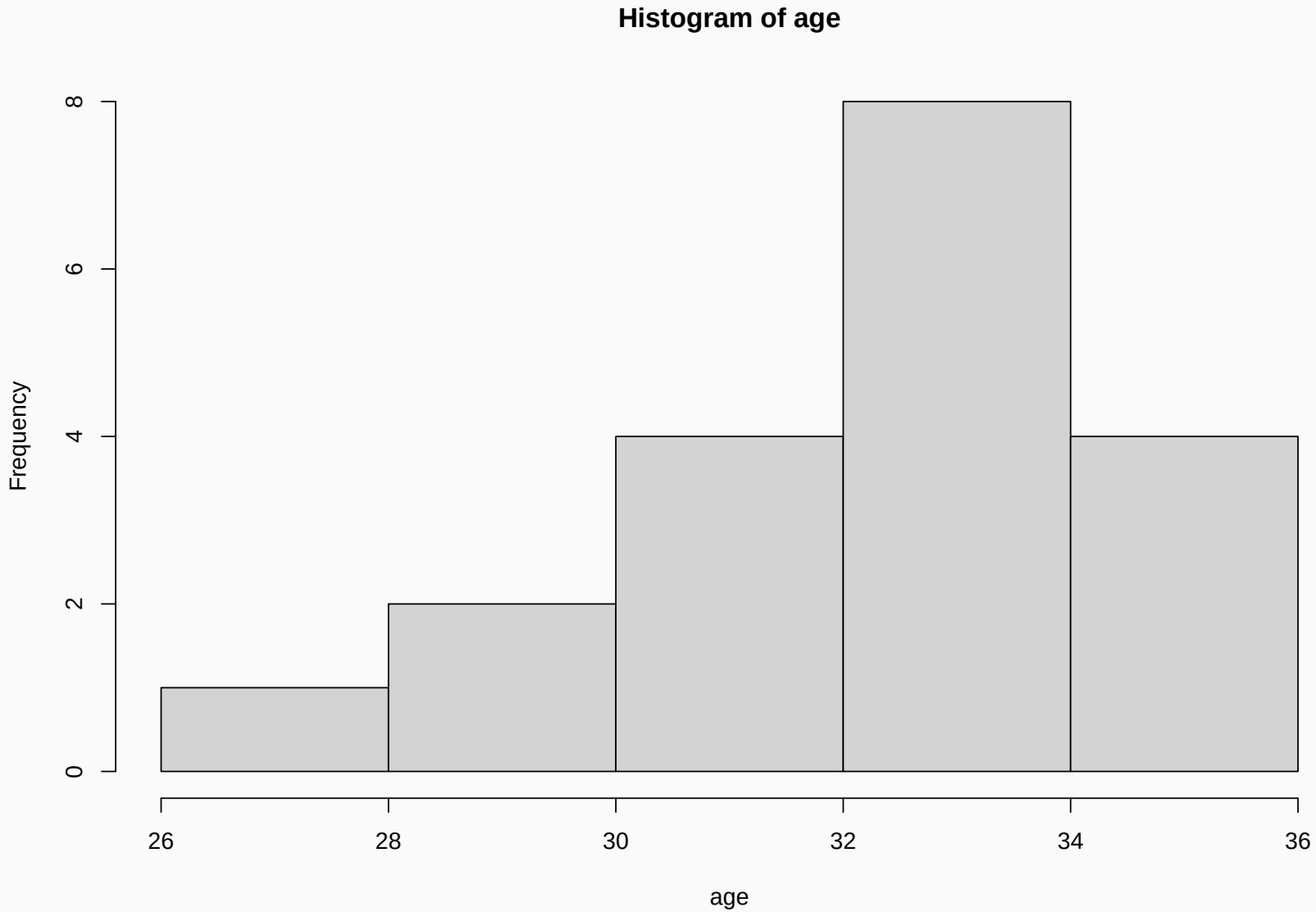
Descriptive statistics

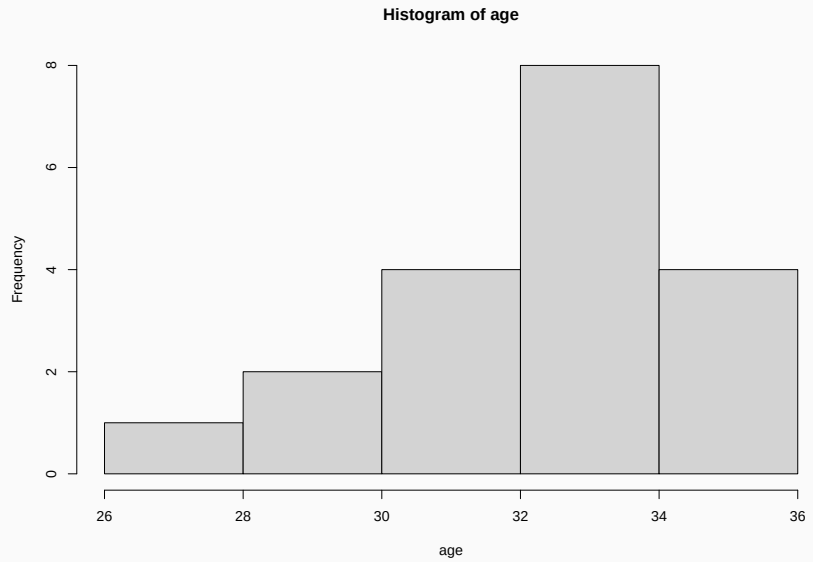
Guess my age

Graph your estimates



Do you think these data are good estimates of my age?

https://pollev.com/franciscorod726



Why / Why not?

Data are hardly ever objective.

We decide **what to measure, when, where, and how**.

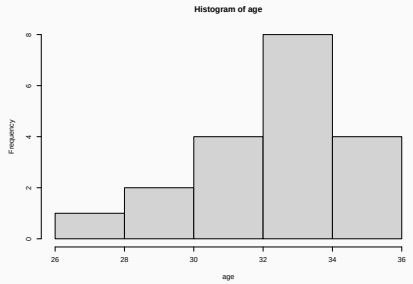
Always consider:

How well do these numbers reflect what we are trying to measure?

Summarise that distribution

Central tendency / location

- mean: $\frac{a_1 + a_2 + a_3}{n}$

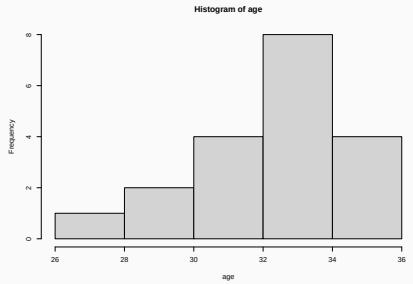


Variation / Spread

Summarise that distribution

Central tendency / location

- mean: $\frac{a_1 + a_2 + a_3}{n}$
- median (50% percentile)



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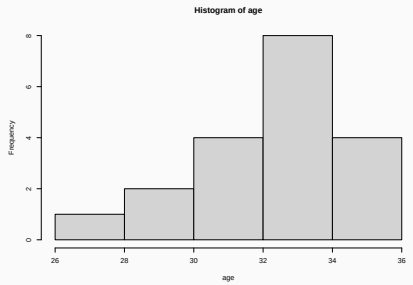

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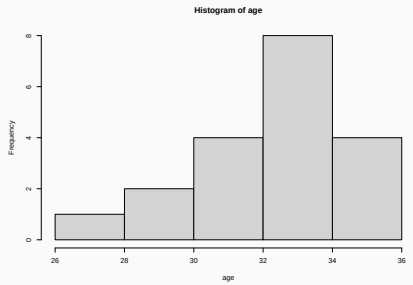

Variation / Spread

- min, max, range

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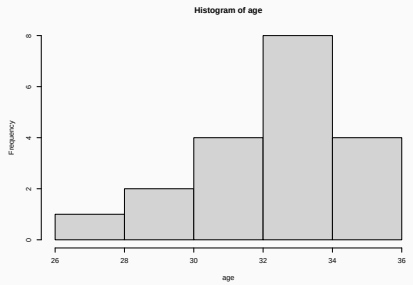

Variation / Spread

- min, max, range
- quantiles (quartiles, percentiles...)

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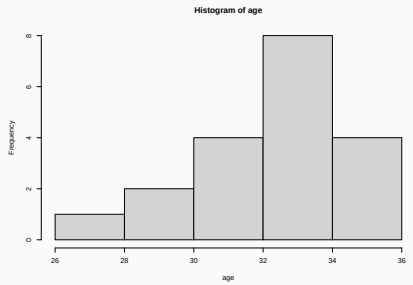

Variation / Spread

- min, max, range
- quantiles (quartiles, percentiles...)
- standard deviation: $SD = \sqrt{\frac{\sum (x - \mu)^2}{n - 1}}$

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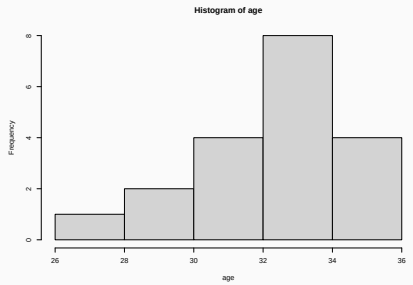

Variation / Spread

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- standard error: $SEM = \frac{SD}{\sqrt{n}}$

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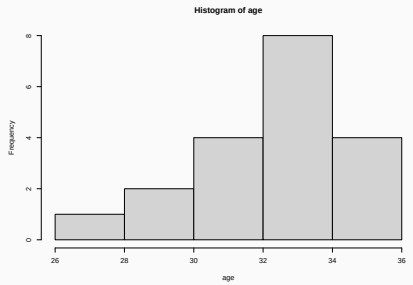

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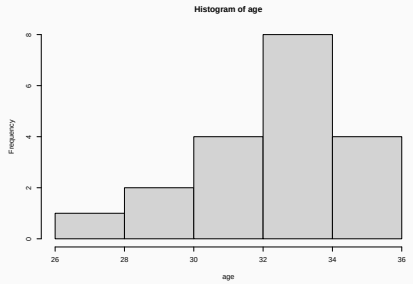

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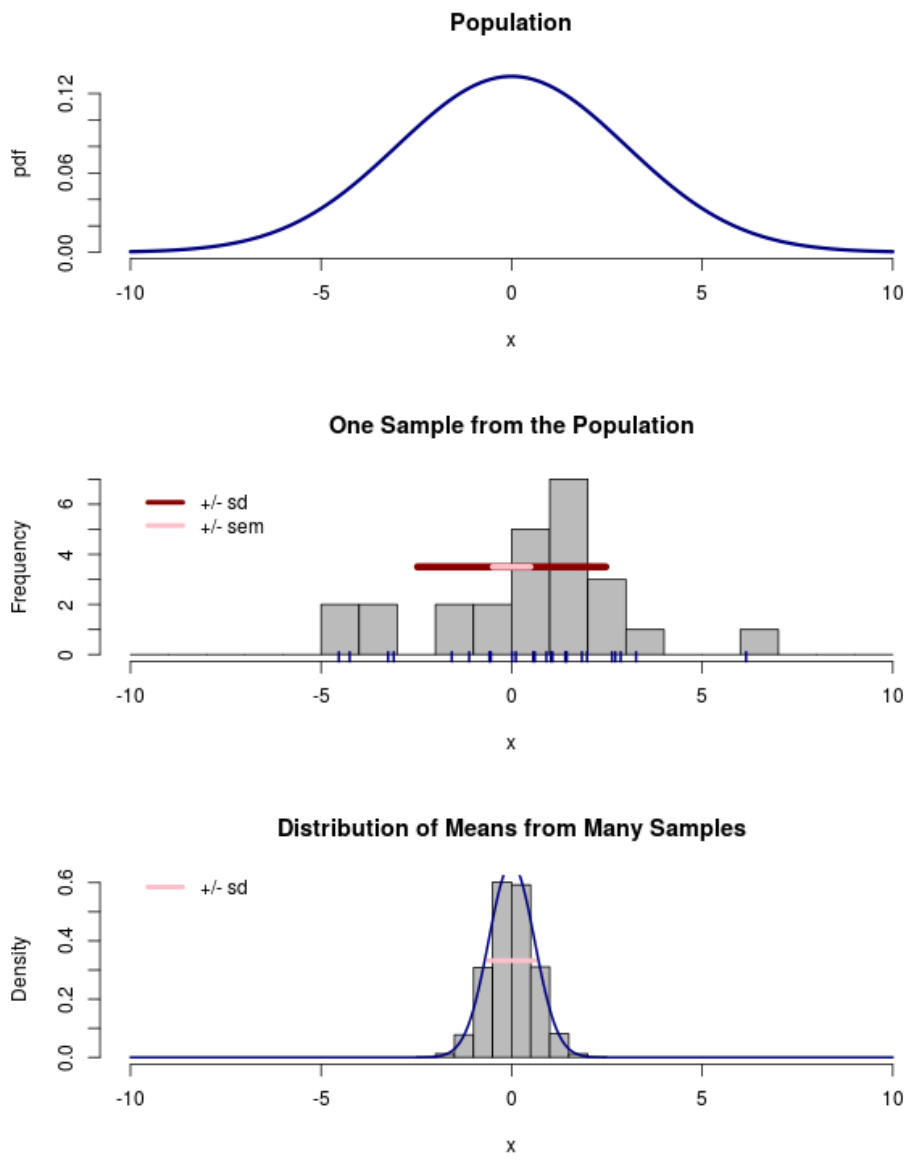
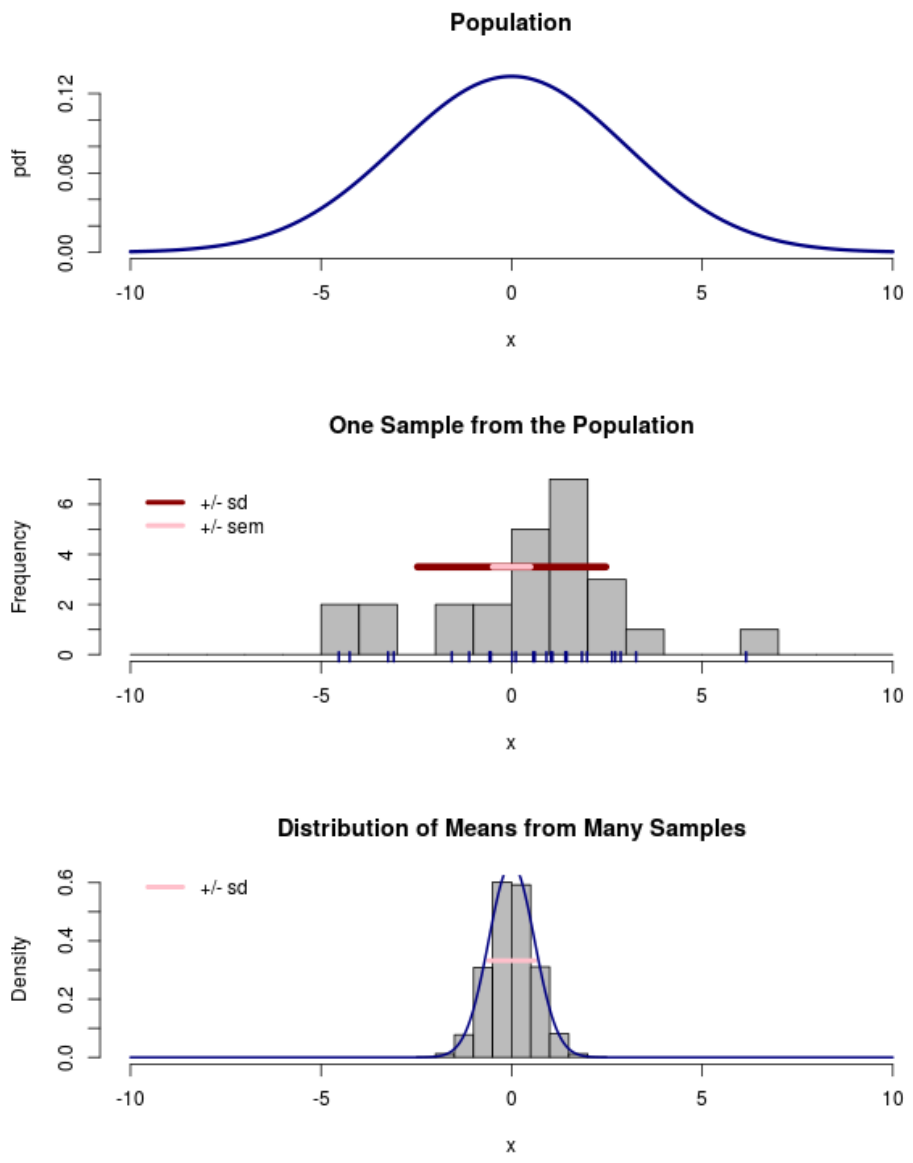
- coefficient of variation (CV = SD / mean)
- confidence intervals

Relationship between SD and SEM



- SD quantifies scatter in population

Relationship between SD and SEM



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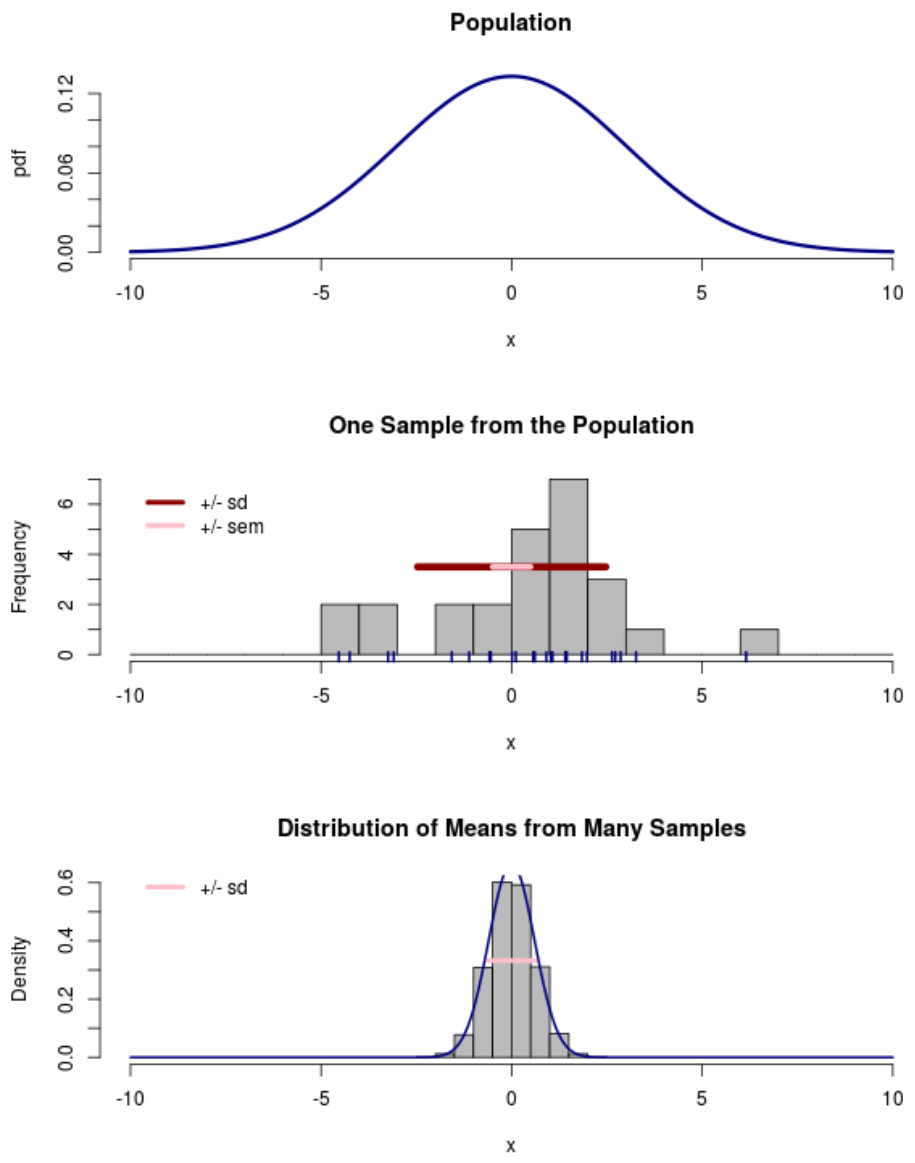
- SEM quantifies uncertainty in parameter estimate (population mean)

Relationship between SD and SEM



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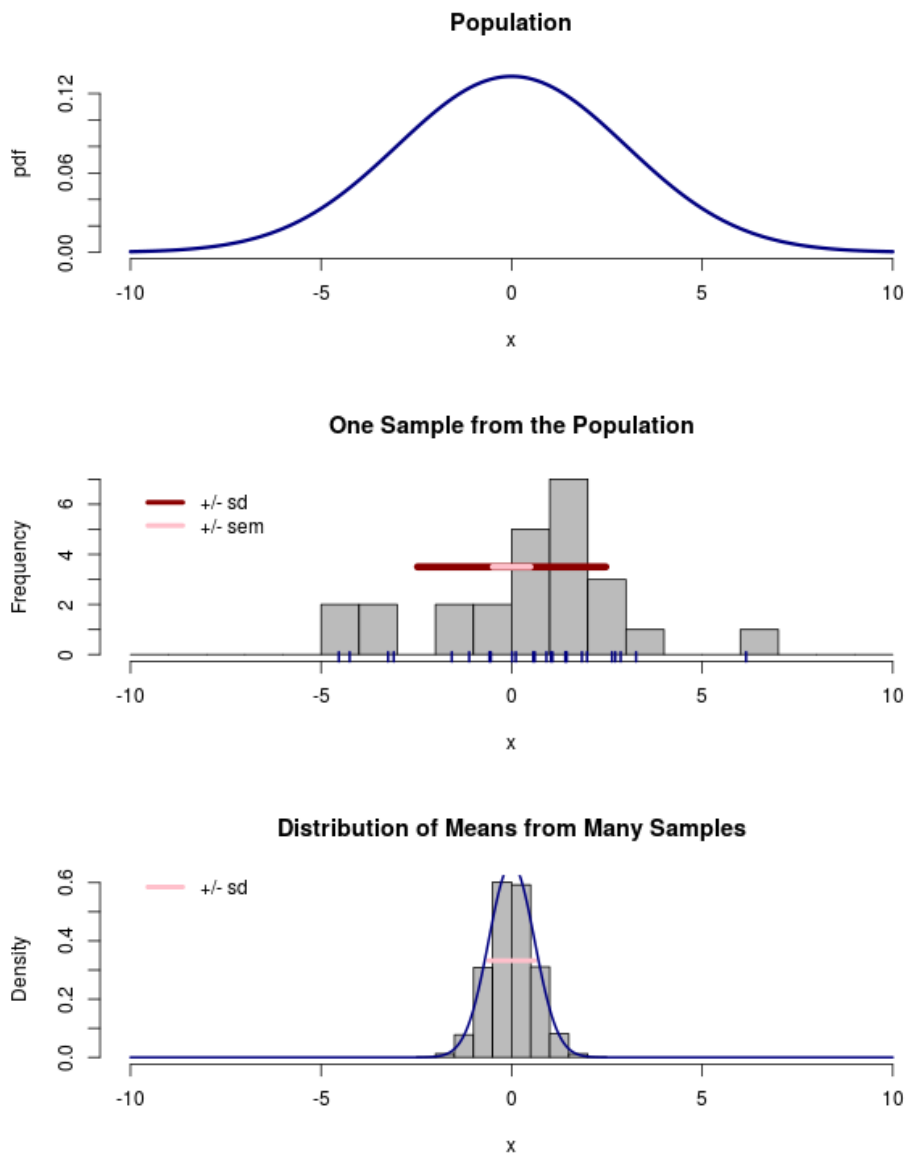
- SEM = SD/sqrt(n)

Relationship between SD and SEM



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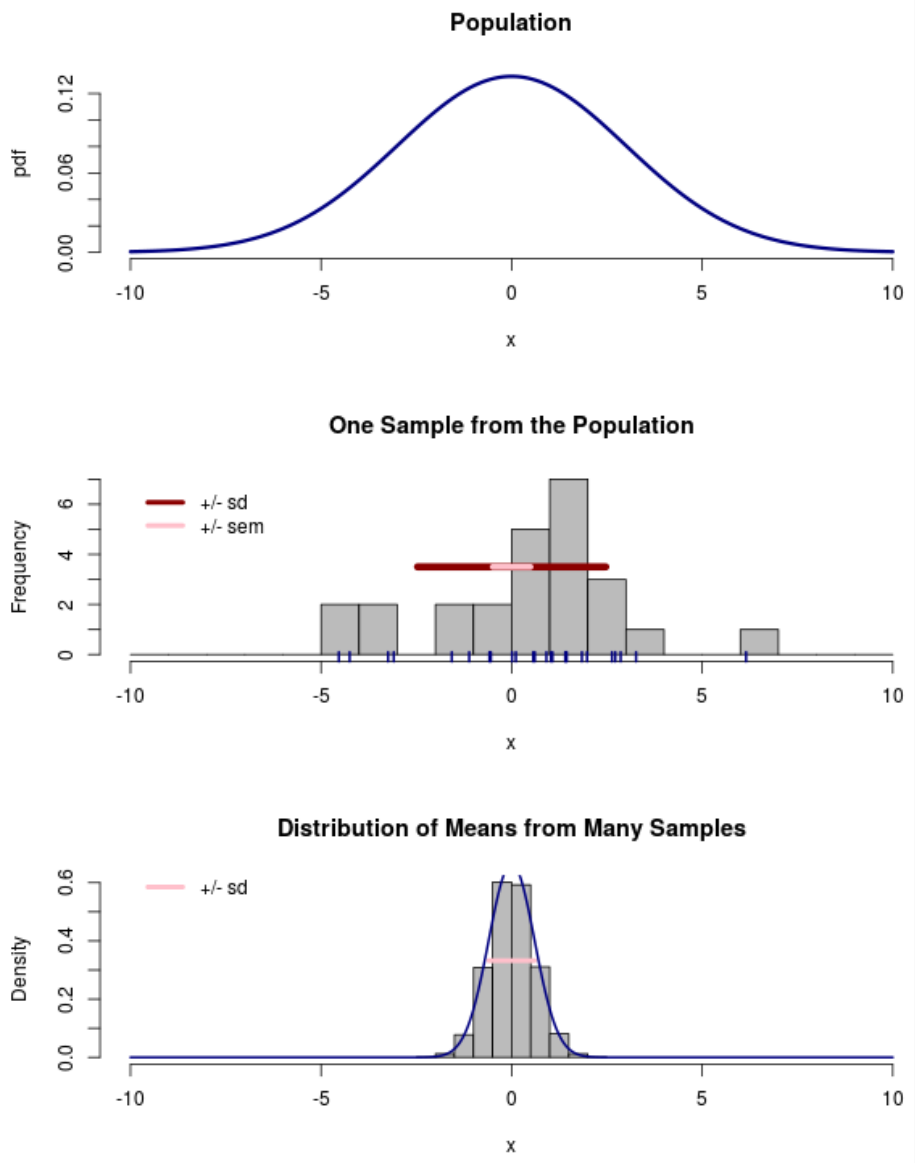

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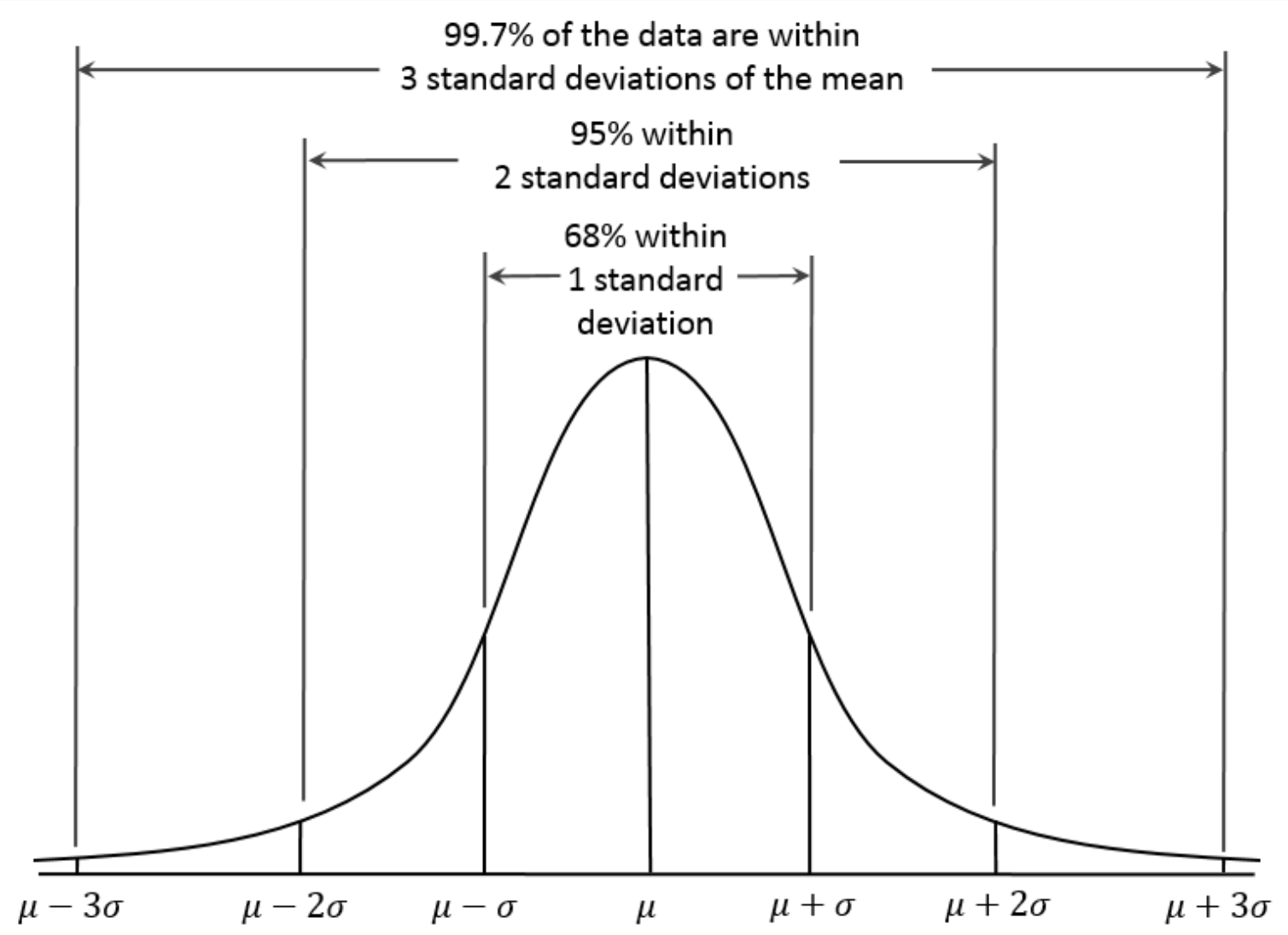
- https://gallery.shinyapps.io/sampling_and_stderr/

In a Normal distribution



What statistical descriptors are best? (and why)

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