STATISTICS - A Fun World! Part -I.a

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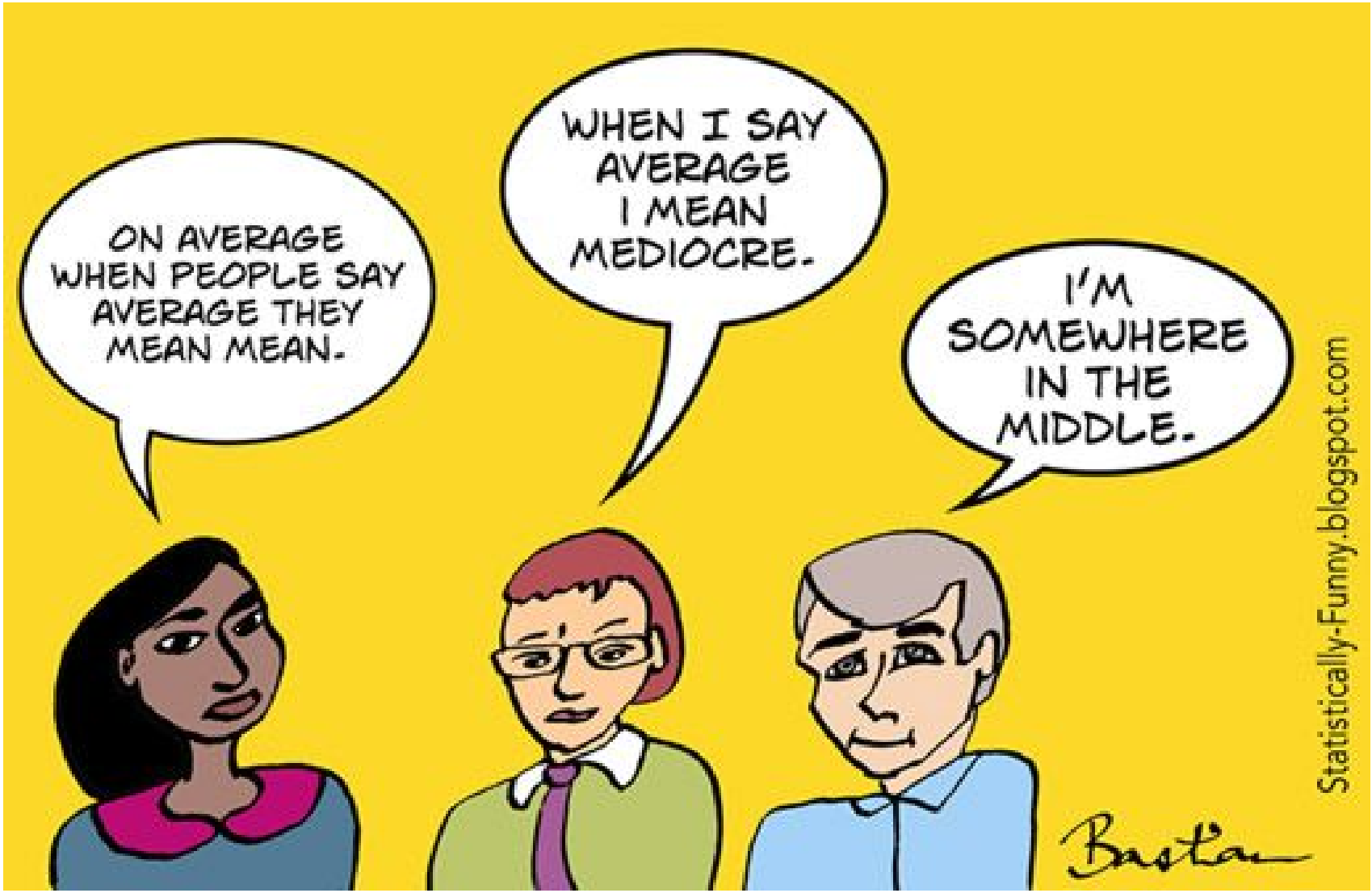
Mean


ON AVERAGE WHEN PEOPLE SAY AVERAGE THEY MEAN MEAN.
WHEN I SAY AVERAGE I MEAN MEDIOCRE.
I'M SOMEWHERE IN THE MIDDLE.
Statistically-Funny.blogspot.com
Bostan

mean

The mean is the average or norm.

- Add up all of the values to find a total.
- Divide the total by the number of values you added together.

$2 + 2 + 3 + 5 + 5 + 7 + 8 = 32$

There are 7 values

Divide the total by 7

$32 \div 7 = 4.57$

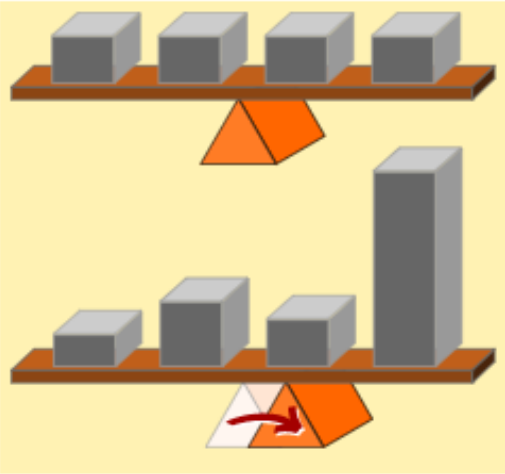
The mean is 4.57

Mean and it's types

- Referred as CT of the data
- To this number, our whole data spread around
- It represent our whole dataset
- Types,
  - Arithmetic Mean
  - Geometric Mean
  - Harmonic Mean
  - Weighted Mean
  - Categorical Mean

Weighted Mean

When some values get more weight than others, the central point (the mean) can change:



Weighted Mean - Understanding 1

- Weighted means can help with decisions where some things are more important than others
- I need to buy a Smart Phone
- My Priorties are,
  - Camera Quality 40
  - RAM 30
  - Processor 25
  - Rate 5
- aaa: bbb : 0.4*8 + 0.3*7 + 0.25*7 + 0.05*6 = 7.35
- ccc: ddd : 0.4*6 + 0.3*6 + 0.25*6 + 0.05*8 = 6.1
- eee: fff : 0.4*8 + 0.3*7 + 0.25*8 + 0.05*7 = 7.65

Weighted Mean - Understanding 2

$$Mean = \frac{10 + 20 + 30 + 40 + 50 + 60}{6} = 210/6 = 35 \quad (1)$$

$$(1/6)*10+(1/6)*20+(1/6)*30+(1/6)*40+(1/6)*50+(1/6)*60 = 35 \quad (2)$$

Weighted Mean - Understanding

- What if the Weights Don't Add to 1?

$$(1/6)*10+(1/6)*20+(1/6)*30+(2)*40+(1/6)*50+(1/6)*60 = 158.33 \quad (3)$$

- Divide by the sum of weights
- Ram usually watches 10 movies a week in this pandemic, but some weeks only gets 2, 4, or 5 because of WFH.So the condition here is,
  - on 2nd weeks: only one movie for the whole week
  - on 14th weeks: 2 movies
  - on 8th weeks: 5 movies
  - on 32nd weeks: 7 movies
  - What is the mean number of movies Ram has watched each week?
- here, use weeks as weight, 2*1 + 14*2 +8*5 + 32*7 = 294
- add the weeks alone, 2 + 14 + 8 + 32 = 56

$$WtMean = \frac{2*1+14*2+8*5+32*7}{2+14+8+32} = 294/56 = 5.25 \quad (4)$$

Geometric Mean - Understanding

- Useful when we want to compare things with very different properties
- Ram needs to buy professional camera, so needs to concern the zoom option and ratings
  - aaa, 200 OZ with rating 6.5
  - bbb, 250 OZ with rating 7.5

$$AM1 = \frac{200 + 6.5}{2} = 103.25 \tag{5}$$

$$AM2 = \frac{250 + 7.5}{2} = 128.75 \tag{6}$$

- GM1 $= \sqrt{(200 * 6.5)} = 36.05 GM2 = \sqrt{(250 * 7.5)} = 43.30$

- Here Zoom and Review two different properties important

Harmonic Mean

- the reciprocal of the average of the reciprocals
- The harmonic mean is also good at handling large outliers.
- But small outliers will make things worse!

Categorical Data - Nominal

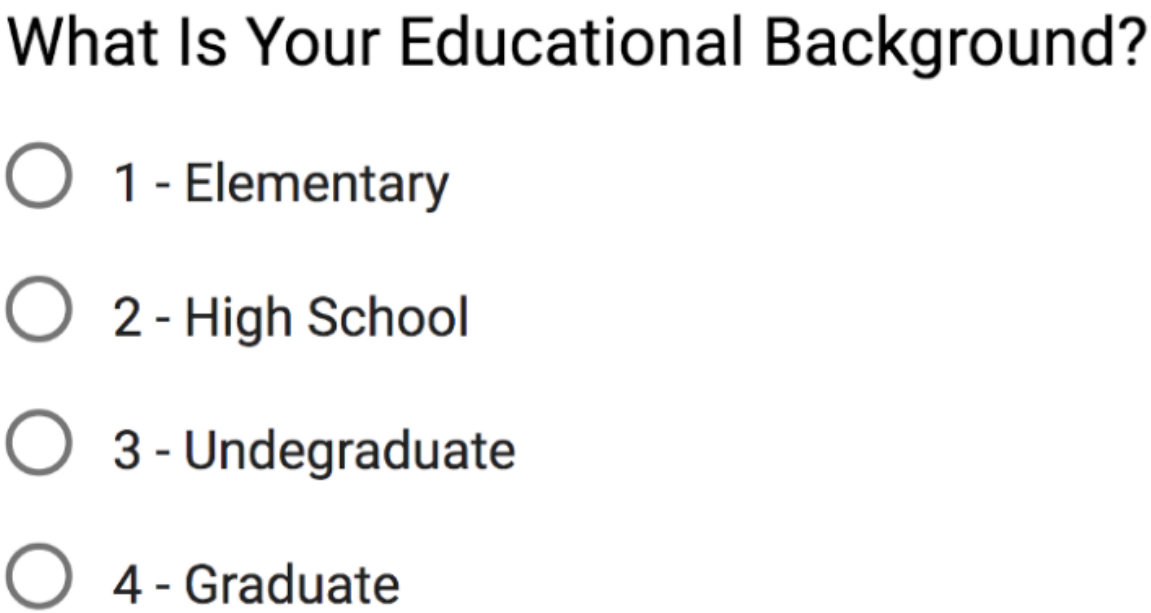
Are you married?

- Yes
- No

What languages do you speak?

- Englisch
- French
- German
- Spanish

Continuous Data - Ordinal



Mean for Categorical Dataset

$$[yes, no, yes, no, yes, yes, no, yes, yes, no] \tag{7}$$

$$\frac{1+0+1+0+1+1+0+1+1+0}{10} = \frac{6}{10} = 0.6 \tag{8}$$

Verdict: Mean

- Arithmetic Mean
- Geometric Mean
- Harmonic Mean
- Weighted Mean
- Categorical Mean

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Learning gives Creativity, Creativity leads to Thinking, Thinking provides Knowledge, and Knowledge makes you Great - Dr APJ Abdul Kalam