Lecture 07
JAMOVI –Data Exploration

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Center

- Median

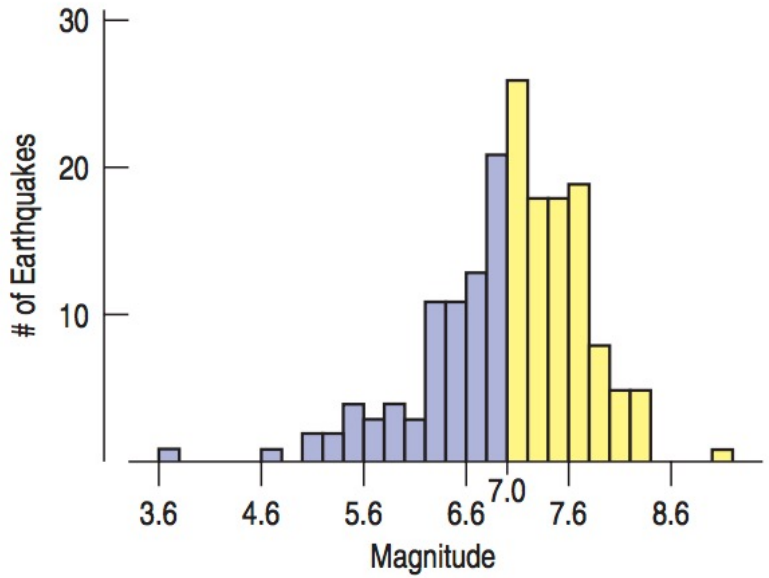


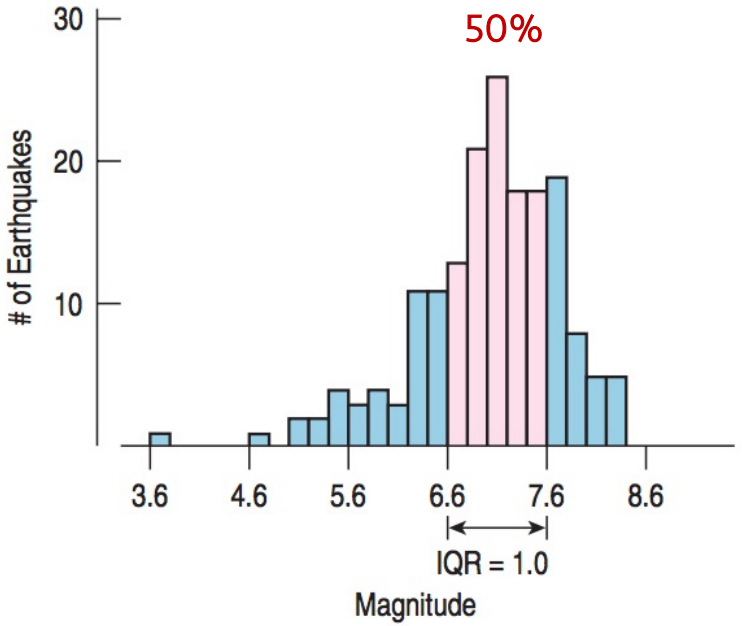
FIGURE 4.10
Tsunami-causing earthquakes (1981–2005).
The median splits the histogram into two halves of equal area.

- 176 earthquakes
- Median: (176+1)/2 = 88.5th value in the sorted data
- ".5" = average of the two values (88th and 89th)

- If there was 221 earthquakes
- Median: (221+1)/2 = 111th value in the sorted data

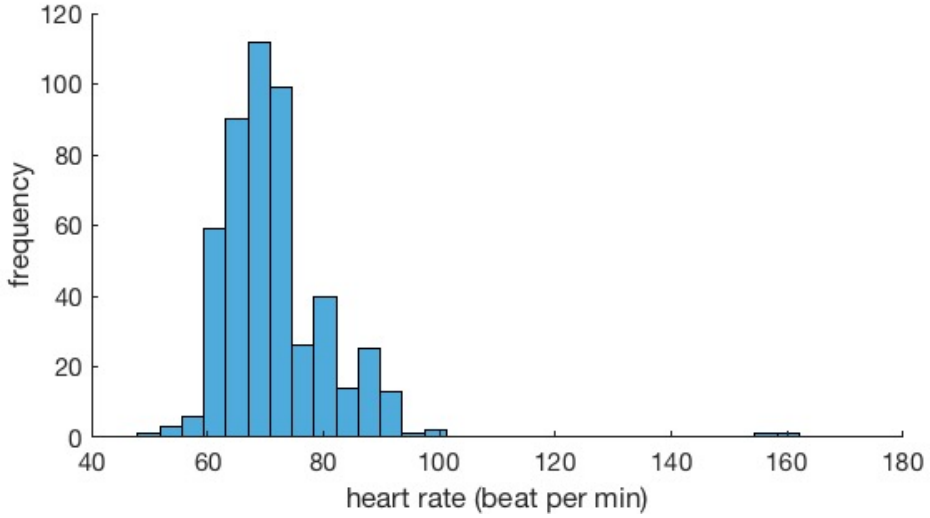
Spread

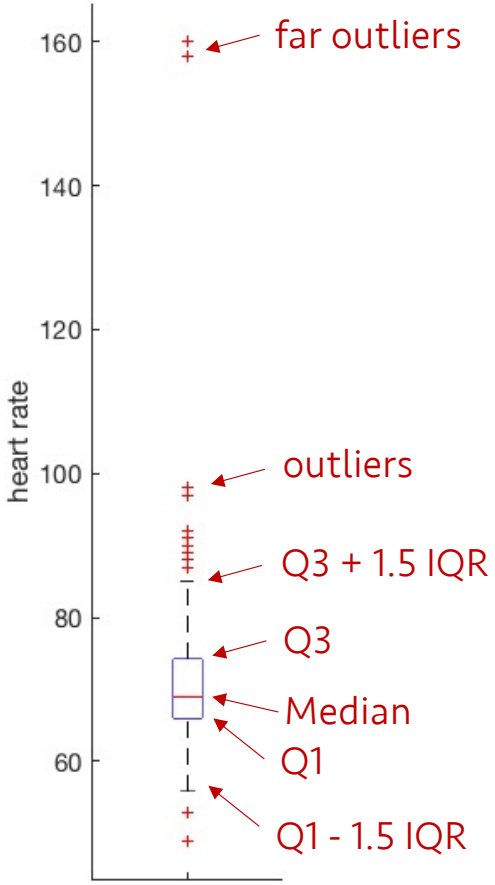
- Range
  - Range = max − min
- Interquartile range
  - Interquartile range (IQR) = upper quartile − lower quartile



Boxplots and 5-Number Summaries

My heart rate data for a week (7/10-7/14)

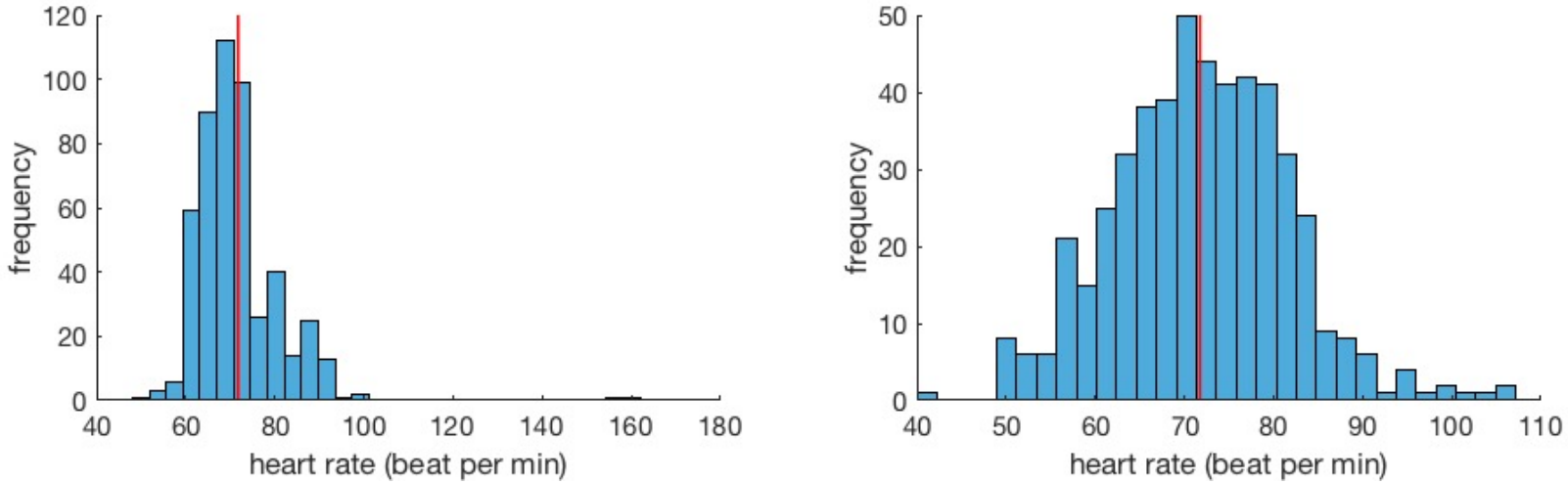




Max	160
Q3	74
Median	69
Q1	66
Min	49

Center of Symmetric Distribution: Mean

$$\bar{y} = \frac{Total}{n} = \frac{\sum y}{n}$$



- If the histogram is symmetric and there are no outliers, the mean will be preferable.
- However, if the histogram is skewed or has outliers, the median might be better.

Spread of Symmetric Distribution: Standard Deviation

Variance

$$s^2 = \frac{\sum (y - \bar{y})^2}{n - 1}$$

Standard Deviation

$$s = \sqrt{\frac{\sum (y - \bar{y})^2}{n - 1}}$$

Mean = 17

Original Values	Deviations	Squared Deviations
14	$14 - 17 = -3$	$(-3)^2 = 9$
13	$13 - 17 = -4$	$(-4)^2 = 16$
20	$20 - 17 = 3$	9
22	$22 - 17 = 5$	25
18	$18 - 17 = 1$	1
19	$19 - 17 = 2$	4
13	$13 - 17 = -4$	16

Add up the squared deviations: $9 + 16 + 9 + 25 + 1 + 4 + 16 = 80.$
Now divide by $n - 1$: $80/6 = 13.33.$
Finally, take the square root: $s = \sqrt{13.33} = 3.65$