

Exercise walk-through

Representing Two Categorical Variables ■ 2.2

eXercise

You must be able to

- organise two categorical variables in a **two-way table** 双向表
- calculate **joint** 联合, **marginal** 边缘, and **conditional** 条件 relative frequencies
- display the relationship with a **segmented** or **side-by-side bar chart**

Method — Three kinds of relative frequency

From a two-way table with grand total N :

- **Joint** — one cell $\div N$.
- **Marginal** — a row or column total $\div N$.
- **Conditional** — a cell $\div$ its **row (or column)** total.

Method — Displaying it

A **segmented (stacked)** or **side-by-side** bar chart shows how the categories of one variable break down by the other.

Practice 2.1 ■ 1 mark

Define a joint relative frequency.

Solution 2.1

Method: Three kinds of relative frequency

Worked steps

the proportion of the whole in one cell (one combination of categories) **B1**.

Practice 2.2 ■ 1 mark

Define a marginal relative frequency.

Solution 2.2

Method: Three kinds of relative frequency

Worked steps

the proportion of the whole in one category (a row or column total over the grand total) **B1**.

Practice 2.3 ■ 2 marks

In a survey of 50 people, 20 are “young and answered yes”. Find the joint relative frequency.

Solution 2.3

Method: Three kinds of relative frequency

Worked steps

$$\frac{20}{50} = 0.40 \quad \text{M1} \quad \text{A1}.$$

Exam-style 3.1 ■ 1 mark

A conditional relative frequency is a proportion within

- A** the whole table
- B** one row or one column
- C** a single cell only
- D** no group

Solution 3.1

Method: Three kinds of relative frequency

- A the whole table
- B one row or one column** 
- C a single cell only
- D no group

Worked steps

B.

Exam-style 3.2 ■ 1 mark

A row or column total divided by the grand total is a _____ relative frequency.

A joint

B marginal

C conditional

D none of these

Solution 3.2

Method: Three kinds of relative frequency

A joint

B marginal 

C conditional

D none of these

Worked steps

B.

Exam-style 3.3 ■ 2 marks

Of 80 students, 24 are “sporty and pass”.

- (a) Find the joint relative frequency of “sporty and pass”.
- (b) Name a chart that displays two categorical variables.

Solution 3.3

Method: Three kinds of relative frequency

Worked steps

(a) $\frac{24}{80} = 0.30$ **M1** **A1**. (b) a segmented or side-by-side bar chart **B1**.