STAT 107 – Fall 2020

What Does A 95% Confidence Interval Mean?

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X = the amount of coffee a U of I student drinks per day
μ = the true average amount of coffee a U of I student drinks per day
$\bar{x}$ = sample average for a particular sample

$\bar{x}$ is always the midpoint of CI

z-CI: $\bar{x} \pm z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$

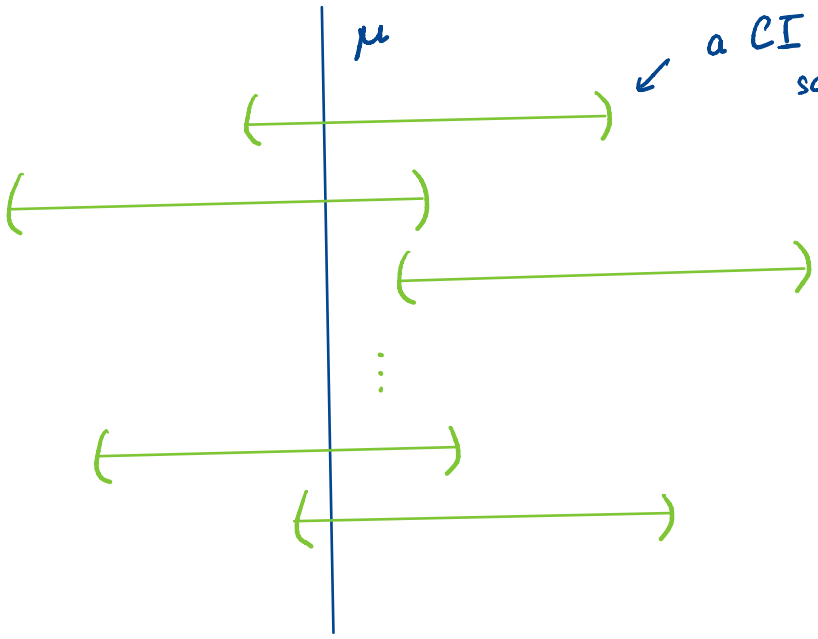
t-CI: $\bar{x} \pm t_{\alpha/2} \cdot \frac{s}{\sqrt{n}}$, $df = n-1$

A 95% confidence interval for μ: (8.4, 10.2) oz

What does confidence level of 95% mean?

μ : unknown, constant

1. ~~There is a 95% probability that the population mean is between 8.4 oz and 10.2 oz.~~
2. ~~There is a 95%~~ 100% probability that the sample mean ($\bar{x}$) is between 8.4 oz and 10.2 oz.
3. ~~95% of the population data~~ (X) are between 8.4 oz and 10.2 oz. $P(8.4 \leq X \leq 10.2) = 0.95$
4. ~~95% of the sample data are between 8.4 oz and 10.2 oz.~~
5. ~~If we take many samples of the same size and each compute a 95% CI for μ, about 95% of the sample means would be between 8.4 oz and 10.2 oz.~~ $P(8.4 \leq \bar{X} \leq 10.2) = 0.95$ ($\bar{x}$'s)
6. ✓ If we take many samples of the same size and each compute a 95% CI for μ, about 95% of the Cis will contain the true mean μ.



NOTE: When can we calculate CI for p?

When $n\hat{p} \geq 5$ and $n(1-\hat{p}) \geq 5$!