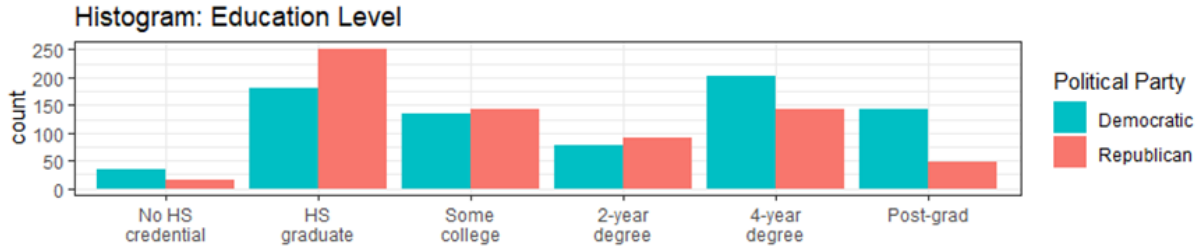

Figure 1: Histogram of the education level achieved by Democrats, in blue, and Republicans, in red. There is a slight skew to the Republicans towards the left, and whereas for the Democrats there are bimodal peaks in HS graduate and 4-year degree.

For education level, the null hypothesis for our p-test was as follows: the probability of Democrats being more educated than Republicans is equally as likely as Democrats being less educated than Republicans. To test this hypothesis, the data is assumed to be at least ordinal data drawn from an I.I.D. sample. In the case of education level data, the education levels of Republicans and Democrats are measured on the same ordinal scale from 1 to 6, each number on the scale representing a level of education completed. As the scale increases, the higher the level of education attained.

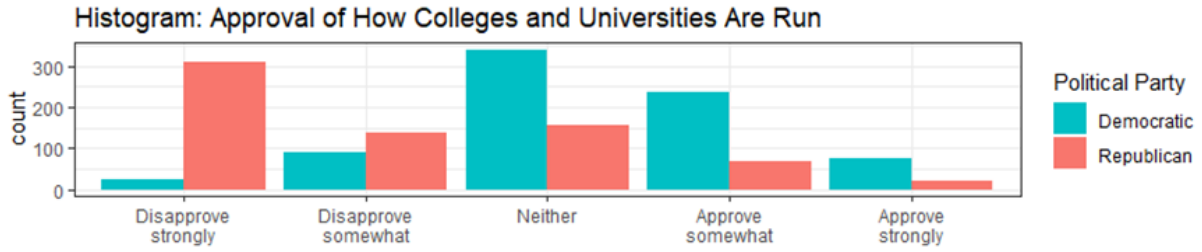

Figure 2: Histogram of the approval of how college and universities are run by Democrats, in blue, and Republicans, in red. There is a strong skew to the Republicans towards the left, and a normal distribution for the Democrats.

The null hypothesis for approval of higher education: the probability that Democrats have stronger approval of higher education than Republicans is the same as the probability that Republicans have stronger approval of higher education than Democrats. In this case, the data is checked for the same criteria as designed by the Wilcoxon rank-sum test. The data is confirmed to be at least ordinal data, as the data is measured from 1 to 5 in increments of approval, with 1 being the lowest and 5 being the highest level of approval. These are on a metric interval scale.

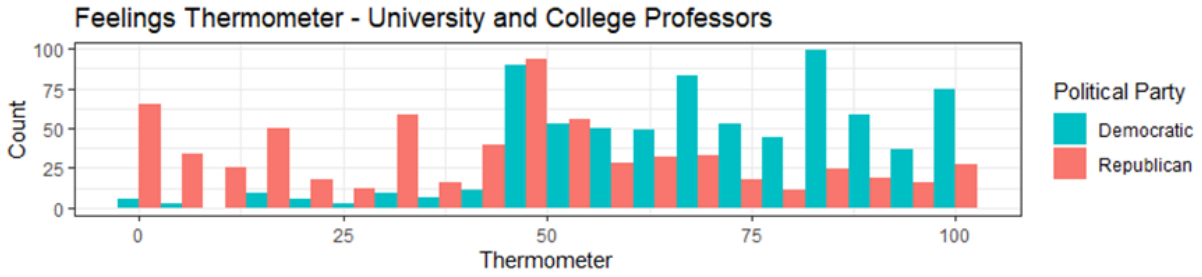

Figure 3: Histogram of how Democrats, in blue, and Republicans, in red, feel about college professors. There is a strong skew to the Democrats towards the right, and a bimodal distribution for the Republicans with peaks at 50 and at 0.

The thermometer for college professors is evaluated by a p-test using the following null hypothesis: the probability that Democrats feel more warmth towards professors than Republicans is the same as the probability that Republicans feel more warmth towards professors than Democrats. The data is indeed at least ordinal; it is ratio data measured on a scale of 0 to 100 in feelings of approval towards college professors.

These variables are then analyzed together through multivariate box and whisker plots.

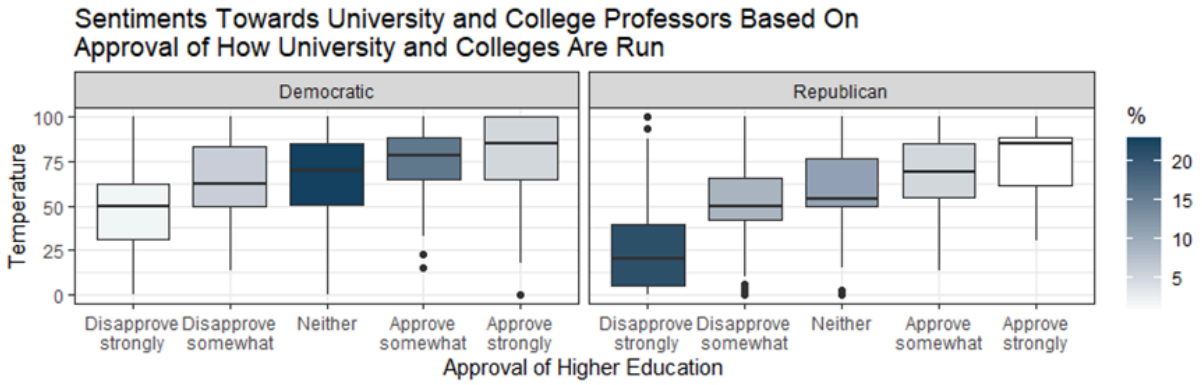

Figure 4: Box and whisker plot of the temperature towards college professors and the approval of higher education for Republicans and Democrats. The percentage that each box encapsulates is represented by the blue color gradient, where the darker the blue, the higher the population in the box. The majority of Democrats are neutral towards approval of higher education and have a mean feeling of around 70. The majority of Republicans disapprove strongly of higher education and have a mean feeling of 20.

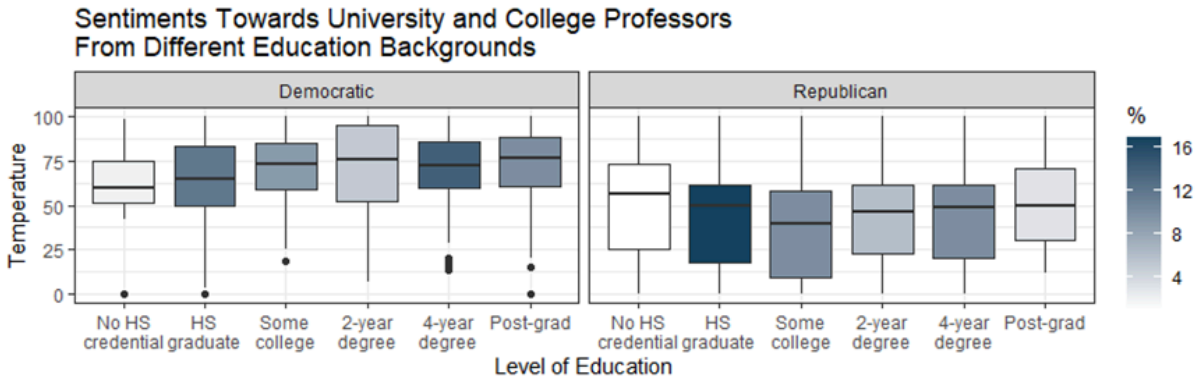

Figure 5: Box and whisker plot of the temperature towards college professors and the level of education for Republicans and Democrats. The Democrats are most strongly correlated with high school graduates and 4-year degrees with mean feelings of warmth above 60. In terms of Republicans, the majority of the population are high school graduates with neutral feelings towards professors, centered around 50.

Interesting to note is that the negative feelings towards college professors from Republicans are evenly represented from all education levels, but the most negative feelings are from college dropouts. Additionally, the most negative feelings towards college professors correlate strongly with the strongest disapproval of higher education for Republicans. Conversely, the most positive feelings towards professors correlate strongly with approval towards university for Democrats.

Test Results and interpretation:

The Wilcoxon rank-sum test yielded significant results across all three variables, indicating partisan differences in education-related attitudes. For education level, the test produced a p-value of 1.009e-10 ($W = 320092$), while higher education approval and perceptions of college professors both returned p-values < 2.2e-16 ($W = 419132$ and $W = 388333$, respectively). At a significance level of $\alpha = 0.05$, these results indicate rejection of the null hypothesis in favor of the alternative: Democrats tend to have higher education levels, greater approval of higher education, and warmer feelings toward college professors than Republicans. Using Cohen's d, an effect size of 0.3447 for Education, 1.2241 for higher education approval, and 1.0874 for thermometer for college professors was produced.

Effect sizes calculated using Cohen's d further illustrate the practical significance of these findings. The effect size for education level ($d = 0.3447$) suggests a small effect, while higher education approval ($d = 1.2241$) and perceptions of college professors ($d = 1.0874$) indicate large effects. These results suggest that while differences in education levels are modest, Democratic voters hold higher education and educators in higher regard than Republican voters. Because positive opinions on secondary schooling can reflect broader pro-education attitudes, these findings imply that Democratic voters may be more supportive of primary schooling as well, with potential implications for education policy and funding at all levels.

References:

American National Election Studies. 224. ANES 2024 Pilot Study [dataset and documentation]. March 19, 2024 version. www.electionstudies.org

Brenan, M. (2024, November 15). Economy most important issue to 2024 presidential vote. Gallup.com. https://news.gallup.com/poll/651719/economy-important-issue-2024-presidential-vote.aspx

Carrasco, M. (2025, January 17). Biden Administration Announces 'Final' Student Loan Debt Relief Approvals. NASFAA. https://www.nasfaa.org/news-item/35444/Biden_Administration_Announces_Final_Student_Loan_Debt_Relief_Approvals#:~:text=Earlier%20this%20week%2C%20the%20Biden,2025%203:7:44%20PM

Petrocik, J. R. (2009). Measuring party support: Leaners are not independents. Electoral Studies, 28(4), 562–572. https://doi.org/10.1016/j.electstud.2009.05.022