Agenda

- 1. Exam 1 Recap
- 2. Randomization test recap
- 3. Hypothesis Testing

Exam 1 Recap The average was 84.6. I am implementing a bootstrap incentive. The threshold for this exam is 80. If you scored below the threshold, your score on *this exam* will be retroactively raised to 80 if you score above the threshold on either of the remaining exams.

Randomization test recap Recall the randomized simulation that we performed in the last class. Our goal was to assess the likelihood that exposure to mites was associated, *to a statistically significant* degree, with a decrease in wilt disease after exposure to Verticillium, a fungus that causes wilt disease.

1. What was the *null hypothesis* for your simulation?

2. What was the *test statistic*?

- 3. Where did the test statistic lie in the *null distribution*?
- 4. Did this evidence cause you to reject or fail to reject the null hypothesis?
- 5. Write *one* sentence to President McCartney summarizing what you've learned about mites and wilt disease.

```
require(mosaic)
tally(~ outcome + treatment, data = Mites)
## treatment
## outcome mites no mites
## no wilt 15 4
## wilt 11 17
```

```
null_dist <- do(5000) * tally(~ outcome + shuffle(treatment), data = Mites)
ds <- tidyr::gather(null_dist, key = type, value = N)
qplot(data = ds, x = N, facets = ~type, binwidth = 1)</pre>
```



What's Wrong? Here are several situations where there is an incorrect application of the ideas presented in this section. Write a short paragraph explaining what is wrong in each situation and why it is wrong.

- 1. A researcher tests the following null hypothesis: $H_0: \bar{x} = 23$
- 2. A study with $\bar{x} = 45$ reports statistical significance for $H_a: \mu > 50$.
- 3. A researcher tests the hypothesis H_0 : $\mu = 350$ and concludes that the population mean is equal to 350.
- 4. A test preparation company wants to test that the average score of their students on the ACT is better than the national average score of 21.1. They state their null hypothesis to be $H_0: \mu > 21.2$.
- 5. A study summary says that the results are statistically significant and the p-value is 0.98.