

Self-Assessment

Week 1: Review of Basics

Writing Hypotheses

1. Write a directional, non-directional, and null hypothesis for the following variables:

IV = grade retention (retained vs. not retained)

DV = degree of alienation from school a student feels (ranges from 1 = no feelings of alienation to 50 = very extreme feelings of alienation).

Degree of alienation ranges from a low of 1 to a high of 50 with 50 indicating the highest level of alienation obtainable with the measuring device. Label which hypotheses are directional, non-directional, and null.

2. Write a directional, non-directional, and null hypothesis for the following variables:

IV = attitude toward school (ranges from 1 = very negative attitude and 15 = very positive attitude)

DV = amount of financial contribution (i.e., US dollars) to school.

Label which hypotheses are directional, non-directional, and null.

Descriptive Statistics

3. Below is a frequency distribution. Find the mean, median, mode, SD, Range, and sample size for these scores.

Score	Frequency
15	1
14	3
13	1
12	2
11	0
10	2

Independent Samples t-test

4. I take blood pressure medication. I was curious whether blood pressure medication could possibly influence my heart rate. Below are measures of my heart rate per minute each morning after exiting my bed. One set of measures occurred while taking Ziac, and the second set of measures occurred while taking Lisinoprol. Is there any difference in heart rate between these two blood pressure medications? Present results in APA style. Also, use t-test results that assume equal variances between groups.

Ziac (10 mg)	54	51	53	50	48	47	48	49	48	50	49	48
Lisinoprol (12.5 mg)	60	57	64	64	62	61	56	65	63	59	58	

Person Correlation

5. In addition to heart rate measures noted above, I also record my weight and blood pressure. These measures were recorded while taking Ziac. What is the relationship between weight, heart rate, and the two measures of blood pressure? Present results in APA style.

The data appear in the table below. To alleviate the data entry task, these data can be downloaded as an SPSS data or Excel data file from the link that appears below.

SPSS: <http://www.bwgriffin.com/gsu/courses/edur8132/selfassessments/Week01/Week01Q5Data.sav>

Excel: <http://www.bwgriffin.com/gsu/courses/edur8132/selfassessments/Week01/Week01Q5Data.xlsx>

These data are also linked on the course web page in the calendar area where this self-assessment material is linked.

Weight (lbs)	Heart Rate	systolic	diastolic
218	44	144	93.5
219	45	135.5	94
217	52	134	87.5
223	47	155.5	95
223	53	161.5	102.5
224	48	154.5	102
224	49	144	95
228	49	151.5	101.5
227	51	155.5	106
226	51	158.5	98
227	56	155	103.5
223	48	158	101
225	52	148	102.5
221	47	174	105.5
221	45	180.5	108
223	46	163	104
222	52	160	106
222	57	162.5	107
205	49	140.5	92
205	48	125	85
208	52	160	102
205	53	153.5	98
208	47	154	98
210	48	142	92
209	49	137.5	96
207	48	138	91.5
212	50	158.5	95
208	53	129.5	93

Hypothesis Testing

6. What is a Type 1 error in hypothesis testing?
7. What is a Type 2 error in hypothesis testing?
8. What is alpha (α)?
9. What is beta (β)?
10. What is power ($1 - \beta$)?
11. Assume the p-value for a Pearson correlation is 0.16. What does this p-value tell us?
12. For each of the following indicate whether the decision regarding the null hypothesis is reject or fail to reject. When needed, assume $\alpha = .05$.

	Obtained Statistic	Test Information	Decision
(a)	$t = -3.26$	Critical $t = \pm 2.85$	_____
(b)	$b_1 = 0.01$	p-value = .16	_____
(c)	$F = 0.008$	Critical $F = 3.86$	_____
(d)	$t = -3.75$	p-value = .01	_____
(e)	$Z = 1.97$	p-value = .049	_____

13. Below are several research scenarios. For each, indicate whether the researcher committed a Type 1 error, a Type 2 error, or no error in hypothesis testing.

(a) Assume there is a strong, positive relationship between variable X (number of 6th grade students in a teacher's classroom) and variable Y (amount of stress that 6th grade teachers experience during the school day) in the population of 6th grade teachers in the United States. That is, the more 6th grade students in the classroom, the more stress the teacher experiences. As with any educational study, researchers investigating the relationship between X and Y are not aware of the true relationship in the population, so researchers must conduct studies with samples and then use inferential statistics to make decisions whether to reject the null hypothesis (H_0 : There is no relationship between X and Y) or fail to reject the null hypothesis. A local researcher wishes to study the relationship between X and Y and he samples 6th grade teachers from local counties. After collecting relevant data, the researcher finds a strong, positive relationship between X and Y and therefore rejects the null hypothesis. The local researcher infers there is a positive relationship between X and Y in the population of 6th grade teachers in the United States.

(b) Assume there is a strong, positive relationship between variable X (number of hours per week a child reads for pleasure) and variable Y (language arts scores in the classroom) in the population of 3rd grade students in the United States. As with any educational study, researchers investigating the relationship between X and Y are not aware of the true relationship in the population, so researchers must conduct studies with samples and then use inferential statistics to make decisions whether to reject the null hypothesis (H_0 : There is no relationship between X and Y) or fail to reject the null hypothesis. A local researcher wishes to study the relationship between X and Y and he samples 3rd grade students from Bulloch County. After collecting relevant data, the researcher finds no relationship between X and Y and therefore fails to reject the null hypothesis. The local researcher infers there is no relationship between X and Y in the population of 3rd grade students in the United States.

(c) Assume there is no relationship between variable X (number of 6th grade students in a teacher's classroom) and variable Y (amount of stress that 6th grade teachers experience during the school day) in the population of 6th grade teachers in the United States. That is, the number of 6th grade students in the classroom does not influence the level of stress a teacher experiences. As with any educational study, researchers investigating the relationship between X and Y are not aware of the true relationship in the population, so researchers must conduct studies with samples and then use inferential statistics to make decisions whether to reject the null hypothesis (H_0 : There is no relationship between X and Y) or fail to reject the null hypothesis. A local researcher wishes to study the relationship between X and Y and he samples 6th grade teachers from local counties. After collecting relevant data, the researcher finds no relationship between X and Y and therefore fails to reject the null hypothesis (i.e., the researcher states that he believes the null hypothesis is correct). The local researcher infers that X and Y are unrelated in the population of 6th grade teachers in the United States.

(d) A researcher found a statistically significant difference between group means. If the researcher committed an error in hypothesis testing, which error is possible?