Lab 1

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Introduction

We suspect that Democrats will favor increasing spending in public schools more than social security. Whereas Republicans will be the other way around. So we will set up two hypothesis test using the Wilcoxon Signed Rank test.

Test set up:

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:

- -2 represents public schools =1 (Increase) **vs.** social security =3 (Decrease): extremely more support for schools
- -1 represents public schools =1 (Increase) **vs.** social security =2 (Same), **or** public schools =2 (Same) **vs.** social security =3 (Dec): more support for schools
- 0 represents public schools and social security coded the same: equal support (both Increase, both Same, or both Decrease)
- 1 represents public schools =2 (Same) **vs.** social security =1 (Increase), **or** public schools =3 (Dec) **vs.** social security =2 (Same): more support for Social Security
- 2 represents public schools =3 (Decrease) **vs.** social security =1 (Increase): extremely more support for Social Security

Test 1:

Null hypothesis (Ho): average Di | i in Democrats = 0

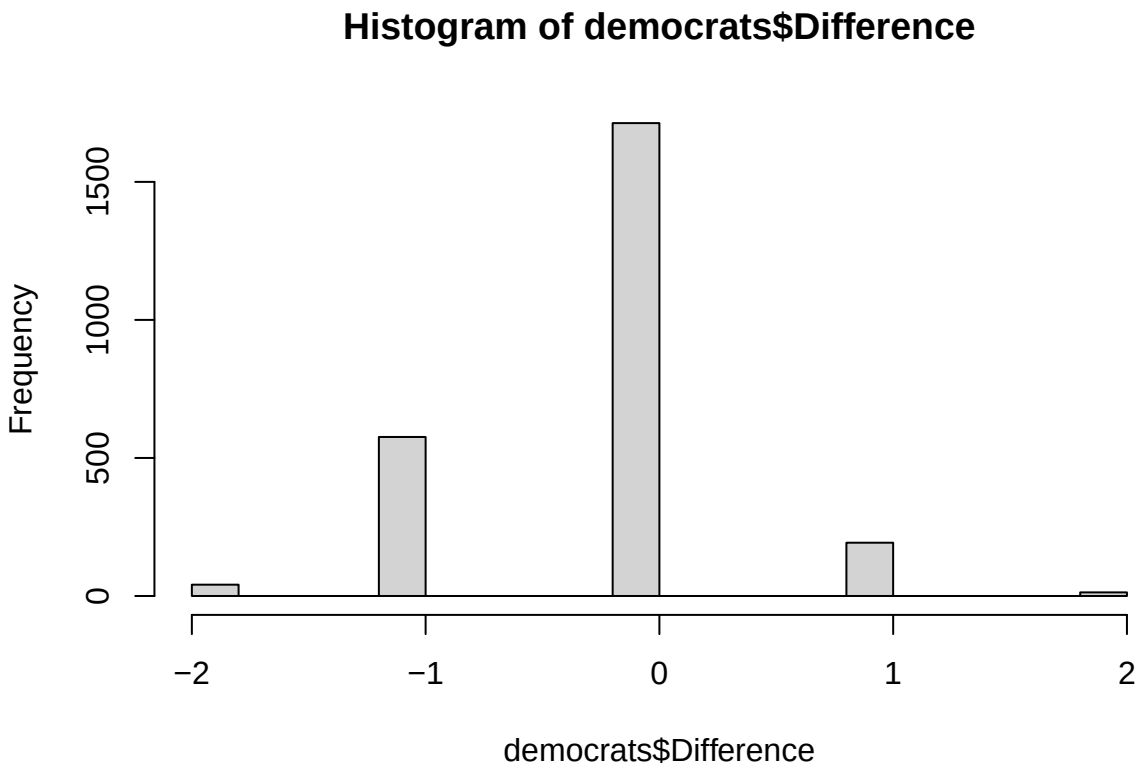
Alternative hypothesis (H1): average Di | i in Democrats < 0 , favoring public schools

Test 2:
Null hypothesis (Ho): average Di | i in Republicans = 0

Alternative hypothesis (H1): average Di | i in Republicans > 0 , favoring social security

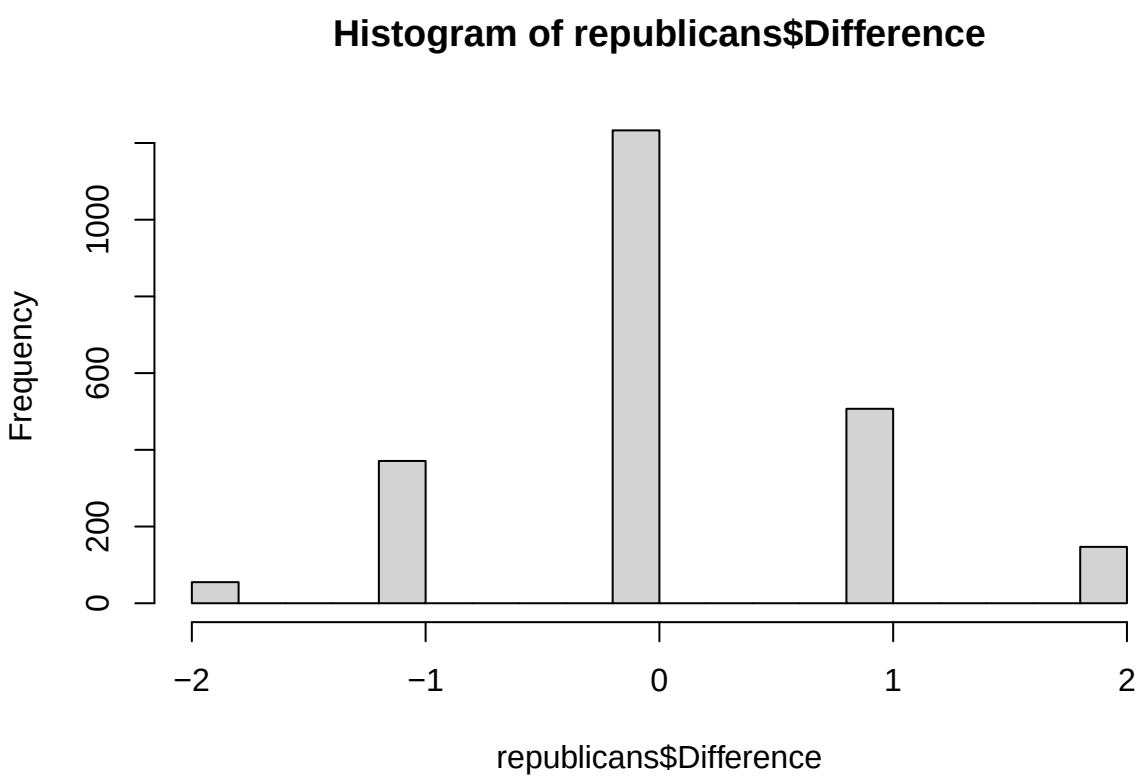
Data Wrangling

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).




```
## [1] -0.1731073
```

```
## [1] 0
```




```
## [1] 0.1383485
```

```
## [1] 0
```

#Alternative hypothesis is public school < social security

```
##
##  Exact binomial test
##
## data:  sum(democrats$Difference < 0, na.rm = TRUE) and sum(democrats$Difference != 0, na.rm = TRUE)
## number of successes = 617, number of trials = 823, p-value < 2.2e-16
## alternative hypothesis: true probability of success is greater than 0.5
## 95 percent confidence interval:
##  0.7236083 1.0000000
## sample estimates:
## probability of success
##              0.7496962
```

```
##
##  Exact binomial test
##
## data:  sum(republicans$Difference > 0, na.rm = TRUE) and sum(republicans$Difference != 0, na.rm = TRU
## number of successes = 654, number of trials = 1080, p-value = 2.065e-12
## alternative hypothesis: true probability of success is greater than 0.5
## 95 percent confidence interval:
```

```
##  0.5804387 1.0000000
## sample estimates:
## probability of success
##              0.6055556
```

Results

Discussion