DA 6823

Kilger

Module 1: Part #2 (35 points)

**The Power of Statistics + the Levels of Measurement + the Different Classes of Variables and Determining Appropriate Statistical Technique + Basic Descriptive Measures**

**General Instructions:** In your own words, answer each of the following questions - don’t copy (e.g. cut and paste) some definition out of a book word for word. This is not a group project – you are expected to complete this module on your own. You may refer to text books, online or other sources but not your fellow classmates. If you don’t understand the question, feel free to ask the instructor in class, in office hours or in an email.

1. **The first couple of questions deal with the concepts of population and sample.**
   1. **What is a population? (3 points)**

A population is an entire group from which a statistical sample is drawn. This could be a group of people, items, locations, businesses, or a many other things that are grouped together.

* 1. **What is a sample? (3 points)**

A sample is a fraction or a percentage of a group – a set of individuals or items that are selected from a population.

* 1. **What is the objective of inferential statistics in terms of sample and population? (4 points)**

The objective of inferential statistics is to take data from a sample and make inferences about the larger group (population) from which the sample was drawn. Simply put, the goal is to draw conclusions from a sample and translate them to a population.

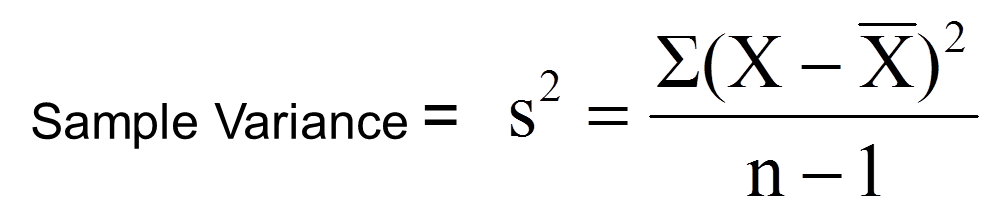
1. **Name two common measures of central tendency (4 points)**

* Mean
* Median

1. **Describe one situation where one measure of central tendency might be better than another measure (2 points)**

The mean is the better measure of central tendency to use when the data distribution is continuous and symmetrical (normal distribution). Also, the median is the better choice when the data is skewed.

1. **Variance and standard deviation are two of the most commonly used measures of variability. Take a look at the formula for variance below:**



* 1. **Looking at the variance formula, if the data points (X) are closely packed around the sample mean, what happens to the sample variance? (3 points)**

If the data points (X) are closely packed around the sample mean, the sample variance will be smaller.

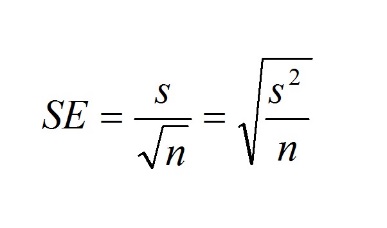
* 1. **The sample standard deviation is closely related to the sample variance. How? (2 points)**

The sample standard deviation is the square root of the sample variance.

1. **Many sample statistics you encounter have standard errors associated with them. Imagine that you are studying the heights of the undergraduate student body of UTSA. The total number of students is 30,000 (e.g., the population) and you randomly pull 10 samples of 100 students each from that population.**
   1. **Will the sample means from each of the 10 samples be the same? (2 points)**

The sample means from each of the 10 samples will not be the same. There may be outliers in each sample.

* 1. **The standard error of the mean represents the variation in sample means that you find in different samples. The formula below is the standard error of the mean.**



1. **What happens to the standard error of the mean if there is a lot of variation in the data? (3 points)**

If there is a lot of variation in the data, the standard error of the mean will be greater.

1. **What happens to the standard error of the mean as sample size increases? (3 points)**

As sample size increases, the standard error decreases.

1. **The sum of squares is a statistical concept that measures variation in data that you will find in many different statistical techniques. Here is the formula for sum of squares below:**



* 1. **This formula should look familiar. What other statistical measures of variation are related to this? (3 points)**
  + Variance
  + Standard Deviation
  1. **As the data points (X) get spread out farther and farther from the sample mean, what happens to the sum of squares? (3 points)**

The sum of squares gets larger as the data points get spread out farther from the sample mean.