Lab 1

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Introduction

Political division in the United States has intensified in recent years (Abramowitz & Saunders, 2008; Jones, 2024). As polarization accelerates in the U.S. political climate, it seems nothing is off-limits from the creeping influence of intense partisanship; in recent years, education itself has become an ideological flashpoint, as polarizing curriculum programming for public schools rose to national attention in the media. In opposition of including Critical Race Theory into how American history is taught, sixteen Republican-led states have passed legislation banning CRT in public schools, with dozens more states introducing similar measures (UCLA School of Law, 2023). These legislative trends reflect deeper, value-driven tensions beyond the classroom. What is the value of an American public education, or the purpose of one? Voters on different ends of the political spectrum may fundamentally disagree.

This report explores whether Democratic and Republican voters hold significantly different views on education. We expect that Democrats will favor increasing federal spending on public schools more than increasing federal spending on social security, and we expect Republicans will favor increasing federal spending on social security more than increasing federal spending on public schools. Using the American National Election Studies (ANES) 2024 Time Series data, we assess whether there are statistically significant partisan differences in attitudes around public school funding. We establish two hypothesis tests using the paired Wilcoxon signed-rank test. More practically, within the current cultural polarization, we offer a perspective into how partisanship is reflected in attitudes around education.

Conceptualization and Operationalization

Question: Do Democratic and Republican voters have different views of education?

We interpret "voters" as survey respondents who indicated they identified more with either the Democratic party or the Republican party, whether this affiliation was strong or weak. Respondents to the ANES are surveyed immediately before and after U.S. elections; a limitation of our analysis is that these respondents may or may not have been voters, but since they indicated a preference for a political party, we have categorized them as such. One way voters' (i.e., survey respondents who identify themselves as leaning Republican or Democrat) views and values are expressed are through attitudes on government spending. The ANES includes questions on federal spending for Social Security and public schools. We used attitudes towards government spending on public schools as our proxy on education more broadly; specifically, we assume that voters who prioritize education are more likely to have indicated that "Federal spending on public schools should be increased."

"Views of education" are far-reaching and nuanced, and cannot adequately be expressed through voting behavior alone; some voters may value education highly, but may not reflect that in their voting behavior because they are a single-issue voter ("32% of U.S. voters say they would only vote for a candidate for major office who shares their views on abortion," says Gallup). Others may value education, but believe in private education rather than public schools.

The subject of government spending is itself a barometer of political affiliation (Johnson, 2018). Therefore, we chose to use survey respondents' reported attitudes towards federal spending on public schools, relative to other types of federal spending (social security), as a proxy for their views on education..

We identify Republicans and Democrats via the feature V241227 (PARTY ID), which summarizes respondents' party affiliation via a 1-7 scale: 1 indicates a "Strong Democrat," 4 an "Independent," and 7 a "Strong Republican." Respondents who indicated they "lean" towards one party, or consider themselves a "not very strong" Democrat or Republican were grouped with their preferred party (Petrocik, 2009). Therefore, values of V241227 in [1,3] are coded as Democrats, and values in [5,7] are coded as Republicans. Values indicating the respondent refused to answer, did not know, was an Independent, or had no preference for political affiliation have been excluded. We chose this feature to represent political affiliation because it is a summary variable, based on the respondent's answers to multiple questions related to partisan attitudes. Additional details on data wrangling manipulation explained in Data Wrangling (next section).

Data Wrangling

We begin by downloading the 2024 time series data from the ANES website and loading it into RStudio. Since we are comparing paired ratings of public school (V241264) and social security (V241261) responses, we filter out "Refused", "Don't know", and "Inapplicable" values in both categories. We limit both variables to values 1 = Increased, 2 = Decreased, and 3 = Kept the same. However, to prepare the data for a sign test, we need to recode each variable. We recode both the public school and social security variables so that 1 = Increased, 2 = Kept the same, and 3 = Decreases, so the responses are ordinal from highest to lowest funding support.

We want to perform the test separately for democrats and republicans, so we split the data by the party ID summary variable (V241227x). We categorize strong, not very strong, and independent-democrats as democrats (and likewise for republicans). Finally, we want to investigate the difference between sentiments towards public school and social security spending, so we calculate our difference variable as public school rating - social security rating for each pair of responses (V241264 - V241261).

Data Understanding

The data for this analysis is based on the American National Election Studies (ANES) 2024 Time Series Study, a continuation of the series of election studies conducted since 1948. The study used a mixed-mode design including in-person, internet, video, telephone, and paper-and-pencil interviewing.

The study's target population is the U.S. citizens who were 18 or older living in the US immediately prior to the 2016 presidential election.

Respondents were asked a series of questions that relates to the respondents opinion on electoral behavior, policy attitudes, and demographic characteristics.

Test Set Up and Hypothesis:

Let Xi = preference for **public school spending (**V241264**), where:**

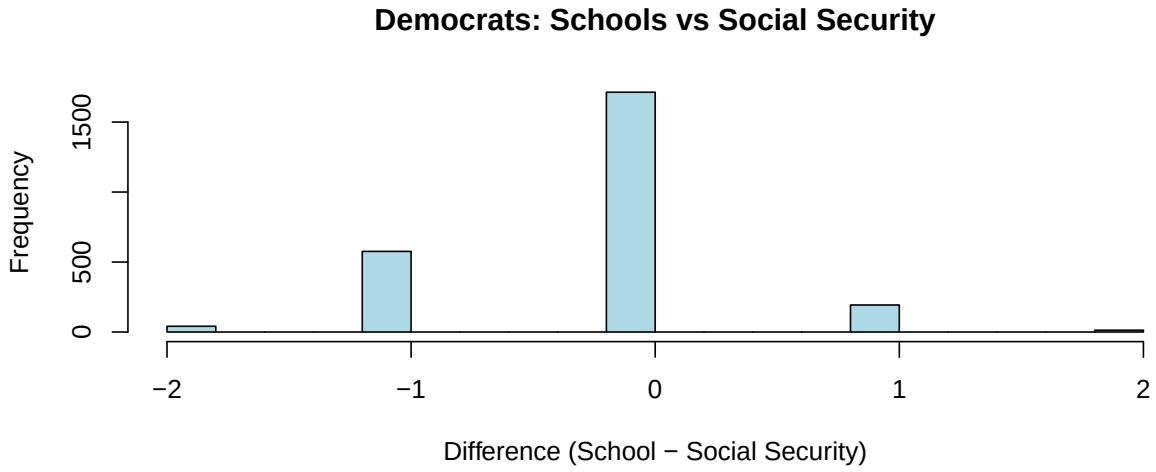
- 1 = Increased
- 2 = Kept the same
- 3 = Decreased

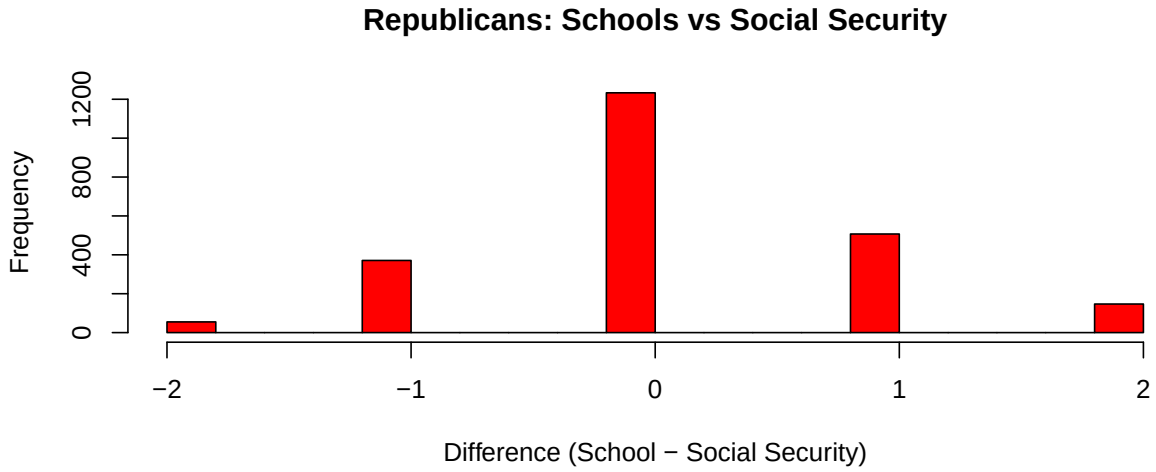
Let Yi = preference for **social security spending (**V241261**),** with the same code as Xi

Let Di = Xi - Yi, with interpretation:

- (-) negative represents response to public schools is higher than response to social security: more support for schools
- 0 represents public schools and social security coded the same: equal support (both Increase, both Same, or both Decrease)
- (+) positive represents response to social security is higher than response to public school: more support for social security

Below are two histograms of the difference variable for democrats and republicans, respectively. For both republicans and democrats, the difference variable is most often zero. For republicans, the difference variable is more often positive than negative, and for democrats the difference is more often negative than positive. These charts indicate that democrats are more likely to exhibit more support for public school funding than social security funding, while republicans are more likely to exhibit more support for social security funding than public school funding.





We designed two tests to check whether these observations hold up under rigorous statistical scrutiny.

Test 1:

** Null hypothesis (Ho): P(Di <0) | i in Democrats = P(Di >0) | i in Democrats

Alternative hypothesis (H1): P(Di <0) | i in Democrats > P(Di >0) | i in Democrats

Test 2:
Null hypothesis (Ho): P(Di <0) | i in Republicans = P(Di >0) | i in Republicans

Alternative hypothesis (H1): P(Di <0) | i in Republicans < P(Di >0) | i in Republicans

Test Selection and Evaluation of Assumptions

We decided to use the Wilcoxon signed test (paired, one-sided) because this allows us to compare directional results from the same respondents. We favored the signed test instead of the signed-rank test as the responses are ordinal.

Assumption 1. (At least) Ordinal Scale - Xi and Yi are both measured on the same ordinal scale - We recoded the the responses to natural order (1 = Increased , 2 = Kept the same , 3 = Decreased)

Assumption 2. IID - ANES respondents were sampled independently - Each paired response is from the same respondent

Test Results and Interpretation

The Wilcoxon signed tests (in R, the binomial sign tests above) uncovered that when respondents had differing views on public school and social security spending, political affiliation mattered:

For Democratic respondents, 617 out of 823 non-tied responses favored increased government spending on public schools over social security. It is unlikely that 75% of Democratic respondents would indicate their preference for public school spending if Democrats had the same views on public school and social security; in fact, the p-value for this result is less than $2.20 * 10^-16$. This p-value is small enough to reject the null hypothesis and provides evidence for a partisan preference among Democrats for public school funding.

For Republicans, 654 out of 1080, or about 61%, of non-tied respondents favored social security spending over public schools. The likelihood of this outcome occurring if the null hypothesis were true is about $2.07 * 10^-12$, which is also statistically significant. This test provides evidence of a republican preference for social security funding over education.

We see that Republicans favored social security, and Democrats favored public schools by a wider margin than Republicans favored social security. In these tests, to understand the practical effect size, we observe the difference from the null, or 0.5: at 0.25 for Democrats and 0.11 for Republicans, Democrats more strongly favored public schools than Republicans favored social security, and Democrats more strongly prioritize public schools for federal budget spending. Together, these suggest that not only do Republicans and Democrats show clear preferences in federal spending, these preferences seem to reflect a meaningful partisan divide in values.

Works Cited

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