Stat 201:
Introduction to Statistics

Standard 33: Dependent v. Independent Samples

Now means…

- Just like before, we will transition from proportions to means.

- We will look at the difference of quantitative variables now – the difference of means.

Difference of Means

- We're often interested in comparing groups of data.
- When you find a confidence interval or complete a hypothesis test using two random samples, you must choose the type of test based on whether the samples are dependent or independent

Types of Two Sample Groupings

- **Dependent Sample:** Data from a designed experiment in which the samples are paired measurements for one set of items. The values in one sample affect the values in the other sample, then the samples are dependent.

Note: The sample sizes in two groups of a dependent sample are equal (when there is no missing data)

Types of Two Sample Groupings

Consider a drug company that wants to test the effectiveness of a new drug in reducing blood pressure. They could collect data in two ways:

- Sample the blood pressures of the same people before and after they receive a dose. The two samples are **dependent** because they are taken from the same people. The people with the highest blood pressure in the first sample will likely have the highest blood pressure in the second sample.

Types of Two Sample Groupings

- **Independent Sample:** are measurements made on two different sets of items. The values in one sample reveal no information about those of the other sample.

Types of Two Sample Groupings

Consider a drug company that wants to test the effectiveness of a new drug in reducing blood pressure. They could collect data in two ways:

- Give one group of people an active drug and give a different group of people an inactive placebo, then compare the blood pressures between the groups. These two samples would be independent because the measurements are from different people.

Which One is Better?

- The real question is ``it is better to design a study that uses one set of subjects whom are measured before and after or two separate groups of subjects, under different conditions, measured once each”

- The major advantage of choosing a repeated-measures design (See Chapter 1) which will result in using dependent test and confidence intervals is that you get to eliminate the individual differences that occur between subjects by comparing individuals to themselves and not others.

Types of Two Sample Groupings

Consider a drug company that wants to test the effectiveness of a new drug in reducing blood pressure. They could collect data in two ways:

- In this case it would be better to compare individuals to themselves as we can see the direct results of the drug opposed to comparing a group of individuals taking the new drug to a placebo group where variability between groups will affect our results.