Chapter 3 Measures of central tendency

1) What are central tendencies?

Central tendencies are the average cases.

2) What are the measures of central tendency?

Mode: the most frequency occurring cases in a group

Median: the middle value that split sample into two equal halves

When N is odd number

Median locates at $(\frac{N+1}{2})^{th}$ in the ascending order of the cases

When N is even number

Median would be the average of two values located at $(\frac{N}{2})^{th}, and\ (\frac{N}{2}+1)^{th}$ in the ascending order of the cases.

Example

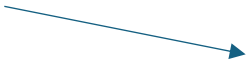
15, 21, 45, 31, 25, 18, 98, 16, 21, 25, 25, 55, 36, 25

Ascending order

15, 16, 18, 21, 21, 25, 25, 25, 25, 31, 36, 45, 55, 98 (N = 14)

14/2 = 7th, and 8th

The two values are 25 and 25, thus the average of the two is 25, which is the median.



15, 16, 18, 21, 21, 25, 31, 36, 45, 55, 98 (N = 11)

(11+1)/2 = 6th

Median will be 25.

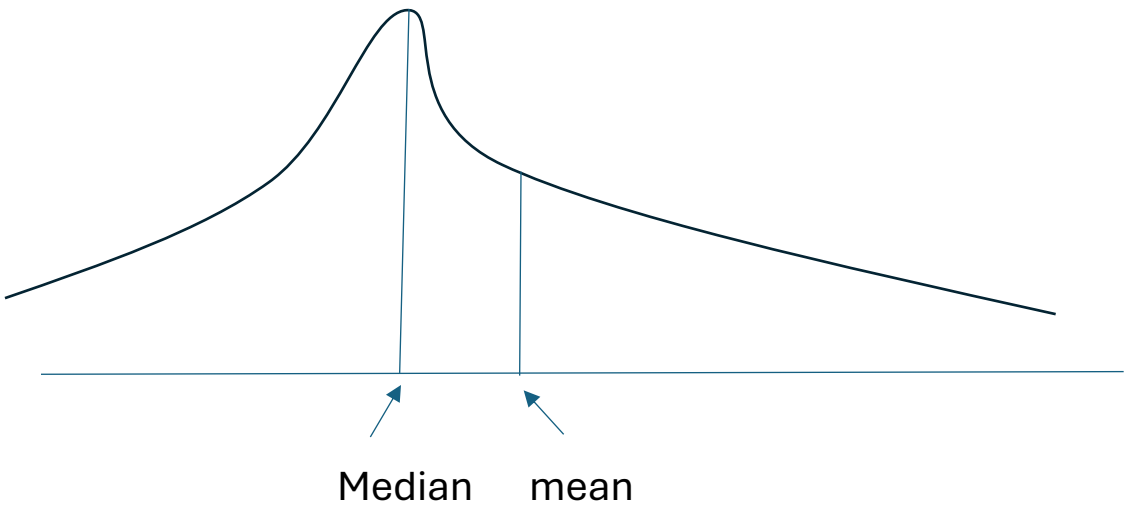
Mean: arithmetic average of interval/ratio variables

$$\bar{X} = \frac{\sum X_i}{N}$$

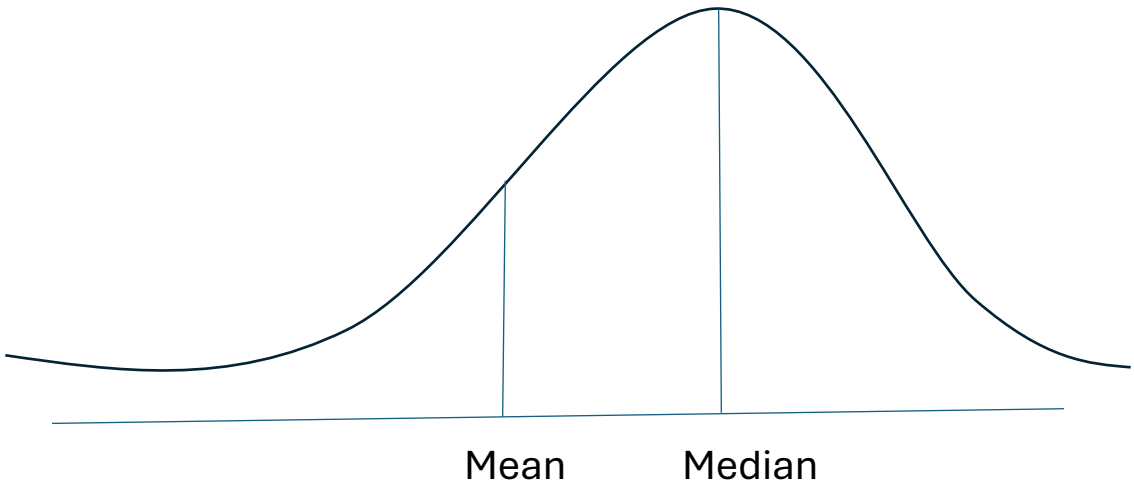
15, 16, 18, 21, 21, 25, 25, 25, 25, 31, 36, 45, 55, 98

$$\bar{X} = \frac{15+16+18+21+21+25+25+25+25+31+36+45+55+98}{14} = 32.6$$

3) Sample distribution



Because the location of mean is on the right side of median, it is called right skewed.



This is called left skewed.

cases	Sample A	Sample B
1	$45K	$45K
2	$55K	$55K
3	$67K	$67K
4	$76K	$76K
5	$99K	$120,364K
Median	$67K	$67K
Mean	$68.4K	$24,121.4K

Because median is not sensitive to outliers, whereas mean is very sensitive to outliers, median would be much more accurate measure of central tendency when the samples are biased.