What Changed?

A psychology study with more than one possible explanation

SS24.P.2a "Contrast the roles of independent, dependent, and confounding variables and the functions of control and experimental groups within the scientific method."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline what Maya changes and circle what she measures; number the two groups 1 and 2, then draw a box around the detail that could make their comparison misleading.

Music, Memory, and an Unexpected Noise

1. Maya predicts that instrumental music while studying will raise students' scores on a memory quiz. She recruits 40 volunteers and randomly assigns 20 to study with music and 20 to study in silence. Both groups get the same list of words, 10 minutes to study, and the same quiz afterward. The music group receives the condition Maya wants to test. The silence group gives her a comparison without that condition. Random assignment helps make the groups similar before studying, but it does not guarantee that every other influence stays the same.

2. In an experiment, the independent variable is what the researcher deliberately changes. The dependent variable is what the researcher measures for a possible response. For example, a researcher might change how long a picture stays on a screen, then count how many details people recall. An experimental group receives the condition under investigation; a control group provides a baseline for comparison. A confounding variable is another factor that differs between groups and could also affect the measured result. Confounds make it hard to tell which factor produced a difference.

3. On quiz day, the music group studies beside a window where loud construction begins, while the silence group studies in a room away from the construction. No one planned this difference. The music group averages eight correct answers out of ten; the silence group averages six. The higher music-group score matches Maya's prediction, but the construction noise could also affect memory. Noise is not the condition she meant to test, and it occurred only for one group. A better repeat would keep both groups in the same quiet setting while changing only whether music plays.

2 ANSWER WITH EVIDENCE

Use the passage

1. What does Maya deliberately change, and what does she measure? Explain how their roles differ.

2. Which group is the control group? How does its role differ from the experimental group's role?

3. Which unplanned factor could confound this test, and why is it not the independent variable?

4. Do the scores show that music caused better recall? Contrast what the group comparison shows with what it cannot establish.

3 YOUR TURN

Your own words

Design a new psychology experiment about a daily habit and attention, using a habit other than listening to music. In four or five sentences, state your prediction, identify the independent and dependent variables, explain what the control and experimental groups do, and name a possible confound and how you would limit it.

What Changed?

PART 1 · READ AND MARK

Underline what Maya changes and circle what she measures; number the two groups 1 and 2, then draw a box around the detail that could make their comparison misleading. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What does Maya deliberately change, and what does she measure? Explain how their roles differ.	**She changes whether students study with music or in silence, the independent variable. She measures memory quiz scores, the dependent variable.**
2	Which group is the control group? How does its role differ from the experimental group's role?	**The silence group is the control group and provides a comparison without music. The music group is the experimental group and receives the condition being tested.**
3	Which unplanned factor could confound this test, and why is it not the independent variable?	**Construction noise could confound the test because only the music group heard it, and it could affect memory. Maya did not deliberately change the noise to test its effect.**
4	Do the scores show that music caused better recall? Contrast what the group comparison shows with what it cannot establish.	**The music group scored higher on average, but the scores do not establish that music caused the difference. Construction noise also differed between the groups and could have affected their scores.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I predict that a five-minute walk before class improves attention on a symbol-search task. The independent variable is whether students take the walk, and the dependent variable is the number of symbols they find correctly in two minutes. The experimental group walks, while the control group sits quietly for five minutes. Different amounts of sleep could affect attention and confound the results. I would group students by reported hours of sleep, then randomly assign equal numbers from each sleep group to each condition.

Accept any distinct daily habit and attention measure if the proposed groups differ in the intended condition and the named confound could affect the outcome. For question 4, students must distinguish an observed score difference from evidence of causation.