MY UNCLE BILLIE, WHO I LOVED BUT COULDN'T STAND

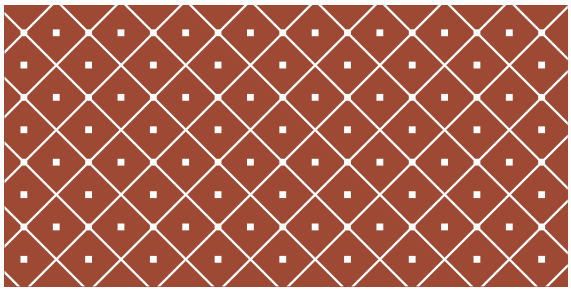
You made it through your first statistical test!
- "That's your first one. Second one gonna be your best?"

College-Level, Technical Writing
- Precision, re-writing and your audience

Where you're at in your education
- Half step away from your program

Where much of the world is at
- Opinions, beliefs, anecdotes, common-sense

What we're doing together
- Building your ability to understand how knowledge in every field is constructed and how to contribute to this process



COMPARING TWO GROUP AVERAGES

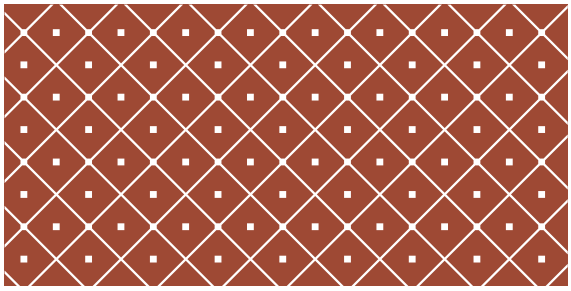
The Two-Sample t-Test

OVERVIEW

- Variations of t-tests
- Signal vs. noise
- Sampling distribution of mean differences
- Independent groups t-test
- Dependent groups t-test
- Effect size tests

VARIATIONS OF T TESTS

- One-sample t-test: Used when comparing sample to population mean and population mean is known.
- Independent: When population mean is unknown, comparisons may be made between treatment and control groups.
- Dependent: When population mean is unknown, comparisons may be made between paired groups.

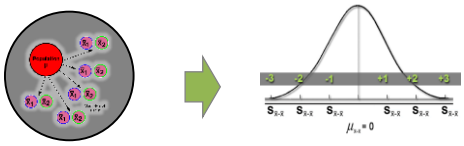


INDEPENDENT GROUPS T-TEST

Comparing two independent sample averages

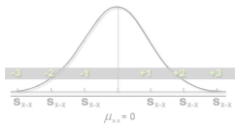
SAMPLING DISTRIBUTION OF MEAN DIFFERENCES

- Mean differences plotted on x axis
- Mean is always 0
- Larger sample leads to more normal distribution and less standard error



ESTIMATED STANDARD ERROR OF THE MEAN DIFFERENCES

$$s_{\bar{X}_1-\bar{X}_2} = \sqrt{\left(\frac{(N_1-1)s_1^2+(N_2-1)s_2^2}{N_1+N_2-2}\right)\left(\frac{1}{N_1}+\frac{1}{N_2}\right)}$$



HOW TO COMPUTE t

$$t = \frac{\text{Difference between sample means}}{\text{Standard error of the difference}}$$

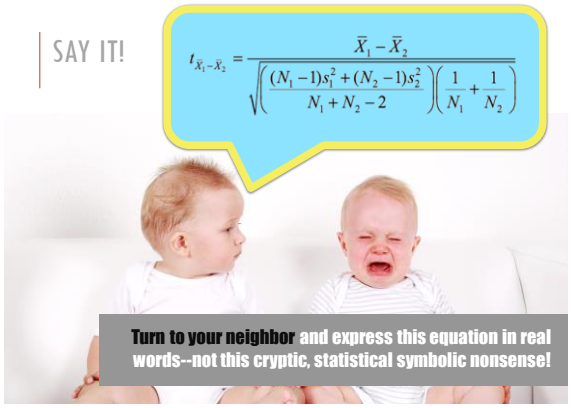
$$t_{\bar{X}_1-\bar{X}_2} = \frac{\bar{X}_1-\bar{X}_2}{s_{\bar{X}_1-\bar{X}_2}}$$

EXPANDED T_{COMP} FORMULA

$$t_{\bar{X}_1-\bar{X}_2} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{(N_1-1)s_1^2 + (N_2-1)s_2^2}{N_1+N_2-2}\right)\left(\frac{1}{N_1}+\frac{1}{N_2}\right)}}$$

Remember that your degrees of freedom is based on $N_1 + N_2 - 2$.

SAY IT!



INDEPENDENT T-TEST ASSUMPTIONS

- Sample data are normally distributed
- Variances of two groups are about equal or homogeneous
- Scores in the two groups are independent (i.e., don't depend on one another)

Determine for yourself whether average, daily calorie expenditure is significantly different for the Hadza and Western sample. Go through all hypo test steps.

Hadza	Western
N = 17	N = 26
Mean = 1,877	Mean = 1,975
s = 364	s = 286

$$t_{\bar{X}_1-\bar{X}_2} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{(N_1-1)s_1^2 + (N_2-1)s_2^2}{N_1+N_2-2}\right)\left(\frac{1}{N_1}+\frac{1}{N_2}\right)}}$$