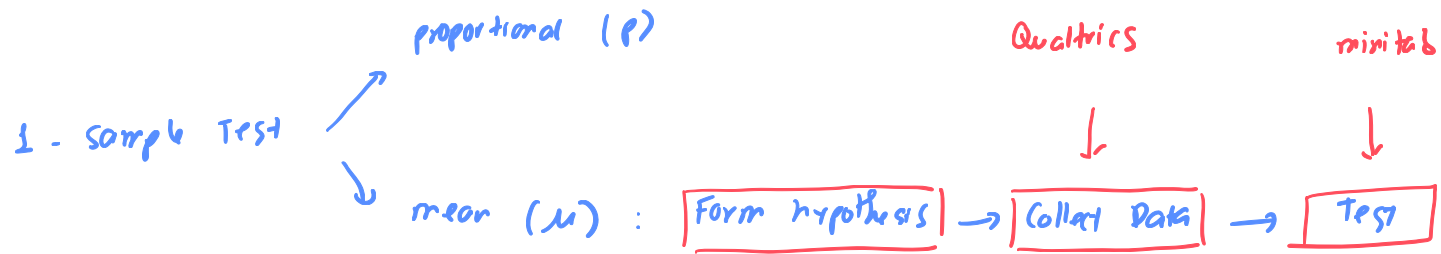


Type I, Type II errors and Significant Levels

① So far:



② Outcomes of a test

$\begin{cases} H_0 : \text{Smoking doesn't increase a risk of lung cancer.} \\ H_1 : \text{Smoking increases a risk of lung cancer} \end{cases}$

	H_0 is correct	H_0 is not correct
① There is sufficient evidence for H_1 . Reject H_0	Type 1 error (α) 	correct!
② There is not sufficient evidence for H_1 . Fail to reject H_0 .	correct 	Type 2 error (β)

$$\begin{cases} H_0 \\ H_1 \end{cases}$$

Get data . compute p-value = $\boxed{.017}$

① p-value < .05 \Rightarrow There is sufficient evidence for H_1 . Reject H_0

\uparrow

signifcant level

(α)

At this signifcant level, there is 5% the outcome is wrong.

② If the signifcant level is .01 ($\alpha = .01$)

p-value > α . Therefore, the outcome change

There is insufficient evidence for H_1 . Fail to reject H_0 .

Example 1:

.015

Suppose we want to test a hypothesis that exercises has positive affect on GPA. We collect data and find p-value = ~~0.015~~. Give the outcomes the test with significant level of .05, .02, and .01.

① $\alpha = .05$

p-value $< \alpha \Rightarrow$ There is sufficient evidence for H_1 . Reject H_0 .
(at 5% significant level)

② $\alpha = .02$

p-value $< \alpha \Rightarrow$ There is sufficient evidence that exercises has positive effect on GPA at 2% significant level

③ $\alpha = .01$

p-value $> \alpha \Rightarrow$ There is insufficient evidence that supports H_1

Example 2:

State in sentences Type 1 and Type 2 when test the hypothesis that drinking any amount of alcohol before driving increases crash risk among teen drivers.