Week 9 – Comparing Many Means (ANOVA)

# Chapter 22

**What does ANOVA stand for?**

**What is the null hypothesis for an ANOVA?**

**What is the alternative hypothesis for an ANOVA?**

**What are the conditions for an ANOVA?**

## Section 2 – Randomization Test for Comparing Many Means

### Conditions

**What are ways to assess the equal variability condition?**

**If it appears that the variability between groups is similar can we say that the equal variance condition is met?**

### Comparing every mean

**Why should we compare every mean rather than only the means that look the most different?**

## Test statistic

**What is the statistic used in an ANOVA?**

**How is this statistic calculated?**

## Creating a permuted sample

Last week, we used cards to simulate what could have happened if $H\_{0}$ was true by ripping the cards in half to separate the $x$ and $y$ values. We then shuffled the cards and created new ($x$, $y$) pairs by resampling from the data without replacement.

**How do we simulate what could have happened if** $H\_{0}$ was true for an ANOVA?

**What tail do we use to calculate the p-value for an ANOVA?**

**If you reject** $H\_{0}$ in an ANOVA what can you conclude?

## Section 3 – Mathematical Model

**What distribution do we use to calculate the p-value for a theory-based ANOVA?**

| term | df | sumsq | meansq | statistic | p.value |
| --- | --- | --- | --- | --- | --- |
| gender | 1 | 2.260213 | 2.2602134 | 7.753005 | 0.005583 |
| Residuals | 461 | 134.394128 | 0.2915274 | NA | NA |

**In the ANOVA table above, what does the statistic column represent?**

**How was that statistic calculated? Specifically, what values from the table were used to obtain it?**

**What distribution was used to calculate the p.value?**