

3.1 Measures of Central Tendency & Distribution

Measures of Central Tendency

- Mode
- Median
 - With odd number of values
 - With even number of values
- Mean
 - Trimmed mean
 - Weighted average



Photograph by Frank Schulenburg

Mean tells the central tendency of a dataset by summing all the values and dividing by the count.

Median

What Does the Median Tell You?

- The 50th percentile of the data.
- The middle rank of the data.
- The median doesn't care much about the ends of the data. Outliers don't bother it.
- It is resistant. It is stable.



Notation about Means

Sample Statistics

- If your mean comes from a sample, it is called x-bar.
- Use a lowercase n for sample size

X

$$\bar{X} = \frac{\Sigma x}{n}$$

Population Parameters

- If your mean comes from a population, it is called mu.
- Use an uppercase N for population size

μ μ

$$\mu = \frac{\Sigma x}{N}$$

Means vs. Medians

Medians

- Very resistant to outliers.
- Very stable.

Means

- Not resistant to outliers.
- Not very stable.



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Weighted Average

Weighted Average

- Sometimes, certain values should count more toward the mean than others.
- If homework is 10% of your grade, and quizzes are 20% of your grade, the quizzes count for more than the homework
- You can arrange this by doing a weighted mean.

$$\Sigma xw = 3.2$$

$$\Sigma w = 1.0$$

Example

- Homework worth 10%, quizzes worth 20%, and final worth 70%.
- You got an A (4.0) on homework, B + (3.5) on quizzes, and B (3.0) on final
- Non-weighted average: $(4+3.5+3)/3 = 3.5$
- Weighted average: $(4.0*0.1) + (3.5*0.2) + (3.0*0.7) = 3.2$

$$= \frac{\Sigma xw}{\Sigma w}$$