Science Dynamics Masterclass

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3 - Measures of Location, Spread and Skewness

Measures of Location

Measures...

Measures of "Central Tendency"

Mode

Mode

The data value that occurs most often. When two modes are present - bimodal.

Median

Median

Another name for Q2, middle point of distribution that divides distribution into two halves. Must be ordered - at least ordinal level!

Mean

SUMA(Xi-Mean)=0

Mean

Arithmetic mean, sum of N divided by N

Spread

Also called:
variability, dispersion, heterogeneity, unpredictability

Summary statistics to measure spread

range

range

difference between highest and lowest value

IQR

IQR

interquartile range - the difference between 3rd and 1st Quartile BEST TO SUMMARIZE SPREAD IN SKEWED DISTRIBUTIONS

variance

$$SD^2 = \frac{\sum(X_i - \bar{x})^2}{N}$$

variance

the average of the square deviations about the mean. SD2 - sensitive do differences in spread. Only comparison of variances of more than one distribution makes sense. All distribution MUST use the same units!

standard deviation

$$SD = +\sqrt{SD^2}$$

standard devi...

positive square root of the variance (it uses original units of the distribution, not squares) Shows the distance from the mean where majority of values fall.

Skewness

$$Skewness = \frac{N}{(N-1)(N-2)} \frac{\sum(X_i - \overline{X})^3}{(SD)^3}$$

Skewness

Variance - squared deviations about the mean, Skewness is the sum of cubed deviations about the mean. Positive for positive, negative for negative skewness. The more severe, the more skewness departs from zero.

Skewness Ratio

$$Skewness\ ratio = \frac{Skewness}{Standard\ Error\ Skewness}$$

Skewness Ratio

When exceeds 2.0 for small samples, the distribution is severely skewed positively.