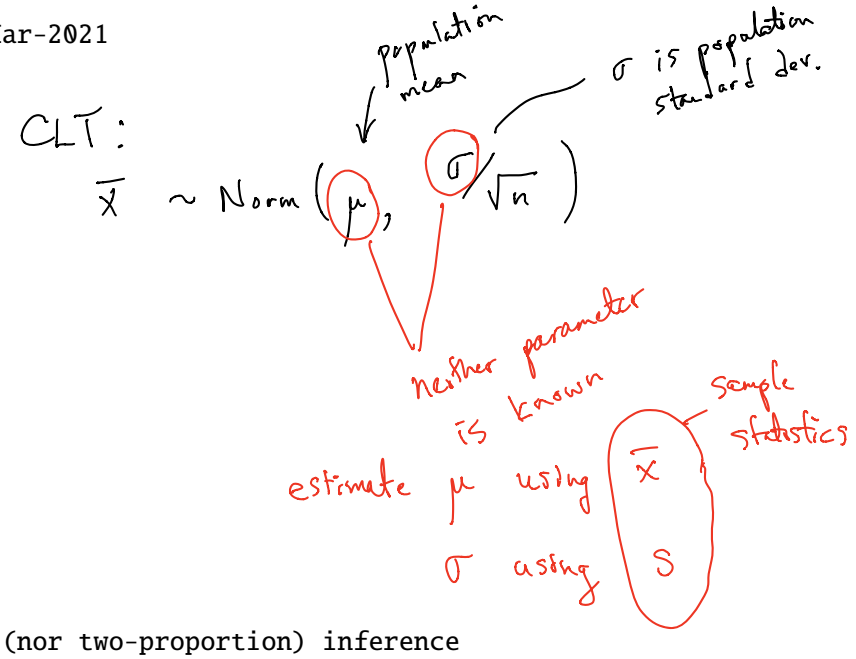
Stat 145, Fri 26-Mar-2021 -- Fri 26-Mar-2021
Biostatistics
Spring 2021



Friday, March 26th 2021

Wk 8, Fr
Topic:: Student t distributions
Read:: Lock5 6.4-6.6, 6.13
HW:: WW ch06Part2 due Tues.

Why t-distributions?
- no need when doing one-proportion (nor two-proportion) inference

- arise in context of quantitative data. Why?

- history

Idea: Use $s/\sqrt{n}$ to estimate for $SE_{\bar{x}}$

- for 1-sample mean settings, what df to choose?

$df = n - 1$

Practice with
1. summarized data
   n=27 healthy white males, mean systolic bp: 114.9 with s=9.3
   (a) Give a 92% CI for true mean bp among healthy white males
   (b) Test mu = 118 vs. a 2-sided alternative

2. raw data
   dogs, from boot package: use lvp variable (left ventricular pressure)
   t.test() command

3. paired data (a.k.a. matched-pairs t)
   Wetsuits data

Math symbols in R Markdown
- two math modes
  what comes between single dollar signs
  what comes between double dollar signs
- greek letters: a backslash followed by letter name spelled out
  \alpha

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   \rho
   \sigma
- "hat" and "bar" additions to a symbol
- subscripts and superscripts
- square roots
- fractions
- special symbols: less than, greater than, not equal to, plus or minus
- hypotheses

For more, see  http://scofield.site/courses/s145/tutorials/mathSymbols.pdf
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1. $\bar{x} = 114.9$, $s = 9.3$, $n = 27$

What can we do with this sample data?

A. Build a CI (say 94%) for μ = mean systolic BP for healthy white males

pt. est. $\pm$ ME

$114.9 \pm (1.966)(1.79)$

t^* crit. val. $\quad SE \approx s/\sqrt{n} = \frac{9.3}{\sqrt{27}}$

LCB = 111.38

UCB = 118.42

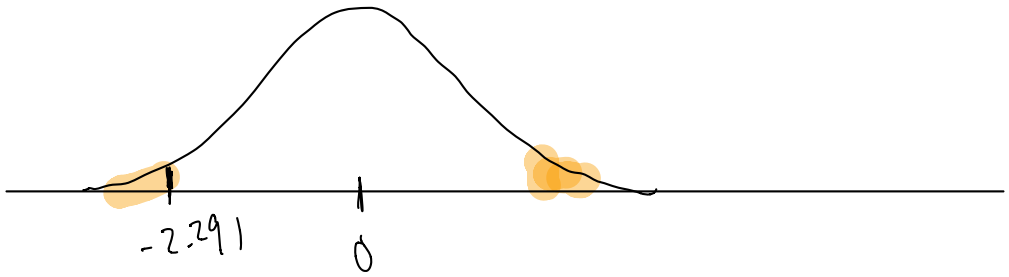
B. Carry out a hyp test

$H_0: \mu = 119$, $H_a: \mu \neq 119$

Key: Use standardized test statistic

$$t = \frac{(\text{observed value}) - \text{hypothesized value}}{SE}$$

$$= \frac{114.9 - 119}{9.3/\sqrt{27}} = -2.291$$



P-value: $2 * pt(-2.291, df = 26) \approx 0.03$