## Lecture 10

## **Continuing Confidence**

Important assumptions for confidence intervals:

- you data is from a random sample
- your data comes from an approximately normal population distribution

\*\*If n is small and the population isn't normal, the true confidence level will be lower than the C used to compute the interval\*\*

## Example:

eBay is a popular internet company for personal auctioning of just about anything. When you list an item to see on eBay, there is an online auction format in which the product sells for the highest price bid over a set period of time (1, 3, 5, 7 or 10 days). In addition, you can offer potential buyers a "buy it now" option whereby they can buy the product immediately at a fixed price that you set.

Do you tend to get a higher or lower price if you give bidders the "buy it now" option? Let's consider some data from sales of the Palm M515 PDA, a popular handheld computer, during the first week of May 2003. During that week, 25 of these handheld computers were auctioned off, 7 of which had the "buy it now" option. Here are the final prices (in dollars) at which the item sold:

Buy it now option: 235 225 225 240 250 250 210 Bidding only: 250 249 255 200 199 240 228 255 232 246 210 178 246 240 245 225 246 225



```
> summary(buynow)
  Min. 1st Qu.
                 Median
                            Mean 3rd Qu.
                                             Max.
  210.0
          225.0
                   235.0
                           233.6
                                    245.0
                                            250.0
> sd(buynow)
[1] 14.6385
> summary(bidding)
  Min. 1st Qu.
                  Median
                            Mean 3rd Qu.
                                             Max.
  178.0
          225.0
                   240.0
                           231.6
                                    246.0
                                            255.0
> sd(bidding)
[1] 21.93611
```

Consider the probability distribution of selling prices with the "buy it now" option. Check the assumptions for using these data to find a 95% confidence interval for the mean of that distribution.

Find the 95% confidence interval for the "buy it now" option, and interpret it. How does it compare to the 95% confidence interval for the mean sales price for the bidding option only?

## Example:

A study dome by the Institute of Psychiatry in London compared various therapies for teenage girls suffering from anorexia. For each girl, weight was measured before and after a fixed period of treatment. The variable measured was the change in weight, X = the weight at the end of the study minus weight at the beginning of the study. The therapies were designed to aid weight gain, corresponding to positive values of X. For the sample of 32 girls receiving the family therapy, the changes in weight during the study were

-5 -4 13 13 11 11 6 9 14 -3 0 7 22 -5 4 9 4 6 14 9 6 -5 -3 23 7 0 -3 14 9 6 11 10



weight change

> summary(weights)
 Min. 1st Qu. Median Mean 3rd Qu. Max.
 -5.000 0.000 7.000 6.563 11.000 23.000
> sd(weights)
[1] 7.491662

What is the distribution of the mean weight change?

Do we meet the assumptions for creating a confidence interval?

Find a 95% confidence interval for weight change and interpret?

Does the therapy seem to be effective?