Lab 1 Question 3: Are survey respondents who have had someone in their home infected by COVID-19 more likely to disapprove of the way their governor is handling the pandemic?

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0.1 Importance and Context

The COVID-19 has changed everything, and one of the most important aspects is how the campaigns for the US 2020 elections were conducted. The pandemic forced to cancel conventions and prompted many states to change how people get and submit their ballots, with all the uncertainty it created. And to make things worse, all of this happened in the middle of social distancing restrictions not seen since almost a century. It's essential to understand how elected officials' approval changed when people got in close contact with COVID-19.

0.2 Description of Data

The ANES data set contains information from 8,280 pre-election interviews with U.S. citizens of voting age. Two variables are particularly relevant for us to answer this question:

- `V201145`: `APPROVE OR DISAPPROVE R'S GOVERNOR HANDLING COVID-19`
- `V201624`: `ANYONE IN HOUSEHOLD TESTED POS FOR COVID-19`

```
summary(df_clean)
```

```
##       gov            covid
##  Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:2.000
##  Median :1.000   Median :2.000
##  Mean   :1.381   Mean   :1.965
##  3rd Qu.:2.000   3rd Qu.:2.000
##  Max.   :2.000   Max.   :2.000
```

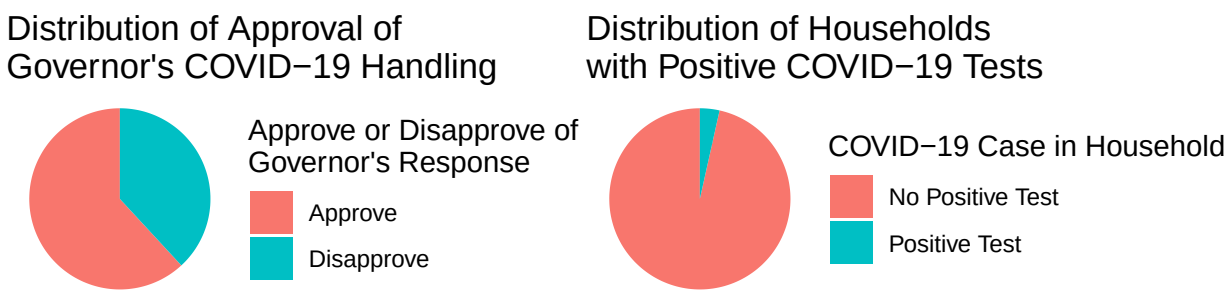

Figure 1: Voters' Approval of Governor and Household COVID-19 Tests

Table 1: Cross Tab of Governor Approval and Positive COVID-19 Tests

	No Positive Test	Positive Test
Approve	0.599	0.020
Disapprove	0.366	0.015

0.3 Most appropriate test

Wilcoxon rank test

0.4 Test, results and interpretation

We establish the *null hypothesis* to be that the average support for the respondent's governor is the same among people that had a member of the household test positive for COVID-19 and those who did not. Given we have no strong initial inclination in either direction, this should be a two tailed test.

We'll be using the standard 5% significance level.

```
df_clean$covid_positive =  df_clean$covid == pos_test
df_clean$gov_approve = df_clean$gov == gov_approve
df_clean$approval <- recode(as.character(df_clean$gov), '1' = 'Approve', '2' = 'Disapprove')
df_clean$covid_tested <- recode(as.character(df_clean$covid), '1' = 'Positive', '2' = 'Not positive')

table(df_clean$approval, df_clean$covid_tested)
```

```
##
##              Not positive Positive
##   Approve            4876      159
##   Disapprove         2978      125
```

```
wilcox.test(as.numeric(df_clean$gov)~df_clean$covid_positive)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  as.numeric(df_clean$gov) by df_clean$covid_positive
## W = 1047269, p-value = 0.0377
## alternative hypothesis: true location shift is not equal to 0
```

```
chisq.test(table(df_clean$approval, df_clean$covid_tested))
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  table(df_clean$approval, df_clean$covid_tested)
## X-squared = 4.0645, df = 1, p-value = 0.04379
```

We reject the null since the p-value is lower than our significance level 5%

```
cor.test(as.numeric(df_clean$gov), as.numeric(df_clean$covid_positive), method='spearman')
```

```
## Warning in cor.test.default(as.numeric(df_clean$gov),
## as.numeric(df_clean$covid_positive), : Cannot compute exact p-value with ties
```

```
##
##  Spearman's rank correlation rho
##
## data:  as.numeric(df_clean$gov) and as.numeric(df_clean$covid_positive)
## S = 8.7757e+10, p-value = 0.03769
## alternative hypothesis: true rho is not equal to 0
## sample estimates:
##       rho
## 0.0230376
```

Although, it's more likely to approve the performance of the governor if there is no positive covid test on the members of the household, the significance is very low with a Sperman's correlation value of `0.023`.