

Correlated Samples t-test Exercise Answers

1. Suppose you are a researcher interested in the factors influencing paper grading by professors. You have a hunch (and/or previous research) might lead you to predict that papers that are typed are rated higher than papers that are handwritten. So you have 10 freshman students currently taking English as well as an introductory psychology course each write one paper. They should each provide two copies of their paper (one typed and one handwritten). Next, we enlist the aid of 20 English instructors. We randomly assign 10 instructors to each of two groups. Each instructor in one group (the control group) will grade each of the 10 papers that are hand written, while the second group (the experimental group) will grade the same papers that are typed. Does typing a paper influence the grade it receives?

Table 1: Descriptive Statistics and t-test Essay Grades by Presentation Format

Outcome	Presentation				n	95% CI for Mean Difference	r	t	df
	Written		Typed						
	M	SD	M	SD					
Grade	81.70	3.92	85.60	3.03	10	-7.44, -0.36	-.002	-2.49*	9

* $p < .05$.

There are statistically significant, at the .05 level, mean differences in grades received between typed and written essays. Those essays typed tended to receive, on average, higher grades than did written essays.

2. Investigators propose that students have elevated blood pressure during finals week due to stress and anxiety associated with testing. To assess this hypothesis, eight students volunteered to have their blood pressure taken at the beginning of the semester and then again during finals week. The blood pressure data (diastolic) is listed below. Is there any evidence that blood pressure levels do differ during finals week?

Table 2: Descriptive Statistics and t-test Blood Pressure by Time of the Semester

Outcome	Week Tested				n	95% CI for Mean Difference	r	t	df
	Week 1		Finals Week						
	M	SD	M	SD					
Blood Pressure	76.00	11.40	82.63	11.41	8	-11.70, -1.55	.86	-3.09*	7

* $p < .05$.

There are statistically significant mean differences in blood pressure between the beginning and end of the semester for the eight students tested. Blood pressure was higher during finals week than during the first week of the semester.

3. A study was conducted to investigate the effectiveness of hypnotism in reducing pain. Results for randomly selected subjects are given below. At the 5% level of significance, test the claim that the sensory measurements are different for each student before and after hypnotism (scores are on a pain scale with higher scores indicating more pain). Assume sensory measurements are normally distributed.

Table 3: Descriptive Statistics and t-test Level of Pain Experienced by Hypnotic State

Outcome	Hypnotic State					n	95% CI for Mean Difference	r	t	df
	Not Hypnotized		Hypnotized							
	M	SD	M	SD						
Pain Experienced	8.71	2.18	5.59	2.61	8	0.69, 5.56	.27	3.04*	7	

* $p < .05$.

There are statistically significant mean differences in level of pain experienced across hypnotic states. Under hypnosis, study participants reported less pain than when not under hypnosis.