Let's play—"Name that Statistical Test"

- ## Steps:

1. Identify IV and DV

2. And their levels of measurement

- Is there an association between receiving CBT and feeling less anxious ("Yes" vs "No")?

IV: _____   Level of Measurement: _____

DV: _____   Level of Measurement: _____

Statistical Test: _____

For $25,000 and a chance at the Big Spin:

- Does CBT improve anxiety symptoms (based on an anxiety scale) more so than those receiving psychodynamic psychotherapy?

IV: _____ Level of Measurement: _____

DV: _____ Level of Measurement: _____

Statistical Test: _____

Today we'll add a new one…

Name the statistical procedure:

Types of variables	Levels of Measurement			
Independent variable	Categorical (nominal or ordinal)	Categorical (nominal—dichotomous, two independent groups)	Categorical (two dependent groups)	Categorical (nominal or ordinal) *more than two attributes*
Dependent variable	Categorical (nominal or ordinal)	Ratio or interval	Ratio or interval	Ratio or interval
Statistical procedure:	_____?	_____?	_____?	ANOVA

(One-way) ANOVA Examples:

- **Are there differences between the mean LCSW licensing scores for MSW graduates of various ethnicities?**

- **For children residing in residential treatment does the number of behavioral outbursts vary by level of self esteem (High, Medium, Low)?**

- **In an experimental study of treatment for depression, clients are randomized to the following groups: 1) medication only, 2) medication plus individual psychotherapy, and 3) individual psychotherapy only. Do the clients in the "medication plus psychotherapy" group show more improved outcomes (lower depression scores) than the other two groups?**

How it works

- ANOVA is an "omnibus" test—it only tests the Null hypothesis of "no difference between the means"

- The ANOVA statistic and associated *p* value does <u>not</u> prove or disprove your research hypothesis by singling out one of the means as "significantly different than the others"

So, how do we answer our research question?

- With the use of multiple comparisons (called *post-hoc* tests)—each group's mean is contrasted with each other group's mean

- This is only done if the ANOVA test results in a p value less than our alpha. (If not, *game over!*)

- The multiple comparisons constitute the second of two types of statistical tests

First, the *F* ratio

- **The ANOVA statistic is called the "*F* ratio". It has the same function as the *t* statistic and the Chi Square value, and it has its own distribution table (built into SPSS) so it can also be associated with a *p* value. Except the *F* ratio is easier to interpret:**

  - The *F* ratio reflects the variation of means *between* the groups divided by the variation of means *within* the groups. So it tells you the % of variation that's related to the difference between the groups

Next, the multiple comparisons

- The *post-hoc* tests the Null Hypothesis that there are no differences between the two means in each comparison

- The *post-hoc* procedure adjusts for the inflated risk of making a Type I error, so that the <u>combined</u> probability of falsely rejecting the Null (Type I error) among all the comparisons is no more than your intended alpha (such as .05)

Reporting the ANOVA

- You would report the overall results of the ANOVA: $F =$ _____, $p \leq .05$

- And to address your research question (alternate hypothesis) you report on the multiple comparisons results with the associated p values.

- See class notes for example