

2.3 Statistics for Two Categorical Variables

Name: _____ Class: _____ Date: _____ Total: 8 marks

KEY WORDS independent 独立 • conditional distribution 条件分布

Objective

Build the skills to answer exam questions on **statistics for two categorical variables**.

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

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Comparing conditional distributions

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

■ 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.

2 Practice

2.1 State how to check for an association between two categorical variables. [1]

2.2 State what it means for two categorical variables to appear independent. [1]

2.3 In group A, 40% buy; in group B, 70% buy. State whether there is an association.[1]

3 Exam-style questions

3.1 Two categorical variables appear independent if their conditional distributions are[1]

- | | |
|---|---|
| A | B |
| C | D |
- A very different
 - B roughly the same
 - C exactly zero
 - D categorical

3.2 An association is shown by [1]

- | | |
|---|---|
| A | B |
| C | D |
- A equal proportions across groups
 - B differences in proportions across groups
 - C a single variable
 - D a mean

3.3 Among smokers, 30% cough daily; among non-smokers, 5% do.

- (a) Find the difference in proportions. [1]
- (b) State whether there is an association. [1]
- (c) State one caution about concluding causation. [1]