

## Exercise walk-through

Justifying a Claim Based on a Confidence Interval for a Difference of Population Proportions ■ 6.9

eXercise

## You must be able to

- use a confidence interval for  $p_1 - p_2$  to judge a claim
- recognise that an interval containing 0 means **no significant difference**
- interpret an interval entirely above or below 0

## Method — Judging a difference from the interval

A confidence interval for  $p_1 - p_2$  gives the plausible values of the difference:

- if the interval **contains** 0, “no difference” ( $p_1 = p_2$ ) is plausible;
- if the interval is entirely **positive**,  $p_1 > p_2$ ; entirely **negative**,  $p_1 < p_2$ .

## Method — Reading a worked interval

A study reports the difference  $p_1 - p_2$  as the 95% interval  $(-0.02, 0.11)$ . Because it **contains** 0, a zero difference is plausible – the data do **not** show a significant difference. Had it been  $(0.03, 0.11)$ , entirely positive, we would conclude  $p_1 > p_2$ .

## Practice 2.1 ■ 1 mark

State how a CI for  $p_1 - p_2$  can justify a claim of no difference.

## Solution 2.1

### Worked steps

if the interval contains 0, “no difference” is plausible **B1**.

## Practice 2.2 ■ 1 mark

A 95% CI for  $p_1 - p_2$  is  $(-0.03, 0.05)$ . State whether “no difference” is plausible.

## Solution 2.2

### Worked steps

yes, plausible (0 is inside the interval) **B1**.



## Practice 2.3 ■ 1 mark

State what a fully positive interval implies.

## Solution 2.3

## Worked steps

that  $p_1 > p_2$  (a real difference) **B1**.

## Exam-style 3.1 ■ 1 mark

A claim of “no difference” ( $p_1 = p_2$ ) is plausible if the CI for  $p_1 - p_2$  contains

**A** 1

**B** 0

**C**  $\hat{p}_1$

**D** the mean

## Solution 3.1

A 1

B 0



C  $\hat{p}_1$

D the mean

## Worked steps

B.

## Exam-style 3.2 ■ 1 mark

A 95% CI for  $p_1 - p_2$  is  $(0.04, 0.12)$ . The claim  $p_1 = p_2$  is

- A** supported
- B** not supported
- C** certainly true
- D** unknown

## Solution 3.2

**A** supported

**B** not supported 

**C** certainly true

**D** unknown

### Worked steps

**B.**

## Exam-style 3.3 ■ 1 mark

A 95% CI for the difference in approval between two groups is  $(-0.02, 0.08)$ .

- (a) State whether 0 is in the interval.
- (b) State whether the groups differ significantly.
- (c) State the plausible conclusion.

## Solution 3.3

### Worked steps

(a) yes **B1**. (b) no **B1**. (c) there is no significant difference between the groups **B1**.