Study Guide #3 (Chs. 10-11)

Study Guide for Exam #3 (Chs. 10-11)

- · You want to see if New Paltz students who smoke take tend to drink more beer per week than New Paltz students in general. You know that the population mean (m) for New Paltz students is 6. However, you have no idea what the population standard deviation (s) is. You randomly ask 4 smokers how many beers they drink per week. Assume an alpha level of $p < .05$. Here are your results:

X

8

12

11

9

1. What is t in this example?

2. What is $t_{critical}$ in this example?

3. What do you conclude about the null hypothesis. EXPLAIN.

- · You want to test the Popeye hypothesis: You are pretty sure that eating spinach makes people stronger. In order to test this hypothesis, you count the number of pushups that 6 people can do. Then you make them all eat spinach. Then you count how many pushups they can do after they eat spinach. Assume an alpha level of $p < .05$. Here are the number of pushups they did before and after the spinach:

Pre-spinach	Post-spinach
4	5
3	3
7	9
2	3
5	8
6	5

4. What is t in this example?

5. What is $t_{critical}$ in this example?

6. What do you conclude about the null hypothesis. EXPLAIN.

7. What is the effect size (Cohen's d) for this example?

- · You want to know whether there is some difference in the amount of sporting events attended for different groups of people: (a) physical education majors, and (b) business majors. In order to test this hypothesis, you randomly select members of each group and find out how many sporting events they each have attended in the past year. You assume an alpha level of $p < .01$. Here are the scores:
- · number of sporting events attended in past year:

(Physical education majors)

X_2

8

10

12

(Business majors)

X_3

0

0

3

- · You want to know whether physical education majors attend more sporting events per year than business majors. Assume an alpha level of $p < .01$.

8. Calculate t.

9. What is $t_{critical}$ in this example?

10. What is your decision concerning the null hypothesis? EXPLAIN in terms of whether the means for the two groups you are comparing are significantly different from one another.

11. What is the effect size in terms of Cohen's d for this example?

Cohen's d = _____

12. In terms of Cohen's conventions for effect size, this effect size is _____.

FORMULAS/ANSWERS:

1. $SS = \sum(X-M)^2 = 10$

$s^2 = SS/(N-1)$ or $SS/df = 10/3 = 3.33$

s = Square Root of $s^2 = 1.82$

$s^2_M = 3.33/4 = .83$

$s_M = .91$

$t = (M - \mu_{M2})/s_{M2} = (10-6)/.91 = 4.40$

2. $t_{critical} = 2.35$ (df = 3, one-tailed, $p < .05$)

3. reject Ho

4. $t = (\text{đ})/s_M = -1/.57 = -1.75$

... here's how to get s_{M2}:

SS (of the difference scores ... subtract each difference score from the mean of the difference score; then square it; then sum these squared numbers) =

SS = 10

$s^2 = SS/(N-1) = 10/5 = 2$

$s^2_M = s^2/N = 2/6 = .33$

s_M = Square root of $s^2_M = .57$

5. $t_{critical}$ = -2.01 (df = 5, one-tailed, $p < .05$)

6. Fail to reject

7. Cohen's d = | (đ)/s |= -1/1.41 = -.71 (or just .71)

8. t_{obt} = (10-1)/1.53 = 5.88

9. $t_{critical}$ = 3.75

10. Reject Ho ... the mean number of sporting events attended by phys. ed. majors is significantly greater than the mean number attended by business majors.

11. Cohen's d = | (10-1)/1.87 |= 4.81

12. In terms of Cohen's conventions for effect size, this effect size is gigantic.