## 9.1a Significance Tests

A procedure for comparing observed data with a claim / hypothesis

↳ To decide how likely the claim is to be true

claim is about $\mu$ or $p$

BBall example: there are 2 possible explanations for why I only made $\frac{8}{20}$:

1. My claim was correct ($p = 0.8$) and by bad luck, an unlikely event occurred
2. I lied and $p$ is actually less than 0.8 (and the result of $\frac{8}{20}$ was not unlikely)

The probability of #1 is so small that we can be pretty sure #2 is correct.

We want to find evidence against the claim that $p = 0.8$.

$p$ = the proportion of free throws made

↳ That claim is called the Null Hypothesis ($H_0$)

$H_0 : p = 0.8$

always use = in $H_0$.

"no difference"

The claim we're trying to find evidence for is $p < .8$

↳ called the Alternative Hypothesis ($H_a$)

$H_a : p < 0.8$

use $<, >, \neq$ for $H_a$ ($\neq$ for 2-sided)

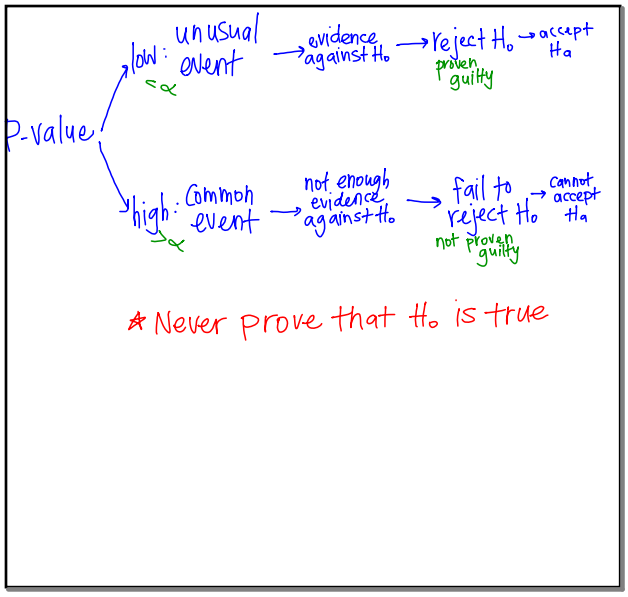
Here, $H_a$ is one sided - because we're only looking in one direction. ($<$)

Ex: p. 532

P-value: a probability that measures the strength of the evidence against $H_0$.

Interpret p-val: Assuming $H_0$ is true, the p-val. is the probability that we'd get results as extreme as ours by luck

bball example: p-value = $\frac{1}{10,000}$




* Never prove that $H_0$ is true

Statistically Significant — not likely to happen by chance

If p-value is smaller than $\alpha$ (significance level)

$P < \alpha$

ex: $\alpha = .05$, $\alpha = .01$ } depends on the problem

Side note #3: $\alpha$ should be decided before we look @ data.

3 C's to the final step of significance tests:

C: Compare — p-val to $\alpha$

C: Conclude — reject/not reject $H_0$

C: Context