

Homework #6  
Chapters 14 and 15

Please answer the following questions from the textbook. Do not handwrite the answers (except for graphs or plots); please use a wordprocessor (e.g. Word, Wordperfect, etc.). For writing formulas in word go to insert → object; and select Microsoft Equation 3.0 or Mathtype).

**Chapter 14**

- 1) If I wanted to test for differences in men and women on intelligence, why would I NOT be able to use random assignment? And what effect would this have on the conclusions we are allowed to draw?
- 2) A researcher believes that securely attached children will be able to sustain romantic relationships (as adults) longer than children who have anxious-avoidant attachment. She randomly selects 25 college level participants that showed anxious-avoidant attached as infants and 25 that were securely attached as infants and asks them the length of their longest romantic relationship. Results are shown on the next page. Do college students who were securely attached as infants have longer relationships than students who showed anxious-avoidant attachment (Show all 7 hypothesis testing steps)?
- 3) In #2 above, do we have homogenous variances? Test for this.
- 4) Calculate the 95% confidence interval for the data for question #2 above.

**Chapter 15**

- 5) Based on our IQPLUS example from class, let's say that IQ has a mean of 100 and a SD of 15 and we know that IQPLUS will increase IQ by 3 points. They want to run a one sample test t-test:
  - a. How many subjects will I need to find this effect 80% of the time?
  - b. How many subjects will I need to find this effect 90% of the time?
- 6) Let's suppose that instead of a one sample test they want to compare 2 randomly selected and assigned samples that were either given a placebo or IQPLUS. They expect the placebo group to have the same SD as the population and the same 3 unit difference between the 2 groups.
  - a. How many subjects overall would you need to get a power of .60?
  - b. How many subjects overall would you need to get a power of .90?
- 7) Let suppose that a researcher is trying to conduct the experiment in #6 above and randomly selects and assigns 20 subjects per group. However, IQPLUS causes a negative reaction in 5 of the experimental group participants and they had to be removed from the study. What is the power of this study now?
- 8) We have just conducted a study comparing the cognitive development of low-birthweight (premature) and normal-birthweight babies at one year of age. Using a score of my own devising, I found the sample means of the two groups to be 25 and 30, respectively, with a pooled standard deviation of 8. There were 20 subjects in each group. If we assume that the true means and standard deviations have been estimated exactly, what was the *a priori* probability (the probability before the experiment was conducted) that the study would find a significant difference?
- 9) Let's modify the exercise in #8 to have sample means of 25 and 28, with a pooled standard deviation of 8 and sample sizes of 20 and 20.
  - a. What is the *a priori* power of this experiment?
  - b. Run the t-test on the data.
  - c. What, if anything, does the answer to (a) have to say about the answer to (b)?

Attachment and Dating Data for #2 above

<b>Avoidant</b>		<b>Secure</b>	
<b>Subject</b>	<b>Years</b>	<b>Subject</b>	<b>Years</b>
1	1	1	5
2	3	2	5
3	3	3	6
4	4	4	8
5	3	5	4
6	1	6	6
7	2	7	7
8	1	8	7
9	2	9	3
10	2	10	5
11	2	11	5
12	2	12	3
13	3	13	4
14	0	14	7
15	2	15	5
16	3	16	6
17	3	17	5
18	3	18	4
19	2	19	4
20	3	20	6
21	3	21	3
22	2	22	7
23	2	23	6
24	2	24	3
25	1	25	4
<b>Mean</b>	<b>2</b>	<b>Mean</b>	<b>5</b>
<b>StDev</b>	<b>0.913</b>	<b>StDev</b>	<b>1.453</b>