MPPU 1034: Application of Statistic in Educational Research

CENTRAL TENDENCY & VARIABILITY

Norazrena Abu Samah

Faculty of Education

Central Tendency

Mode

- The most frequencies
- Nominal Scale
- Ordinal Scale
- Interval Scale
- Ratio Scale

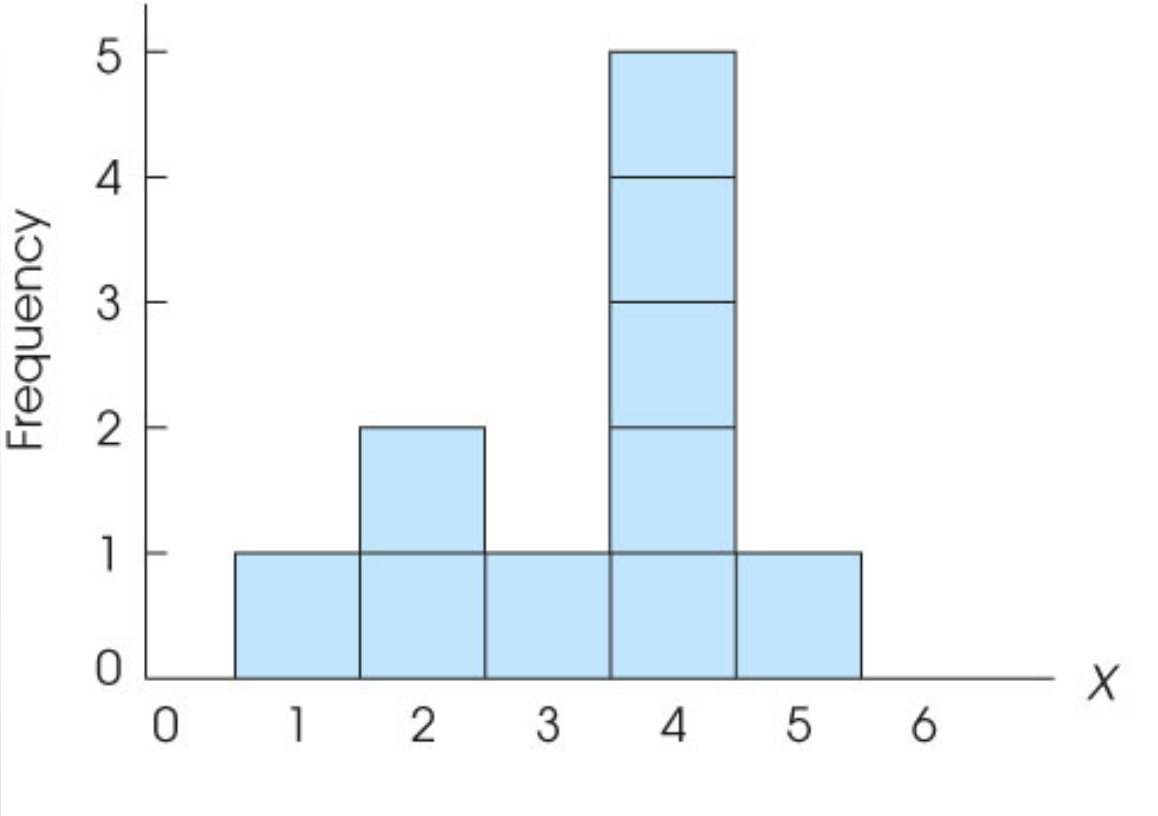
Median

- Midpoint
- Ordinal Scale
- Interval Scale
- Ratio Scale

Mean

- The average
- The balance point
- Interval Scale
- Ratio Scale

Central Tendency



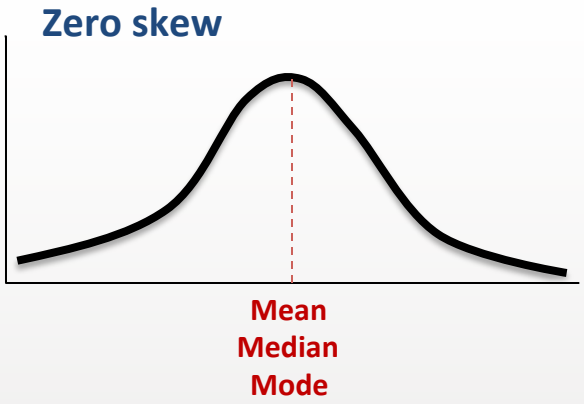
Mode? Median? Mean?

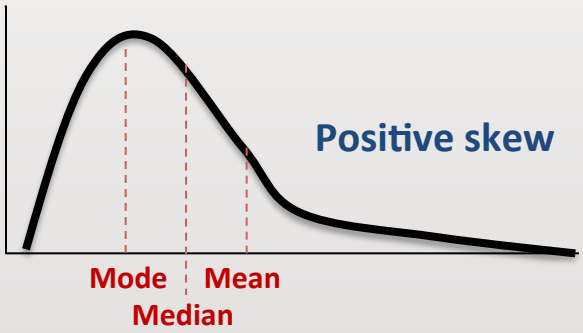
Central Tendency

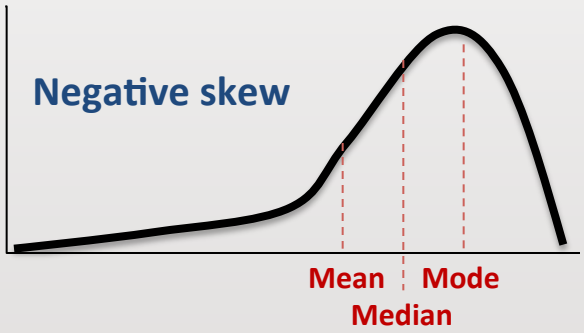
x	f	fx
1	1	1
2	2	4
3	1	3
4	5	20
5	1	5
	N = 10	∑X = 33

What can you say about score X = 4.5?

Effects of Skewness Upon Relative Locations of Mean, Mode and Median







Central Tendency

Sketch and name the shape of:

Mode = 12 Median = 10 Mean = 7	Mode = 6 Median = 7 Mean = 13	Mode = 7 Median = 7 Mean = 7
Mode = 5, 9 Median = 7 Mean = 8	Mode = 5 Median = 10 Mean = 11	Mode = 15 Median = 10 Mean = 9

Variability

- Variability is to measure of how spread out the scores are in a distribution.
- Variability consists of range, interquartile range, standard deviation and variance.

Variability:
Range

- The range is the total distance covered by the distribution.
- For raw data, range is from the highest score to the lowest score.
- For grouped data, range is from the most upper real limit to the lowest real limit of scores.

Variability: Interquartile Range

- The interquartile range is the distance covered by the middle 50% of the distribution.
- Interquartile range is measured by the difference between the first quartile, Q_1 and the third quartile, Q_3.

Variability: Standard Deviation and Variance

- Standard deviation measures the standard distance between a score and the mean.
- Standard deviation is the square root of variance
- Variance measures the squared deviation of a score from its mean.
- The formula for variance is:

$$\sigma^2 = \frac{\sum X^2 - \frac{\left(\sum X\right)^2}{N}}{N} \quad \textbf{OR} \quad s^2 = \frac{\sum x^2 - \frac{\left(\sum x\right)^2}{n}}{n-1}$$

Central Tendency & Variability

x	f
1	2
2	4
3	5
4	3
5	4
6	2

Find the mean, mode, median, range, interquartile range, variance and standard deviation for the sample.

What can you say about score X = 3.2?

Central Tendency & Variability

A student got:

1. 70 marks in Mathematics, where the mean is 80 marks and standard deviation is 5 marks.
2. 60 marks in Science, where the mean is 55 marks and standard deviation is 3 marks.

Which score is better? Why do you say so?

Thank You