

Exercise walk-through

Skills Focus: Selecting an Appropriate Inference Procedure for Categorical Data ■

8.7

eXercise

You must be able to

- choose a **goodness-of-fit** test, a test of **homogeneity**, or a test of **independence**
- distinguish these chi-square procedures from a one- or two-proportion procedure

Method — Which categorical procedure?

- **Goodness of fit** — does **one** categorical variable match a claimed distribution?
- **Homogeneity** — is the distribution of one variable the **same across several groups**?
- **Independence** — are **two** categorical variables associated in **one** sample?
- **One/two proportion** — for a single proportion or the difference of two proportions (a two-category variable).

Method — Worked choices

“Does this die match a uniform distribution?” – one variable versus a claim → **goodness of fit**. “Do three schools have the same grade distribution?” – one variable across groups → **homogeneity**. “Are gender and subject choice associated in one sample?” – two variables, one sample → **independence**.

Practice 2.1 ■ 1 mark

State when to use a goodness-of-fit test.

Solution 2.1

Worked steps

when checking whether one categorical variable matches a claimed distribution **B1**.

Practice 2.2 ■ 1 mark

State when to use a test of independence.

Solution 2.2

Worked steps

when testing whether two categorical variables are associated in one sample **B1**.

Practice 2.3 ■ 1 mark

State the difference between a two-proportion test and a chi-square test of homogeneity.

Solution 2.3

Method: Which categorical procedure?

Worked steps

a two-proportion test compares two groups on a two-category variable; homogeneity compares a variable with more than two categories across groups **B1**.

Exam-style 3.1 ■ 1 mark

To test whether one categorical variable's distribution matches claimed proportions, use

- A** a t-test
- B** a goodness-of-fit test
- C** regression
- D** a z-interval

Solution 3.1

Method: Which categorical procedure?

A a t-test

B a goodness-of-fit test



C regression

D a z-interval

Worked steps

B.

Exam-style 3.2 ■ 1 mark

To test the association between two categorical variables in one sample, use

- A** a goodness-of-fit test
- B** a test of independence
- C** a mean test
- D** a slope test

Solution 3.2

Method: Which categorical procedure?

A a goodness-of-fit test

B a test of independence 

C a mean test

D a slope test

Worked steps

B.

Exam-style 3.3 ■ 1 mark

A researcher compares the distribution of blood types across 3 hospitals.

- (a) Name the type of data.
- (b) Name a suitable chi-square test.
- (c) State the degrees-of-freedom formula for the table.

Solution 3.3

Worked steps

- (a) categorical (counts) **B1**. (b) a chi-square test of homogeneity **B1**. (c) $(r-1)(c-1)$ **B1**.