

Full name _____

SUNet ID (the part before @stanford.edu) _____

Section (e.g., TUES 9:30) _____

Please write legibly so the teaching team can log your attendance: if we can't read your name, we can't give you credit.

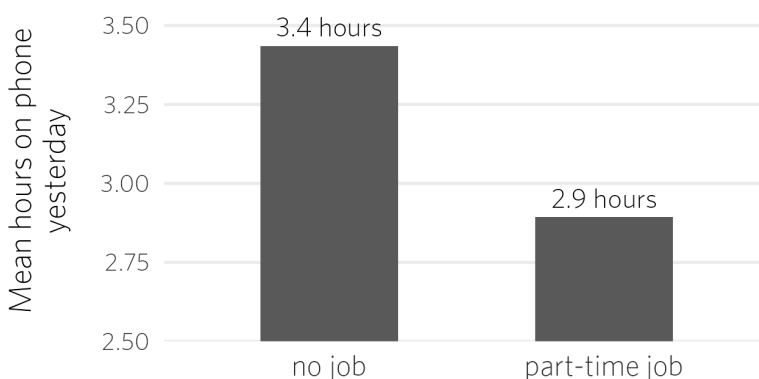
PSYCH 10 · Fall 2026 · Worksheet for Lecture 4: Explaining variation

Work through these with the people sitting next to you; the teaching team will be walking around to help. Credit is for a good-faith effort, not for right answers. Hand it in before you leave.

Part 1 · A bar plot in the campus paper

Students with jobs spend 15% less time on their phones

Class survey, 148 students



Suppose a campus newspaper printed this bar plot, with the headline “Students with jobs spend 15% less time on their phones.” The bars are the mean number of hours spent on the phone yesterday, for students without a job and for students with a part-time job.

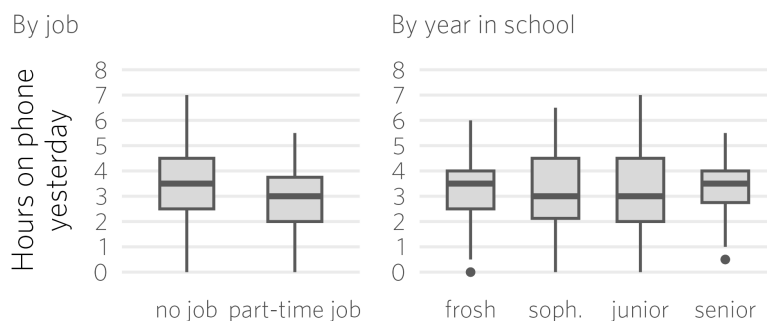
- The headline says 15% less. Check that with the two numbers printed on the bars: by what percentage is the job group’s mean below the no-job group’s mean?
- Look at where the vertical axis starts. If it started at zero instead, would the two bars look nearly the same height, or very different?
- The two means differ by half an hour. From this bar plot alone, can you tell whether half an hour is a big difference compared with how much students *within the same group* differ from one another? What would a plot have to show before you could answer that question?

a. _____

b. _____

c. _____

Part 2 • Job or year?



These plots show the same 148 students' phone hours broken down two ways: by job, and by year in school.

- Which explanatory variable explains more of the variation in phone hours, job or year? Say which feature of the box plots you used: the distance between the medians, or the amount of overlap between the boxes.
- Look at the students without a job. Is everyone in that group on their phone for about 3.5 hours a day? Say which part of the box plot is your evidence.

a. _____

b. _____

Part 3 • Tennis and a long life

A 2018 study followed about 8,600 adults in Copenhagen for 25 years. **People who played tennis lived about 9.7 years longer, on average, than people who did no exercise.**

- Write down **two different processes** that could have produced that difference: two different explanations for how it could have come about, not two versions of one explanation.
- Ask a neighbor for one of theirs and write it down as your third. Then check each other's: does your neighbor's process seem plausible to you, and does yours to them?
- Circle the one of the three you find most plausible.
- Pick one of the others. What would you look up, or go out and measure, to tell whether it or the one you circled is what produced the difference?

a1. _____

a2. _____

b. _____

d. _____

What is something new you learned today?
