Exercise walk-through

Statistics for Two Categorical Variables ▪ 2.3

eXercise

You must be able to

- compare **conditional distributions** 条件分布 across categories
- decide whether two categorical variables show an **association** or appear **independent** 独立
- interpret **differences in proportions** between groups in context

Method — Comparing conditional distributions

To check for a relationship, compare the **conditional distributions** of one variable across the categories of the other.

Method — Association vs independence

- If the conditional distributions are **noticeably different**, there is an **association**.
- If they are **about the same**, the variables appear **independent**.

Always describe the **difference in proportions** in context — and remember association is **not** causation.

Practice 2.1 ▪ 1 mark

State how to check for an association between two categorical variables.

Solution 2.1

Method: Association vs independence

Worked steps

compare the conditional distributions across the categories of one variable B1.

Practice 2.2 ▪ 1 mark

State what it means for two categorical variables to appear independent.

Solution 2.2

Method: Association vs independence

Worked steps

their conditional distributions are roughly the same B1.

Practice 2.3 ▪ 1 mark

In group A, 40% buy; in group B, 70% buy. State whether there is an association.

Solution 2.3

Method: Association vs independence

Worked steps

yes — the proportions differ noticeably B1.

Exam-style 3.1 ▪ 1 mark

Two categorical variables appear independent if their conditional distributions are

A very different

B roughly the same

C exactly zero

D categorical

Solution 3.1

Method: Association vs independence

A very different

B roughly the same ✓

C exactly zero

D categorical

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

An association is shown by

A equal proportions across groups

B differences in proportions across groups

C a single variable

D a mean

Solution 3.2

A equal proportions across groups

B differences in proportions across groups ✓

C a single variable

D a mean

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

Among smokers, 30% cough daily; among non-smokers, 5% do.
(a) Find the difference in proportions.
(b) State whether there is an association.
(c) State one caution about concluding causation.

Solution 3.3

Method: Association vs independence

Worked steps

(a) $30\% - 5\% = 25$ percentage points B1. (b) yes, there is an association B1. (c) an association does not prove that one variable causes the other B1.