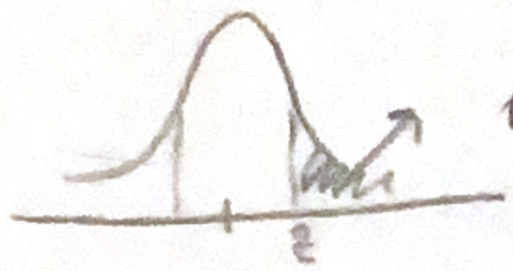
2 test

1. Bulunacak parametreyi sec.
2. Ho, Ha & α'yı tanımla.
3. Test statistic'i bul (z ya da t)
4. $\bar{x}$, s, n bul, z'de yerine koy
5. P value yu bul.
6. P value & α'yı karşılaştır.

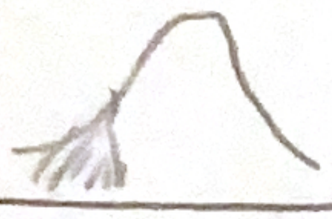
Upper Tailed Test



Ha contains >

$1 - \Phi(z) = p$

Lower Tailed Test



Ha has <

P-value = $\Phi(z)$

Two Tailed Test

≠

P-value = $2[1 - \Phi(|z|)]$

ex $\alpha = 0.05$ $n = 19$ $\bar{x} = 562.68$

$H_0 = \mu = 500$ $\frac{s}{\sqrt{n}} = 41.495$

$H_a: \mu > 500$ $s = 180.874$

$T = \frac{\bar{x} - 500}{\frac{s}{\sqrt{n}}} \rightarrow t = \frac{562.68 - 500}{41.695} = 1.51$

$v = 19 - 1 = 18$

t	v	...	18
1.5	→		→ 0.075

$0.075 > 0.05$ → fail to reject Ho

Errors

Type I error → Rejection Ho when it was true (α)

Type II error → Not rejecting Ho when it was false (β)

$\chi^2 = \sum \frac{(O-E)^2}{E}$ O = Observed, E = expected, k = # kategori, $v = k - 1$

z-test

n büyük

σ bilinyor

$\bar{x}$ normal

bilinmiyorsa s kullan

$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$

$\Phi(t) = P(z \leq z)$

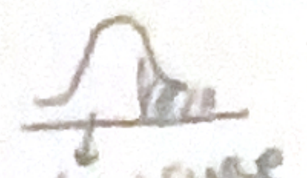
t-test

n küçük

σ bilinmiyor (?)

$\bar{x}$ normal

$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$



t	v	...	18
1.5	→		→ 0.075

↓ p value

z	...	-0.06
1.9	←	0.9750

p-value > α → fail to reject Ho

ex $H_a: \mu > 100$ $\alpha = 0.05$

$H_0: \mu = 100$, $\sigma_{\bar{x}} = 2 \rightarrow \frac{\sigma}{\sqrt{n}}$

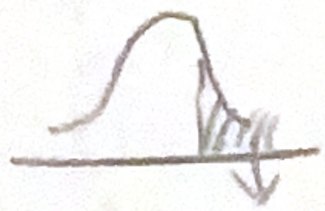
$\bar{x} = 103$

$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}} = \frac{103 - 100}{\frac{2}{\sqrt{5}}} = 1.5$

z = Number of σs between μ_0 & $\bar{x}$

z ↑ Ho rejection ↑

P-value = P(z ≥ z when Ho is true)



$1 - \Phi(1.5) = 0.0668$

↓

P-value > α

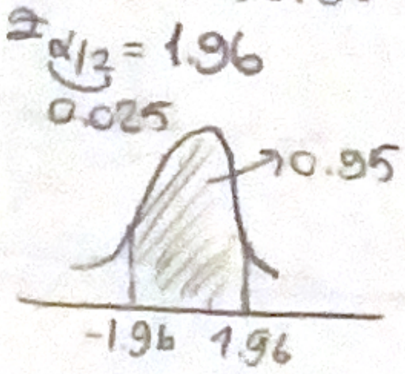
(0.0668) > 0.05

fail to reject

Ha: μ > 100

Confidence Interval

$\alpha = 1 - CL$ → 0.95

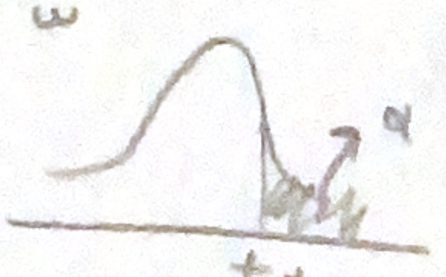


Confidence Interval (small n) → $P(-t_{\alpha/2,n-1} < T < t_{\alpha/2,n-1}) = 1 - \alpha$

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

CI with z → $\left(\bar{x} - 1.96 \frac{\sigma}{\sqrt{n}}, \bar{x} + 1.96 \frac{\sigma}{\sqrt{n}}\right)$

Sample size for width w → $n = \left(2 z_{\alpha/2} \frac{\sigma}{w}\right)^2$



> t critical value

$p \leq \alpha$ → reject

$p \geq \alpha$ → fail to reject