

Measures of Dispersion

This is another way of summarising data. This measure gives an indication of the spread of scores (the extent to which the scores deviate from the measure of central tendency). In these sets of scores -

13 14 15 16 17 and 5 10 15 20 25

the mean for each example is 15, but the second set of scores shows a much greater spread than the first. A measure of dispersion is therefore a further way of summarising data and gives more useful information than a measure of central tendency alone.

The range

This is the simplest of the measures as it is the difference between the highest and lowest score.

For example - with scores of 4, 5, 5, 7, 9, 9, 9, 17

The range would be - the highest number minus the lowest number $17 - 4 = 13$

A revised formula adds 1 to this score. This then takes into account that numbers have been rounded up or down. If the numbers are not whole then the original formula applies.

Advantages

- Easy to calculate
- Takes account of extreme values

Disadvantages

- Can be greatly influenced by one score that is different from all the others (see example)
- It ignores all but 2 of the scores, so is unlikely to provide an inadequate measure of the general spread or dispersion of scores around the mean.

Standard Deviation

A more sophisticated measure of dispersion, since it calculates the average distance from the mean of all scores. It is a more powerful measure of dispersion than the range since the value of ALL scores are taken into consideration in the calculation. Because it is a precise measure, it is usually used when the data itself is precise (such as time scores). Range is used when data is less precise.

Advantages

- Takes account of all the scores and provides a sensitive measure of dispersion
- It describes the spread of scores in a normal distribution with great precision

Disadvantages

- Much harder to work out!

Variance

This is the standard deviation squared. It is sometimes required to carry out statistical tests on data.