P-Value

Hypothesis: More than 75% of class 2025 at Bryant have siblings.

$H_0: p \leq .75$

$H_1: p > .75$

Data:

ID	have siblings
1	Yes
2	Yes
3	NO
4	NO
⋮	⋮
35	Yes

OR

Number of students: 35

have siblings: 26

p-value: we will calculate the p-value.

p-value is the probability / chance that the data exist if H_0 is true.

① what happens if p-value is 0 ?

p-value = 0 means: If H_0 is true, there is NO chance the data exist.

If H_0 is true, you don't observe this data.

⇒ H_0 should not be true b/c you Do observe the data

H_0 is not true $\Rightarrow$ H_1 is true

② If p-value is extremely small (p-value $\leq .05$)

Say p-value : .01 . This means :

If H_0 is true, then there is 1% chance the data exist (or you observe the data)

99% chance you observe different data.

almost no chance

$\Rightarrow$ H_0 is almost certainly not true. We say :

The data support your hypothesis (H_1)

③ If p-value is not small (p-value $> .05$)

If H_0 is true, there is a "good" chance that you observe the data.

H_0 may be true or not . H_1 may be true or not

The data does not support H_1. There is NO conclusion reached

Example

P-Value

P-value: The probability that "the data" exists if the null hypothesis is True