

## Meditation and Exam Performance

A university wellness center wants to know whether short guided “micro-meditation” breaks can improve students’ exam performance. They recruit 120 first-year students enrolled in the same introductory psychology course. Before the first midterm, the wellness center randomly assigns students to one of two groups:

- Group A (60 students): Before each of the three class sessions leading up to the midterm, these students participate in a 5-minute guided meditation audio recording.
- Group B (60 students): In each of those same class sessions, these students do not receive the meditation session.

All students then take the same midterm exam under identical conditions. The researchers compare average midterm exam scores between the two groups. To ensure fairness, the professor teaching the class does not know which students are in which group. After the exam, the wellness center also records background information from each student, including:

- Amount of sleep the night before the exam
- Stress level (self-reported on a 1–10 scale)
- Whether they regularly meditate outside class
- Whether they studied more or less than usual for this exam

a) Identify the explanatory and response variables in this study.

**Explanatory: Whether they meditated. Response: How well they performed on the exam.**

b) Is this study a controlled experiment or an observational study? Explain.

**Controlled experiment. Random assignment was used, where the explanatory variable was imposed on the observational units (students).**

c) Does this study make use of a comparison group? Explain.

**Yes, the students who did not receive meditation treatment were the comparison group. By comparing with that group, we can better determine if the meditation had an effect.**

d) Identify a lurking variable. Why is it a lurking variable?

**The amount of sleep, for instance. Because this can affect the response variable (exam performance).**

- e) Are there any confounding variables? If so, identify one. If not, why not?  
**No, there aren't any confounding variables. Confounding variables are lurking variables that also affect the explanatory variable. However, by randomly assigning the students into treatment groups, the experiment imposes the explanatory variable on the students, so no other variables can affect it.**
- f) Does this study make use of random assignment? Explain.  
**Yes, the study randomly assigns half of the students to a meditation group, and the other half to not receive that treatment.**
- g) Once the study is completed, does its design allow you to make a cause-and-effect conclusion about the effect of meditation on exam performance? Why or why not?  
**Yes, because this is an experiment and not an observational study, we can therefore draw cause-and-effect conclusions. This is because the only difference between the treatment group and the control group is whether they received meditation treatment. Therefore, if one group does significantly better than the other, we can attribute that difference to the meditation treatment.**