

Is yawning contagious?

MS 204 Chapter 1

Summary

It is commonly believed that yawning is contagious. Via Wikipedia:

Yawning in adults occurs most often immediately before and after sleep, during tedious activities and as a result of its contagiousness, and is commonly associated with tiredness, stress, overwork, lack of stimulation and boredom, though studies show it may be linked to the cooling of the brain. In humans, yawning is often triggered by others yawning (e.g., seeing a person yawning, talking to someone on the phone who is yawning) and is a typical example of positive feedback. This “infectious” yawning has also been observed in chimpanzees, dogs, and can occur across species.

There is even psychological literature on the subject: Anderson, James R.; Meno, Pauline (2003). “Psychological Influences on Yawning in Children”. *Current psychology letters* 2 (11).

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 (seeded) and 16 to a control group where there wasn't a yawn seed. The results are as follows:

```
library(tidyverse)
library(mosaic)
seeded <- c(rep(0, 12), rep(1, 24), rep(0, 4), rep(1, 10))
yawned <- c(rep(0, 36), rep(1, 14))
Yawners <- data.frame(seeded, yawned)
tally(yawned ~ seeded, Yawners)
```

```
##      seeded
## yawned  0  1
##      0 12 24
##      1  4 10
```

Big idea: It was observed that a larger percentage of those who were seeded with a yawn, actually yawned. But how sure are we that that observed difference is meaningful? Can we conclude that there is truly an association between these two variables?

1. What do you think is the explanatory variable? Response variable?
2. What is the risk (probability) of yawning, for the seeded group?
3. What is the risk (probability) of yawning, for the unseeded group?
4. What is the relative risk (RR) of yawning, comparing the seeded to the unseeded?
5. If there were no association between yawning and the proximity of another yawner, what would the relative risk be?
6. After conditioning on the margins, how many “degrees of freedom” are there in this table?
7. Let X be the number of people in the seeded group that yawned. What are the possible values for X ?
8. In terms of X , what would be an extreme result? $X =$
9. What would another extreme result be? $X =$
10. What are other variables (say, Y) that we could have used instead in this experimental context?

Group activity (groups of 2) Let's try to put yawning in context by randomizing the placement of the yawners among the experimental group (seeded) and control group (unseeded).

1. Make a deck with 36 black cards (for the non-yawners) and 14 red cards (for the yawners)
2. Shuffle the cards well
3. Deal out 34 cards (for the seeded group), and count the number of red cards (yawners). Mark this number below (X_1 for the first trial, X_2 for the second, etc)
4. Repeat steps 2 & 3 five times, taking turns.
5. When your group is done, add your results to the board

Record your results here

- $X_1 =$
- $X_2 =$
- $X_3 =$
- $X_4 =$
- $X_5 =$

Class findings:

Summarize the class findings using 2-3 succinct sentences