

Exercise walk-through

7.9

Carrying Out a Test for the Difference of Two Population Means

AP Statistics

Two-mean test and paired data

A **two-sample t-test** t of
 $H_0 : \mu_1 = \mu_2$ - **do not pool** (unlike
 proportions):

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2}}$$

Same subjects measured twice? Use a
paired t-test t : reduce each
 pair to a difference d , then a one-sample
 t .

Brands

$\bar{x}_1 = 85, \bar{x}_2 = 78; SE = \sqrt{2}$:

$$t = \frac{7}{1.414} \approx 4.95$$

$df = 8, p \approx 0.001$: reject.

Exercises 2.1-2.3

2.1 State the steps to carry out a two-sample t-test.

[2]

2.2 State what a large $|t|$ suggests.

[1]

2.3 A two-sample t-test gives a p-value of 0.06 at $\alpha = 0.05$. State the decision.

[1]

Exercises 2.1-2.3

2.1 State the steps to carry out a two-sample t-test. [2]

2.1

- state hypotheses and check conditions; compute t ; find the p-value; compare to α and conclude

2.2 State what a large $|t|$ suggests. [1]

2.2

- a difference between the two means (a small p-value)

2.3 A two-sample t-test gives a p-value of 0.06 at $\alpha = 0.05$. State the decision. [1]

2.3

- fail to reject H_0 ($0.06 > 0.05$)

Exercises 3.1-3.2

3.1 A two-sample t-test compares

[1]

☐

A two proportions

B two means

C one mean to a fixed value

D categories

3.2 A two-sample t-test fails to reject H_0 when the p-value is

[1]

☐

A below α

B above α

C exactly zero

D negative

Exercises 3.1-3.2

3.1 A two-sample t-test compares

[1]

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A two proportions

B two means

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D categories

3.1 B

- two means.

3.2 A two-sample t-test fails to reject H_0 when the p-value is

[1]

☐

A below α

B above α

C exactly zero

D negative

3.2 B

- above α .

Exercise 3.3 (a)

3.3 A two-sample t-test gives a p-value of 0.01 at $\alpha = 0.05$.

(a) State the decision.

[1]

Exercise 3.3 (a)

3.3 A two-sample t-test gives a p-value of 0.01 at $\alpha = 0.05$.

(a) State the decision.

[1]

(a)

- reject H_0

Exercise 3.3 (b)

3.3 A two-sample t-test gives a p-value of 0.01 at $\alpha = 0.05$.

(b) State whether the means differ significantly.

[1]

Exercise 3.3 (b)

3.3 A two-sample t-test gives a p-value of 0.01 at $\alpha = 0.05$.

(b) State whether the means differ significantly.

[1]

(b)

- yes

Exercise 3.3 (c)

3.3 A two-sample t-test gives a p-value of 0.01 at $\alpha = 0.05$.

(c) State the conclusion in context.

[1]

Exercise 3.3 (c)

3.3 A two-sample t-test gives a p-value of 0.01 at $\alpha = 0.05$.

(c) State the conclusion in context.

[1]

(c)

- there is convincing evidence that the two means differ