

Is Yawning Contagious?

An experiment conducted by MythBusters tested if a person can be subconsciously influenced into yawning if another person near them yawns.

In this study 50 people were randomly assigned to two groups: 34 to a group where a person near them yawned (group: stimulus) and 16 to a control group where there wasn't a yawn seed (group: no stimulus). They then recorded the whether each subject yawned (response: yawn) or not (response: no yawn). The results appear below.

	No Yawn	Yawn
No Stimulus	12	4
Stimulus	24	10

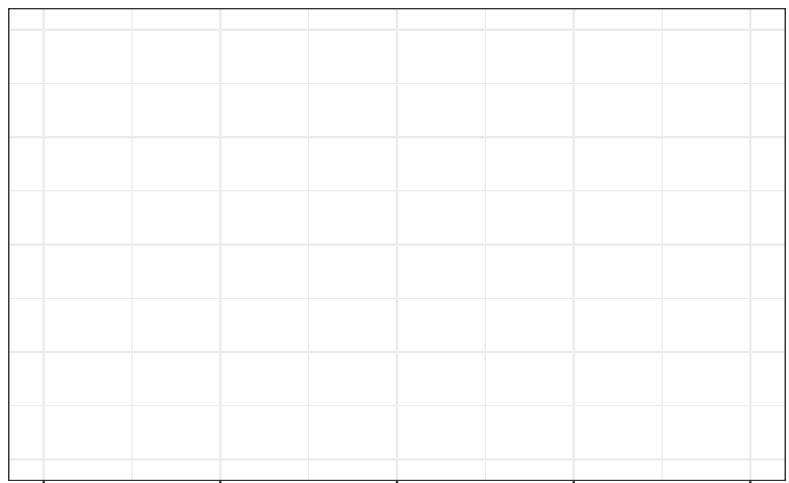
- (1) What is the explanatory variable? Response variable?
- (2) What was the proportion of yawners in the stimulus group, \hat{p}_s ?
- (3) What was the proportion of yawners in the no stimulus group, \hat{p}_n ?
- (4) If there were *no association* between yawning and the proximity of another yawner, what would you expect the difference to be between these two proportions?
- (5) What are the possible values that $\hat{p}_s - \hat{p}_n$ can take? (i.e., what is the maximum value? the minimum value?)
- (6) In terms of $\hat{p}_s - \hat{p}_n$, what is an example of a result that would demonstrate a strong association between yawning and being exposed to a yawn?

Simulating Yawners

What kind of data would be observed if there was no association between these variables and if the only variation was caused by the process of randomly assigning subjects to the two conditions? Find out by running a *hypothesis test*!

7. Write out an appropriate null hypothesis (H_0) for the MythBusters' experiment.
8. Write out an appropriate alternative hypothesis (H_a) for the MythBusters' experiment.
9. We will use the difference in observed proportions of yawners between the two groups, $\hat{p}_s - \hat{p}_n$, as the *test statistic* for the hypothesis test. Copy down the value of the test statistic that the Mythbusters observed from the first page.
10. The yawn dataset in the stat20data package contains the results of the 50 participants in the MythBusters experiment. Use the infer package (and tidyverse library) to simulate 6 yawning experiments under the null hypothesis, calculating the difference in proportions $\hat{p}_s - \hat{p}_n$ for each. Record your results in the table below. You will fill out the blank plot later in class!

Sim	$\hat{p}_s - \hat{p}_n$
1	
2	
3	
4	
5	
6	



- (11) If there was in fact no relationship between yawning and the stimulus, what values of $\hat{p}_s - \hat{p}_n$ would you expect to see?
- (12) Is this data convincing evidence that yawning is contagious? Why or why not?