Is Yawning Contagious? (statistical inference from first principles) Big idea: is there an association between two variables? 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:

```
seeded <- c(rep(0, 12), rep(1, 24), rep(0, 4), rep(1, 10))
yawned <- c(rep(0, 36), rep(1, 14))
table(seeded, yawned)

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

1. Here, what do you think is the explanatory variable? Response variable?

2. What is the probability of yawning, for the seeded group?

3. What is the probability of yawning, for the unseeded group?

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 probabilities?

5. Let X be the number of people in the unseeded group that yawned. What are the possible values that X can take?

6. In terms of X, what would be a more extreme result? $X =$

Group activity Sampling from this table, assuming that there is no association between exposure to yawning and yawning yourself.

1. From your two decks, make one single deck that has 50 cards: 36 black and 14 red (yawners). Set the extra cards aside.
2. Shuffle deck well.
3. Deal the deck out into two piles: one of 16 (unseeded) and one of 34 (seeded).
4. Count up the number of red cards (yawners) in the pile of 16 and record in the table below.
5. Repeat steps 2-4, five times, taking turns.
6. When your group is done, add your results to the board.

x_1	x_2	x_3	x_4	x_5	x_6

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1. How many red cards would we expect (on average?)

2. What did we observe?

3. How would we summarize these results? What is the big idea?