

What your research supposedly looks like:

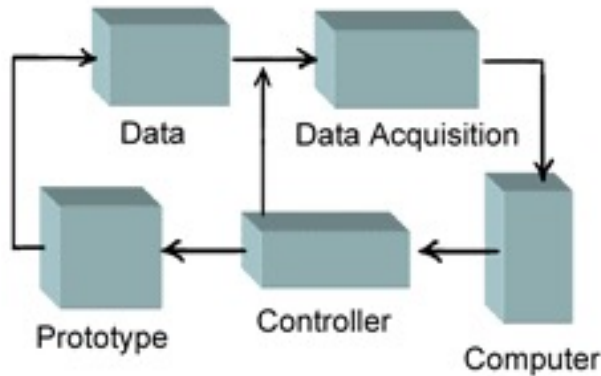


Figure 1. Experimental Diagram

What your research *actually* looks like:

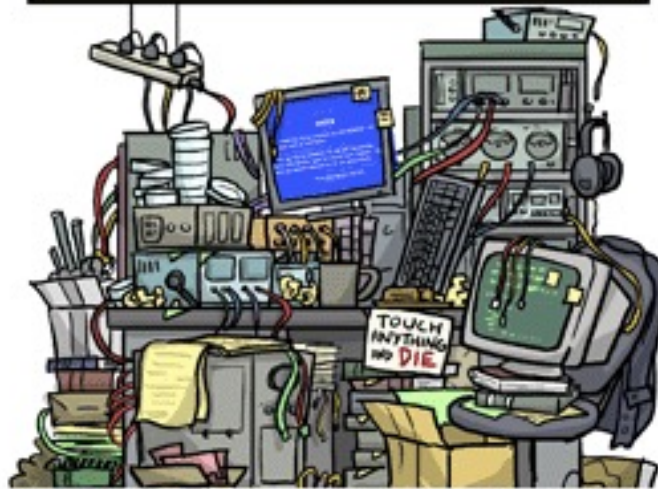


Figure 2. Experimental Mess

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How's my design?

Lab Studies

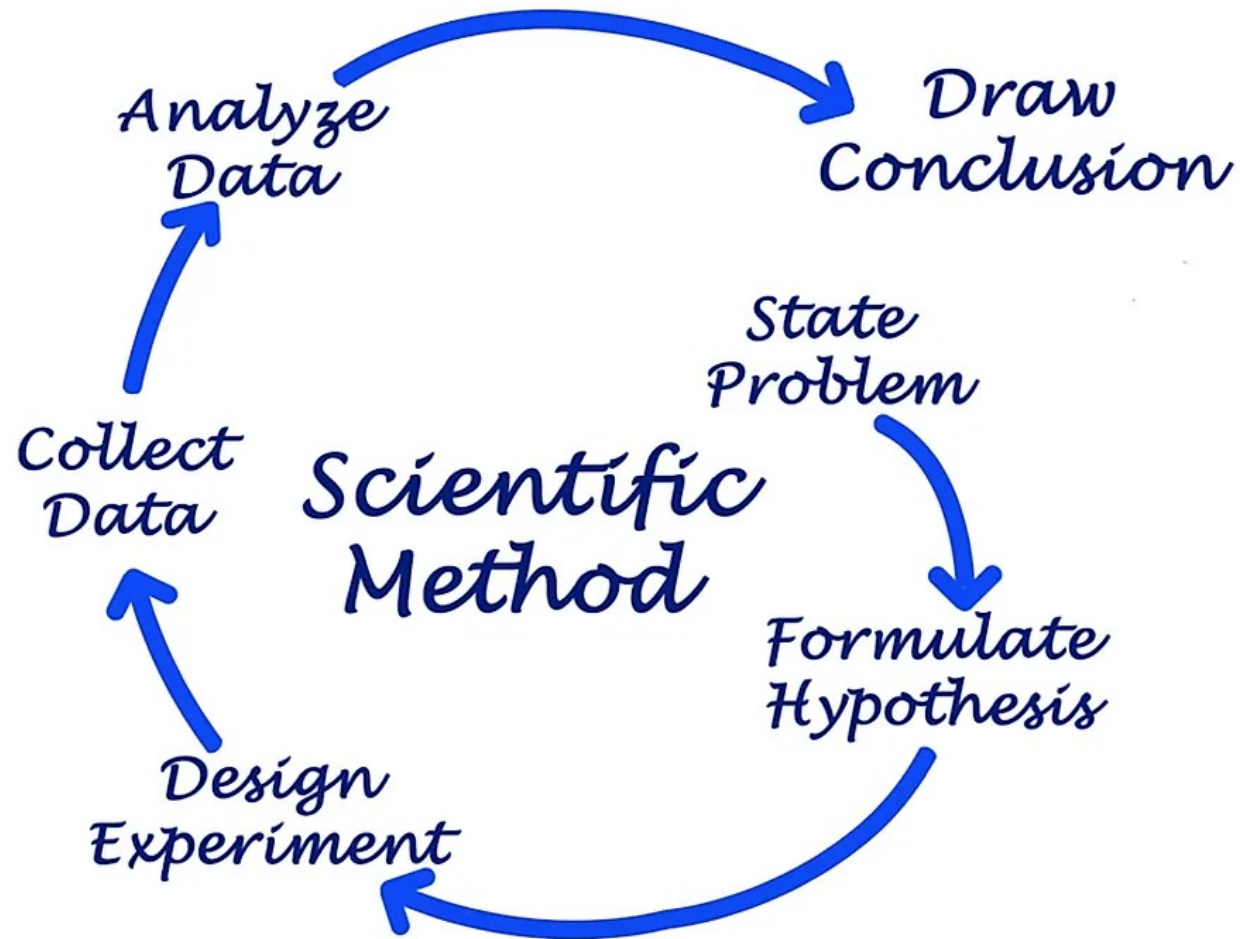


1. Experimental design

Variables, validity, manipulation, measurement

2. Physiological data analysis

Breakout session



Science as an ongoing process

Defining variables

- The *independent variable* is the one you change that makes the scenario different than normal conditions (control)
- The *dependent variable* is the way you will measure the results of the experiment
- A *control variable* is anything that is held constant or limited in the experiment

Balancing internal and external validity

- *Internal validity* is about how strongly you can demonstrate causation
(whether only your manipulation explains your outcomes)
- *External validity* is about how confidently you can generalize your findings
(whether study subjects and environment are representative)

Manipulating independent variables

- **Experimental and control conditions**
(decide how many conditions to use and how widely they vary)
- **Between- or within-subjects design**
(whether subjects experience one or all conditions)

Measuring dependent variables

- **Data collection on your variable outcomes**
(aim for reliable and valid measurements that minimize bias or error)
- **Ethical considerations**
(obtaining consent, minimizing harm, data anonymity)

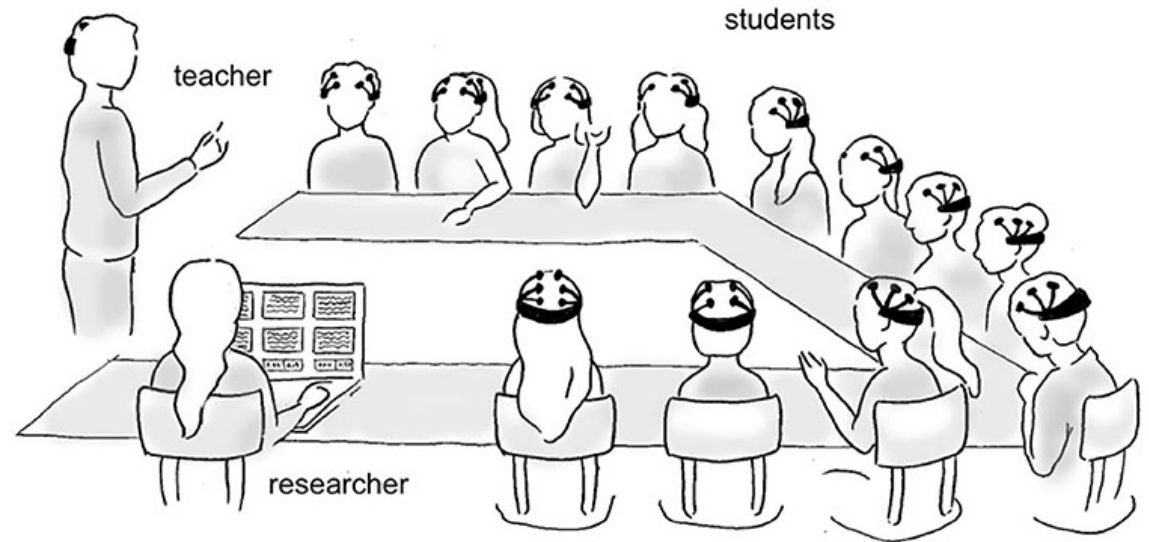
1. Experimental design

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Breakout session

- Lab5_EMG.ipynb



- Experimental design requires balancing internal and external validity so that specific yet generalizable conclusions can be drawn

- Lab 6: Online Studies
- *Presentations of Experimental Designs on Wednesday*
- *Start thinking of, and working on, Data Collection*