Exercise walk-through

Introducing Statistics: Do the Data We Collected Tell the Truth? ▪ 3.1

eXercise

You must be able to

- explain how the **method** of data collection affects the conclusions
- recognise sources of **bias** 偏差 that make data unrepresentative
- distinguish data that support a **generalization** 推广 from data that do not

Method — The method matters

How data are collected shapes what conclusions are valid. A flawed method can make even a large data set useless.

Method — Bias

Bias systematically makes a sample **unrepresentative** of the population, so conclusions are distorted.

Method — Generalizing

Only data from a well-chosen (ideally random) sample can be **generalized** to the whole population.

Practice 2.1 ▪ 1 mark

State how the method of data collection affects conclusions.

Solution 2.1

Method: The method matters

Worked steps

a poor method can make the data unrepresentative, so the conclusions are invalid B1.

Practice 2.2 ▪ 1 mark

Define bias in data collection.

Solution 2.2

Worked steps

a systematic tendency for a sample to misrepresent the population B1.

Practice 2.3 ▪ 1 mark

State what kind of sample allows generalization to a population.

Solution 2.3

Worked steps

a random (representative) sample B1.

Exam-style 3.1 ▪ 1 mark

Biased data are

A always accurate

B unrepresentative of the population

C very large

D perfectly random

Solution 3.1

A always accurate

B unrepresentative of the population ✓

C very large

D perfectly random

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

The way data are collected affects

A the population size

B the conclusions we can draw

C the mean only

D nothing at all

Solution 3.2

Method: The method matters

A the population size

B the conclusions we can draw ✓

C the mean only

D nothing at all

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

A poll surveys only people at a gym about their exercise habits.
(a) State whether the sample is representative of all adults.
(b) Name the problem.
(c) State whether the results can generalize to all adults.

Solution 3.3

Method: Generalizing

Worked steps

(a) no B1. (b) bias (undercoverage — gym-goers are not typical) B1. (c) no B1.