

Are Democratic voters more enthusiastic about Joe Biden or Kamala Harris

Rui Li, Da Qi Ren, Dicky Woo

Contents

1	Are Democratic voters more enthusiastic about Joe Biden or Kamala Harris?	2
1.1	Importance and Context	2
1.2	Description of Data	2
1.3	Most appropriate test	3
1.4	Test, results and interpretation	3

1 Are Democratic voters more enthusiastic about Joe Biden or Kamala Harris?

1.1 Importance and Context

Kamala Harris was one of the biggest opponents on the debate stage and then became Biden's vice president pick. With Biden winning the 2020 presidential election, it could be people vote due to their enthusiasm about Biden. But, is it possible that people vote Biden because his successful strategy by picking Kamala Harris to be his vice president? We already know Biden won 2020 election, It is interesting to find out if democrats are more enthusiasm about Biden or Harris.

1.2 Description of Data

We are using 2020 American National Election Studies(ANES) Time Series study. We only limit the thermometer feelings of respondents from the democratic registration party. For each individual respondent. In the survey, respondents were asked to fill in their feelings toward political leaders, which is called thermometer feelings. In this hypothesis test, we only compare democratic respondents' feelings toward Biden and Harris.

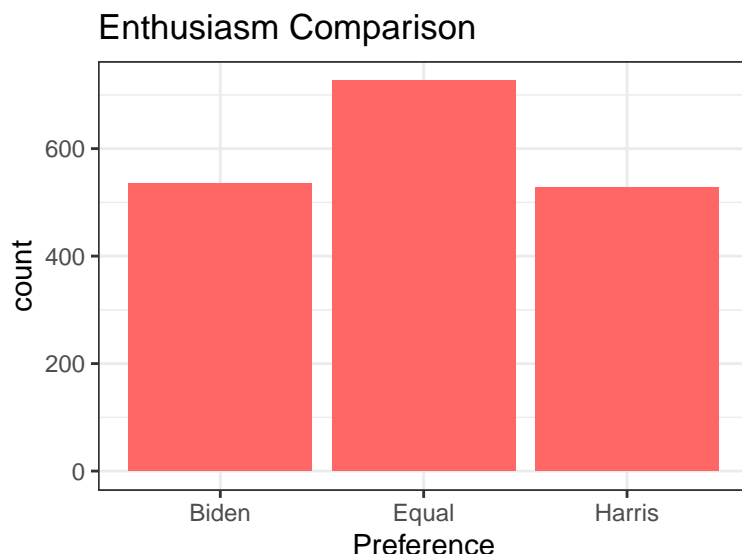
The thermometer feels contains values including 0-100 actual value, 998. Don't know, -4 Technical errors, and -9. Refused. We first excluded observations if respondent's thermometer feelings toward Biden or Harris are either 998. Don't know, -4. Technical errors, or -9 refused, because we do not have enough information to fill in value to conduct comparison. After subsetting, we have 1788 observations.

Even thermometer feels are filled in as actual values between 0 to 100, we cannot treat the value as metric value. Instead these feeling values need to be treated as ordinal data, because we cannot interpret one has the same enthusiasm about Biden even they fill the same value about Biden. Furthermore, we cannot interpret one is twice as enthusiastic about Biden as another, if he/she filled in a doubled value than another in Biden's thermometer feelings.

Admittedly, we cannot compare enthusiasm level between individuals, we can compare the enthusiastic feelings toward Biden and Harris for one individual. We took the data and compare the thermometer feelings toward Biden and Harris to arrive at one individual's preference of these two political leader. If one scores higher for Harris than Biden, then this individual is more enthusiastic about Harris.

We show in Figure 1, 535 out of the 1788 observations likes Biden more, 527 likes Harris more, 726 equally enthusiastic about Biden and Harris. Base on the counts we do not think there is a lot of difference in feelings toward Biden and Harris.

#grouped bar plot for Biden and Harris Preference



1.3 Most appropriate test

We then need to pick a hypothesis test to check whether Democratic registration respondents are more enthusiastic about Biden or Harris. Even though the values are from 0-100, these values are in ordinal scales, a non-parametric test is appropriate. Also, the feeling thermometer of Biden and Harris is a paired measure for each sample. These paired measurements can only be used to get a preference of an individual, rather than compared between individuals. Because we need to test a paired measurement on the same sample, and the measurement is ordinal scale data, we choose to use a sign test, implemented in R by using `binom.test`.

Null Hypothesis $H_0 : p = 0.5P(\text{More enthusiastic about Biden}) = P(\text{More enthusiastic about Harris})$

Alternative Hypothesis $H_1 : p \neq 0.5P(\text{More enthusiastic about Biden}) \neq P(\text{More enthusiastic about Harris})$

The sign test requires the following assumptions to be true:

- i.i.d. data. Letters and emails pushed household members from the sampled addresses to respond to a screener on the web. Once a screener interview was completed, responding households followed different protocols for survey mode based on assignment to different sample groups. All respondents who completed the post-election survey did so in the same mode used for the pre-election survey. This could break independent as well as the identically distributed assumption, since people from one household may tend to have the same political opinion. For people from a bigger family size could introduce biases.
- Ordinal scale. Based on the data, we are not certain whether participants use the same scale when they think about Biden and Harris. Another way of noting this is to ask whether voters hold the same anchoring points on these scales. Especially, we see cases that respondent filled in thermometer feelings for one leader, and refused to score for the other leader. We throw away those observations, however, further surveys are needed to track why respondents are refused to score thermometer feelings.

1.4 Test, results and interpretation

```
##
## Exact binomial test
```

```
##
## data:  sum(Biden_Harris$Like_Biden) and sum(Biden_Harris$Like_Biden) + sum(Biden_Harris$Like_Harris)
## number of successes = 535, number of trials = 1062, p-value = 0.8299
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.473250 0.534262
## sample estimates:
## probability of success
##           0.5037665
```

The result has a p value of 0.8299. We failed to reject the null hypothesis - people are equally enthusiastic about Biden and Harris. We do not find enough evidence about people have preference between Biden and Harris. This test result confirmed what we show in Figure 1, 29.9 % of people more enthusiastic about Biden, 29.5% democratic respondent are more enthusiastic about Harris, and 40.6% of people equally enthusiastic about Biden and Harris.

although Biden won democratic debate, this survey results shows that people have no strong preference between Biden and Harris. Also, This test gives us a confidence interval of 0.473 to 0.534. We have 95% confidence that the the ratio of probablity of people are more enthusiastic about Biden over probablity of people are more enthusiastic about Harris fall between 0.473 and 0.534.

#practical significance

```
## [1] 0.004474273
```

We also used Common language size effect to evaludate the practical significance for the test result. We learned that people have no strong preference for Biden and Harris. The practical significant score is 0.00447, which is smaller than 0.1. This refers to “People equally enthusiastic about the Biden and Harris” has very little magnitude of practical significance.