

Chapter 3 Measures of central tendency in frequency table

1) Mode

Gender (sex)	Frequency	Percentage	Proportion	cumulative
Men	7	$7/22 * 100 = 31.8\%$	$7/22 = .32$	
women	15	$15/22 * 100 = 68.2\%$	$15/22 = .68$	
N (total number of cases)	22	100%	1.00	

Mode for the variable gender in this sample of class is women.

Education (X)	frequency	percentage	Cumulative frequency
<HS	56	18.1	56
HS	21	6.7	77
Some college	97	31.3	174
BA	120	38.8	294
Graduate/professional	15	4.9	309
N	309	100	---

Mode for the variable education in this sample is BA.

2) Median

Education (X)	frequency	percentage	Cumulative frequency
<HS	56	18.1	56
HS	21	6.7	77
Some college	97	31.3	174
BA	120	38.8	294
Graduate/professional	15	4.9	309
N	309	100	---

N = 309, which is odd number, so

When N is odd number

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

$310/2 = 155^{th}$ so that the median is “some college.”

age	Frequency	Cumulative frequency
2	65	65
16	96	161
21	102	263
29	57	320
37	36	356
45	158	514
58	26	540
N	540	---

$540/2 = 270^{th}$ and 271^{st}

Both 270^{th} and 271^{st} are 29 years old, the average of them is 29 years old. Therefore, the median for this sample in age is 29.

3) Mean

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

Education (X)	frequency	percentage	Cumulative frequency
<HS = 1	56	18.1	56
HS = 2	21	6.7	77
Some college = 3	97	31.3	174
BA = 4	120	38.8	294
Graduate/professional = 5	15	4.9	309
N	309	100	---

$$\bar{X} = \frac{\sum X_i f_i}{N} = \frac{1 \times 56 + 2 \times 21 + 3 \times 97 + 4 \times 120 + 5 \times 15}{309} = 3.06$$

age	Frequency	Cumulative frequency
2	65	65
16	96	161
21	102	263
29	57	320
37	36	356
45	158	514
58	26	540
N	540	---

$$\bar{X} = \frac{\sum X_i f_i}{N} = 28.5$$

4) Exercise

For the following sample, please compute its mode, median, and mean

temperature	frequency	Cumulative frequency
28	36	36
35	12	48
45	38	86
55	60	146
61	75	221
72	21	242
N	242	---

Mode = 61

Median = 55

$242/2 = 121^{\text{st}}$, and 122^{nd}

$$\text{Mean } (\bar{X} = \frac{\sum X_i f_i}{N}) = 51.76$$

5) When to use which

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