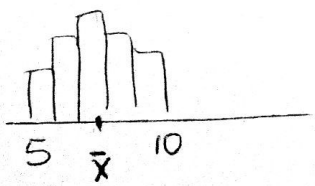
Summary

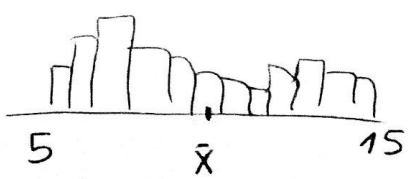
Measures of center

	sample	population
Mean	$\bar{x} = \frac{x_1 + \dots + x_n}{n} = \frac{1}{n}\sum_{i=1}^{n} x_i$	$\mu = \frac{x_1 + \dots + x_N}{N} = \frac{1}{N}\sum_{i=1}^{n} x_i$
Median	$\tilde{x}$, Med, M.	population median
Mode	sample mode	population mode
Midrange	sample midrange $\frac{\text{maximum} + \text{minimum}}{2}$	population midrange $\frac{\max + \min}{2}$

Measures of variation

	sample	population
Range	max − min sample range	max − min population range
standard deviation	$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$	$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$
variance	$s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$	$\sigma^2 = \frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2$





coefficient of variation

$CV = \frac{s}{\bar{x}} \cdot 100$

based on a sample

significantly low values are lower than $\bar{X} - 2S$

significantly high values are greater than $\bar{X} + 2S$

$x_1 \quad x_2 \quad \ldots \quad x_n$

$\downarrow \quad \downarrow \qquad\qquad |$

$z_1 \quad z_2 \quad \ldots \quad z_n$

$$z_i = \frac{x_i - \bar{X}}{S}$$

mean of $z_1 \ldots z_n$ = centered ≈ 0.

$S \approx 1$.

based on z scores (sample z scores)

significantly low values are lower than -2

significantly high values are greater than 2

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sequentially sample 3 students:

ggg, ggb, gbg, gbb,
bgg, bgb, bbg, bbb.

a) event:

"sampling one boy" : gbg, bgg

"sampling one or two girls" : ggb, gbg, gbb, bgg, bgb, bbg

b) simple event:

"sample three boys" : bbb

c) sample space : ggg, ggb, gbg, gbb, bgg, bgb, bbg, bbb

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Procedure: sequentially sample 3 students
event: A = "sampling two or more girls"

a) $P(A) = \frac{\#\text{ of times that A happens}}{\#\text{ repetitions}}$: based on repetitions

$= \frac{6}{10} = 0.6.$

b) $P(A) = \frac{4}{8} = 0.5$: based on the simple events from procedure.

c) $P(A) = 0.8$