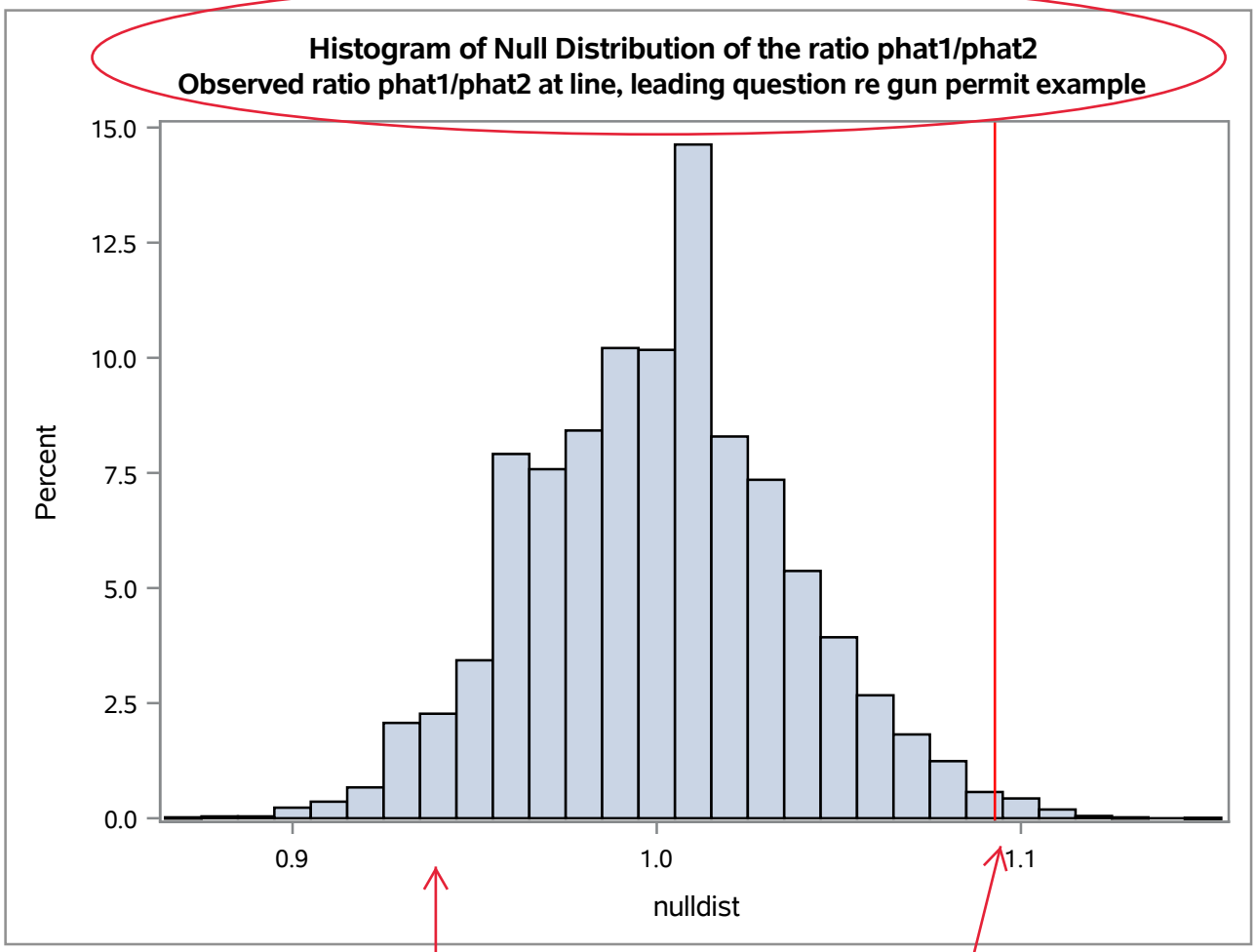


This histogram represents the randomization distribution of the ratio of the two sample proportions, phat_1 / phat_2. This null distribution shows how this ratio of the sample proportions would behave if there was no treatment (form of question) effect.

The observed ratio of the sample proportions is here.

This is quite far away from the center of the null distribution giving evidence that wording of the question does have an effect on the proportion who would favor requiring a permit. The P-value is below.

# Histogram of Null Distribution of the ratio phat1/phat2
# Observed ratio phat1/phat2 at line, leading question re gun permit example

Observed ratio phat1/phat2, Pvalue for H_1:p1 notequal p2

| phat1 | size1 | phat2 | size2 | obsratio | pvalue |
|---|---|---|---|---|---|
| 0.7528455 | 615 | 0.6888889 | 585 | 1.0928403 | 0.0096 |

The sample proportions and sample sizes are here.

The observed ratio of the sample proportions is phat_1 / phat_2 = 1.0928

The randomization P-value .0096
shows that 0.96% of the 10,000 random assignments of the observations to the two groups yielded a ratio at least 0.0928 units away from 1, that is, a ratio less than or equal to .9072 or greater than or equal to 1.0928.

The hypothesis of interest is
H_1: p_1 > p_2 that is H_1: p_1/p_2 > 1
The P-value for this hypothesis is .0096/2 = .0048

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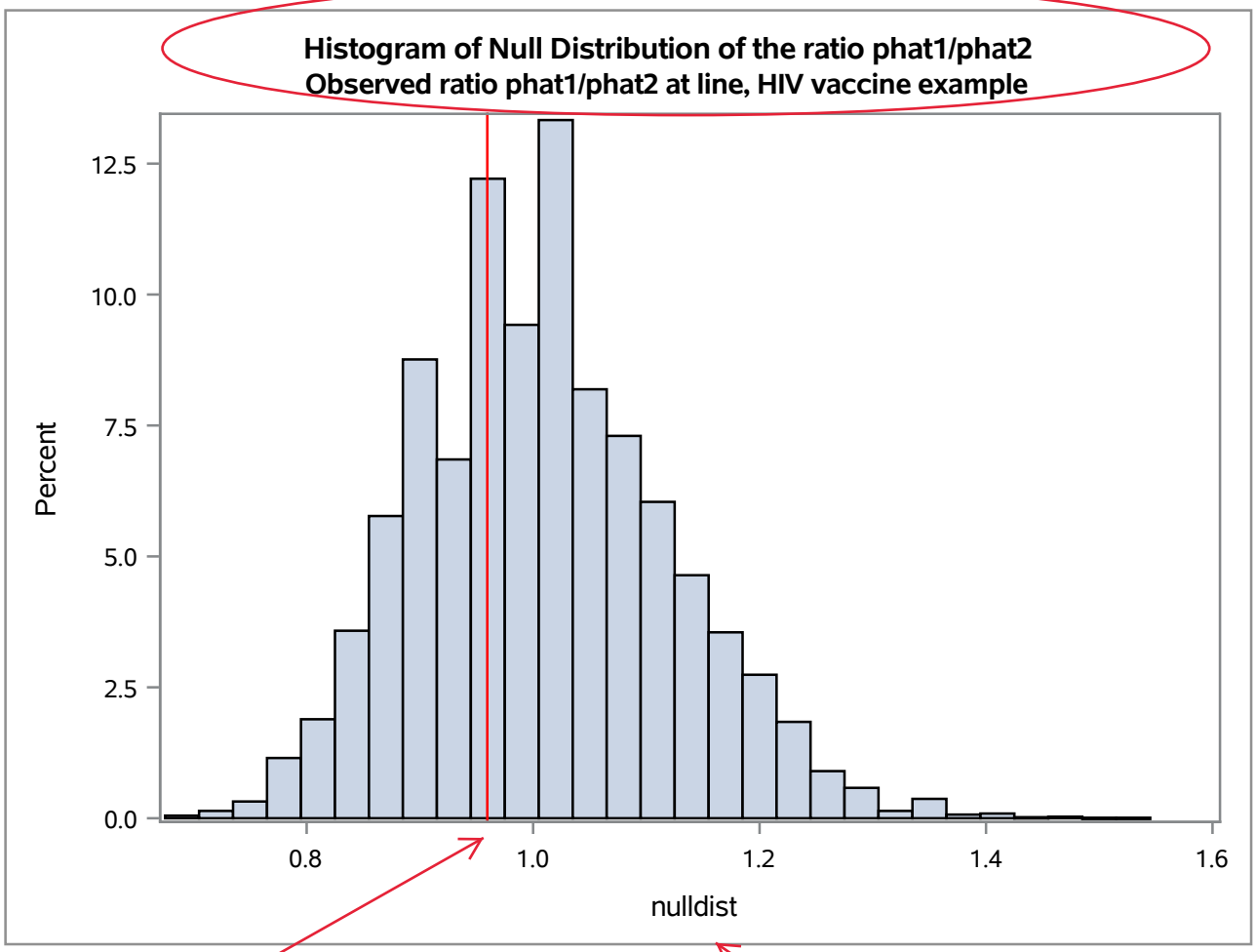
For comparison, the P-value (nondirectional) computed using the normal approximation to the sampling distribution of the ratio of sample proportions is .0140 which is very similar.




The observed ratio of the sample proportions is here.

This is NOT far away from the center (one) of the null distribution showing that there is NOT evidence that the effect of the vaccine is different from the effect of the placebo. The P-value is below.

This histogram represents the randomization distribution of the ratio of the two sample proportions, phat_1 / phat_2. This null distribution shows how this ratio of the sample proportions would behave if there was no treatment (vaccine) effect.

# Histogram of Null Distribution of the ratio phat1/phat2
# Observed ratio phat1/phat2 at line, HIV vaccine example

Observed ratio phat1/phat2, Pvalue for H_1:p1 notequal p2

| phat1 | size1 | phat2 | size2 | obsratio | pvalue |
|---|---|---|---|---|---|
| 0.0669817 | 3598 | 0.0698061 | 1805 | 0.9595388 | 0.6733 |

The sample proportions and sample sizes are here.

The observed ratio of the sample proportions is
phat_1 / phat_2 = 0.9595

The randomization P-value .6733 shows that 67.33% of the 10,000 random assignments of the observations to the two groups yielded a ratio at least 0.0405 units away from 1, that is, a ratio less than or equal to .9995 or greater than or equal to 1.0405.

The hypothesis of interest is
H_1: p_1 < p_2 that is H_1: p_1/p_2 < 1
The P-value for this hypothesis is .6733/2 = .3366 which is NOT small. The data do not support the hypothesis that the vaccine is better than the placebo!

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For comparison, the P-value (nondirectional) computed using the normal approximation to the sampling distribution of the ratio of sample proportions is .6970 which is very similar.