

P-Value

- ① More than 30% of class of 2025^{at Bryant} major in Finance.

$H_0: p \leq .3$ (less than or equal to 30%)

$H_1: p > .3$ (more than 30%)

- ② collect data: There are 2 ways to present the data

ID	Major in Finance
1	Yes
2	Yes
3	No
4	Yes
5	No
...	...
35	Yes

Number of students: 35

Finance majors: 8

②

- ③ p-value is the probability that the data exists if H_0 is true

If p-value is 0

⇒ If H_0 is true, the probability the data exists is 0.

or there is NO chance you see the data.

But The data DOES exist. You do see the data.

This means H_0 is NOT True

→ The opposite of H_0 is True.

⇒ H_1 is True

The argument: ① $p\text{-value} = 0$: If H_0 is true, the impossible happens
⇒ H_0 should not be True
⇒ H_1 is True

② $p\text{-value is extremely small}$ ($p \leq .05$)

If H_0 is true, then almost certain that you will the
differen data

⇒ H_0 should not be true

⇒ H_1 should be true if The data supports H_1

③ $p\text{-value is not small}$ ($p > .05$)

If H_0 is true, there is a good chance the data exists.

H_0 may be true or not.

$\Rightarrow H_1$ may be true or not.

\Rightarrow we found no evidence to support H_1 or
the data does not support your hypothesis, H_1

Example

P-Value

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

