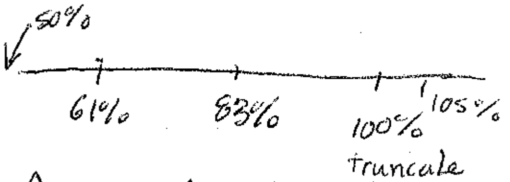
AMS 7
Notes
10/29
1
Julia Larson

10/29 Inferential Summary

In last notes	In lat notes
"	"
"	"
95% CI for p	$\hat{p} \pm 1.96\sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = (61\%, 106\%)$

We will pretend we have lots of data for 1's + 0's info



$\hat{p} \pm 1.36\ \hat{SE}(\hat{p})$

$2 \cdot 11\% = 22\%$

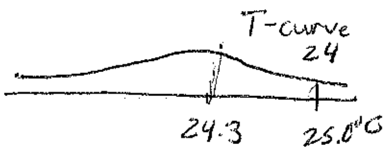
$61\% - 105\%$

at 95% conf. level. The data does not support theory that $p = 50\%$. The difference Between 50% and 83% is statistically significant = is large in statiscal terms = is probably real.

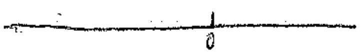
Neyman's logic: Null theory
(how data came out)* vs. (how data should have come out if null true)** Try null on for size.

Full data in Notes...

$\hat{SE}$ 0.27°C



← long range histogram of $\bar{Y}$ if null is true. Accounting for unceirtinity in σ



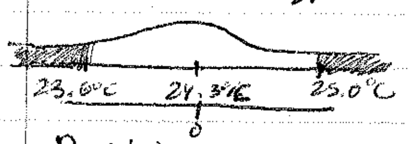
← $\frac{25.0°C - 24.7°C}{0.27°C} = \frac{+0.7\ °C}{0.27\ °C} = +2.59$

$\frac{\bar{Y} - \mu_0}{s/\sqrt{n}}$ = (how data came out) − (how data should have come out if null was true)

→ $\hat{SE}$ of $\bar{Y}$

$\frac{\text{Single}}{\text{noise}}$ = t = "t statisic" or "T test"

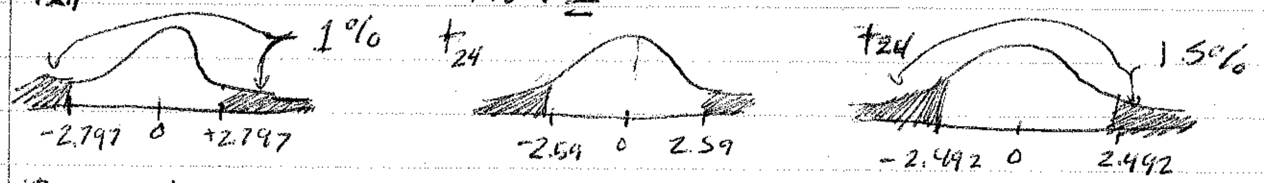
$\hat{SE}$ .27°C T_{24}



P-Value = chance, if the null were true, of getting data as extreme as or more extreme than what you got.

$H_0: \mu = 24.3°C$
$H_A: \mu \neq 24.3°C$

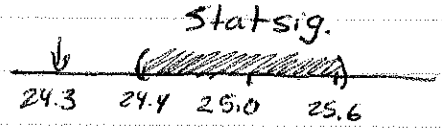
$1\% < P$



Reject the null if the P value is small (favor alternative, if P value is big go with the null

Conventions:

$P \leq 5\% \longleftrightarrow$ stat sig. $\longleftrightarrow$ regecting the null
$P \leq 1\% \longleftrightarrow$ highly stat sig



Here stat sig is not highly statisical

$H_0 = \mu = \mu_0$ ← null
$H_{A1} = \mu \neq \mu_0$ 2 sided alternative 2 tailed t test
$H_{A2} = \mu > \mu_0$ 1 sided alternative 1 tailed test
$H_{A3} = \mu < \mu_0$ 1 sided alternative 1 tailed test

Lets say P value is 8% for a 2 sided test, you can't publish this in a journal but if you do a 1 sided test, equals 4% now publishable.

$$t \neq \pm 2.59 = \frac{\bar{Y}-\mu_0}{s/\sqrt{n}} = \frac{\bar{Y}-24.3}{s/\sqrt{25}} = \frac{\text{signal}}{\text{noise}}$$

Julia larson

③ statsig $\neq$ practsig

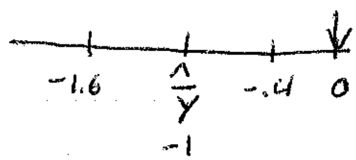
ex. drug reduces BP, measure people before and after

Person #	B	A	A-B
1	177	159	-18
2	155	157	+2
⋮	⋮	⋮	⋮
n	201	201	0

$\bar{Y} = -1$ mmHg

$\sigma = 10$ mmHg

95% CI



$\bar{Y} \pm \frac{s}{\sqrt{n}}$

$z \cdot \frac{10}{\sqrt{1000}} =$

1.96

null: $\mu = 0$

$(2)(0.3)(0.6)$ diff. Let w. $\bar{Y} = -1$, $\mu_0 = 0$ is statsig

but not practically significant, too much data