# Measures of Center.

Measures of center are generally not very difficult to understand or calculate, and they are widely used to provide representative values that “summarize” data sets.

Measures of center play a central role in many methods of statistics and in this activity, we consider the mean, median, mode, and midrange.

Note that the term “average” is not used because it is not clearly and unambiguously defined.

The term “average” plays no role in the study of statistics.

There are several different measures of center, but here we consider only the mean, median, mode and midrange.

The mean is generally the most important of all numerical measurements used to describe data, and it is what many people call the average.

The term “average” is not used by statisticians and should not be used when referring to a measure of center.

To calculate the mean of a set of data, add all of the data values and divide the resulting sum by the number of data values.

Here are important properties of the mean:

1. Sample means drawn from the same population tend to VARY LESS than other measures of center.
2. The mean of a data set uses EVERY data value.
3. A disadvantage of the mean is that just one extreme value can change the value of the mean substantially.

The mean is not *RESISTANT*.

The median of a data set is the measure of center that is the middle value when the original data values are arranged in order of increasing (or decreasing) magnitude.

To calculate the median, first sort the data. To “sort” the data, we simply arrange data values in order, usually from lowest to highest.

If there is an odd number of values, the median is the value in the exact middle of the sorted list of data.

If there is an even number of values, add the middle two numbers, then divide by two.

Here are important properties of the median:

1. The median does not change by large amounts when we include just a few extreme values.

The median is a RESISTANT measure of center.

1. The median does not directly use every data value.

Because the median is not too sensitive to a few extreme values, the median is often a good choice if there are some extreme values present in the data.

Now, it is time to test your knowledge.

Let’s try another one.

The mode of a data set is the value or values that occur with the greatest frequency.

The mode is not too good for typical quantitative data consisting of measurements or counts, but it’s the only measure of center that can be used with qualitative data.

That is, data consisting of names, labels, or categories only.

Here are important properties of the mode:

1. The mode can be found with qualitative data.
2. A data set can have no mode or one mode or multiple modes.

The midrange of a data set is the measure of center that is the value midway between the maximum and minimum values in the original data set.

To calculate the midrange, add the maximum and minimum values, and then divide by two.

Because the midrange uses only the maximum and minimum values, it is very sensitive to those extremes, so the midrange is not resistant.

In practice, the midrange is rarely used, but it has the following redeeming features:

1. The midrange is very easy to compute.
2. The value of the midrange is sometimes used incorrectly for the median, so confusion can be reduced by clearly defining the midrange along with the median.

Now, it is time to test your knowledge.

In this activity we reviewed four measures of center including the mean, median, mode and midrange.

Measures of center are widely used to provide representative values that “summarize” data sets and play a central role in many methods of statistics.

Congratulations, you have mastered an important concept of Statistics!

In life, don’t be mean. Be median, or midrange, or mode.