**PSYC 1120: Section Notes for 11/19/14**

**Independent samples t tests**

**(see also Howell textbook, chapter 14)**

Design of independent samples t-test: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Null Hypothesis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

So what are you asking? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

According to the Null Hypothesis, one would expect this difference to vary some over lots of samples. Is the difference between means you find so large that the null hypothesis does not make sense?

Use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to express how deviant your obtained difference is between those different sample means.

**Example (using made up data) of independent samples t-test**:

|  |  |  |
| --- | --- | --- |
| **Group 1** | **(X-M1)** | **(X-M1)2** |
| 2.0 | -3.0 | 9.0 |
| 3.0 | -2.0 | 4.0 |
| 5.0 | 0.0 | 0.0 |
| 10.0 | 5.0 | 25.0 |

M1=5.0 SS1=38 S12=38/3=12.67

|  |  |  |
| --- | --- | --- |
| **Group 2** | **(X-M2)** | **(X-M2)2** |
| 10.0 | -2.0 | 4.0 |
| 12.0 | 0.0 | 0.0 |
| 14.0 | 2.0 | 4.0 |
| 11.0 | -1.0 | 1.0 |
| 13.0 | 1.0 | 1.0 |

M2=12.0 SS2=10 S22=10/4=2.5

df:\_\_\_\_\_\_\_\_\_\_ df: \_\_\_\_\_\_\_\_\_\_\_\_

Scenario: Two groups of subjects, a “control” group and an “interference” group as in the Stroop color word interference test.

Dependent measure: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The example data set has unequal sample sizes: Although this is a more complex formula, it is the most used by scientist because it is more general.

However, it is good practice to have the SAME/DIFFERENT (Circle one) of subjects in each group to keep things simpler, particularly with more complicated designs.

This also is important to help keep your t-test \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**What error term do we use?**

Calculate error term from the two sets of scores. This provides an idea of how variable the scores are.

What do we call the error term when describing variability from two groups?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why is this the best possible estimate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The pooled variance estimate will be a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ average of the two groups’ variance

estimates: each group will contribute according to how many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it has.

Each group contains scores that reflect the (pretty much) identical experience within the

study. The only reason scores within a group vary is due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

So, the variability within a group provides a look at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the population.

**Calculations:**

Pooled variance estimate:

Spooled2 = (n1 – 1)S12 + (n2 – 1)S22 WHICH IS THE SAME AS SS1 + SS2

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n1 + n2 – 2 df1 + df2

Sp2 = WHICH IS THE SAME AS

Sp2 = OR =

SE for difference between two means:

SE = √(Sp2/n1)+(Sp2/n2)

SE = √( )+( )

SE = √( ) =

Calculate your t-value:

t = M1 – M2 / SEMM-M

t = ( ) / ( )

t =

Find critical value of t:

df = alpha = tails = tcritical =

Do you REJECT the null or FAIL TO REJECT the null? (Hint: draw your normal curve below)