Exercise walk-through

Potential Errors When Performing Tests ▪ 6.7

eXercise

You must be able to

- describe a **Type I error** 第一类错误 (rejecting a true H_0)
- describe a **Type II error** 第二类错误 (failing to reject a false H_0)
- describe the **power** 功效 of a test

Method — Two kinds of error

- **Type I** — reject H_0 when it is actually **true** (a false alarm). Its probability is α.
- **Type II** — fail to reject H_0 when it is actually **false** (a missed effect). Its probability is β.

Method — Power

Power $= 1 - \beta$ — the probability of correctly detecting a real effect (rejecting a false H_0).

Practice 2.1 ▪ 1 mark

Define a Type I error.

Solution 2.1

Method: Two kinds of error

Worked steps

rejecting H_0 when it is actually true **B1**.

Practice 2.2 ▪ 1 mark

Define a Type II error.

Solution 2.2

Method: Two kinds of error

Worked steps

failing to reject H_0 when it is actually false **B1**.

Practice 2.3 ▪ 1 mark

State what the power of a test measures.

Solution 2.3

Worked steps

the probability of correctly rejecting a false H_0 (detecting a real effect) B1.

Exam-style 3.1 ▪ 1 mark

A Type I error is

A rejecting a true H_0

B failing to reject a false H_0

C a correct decision

D a form of bias

Solution 3.1

Method: Two kinds of error

A rejecting a true H_0 ✓

B failing to reject a false H_0

C a correct decision

D a form of bias

Worked steps

A.

Exam-style 3.2 ▪ 1 mark

The probability of a Type I error equals

A β

B α

C the power

D 0

Solution 3.2

Method: Two kinds of error

A β

B α ✓

C the power

D 0

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

A drug that does **not** work is declared effective by a test.
(a) Name this type of error.
(b) Name the error of missing a drug that **does** work.
(c) Name the probability of correctly detecting a real effect.

Solution 3.3

Method: Power

Worked steps

(a) a Type I error B1. (b) a Type II error B1. (c) power B1.