

# Statistic for Educational Research MPU1034 Topic 8 : Hypothesis testing

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# Hypothesis Testing

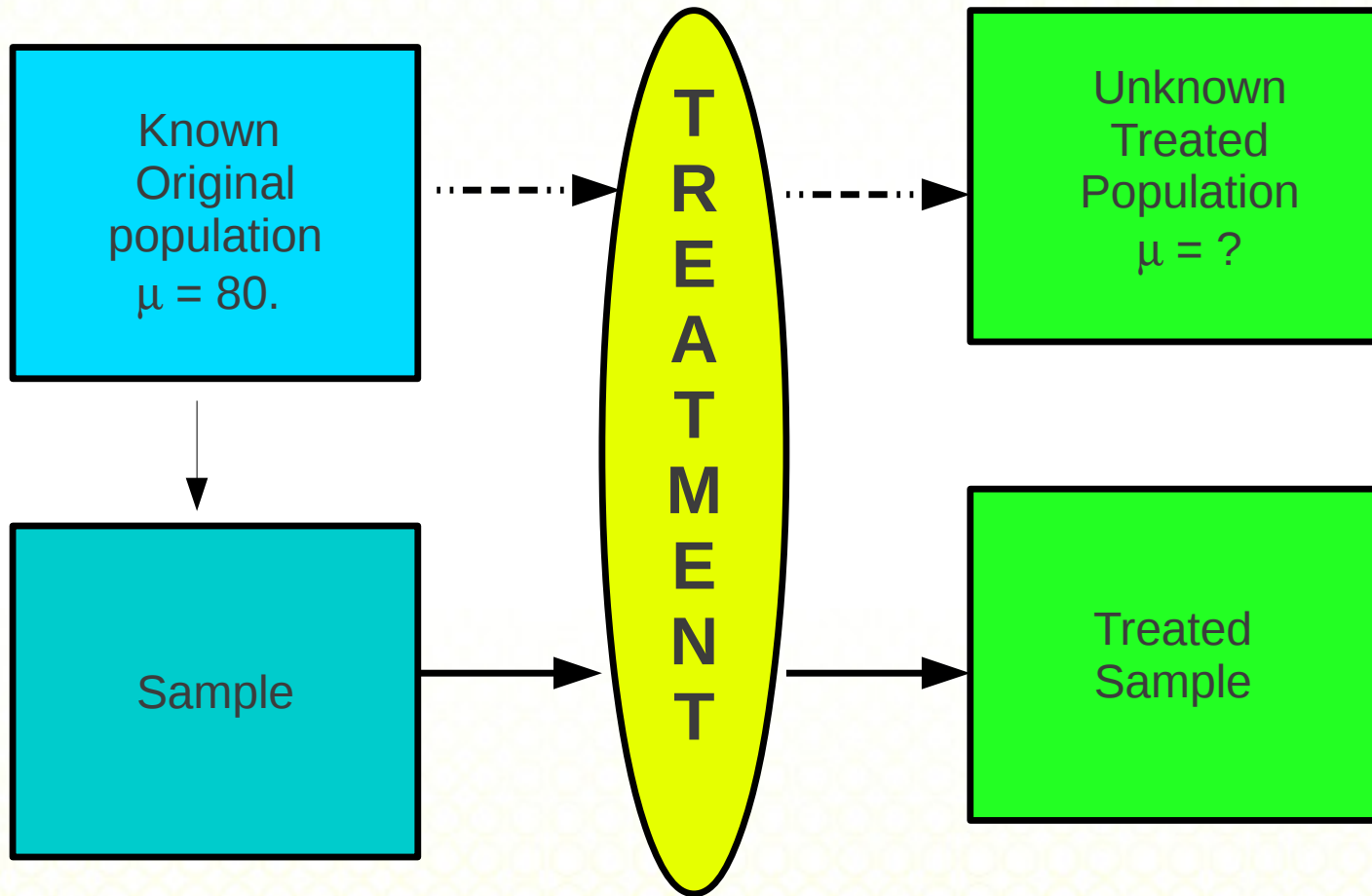
- Hypothesis testing is a statistical technique to determine whether a treatment has an effect on the sample.

# Hypothesis Testing (2)

Steps in hypothesis testing :

1. A sample is selected from the population.
2. The treatment is administered to the sample.
3. After treatment, the individuals in the sample are measured.

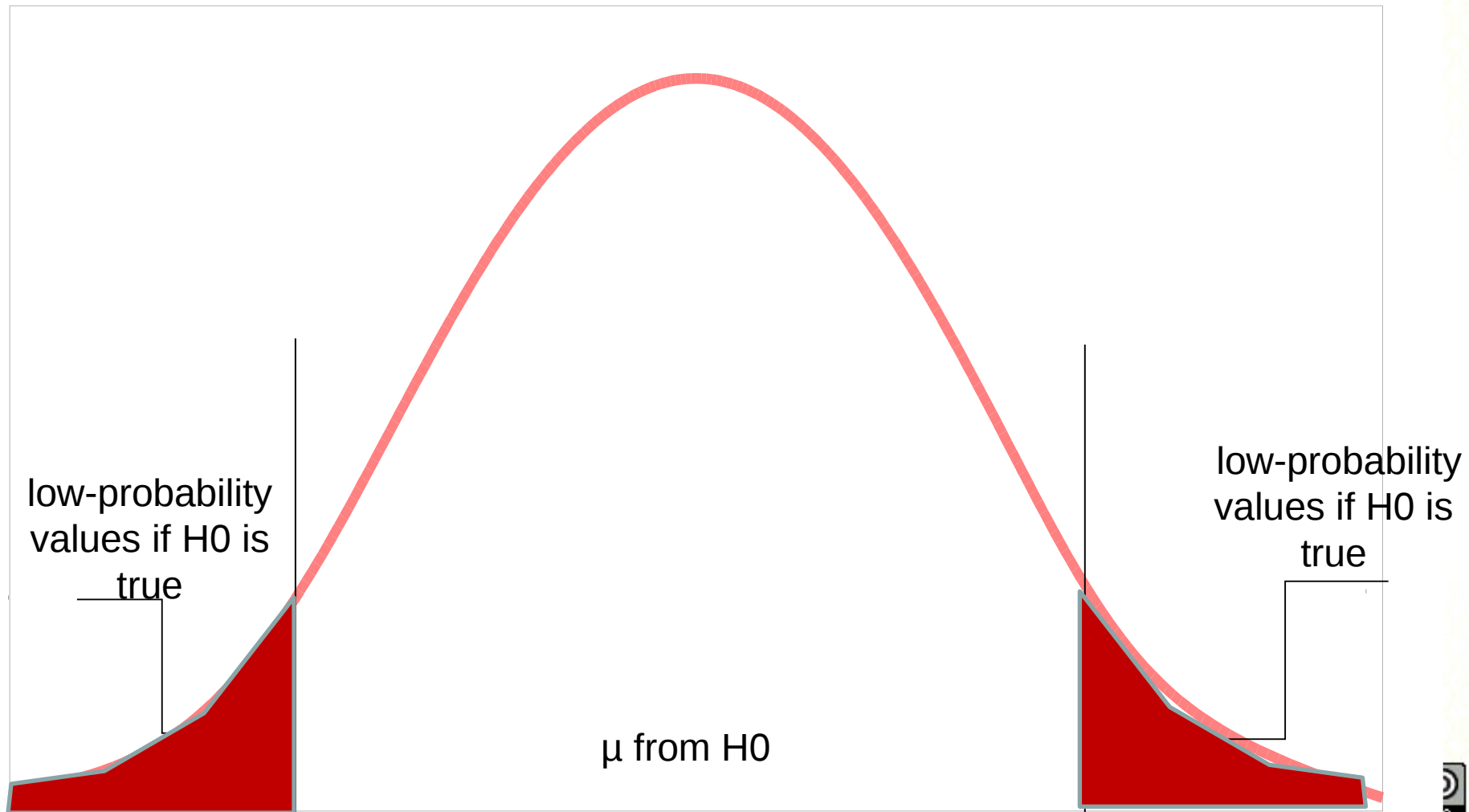
# Hypothesis Testing (3)



# Hypothesis Testing (4)

- The hypothesis testing is to explain about :
  1. Difference between the sample and the population.
  2. The difference may be due to sampling error .

# Hypothesis Testing (5)



# Steps in Hypothesis Testing

State the hypothesis

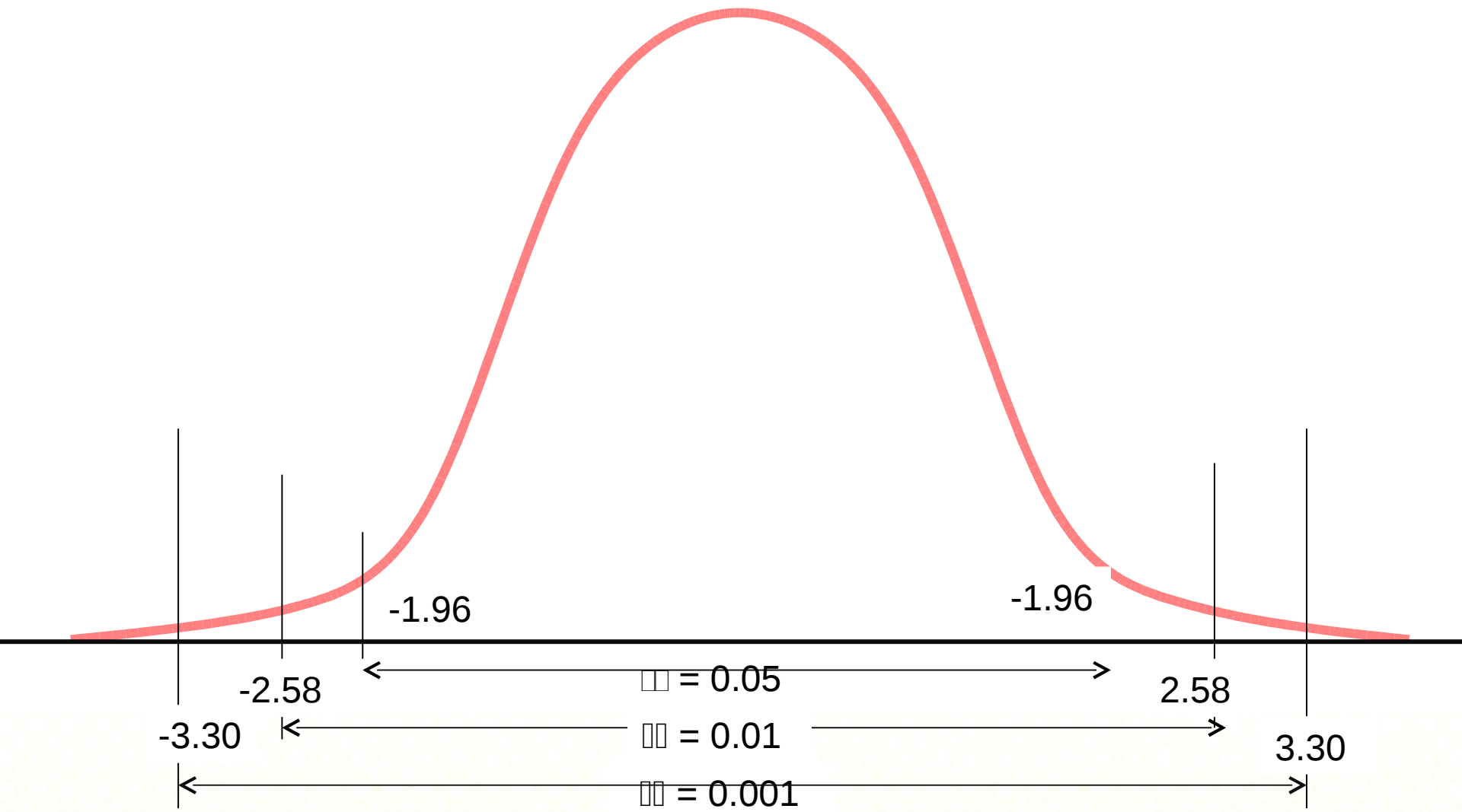
Select the  $\alpha$  level

Complete the test statistic

Locate the critical region

Reject the null hypothesis  
if the difference is relatively.

Accept the null hypothesis  
if the difference is relatively.





### Actual Situation

EXPERIMENTER'S  
DECISION

Reject  $H_0$

No Effect,  
 $H_0$  True

Effect Exists,  
 $H_0$  False

Type I error

Decision correct

Retain  $H_0$

Decision correct

Type II error

# One-Tailed Test

- A **one-tailed test** includes direction in the statement of the hypotheses and in the location of the critical region. .

# One-Tailed Test (2)

- For example, in an experimental study, a teaching intervention result in an increase of test scores in statistical thinking. Population is 75, assuming the mean of the original, the null hypothesis is

$$H_0 : \mu \leq 75$$

# Measuring Effect Size

- The hypothesis test is influenced by :
  - a. The size of the treatment effect and
  - b. The size of the sample.
- A very small effect can be significant is in a very large sample.

# Measuring Effect Size (2)

- A significant effect does not necessarily mean a large effect.
- A measure of the **effect size should accompanied the hypothesis test.**
- Cohen =  $s d$  is a standardized measure of effect size.
- **Cohen =  $s d$**  measures the size of the mean difference in terms of the standard deviation.

# Power of a Hypothesis Test

- The **power** of a hypothesis testing is the probability rejecting the null hypothesis when the treatment does have an effect.
- The power of a test depends on the size of the treatment effect and the size of the sample.