It is unlikely we will only be interested in the average value of our data, we will want to know how large the spread or dispersion of values is about it.
The simplest measure of dispersion is the **range**. The range is simply the difference of the lowest and highest values. The range is another easy-to-understand measure, but it will clearly be very affected by a few extreme values.

Measures of Dispersion

Aside from the range, the most common measures of dispersion are:

- Variance
- Standard deviation
- Mean Absolute Deviation (MAD)
- Inter-quartile range.

Measures of Dispersion

- The first three are related to the use of the arithmetic mean, and are computed using deviations of each observation from the mean.
- The mean absolute deviation (MAD) uses the absolute values of the deviations from the mean and perhaps gives us a more intuitively understandable measure of deviation than variance and standard deviation.

Coefficient of Variation

The coefficient of variation, CV, indicates the relative magnitude of the standard deviation as compared with the mean of the distribution of measurements, as a percentage. Thus, the formulas are

$$\text{Population}: \ CV = \frac{\sigma}{\mu} \times 100$$

$$\text{Sample}: \ CV = \frac{s}{\bar{x}} \times 100$$

The coefficient of variation is useful when we wish to compare the variability of two data sets relative to the general level of values (and thus relative to the mean) in each set.