

## AS1(Assignment 1, Unit 5) Independent Measures t-test

Please write your responses in red 😊

A pharmaceutical company wishes to test the effects of a herbal supplement on anxiety levels. The researcher randomly selects a sample of  $n=16$  adults from Essex County. The sample is randomly assigned to either the herbal supplement, Group B or a placebo, Group A.

Here are the data:

GROUP "A"	GROUP " B "
12, 16, 18, 21,	13, 18, 20, 16
17, 18, 18, 19	19, 21, 19, 22

1. What is the researcher's hypothesis?

The herbal supplement has an effect on the anxiety levels.

2. What is the null hypothesis?

The null hypothesis is the herbal supplement has no effect on anxiety levels.

3. What is the independent variable?

The herbal supplement.

4. What is the dependent variable?

The anxiety levels.

5. What is the name of the *research design* in this study?

Between subject research design.

6. What is the appropriate *hypothesis test* to analyze the data from this study?

Independent measure t-test.

7. What are the two mean "differences" you are analyzing in these data?

The difference between the means that the researcher can contribute to the independent variable and the difference between the means just by chance.

8. What is the definition of a random assignment?

The definition is assigning people in different experimental groups by random or chance so that everyone has a equal chance of being into the group.

9. Why is using a random sample important in this study?

Using random sample is important in this study because study samples is used to be able to generalize the results of the study back to the population of interest. It allows the researcher to assume that the sample represents and looks like the population. Its helps generalize the results of the conducted study of the sample back to the population.

10. If a researcher failed to use random assignment, how would this affect the research conclusion?

It would affect the research conclusion because without the use of random assignment, the researcher would not assume that the difference between the groups is the independent variable. Without using the random assignment, all the variables would be different between all the groups and would have been the cause of the observed effect. Without it the researcher cannot conduct the cause to the independently variable.

11. If a researcher failed to use a random sample, how would this affect the research results?

If he failed to use random sample, then the sample isn't random. Which means that the researcher picked the samples on the ones he liked, which is biased and not randomized. This will mean that the data will not be representative of the population.

12. Run the appropriate SPSS analysis on the data and cut and paste your SPSS results here:

### Group Statistics

	VAR00002	N	Mean	Std. Deviation	Std. Error Mean
VAR00001	1.00	8	17.3750	2.61520	.92461
	2.00	10	18.8000	2.65832	.84063

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Significance One-Sided p	Significance Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
VAR00001	Equal variances assumed	.014	.908	-1.138	16	.136	.272	-1.42500	1.25205	-4.07922	1.22922
	Equal variances not assumed			-1.140	15.251	.136	.272	-1.42500	1.24963	-4.08472	1.23472

### Independent Samples Effect Sizes

		Standardizer <sup>a</sup>	Point Estimate	95% Confidence Interval	
				Lower	Upper
VAR00001	Cohen's d	2.63954	-.540	-1.480	.416
	Hedges' correction	2.77189	-.514	-1.409	.396
	Glass's delta	2.65832	-.536	-1.484	.439

- a. The denominator used in estimating the effect sizes.  
Cohen's d uses the pooled standard deviation.  
Hedges' correction uses the pooled standard deviation, plus a correction factor.  
Glass's delta uses the sample standard deviation of the control group.

13. Based on your SPSS results, please answer the following questions:

(a) What is the appropriate decision, reject the null or fail to reject the null? **Fail to reject.**

(b) Write the “statistical statement” of your SPSS analysis: **There is no statistically significant difference in the mean scores of variable VAR00001 between groups with different values of variable VAR00002.**

(c) Please write your results as they might be written in a research study (refer to the “In the Literature” section of chapter 10 of your textbook).

**A t test was conducted to compare the mean scores of the variable VAR01 between the groups with different values of variable VAR02. The results showed that there was no difference in the mean scores between the two groups. ( $t(16) = -1.140$ ,  $p = .272$ ,  $d = 2.64$ , 95% CI [-1.480, 416]).**

(d) Is there a probability of Type I error? **Yes**

(e) Is there a probability of Type II error? **Yes**