STA305/1004 - Review Class

February 27, 2017

Today's class

- Review for midterm test

Midterm Test Information

Date: Wednesday, March 1

Time: The test will begin at approximately 11:10. The time allowed to complete the test will be 90 minutes.

Location:

- If your last name begins with a letter between A-M then you will write in AH400 (our classroom).
- If your last name begins with a letter between N-Z then you will write in EX310.

Test Preview:

Available at 1:00PM today on Portal.

Consider a randomized study of two medical treatments A and B. Three subjects are randomized to treatment A and three subjects are randomized to treatment B. The response measured is mortality, y, after 6-weeks on treatment. Primary question: is there a difference in average mortality between the two treatments?

The data are below:

Subject	y	Treatment
1	5.56	A
5	14.73	A
4	7.13	A
6	8.32	B
3	4.01	B
2	10.91	B

1. Is the treatment assignment ignorable?
2. How could subjects be randomized to treatment?

Q1

```
y <- c(yA,yB);observed <- mean(yA)-mean(yB);observed #obs mean diff

[1] 1.393333

index <- combn(1:6,3); res<-numeric(20)
for(i in 1:20){res[i] <- mean(y[index[,i]])-mean(y[-index[,i]])}
round(res,2)

 [1]  1.39  2.19 -0.69  3.91 -2.88 -5.75 -1.15 -4.96 -0.36 -3.23  3.23
[12]  0.36  4.96  1.15  5.75  2.88 -3.91  0.69 -2.19 -1.39

mean(res)

[1] 0

round(res-mean(res),2)

 [1]  1.39  2.19 -0.69  3.91 -2.88 -5.75 -1.15 -4.96 -0.36 -3.23  3.23
[12]  0.36  4.96  1.15  5.75  2.88 -3.91  0.69 -2.19 -1.39

round(observed-mean(res),2)

[1] 1.39
```

3. Calculate the randomization P-value?
4. Does the treatment *cause* a change in average mortality?

1. What is statistical power?
2. Suppose that a study is designed to test $H_0 : \mu = 0$ vs. $H_1 : \mu < 0$. The study is conducted with $n = 10, \sigma = 1$ using $\alpha = 0.05$. The data is analyzed: $\bar{x} = -0.36, P\text{-value} = 0.13$. Is the reason that the study is not significant due to low power?