Chapter 3: measures of central tendency in frequency table

1) What is central tendency measure?

Central tendency is what average case look like

Average income by occupation, by region, by race/gender, average height, weight, etc.

2) Mode

Mode: is the group in a variable with the highest frequency

Gender	Frequency	percentage	proportion
Men	7	7/26 * 100 = 26.9%	7/26 = .27
Women	19	19/26 = 73.1	19/26 = .73
N (total number of cases)	26	100	1.00

Mode for gender for our class is "women."

3) Median

Median is the middle point splitting the sample into two equal halves.

If N is odd number; the median would be located at the $(\frac{N+1}{2})^{th}$ location in a sample that is ascending ordered.

For example, if N = 9, then the median would be (9+1)/2 = 5th.

If N is an even number, the median would be the average between the two values in $(\frac{N}{2})^{th}$ and $(\frac{N}{2}+1)^{th}$ location in a sample that is ascending ordered.

age	frequency	Cumulative frequency
12	42	42
23	12	54
32	32	86
41	19	105
55	58	163
60	37	200
75	5	205
N	205	---

The median would be located at $(206)/2 = 103^{rd}$

The median = 41

4) mean

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

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$$\bar{X} = \frac{12 \times 42 + 23 \times 12 + 32 \times 32 + 41 \times 19 + 55 \times 58 + 60 \times 37 + 75 \times 5}{205}$$
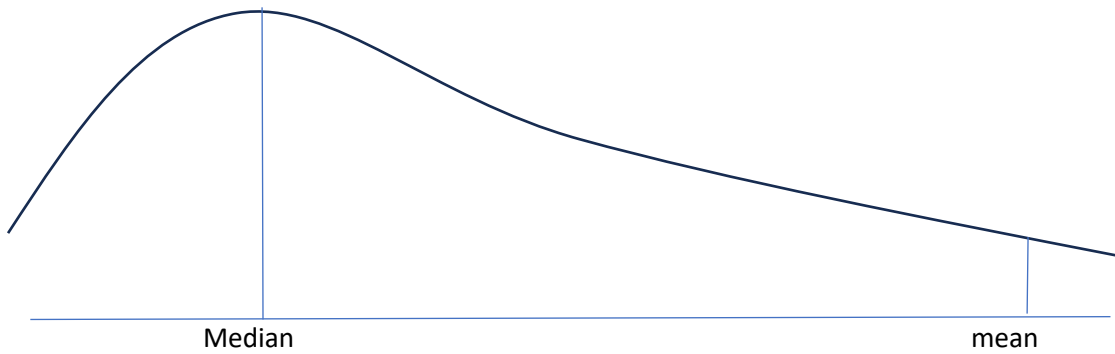
$$\bar{X} = 40.8$$

For this sample, the median is 41, and the mean is 40.8, so it is left skewed.

5) properties of central tendency measures

median is not sensitive to the outliers, whereas the mean is very sensitive to the outliers

Case #	Sample A	Sample B
1	$45K	$45K
2	$55K	$55K
3	$60K	$60K

4	$78K	$78K
5	$90K	$150,000K
Median	$60K	$60K
Mean	$65.6K	$30,048K

Median   mean

This is right skewed graph because mean is on the right side of median (Mean > Median)

6) exercise, for the following frequency table, please compute its mode, median and mean

Age	frequency	Cumulative frequency
1	142	142
9	1	143
30	320	463
49	190	653
51	58	711
67	137	848
N	848	---

Mode   = 30

Median = 30; 848/2 = 424th, and 425th;

Mean   = 36.8

7) when to use which

	mode	median	Mean
Nominal	Yes	No	No
Ordinal	Yes	No	No
Interval/ratio	Yes	Yes	Yes