Module 05 Lesson 03
VoiceThread: Independent T-test
Transcript

where,
Σ = sum the following scores
M_X = mean for Group X
M_Y = mean for Group Y
X = sum for Group X
Y = sum for Group Y
N_X = sample size for Group X
N_Y = sample size for Group Y

In the 'Fast Food and Obesity' study:
X is the treatment group
Y is the control group.

Null: Fast food consumption has no effect on the obesity rates in the US
Alternative: Fast food consumption has an effect on the obesity rates in the US.

$t = (5.25 - 1.35) / Ö [\underline{(953 - 105^2/20) + (149 - 27^2/20)}] * [(1/20) + (1/20)]$
$(20 + 20) - 2$

t = 2.89

You need to compare the calculated t value against this standard table of t scores to find the probability value (p) associated with the obtained t-ratio of 2.89.

To do this you need to calculate what is called the degrees of freedom (df). In short, think of df as a mathematical restriction that you need to put in place when we calculate an estimate one statistic from an estimate of another (as we may have samples of different sizes).

Calculating the degrees of freedom (df):

$df = (N_X - 1) + (N_Y - 1)$

which in this example

df = (20 - 1) + (20 – 1) = 38

Once you have the df, you use the standard t table to find the p value.

Here is an abbreviated t-table for 0.05 level.

For this example, t = 2.89, df = 38.

If you look for the closest df value it would be 40. The obtained value at 0.05 for 40 df = 2.02.

The calculated t value of 2.89 exceeds this cutoff of 2.02 shown on the table at the 0.05 level. Therefore, $p < 0.05$.

$p < 0.05$ –you would therefore reject the null hypothesis and accept the alternative hypothesis that fast food consumption leads to obesity.

All this t test has really done is test the difference between the mean of the treatment group versus the mean of the control group.