

Lesson 4 - Strength of Evidence

- Objectives:
1. Parameter vs. Statistic
 2. How to simulate chance model
 3. Statistical Significance
 4. 3S Strategy
 5. Null and alternative hypothesis
 6. p-value (applet)
 7. Interpret p-value
- conversely if the observed result is consistent w/ the by chance model, we say the chance model is plausible.

What is Statistical Significance? - if result unlikely to occur by random chance we say it is SS.

Indicates the Strength of Evidence that the observed result did not occur by chance alone.

- 3S Strategy
- Statistic \rightarrow what we saw (computed from observed data)
 - Simulate \rightarrow Applet / coin / Dice (determine distribution of possible outcomes if null hypothesis is true)
 - Strength of Evidence
 - \hookrightarrow P-value / The argument
- Assuming the chance model is true, how likely is the observed statistic

Parameter - long run numerical property of a random process and is not observable. (Unknown)

Statistic - computed from the observed data (Known)

π : Long-run true proportion.
parameter
unknowable/unobservable

\hat{p} : observed proportion
Statistic
we see it, it happened

H_0 : Null Hypothesis
The "by chance" parameter assumption

H_a : Alternative Hypothesis
The "There is an effect" explanation that contradicts the null.

n : Sample size (per simulation)

P-value: The probability of observing a sample at least as extreme as \hat{p} if H_0 is True

Strength of Evidence against the null
 $0.1 < P$ WEAK

$0.05 < P \leq 0.10$ MODERATE

$0.01 < P \leq 0.05$ Strong

$P \leq 0.01$ Very Strong