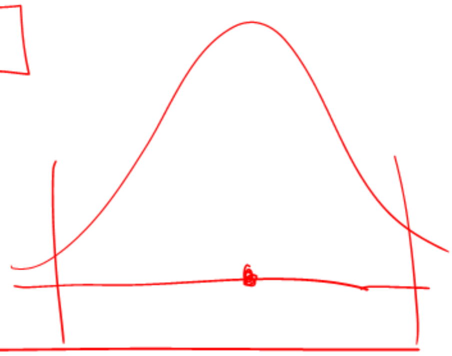
Topic 5: trimmed mean : $\alpha = 0.1$

$\underbrace{0, 1,}$ $\underbrace{10, 12, 11, 13, \ldots, 40,}$ $\underbrace{75, 90}$.

$\bar{X}$

pop mean : μ ← most common estimator : $\bar{X}$ = sample mean.

CI for μ : $\bar{X} \pm \boxed{}$



⇓

ST2132

$\boxed{\text{parameter}}$ ← estimate ← estimator

pop. mean : μ ← $\bar{X}$: unbiased estimator of μ.

$E(\bar{X}) = \mu$

pop. location ← trimmed mean → robust

$\bar{X}$ → not robust.

Contingency table : conditional prob :

$$Pr(\text{Diseased} \mid X = \text{yes}) = \frac{a}{a+b} := P_1$$

$$Pr(D \mid X = \text{No}) = \frac{c}{c+d} := P_2$$

P_1 vs P_2 : $P_1 - P_2$ ①, P_1 / P_2 ②

X	Disease: yes	No	Total
yes	a	b	a + b
No	c	d	c + d

③ $OR = \frac{ad}{bc}$ ←

For a general parameter: $\underline{\theta}$ $\Leftarrow$ a point estimate for θ : $\hat{\theta}$:

$$\hat{\theta} \pm \underbrace{\text{margin of error}}$$

$$= \boxed{\text{multiplier}} * \text{s.error of } \hat{\theta}.$$

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parameter = pop mean μ $\Leftarrow$ point estimate : $\bar{X}$

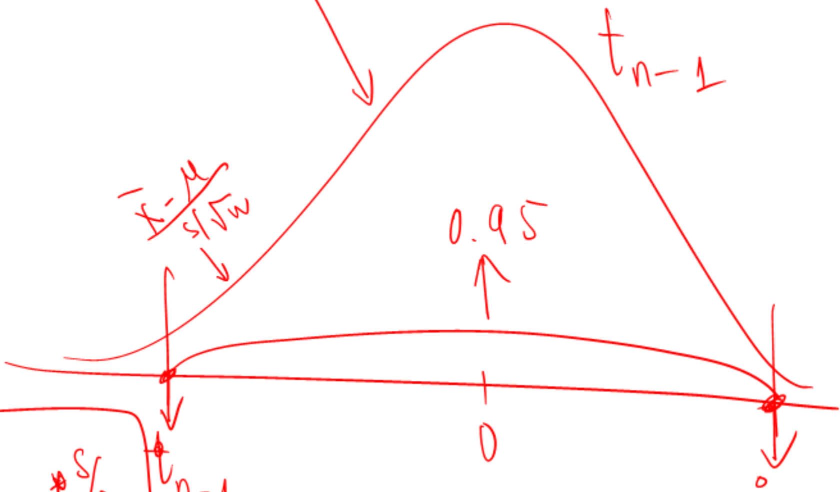
$$\bar{X} \pm \underline{\underline{\text{margin of error}}}$$

CLT

$$\Rightarrow \bar{X} \sim \underline{N\left(\mu ; \sigma^2/n\right)}$$

$$\Rightarrow \frac{\bar{X} - \mu}{\sigma/\sqrt{n}} \sim N(0,1) \Rightarrow \frac{\bar{X} - \mu}{s/\sqrt{n}} \sim t_{n-1}$$

$\Rightarrow$



95%

$\Rightarrow$ CI for μ

$$\boxed{\bar{X} \pm t_{n-1, 0.975} * s/\sqrt{n}}$$

t_{n-1}

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parameter: pop. odds ratio : θ $\Leftarrow$ point estimate : $\hat{\theta}$ $\Leftarrow$ can get from data

CI : $\hat{\theta} \pm \underline{\underline{\text{margin of error}}}$.

Sampling distn of $\hat{\theta}$ is $\underline{\text{NOT}}$ normal, but :

sampling distn of $\underline{\log \hat{\theta}}$ can be approximated by normal.

$\Rightarrow$ form CI for $\log \theta$ $\Rightarrow$ take expo...

Flow

$\Rightarrow$ get CI for θ.

$\theta \leftarrow \hat{\theta}$

$\log\theta \leftarrow \log\hat{\theta}$: CI for $\log\theta$: $\log\hat{\theta} \pm \boxed{\text{margin of error.}}$

$= \boxed{\text{multiplier}} * S.E \text{ of } (\log\hat{\theta})$

$\Downarrow$ from $Z \sim N(0,1)$

$$\boxed{\log\hat{\theta} \pm \underbrace{Z_{\alpha/2}}_{\approx q_{1-\frac{\alpha}{2}}} * ASE(\log\hat{\theta}) = \sqrt{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}}$$

a

$\underbrace{CI = (0.8\,;\ 5)}_{\text{for } \theta} \ni 1 \Rightarrow \underline{OR}$ could equal to $\underline{1}$

pop oddsratio

$t_{n-1} \rightarrow Z$

df very large then $t_{df} \approx Z$

CI for μ:

$$\boxed{\bar{X} \pm Z_{\frac{\alpha}{2}} * S/\sqrt{n}}$$

$t_{n-1;}$