



A-Level Psychology Research Methods Exam with A-Grade Answers

By [PsychLogic](#), published Feb 18, 2020

A psychologist wanted to test whether listening to music improves running performance.

The psychologist conducted a study using 10 volunteers from a local gym. The psychologist used a repeated measures design. Half of the participants were assigned to condition A (without music) and half to condition B (with music).

All participants were asked to run 400 metres as fast as they could on a treadmill in the psychology department. All participants were given standardised instruction. All participants wore headphones in both conditions.

The psychologist recorded their running time in seconds. The participants returned to the psychology department the following week and repeated the test in the other condition.

(a) Identify the type of experiment used in this study.

- A. Laboratory
- B. Natural
- C. Quasi
- D. Research

(1 mark)

“It is an artificial situation where the experimenter manipulates the variables of music/no music and participants know they are taking part in a study.”

(b) Identify the operationalised dependent variable in the study. (2 marks)

“How fast participants could run 400m on a treadmill measured in seconds”.

(Note how specific this is...)

(c) The results of the study are given in Table 1 below.

Table 1. Mean number of second taken to complete the 400m run and the standard deviation for both conditions.

	Condition A	Condition B
Mean 400m time (s)	123	117
Standard deviation	9.97	14.5

Explain why a histogram would not be an appropriate way of displaying the means shown in Table 1.

(2 marks)

“Data shown in the table is not at the interval level of measurement.”

(d) Name a more appropriate graph to display the means shown in Table 1. Suggest appropriate X (Horizontal) and Y (vertical) axis labels for your graph choice.

(3 marks)

Name of graph

Mean number of second taken to complete the 400m run for condition A (no music) and condition B (music).

X axis label

Condition A (without music), Condition B (with music)

Y axis label

Mean 400m time (s)

(e) What do the mean and standard deviation values in Table 1 suggest about the participants' performances with and without music? Justify your answer.

(4 marks)

“Listening to music caused, on average, slightly faster speed than not listening to music (117 s. compared to 123 s.) This suggests that listening to music results in a faster running speed. The SD figure for Condition B (music) of 14.5 is higher than Condition A (no music) of 9.97. This means that there was more average variability from the mean score when participants listened to music: i.e. some ran quite a lot faster and some ran quite a lot slower than the mean average whereas for Condition A each participant's speed was more consistent/more closely clustered around the mean. This suggests that music may have helped some participants run faster and caused some participants to run slower.”

(f) Calculate the percentage decrease in the mean time it took participants to run 400 metres when listening to music. Show your workings. Give your answer to three significant figures. (4 marks)

“Mean speed reduced from 123 to 117 = 6 seconds slower.
 To calculate % decrease in speed: $6/123 \times 100 = 4.878\%$ decrease in speed (3 d.p.)”

The researcher used a directional hypothesis and analysed the data using a related t-test. The calculated value of t where degrees of freedom (df) = 9 was 1.4377. He decided to use the 5% level of significance.

Table 2. Table of critical values of t

Level of significance for a one-tailed test	0.05	0.025
Level of significance for a two-tailed test	0.10	0.05
df = 1	6.314	12.706
2	2.920	4.303
3	2.353	3.182
4	2.132	2.776
5	2.015	2.571
6	1.943	2.447
7	1.895	2.365
8	1.860	2.306
9	1.833	2.262
10	1.812	2.228

Calculated value of t must be equal to or greater than the critical value in this table for significance to be shown

(g) Give three reasons why the researcher used a related t-test in this study and, using Table 2, explain whether or not the results are significant.

(5 marks)

Why researcher used a related t-test.

Answer

“Because it is a test of difference using a repeated measures design with interval level data.”

Are results significant?

Answer.

“The results are not significant because the calculated value of t (1.4377) < the CV (1.833) (1-tailed test, $p = 0.05$, $df = 9$). Therefore, the experimental hypothesis should be rejected.”

Explanation + notes.

The above is the quickest way of writing the correct answer. The way to work out the correct answer is

1. What is the observed/calculated value? In this case it is the value of $t = 1.4377$.
2. Find the correct critical value (CV) on the table. You need to cross-reference the correct level of significance (we are told it is 0.05) for the correct one/two-tailed test (we are told it's directional/one-tailed) with the correct df value (which we are told is 9). Cross-referencing this gives us the CV value of 1.833.
3. The rule for the related t-test (written under the table) is that if the calculated value > than the CV then the result is significant. The calculated value of t is smaller than the CV ($1.4377 < 1.833$) therefore the result is not significant.”

(i) Identify one extraneous variable that could have affected the results of this study. Suggest why it would have been important to control this extraneous variable and how it could have been controlled in this study.

(3 marks)

Use your imagination:

“The type of music being played could have acted as an extraneous variable. Some participants may have particularly disliked the music being played and this dislike may have caused them to run more slowly. Therefore, it may not have been the simple presence or absence of music which affected running speed but how much they liked/disliked the music they were listening to.”