

# 6 Hypothesis tests – Part 2

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Vocabulary 词汇

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*Write each word three times. 把每个单词抄写三遍。*

| English | 中文 | Write it 3 times (English) |
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| hypothesis test | 假设检验 | _____ |
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## Recall

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In Part A you estimated a value with a confidence interval. Now test a claim:

- Is a coin fair, or biased?
- Does the data give real evidence, or could it just be chance?

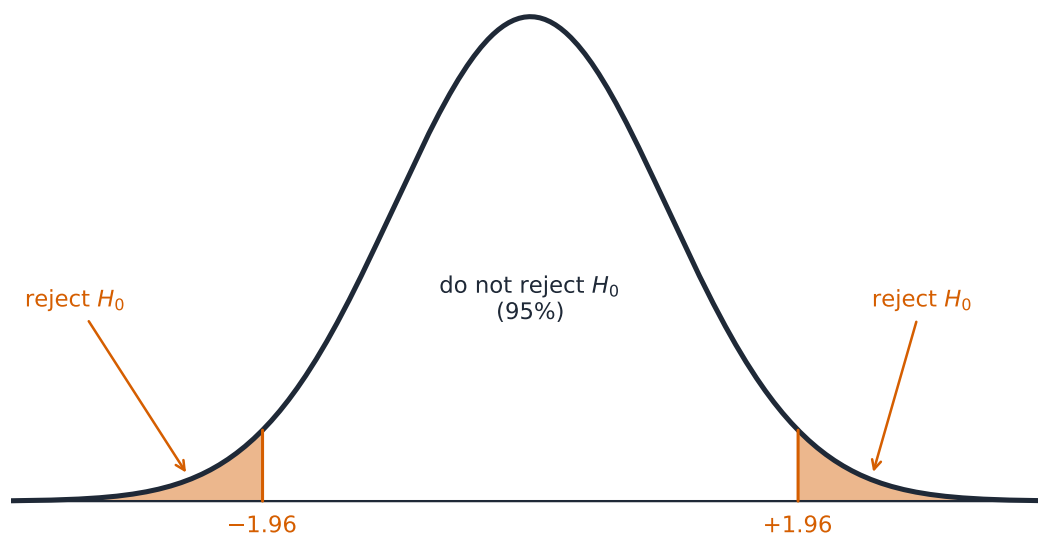
Each idea has a worked example before the Practice.

## New ideas

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### ■ 1 A hypothesis test

A **hypothesis test** 假设检验 weighs evidence against a claim. It starts with a **null hypothesis** – “nothing unusual is going on” (for example, the coin is fair).



## ■ 2 The p-value

The **p-value** is the chance of getting data at least this extreme **if the null hypothesis were true**. A **small** p-value means the data would be surprising, which is evidence against the null.

## ■ 3 The decision

If the p-value is below a chosen level (often 0.05), we **reject** the null hypothesis – the effect is "statistically significant". Otherwise we do not reject it.

*Worked example.* A coin gives 9 heads in 10 flips. If the coin were fair, that is very unlikely (small p-value), so we have evidence it is biased.

## ■ 4 What it does not prove

Failing to reject the null does **not** prove it true – it just means there was not enough evidence against it.

**Watch out:** a small p-value means the data are **surprising if the null is true** – it does not directly give "the probability the null is true". And "not significant" means "not enough evidence", not "proven no effect".

## Practice

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Try these in order. The methods are all above.

**2.1** State what the null hypothesis usually represents. [2]

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**2.2** State what a p-value measures. [2]

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**2.3** State what a small p-value tells you. [2]

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**2.4** A test gives a p-value of 0.02 (below 0.05). State the decision. [1]

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**2.5** Explain why failing to reject the null does not prove it true. [2]

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