

Programming Psychology Experiments: Overview

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Lecture 0 | 5 September 2025

What will you get from this course?

Learn to **build psychology experiments** (Python & JavaScript):

- Instruct the computer to present what you want when you want it
- Record participant responses to a datafile

Learn the **basics of data analysis** (R):

- Clean up the collected data for tidy analysis
- Basic statistical analysis and plotting

Improve your **programming skills** through hands-on practical tutorials

Why should you learn all this?

Programming experiments, **analyzing** data, and computational **modeling** are central to contemporary research in cognitive science (and beyond)

Understanding how computers work is **foundational to cognitive science**

Learning to **automate repetitive tasks** saves time and energy

LLMs are still too unreliable to automate coding itself—for now, you are better off using them *minimally* in the beginning and *collaboratively* later on, once you are in a good position to evaluate their outputs

What is expected of you?

Regular attendance: Let us know in advance via [email](#) if you cannot attend the lectures for a good reason

Working during and outside the lectures: At the end of each lecture, we will ask you for a copy of your work folder for that session

Grading: PASS/FAIL

The plan for the course

Weeks 1–6: Building experiments in Python (Python review, experiment libraries, presentation of audiovisual stimuli, recording responses, counterbalancing)

Weeks 7–9: Working with data in R (tidy data, ggplot, statistical tests)

Weeks 10–12: Online experiments (jsPsych), w/ Maxime Cauté

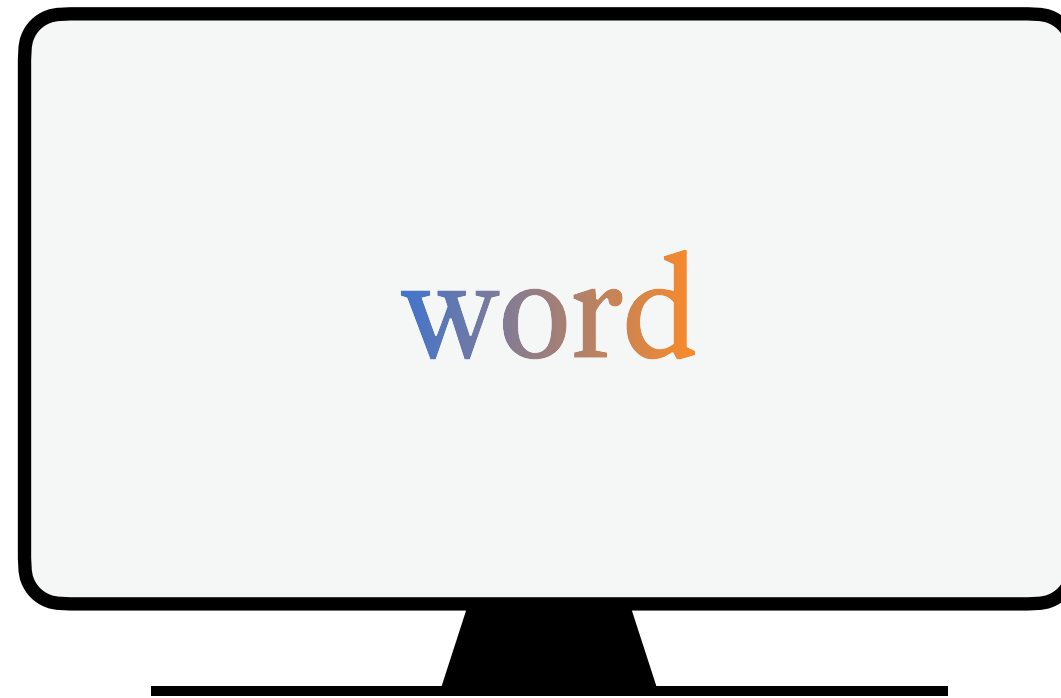
Week 13: Wrap-up

Example: The Stroop effect

Name the color of the ink.

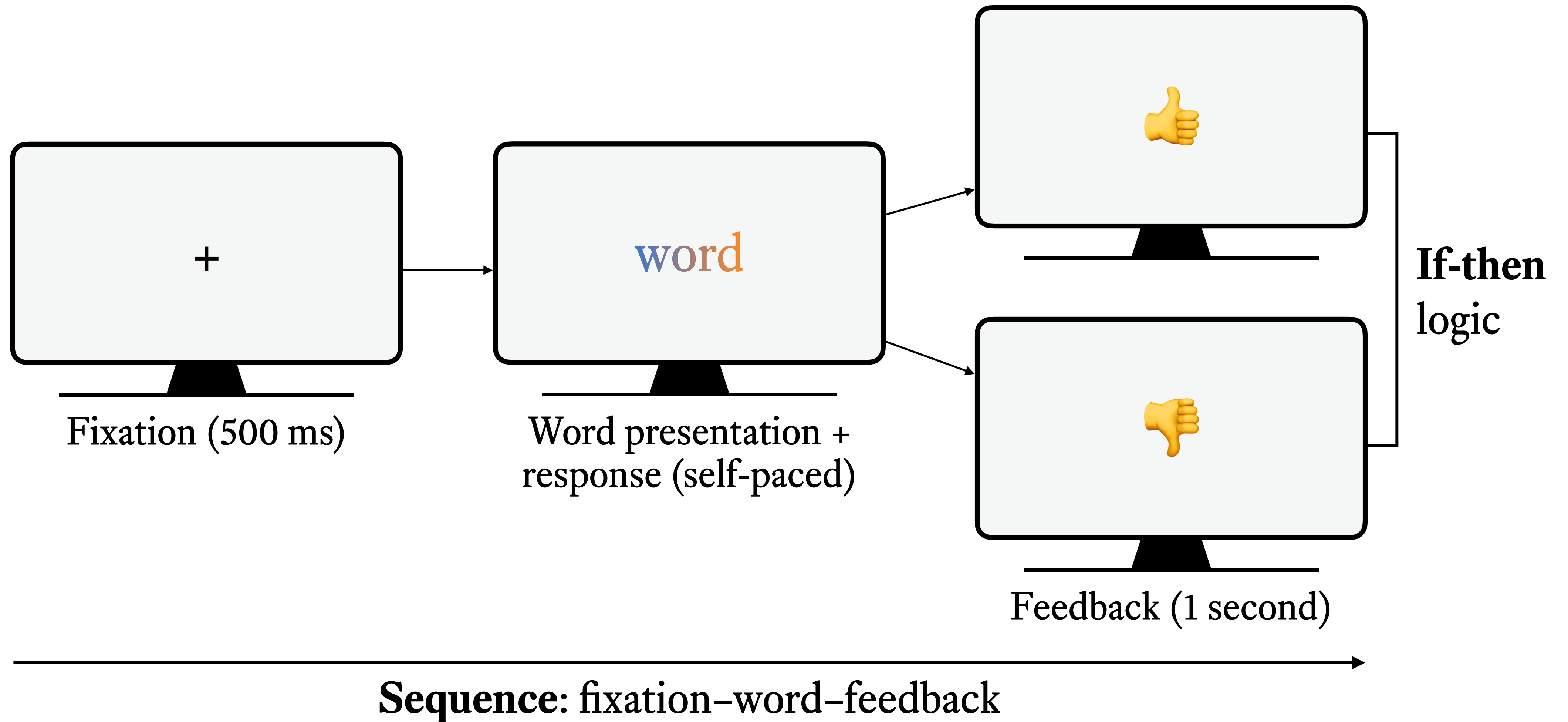
green

Example: Stimulus structure

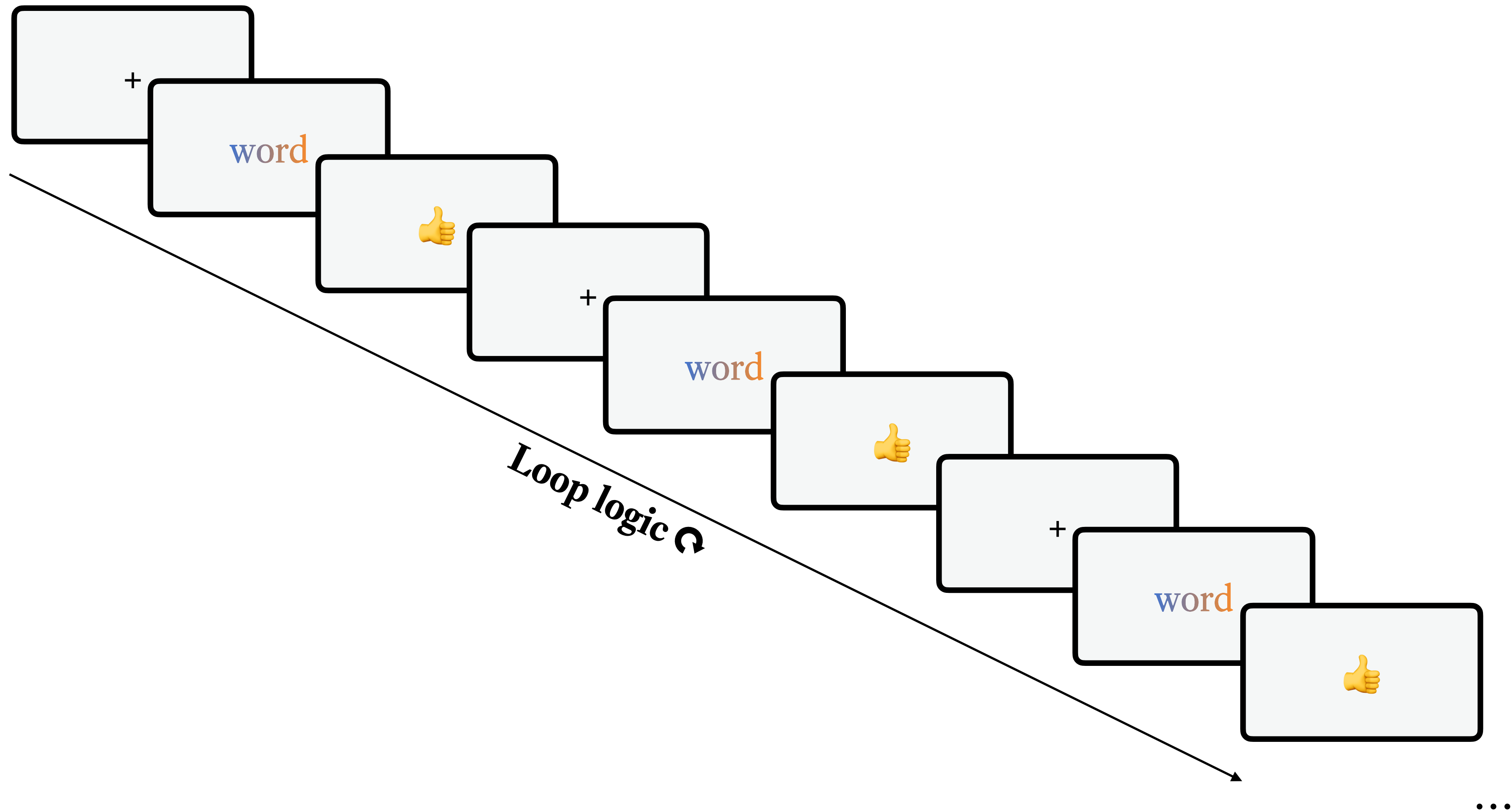


2 variables: word & ink color
2 constants: position & size

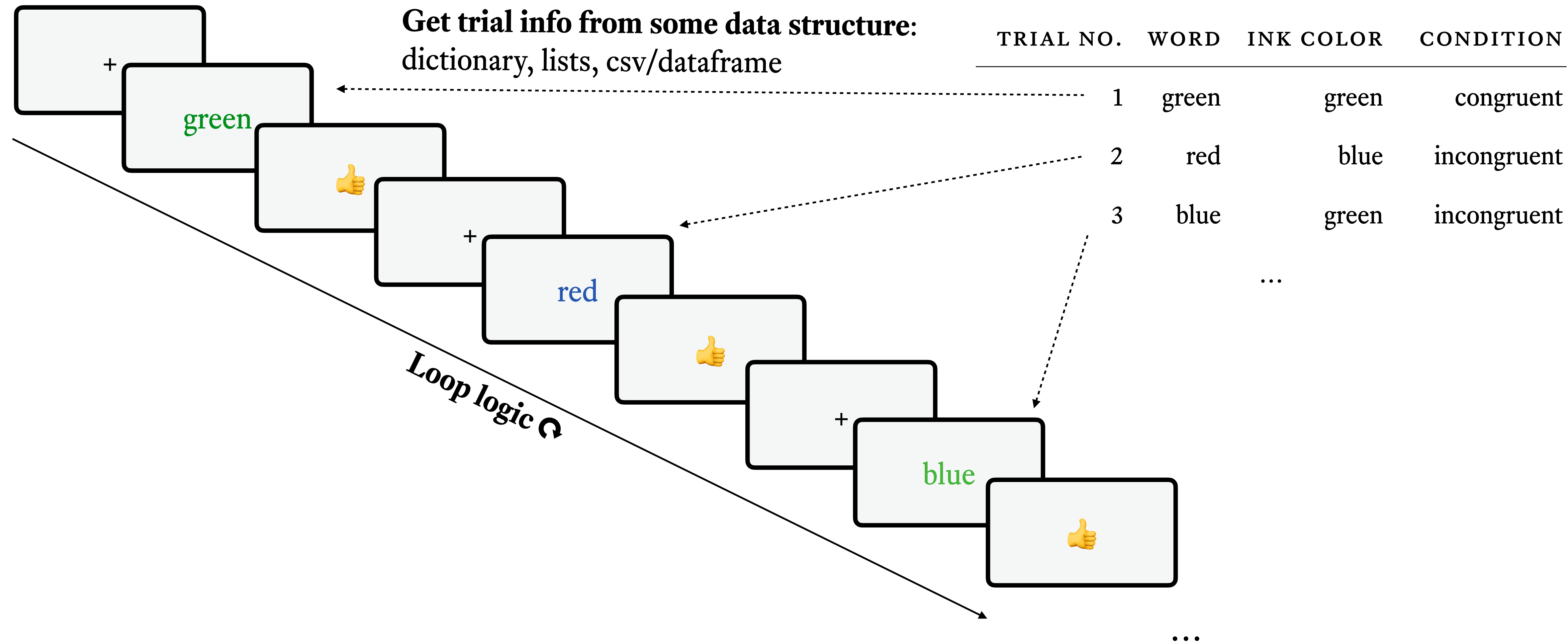
Example: Trial timeline



Example: Experiment timeline



Example: Experiment timeline



Example: Plotting data

| SUBJECT | TRIAL NO. | WORD | INK COLOR | CONDITION | RESPONSE TIME | CORRECT |
|---------|-----------|-------|-----------|-------------|---------------|---------|
| 1 | 1 | green | green | congruent | 732 | 1 |
| 1 | 2 | red | blue | incongruent | 951 | 0 |
| 1 | 3 | blue | green | incongruent | 812 | 1 |

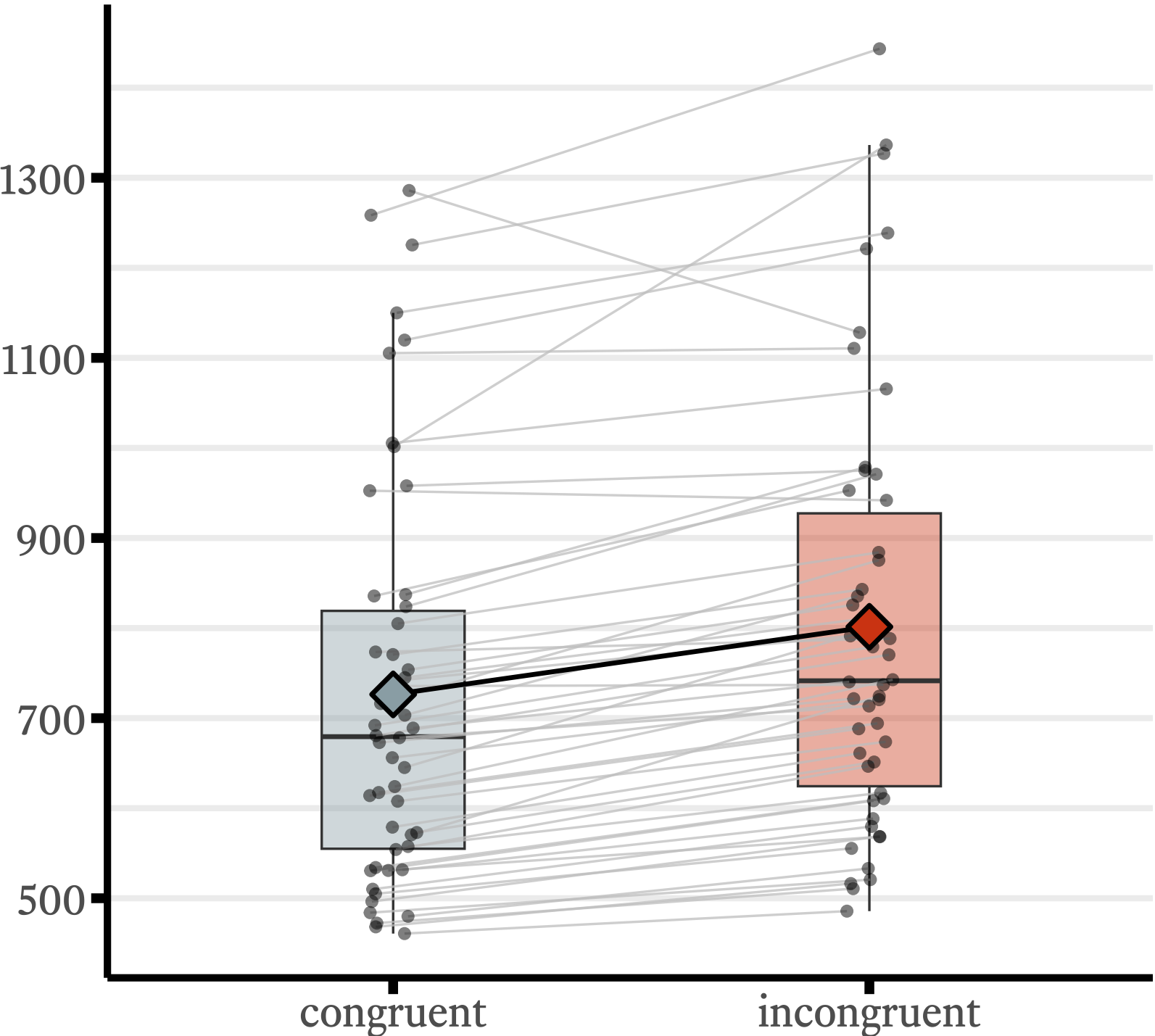
...

average by subject
and condition

| SUBJECT NO. | CONDITION | RESPONSE TIME | CORRECT |
|-------------|-------------|---------------|---------|
| 1 | congruent | 732 | 0.9 |
| 1 | incongruent | 800 | 0.8 |
| 2 | congruent | 812 | 1 |

...

Response Times by Condition (ms)



Resources

GitHub repository: <https://github.com/barburevencu/PPE>

This will be updated with lecture slides and exercises as we go along

Python cheatsheet: <https://www.pythoncheatsheet.org/>

Expyriment documentation: <https://docs.expyriment.org/>

R Tidyverse cheatsheet: https://media.datacamp.com/legacy/image/upload/v1676302697/Marketing/Blog/Tidyverse_Cheat_Sheet.pdf

Installation party

Basic Python quiz: <https://forms.gle/Lf6qD4rH1dB42kQW7>

Installation guide: <https://github.com/barburevencu/PPE/blob/main/Installation/installation-guide.md>

Installation tests: <https://github.com/barburevencu/PPE/blob/main/Installation/installation-test.md>