



Neural Representation of Expectations on Somatic Pain, Vicarious Pain, and Cognitive Effort

Quality control and timing

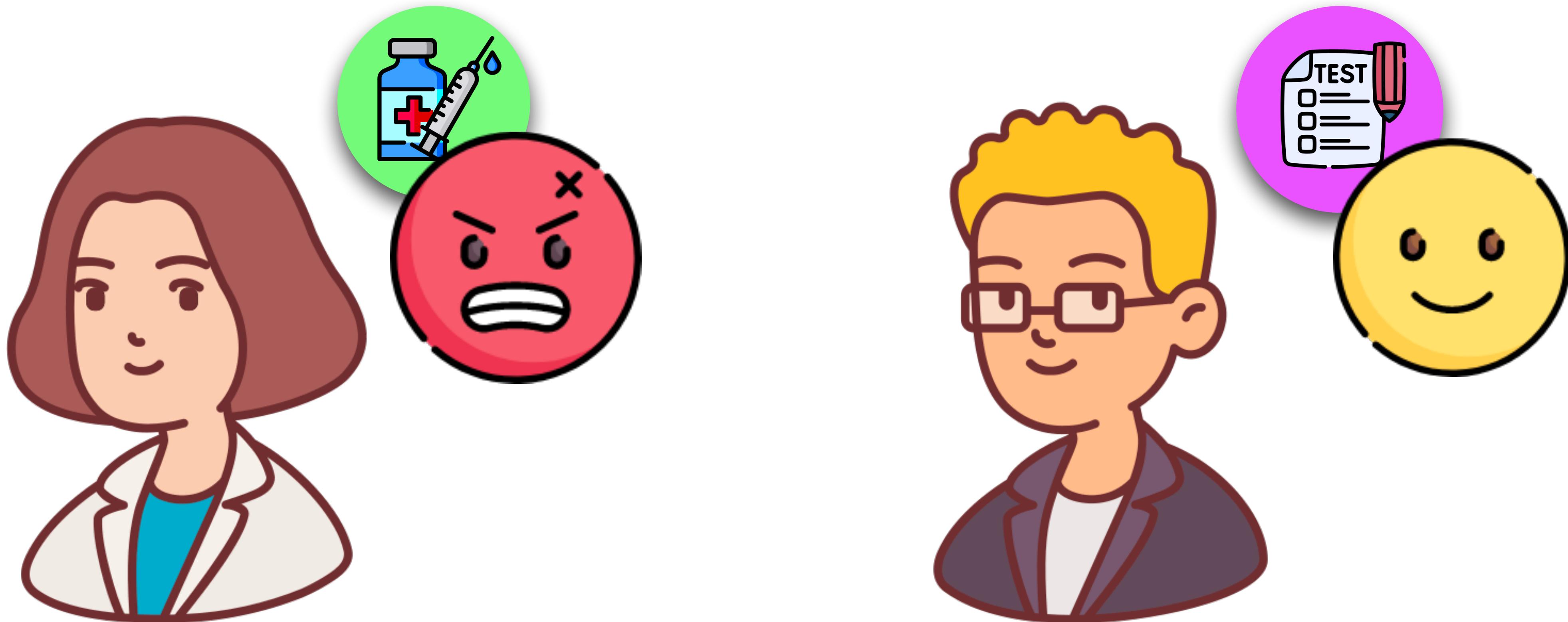
Agenda

- Go over experimental design
- Examine timing of collected data
- Explain biopac TTL onset extraction
- Apply NPS to brain data, using biopac TTL-extracted onsets
- Discuss behavioral results
- Plan future brain analysis

Expectations: mental models of the world

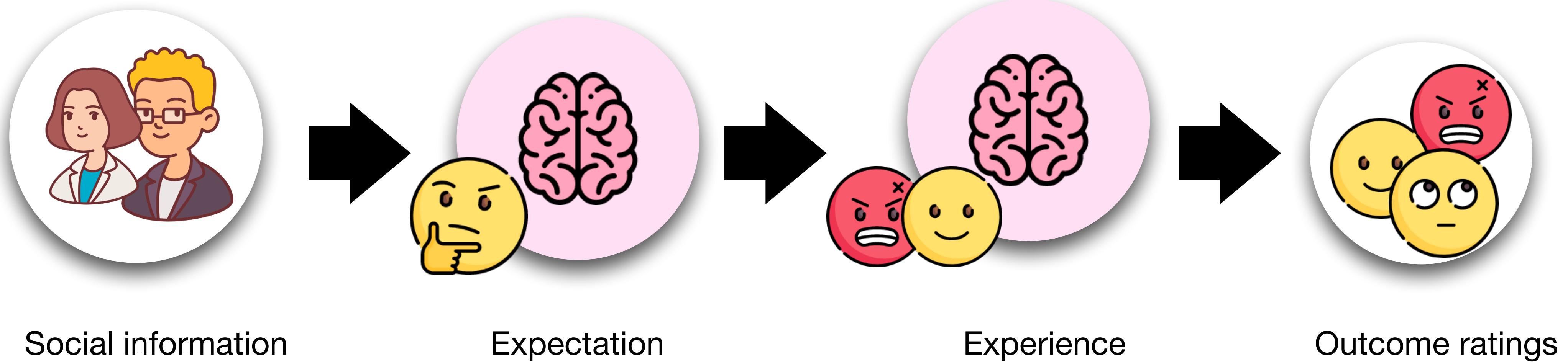


Expectations can shape experiences



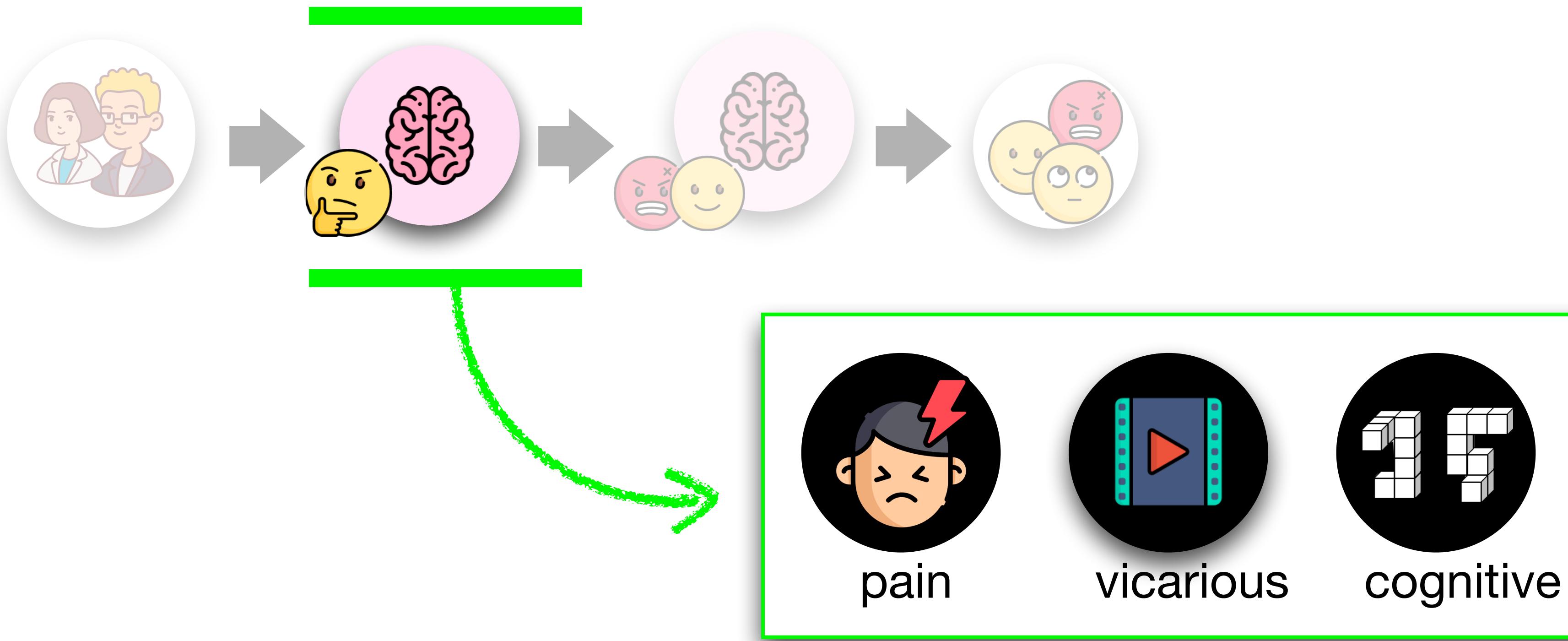
(Wager et al., 2013; Cormier et al., 2013; Sawamoto et al., 2000; Koyama et al., 2005; Lorenz et al., 2005; Brown et al., 2008; Atlas et al., 2010; Bingel et al., 2011; Wiech et al., 2014; Swanson & Tricomi, 2014)

Expectations can shape experiences



How do expectations shape experiences?

Expectations can shape experiences

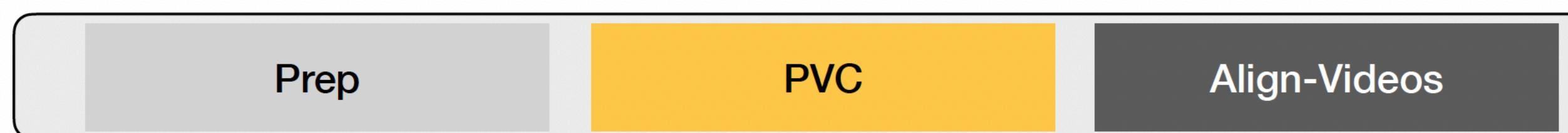


Expectation representations...
domain-general? domain-specific?

Spacetop setup

session overview

session 01



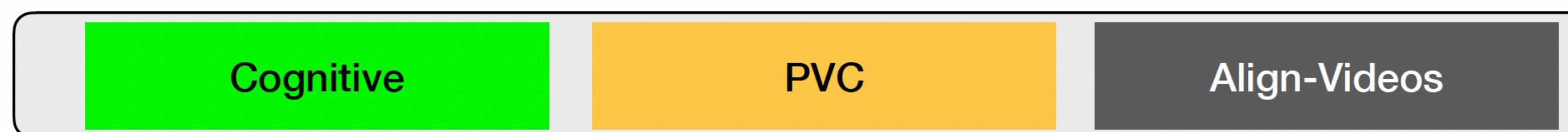
session 02



session 03

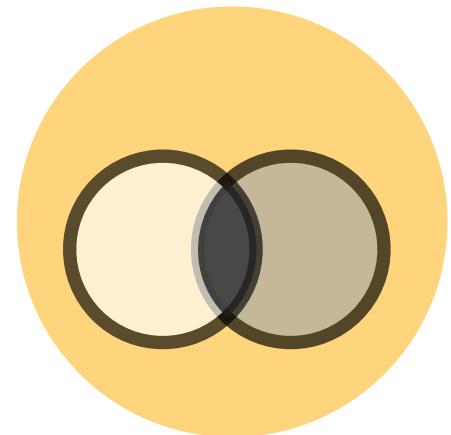


session 04



Experimental design : factors

3 tasks



- Pain
- Vicarious
- Cognitive

2 social cues



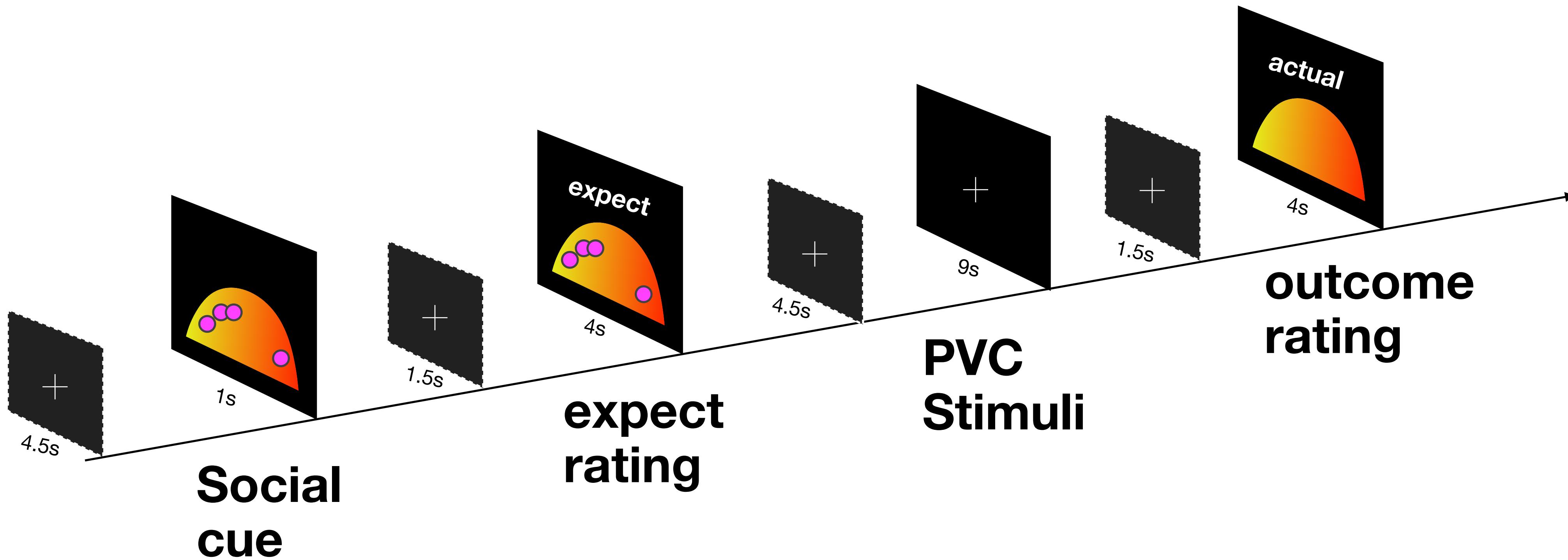
- High
- Low

3 stimulus intensity

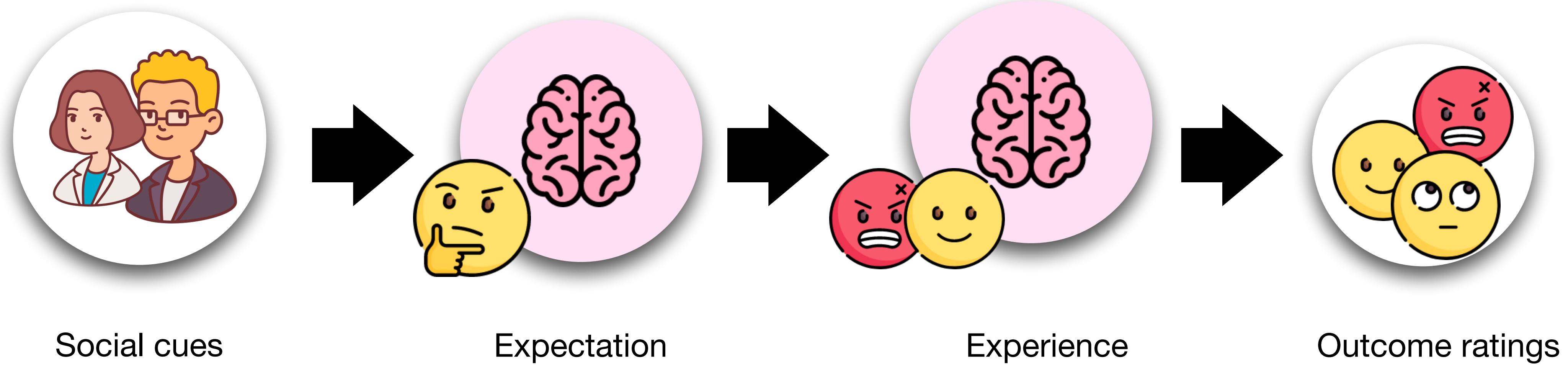


- High
- Med
- Low

Experimental design: one trial

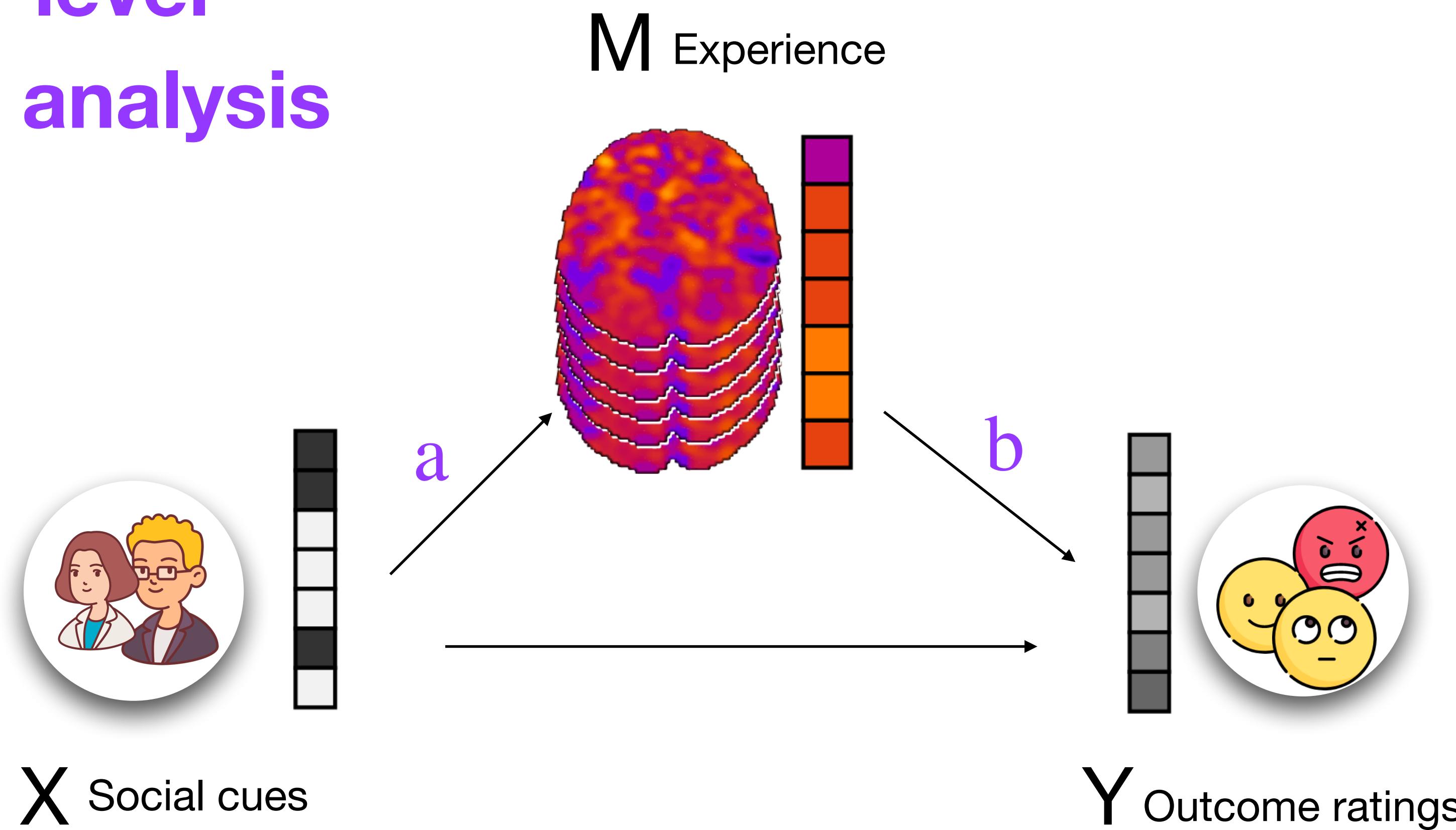


How to investigate the mechanism of cue expectancy effect?



What voxels mediate the cue effect on experience?

∴ Multi-level
Mediation analysis



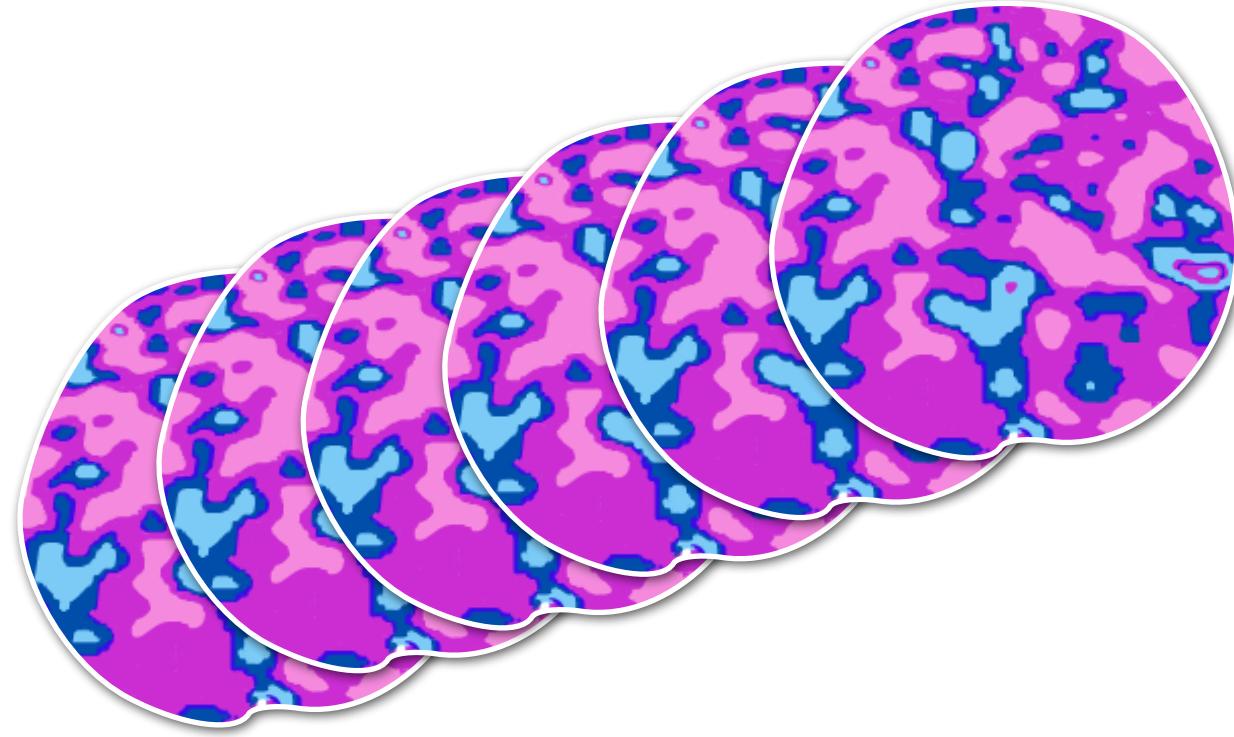
Quality check

Take the time to reorient and quality check

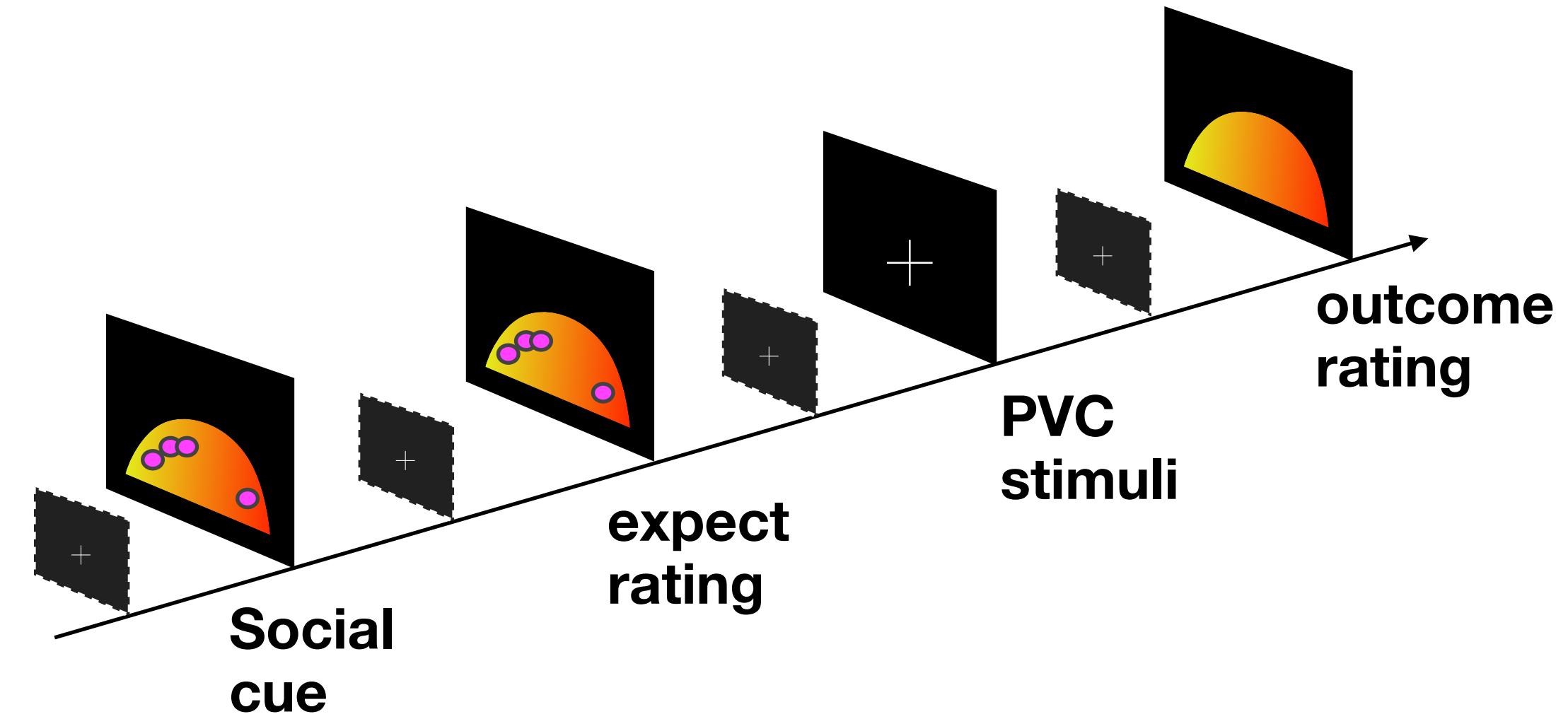
- Examine timing of collected data
- Explain biopac TTL onset extraction
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Is each run exhibiting expected run time?

Any delays in the videos? Or pain trials?



0.46 s TR \times 6

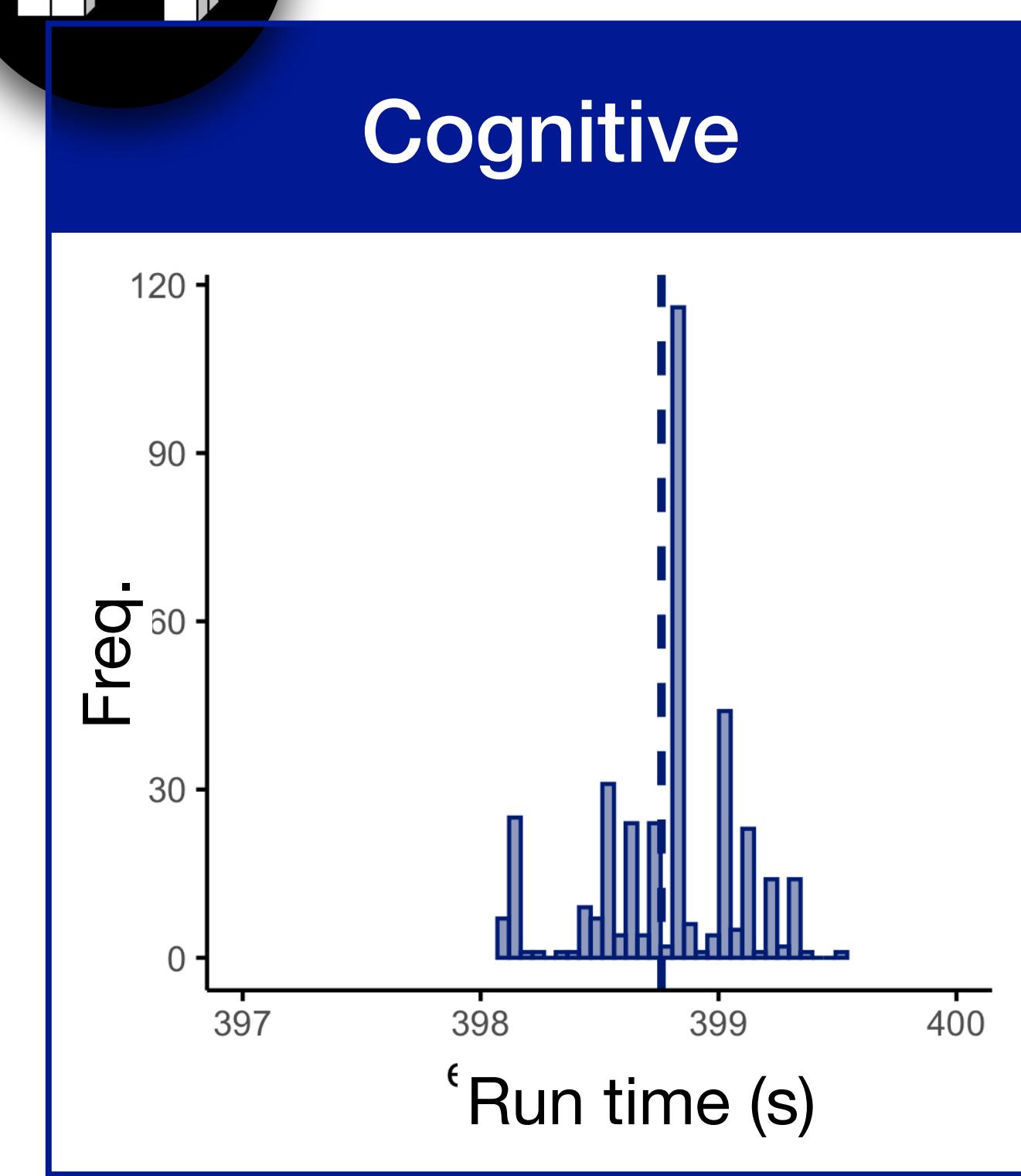
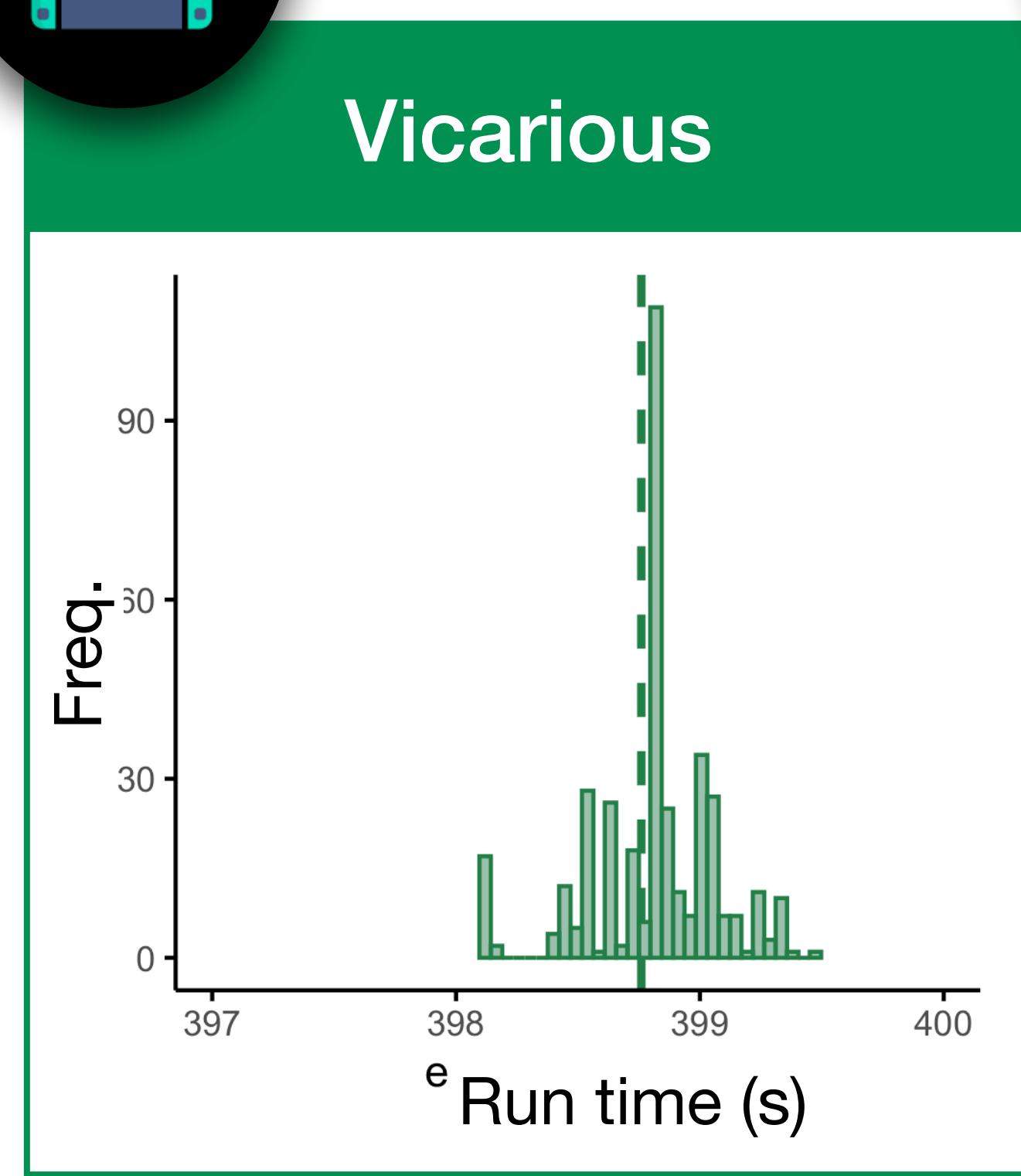
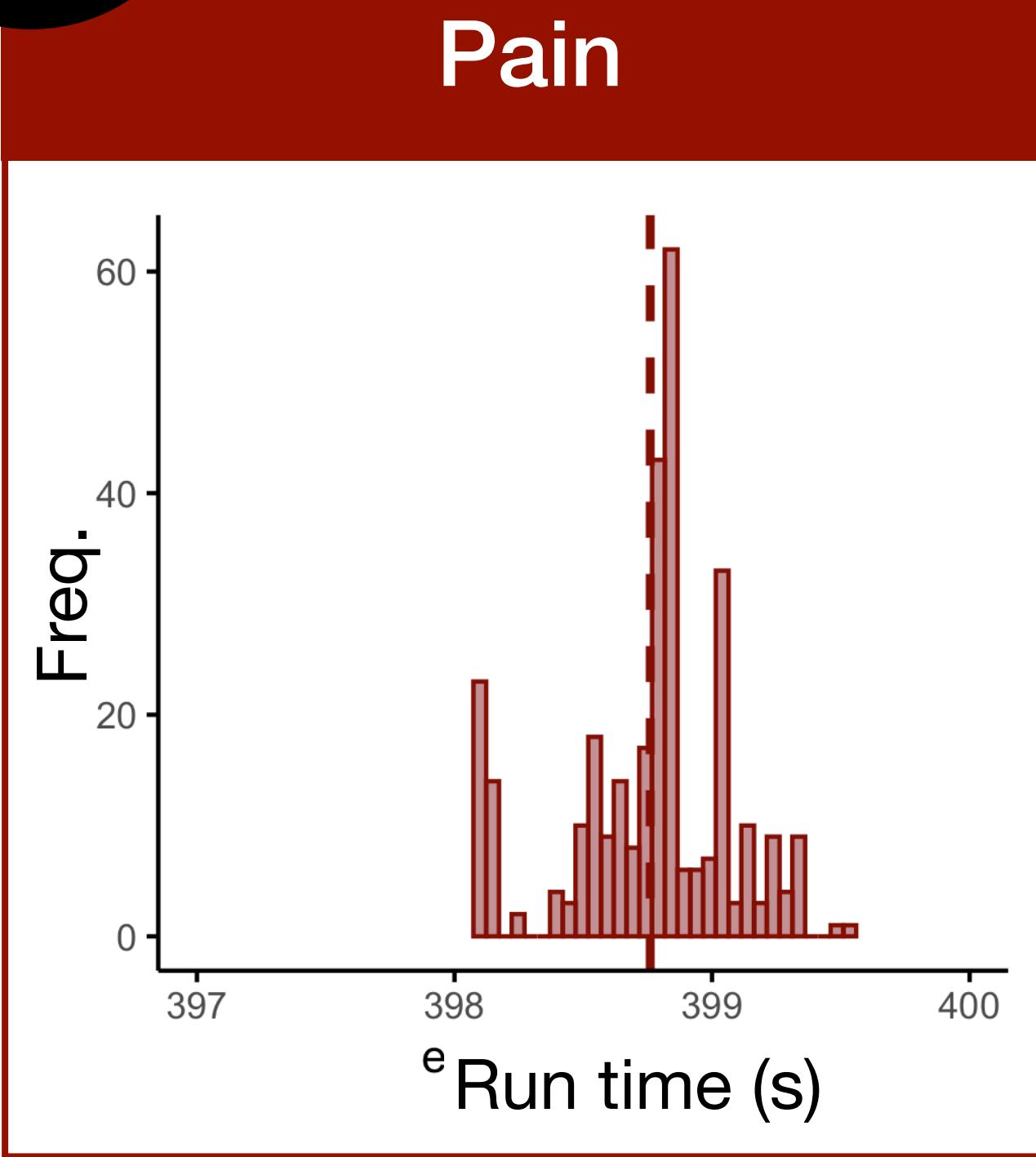
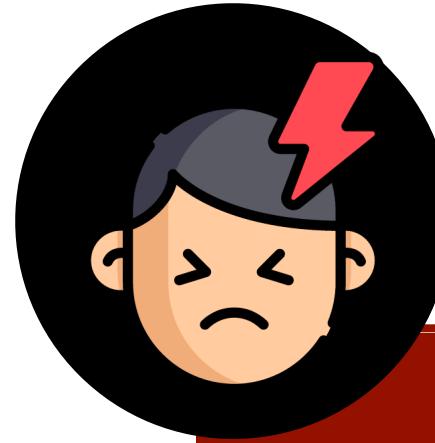


33 s trial \times 12

∴ **Expected time**
= 398.76 s

Is each run exhibiting expected run time?

Expected length: 398.76 s



Is each run exhibiting expected run time?

Let's make sure we have the optimal environment for PTB

The screenshot shows a web browser window displaying the "System Requirements" page for Psychtoolbox-3. The page has a red background with a large yellow exclamation mark in the center. The text on the page is as follows:

Short version

- *Operating systems*
GNU Linux is supported by some features and HiDPI Resolution. *discouraged* if output, or use large and growing supported yet.
- *Runtime environments*
64-Bit Matlab supported by **version 6.4.0**.
- *Graphics cards*
Recommended work well **on Linux**.
AMD GPUs are quality open-source also to some extent. **AMD propriety** any new Linux.

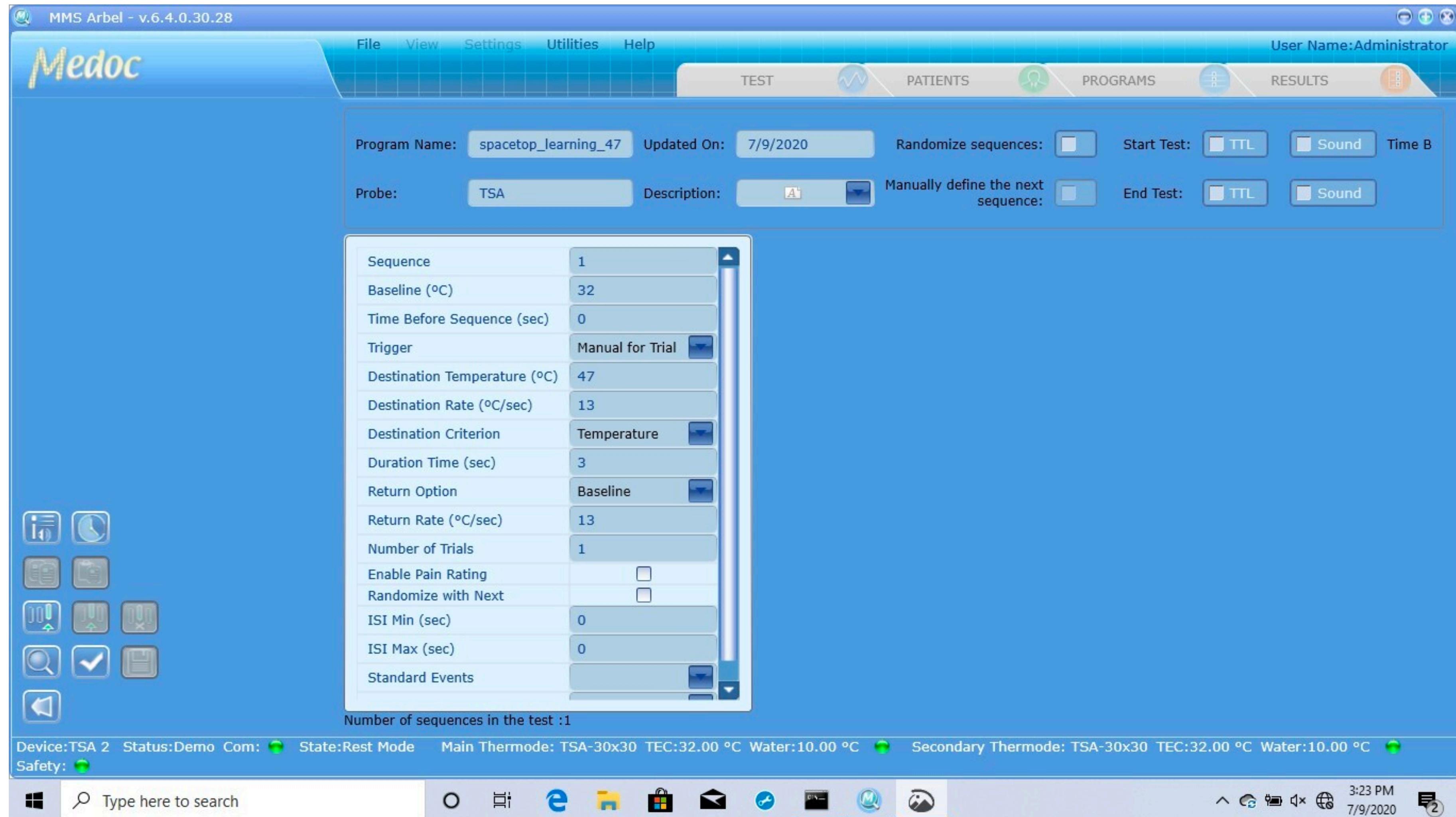
Diving in

Contribute work or money to the project
Wiki
Bugs & Feature requests
Commercial services
Git repository

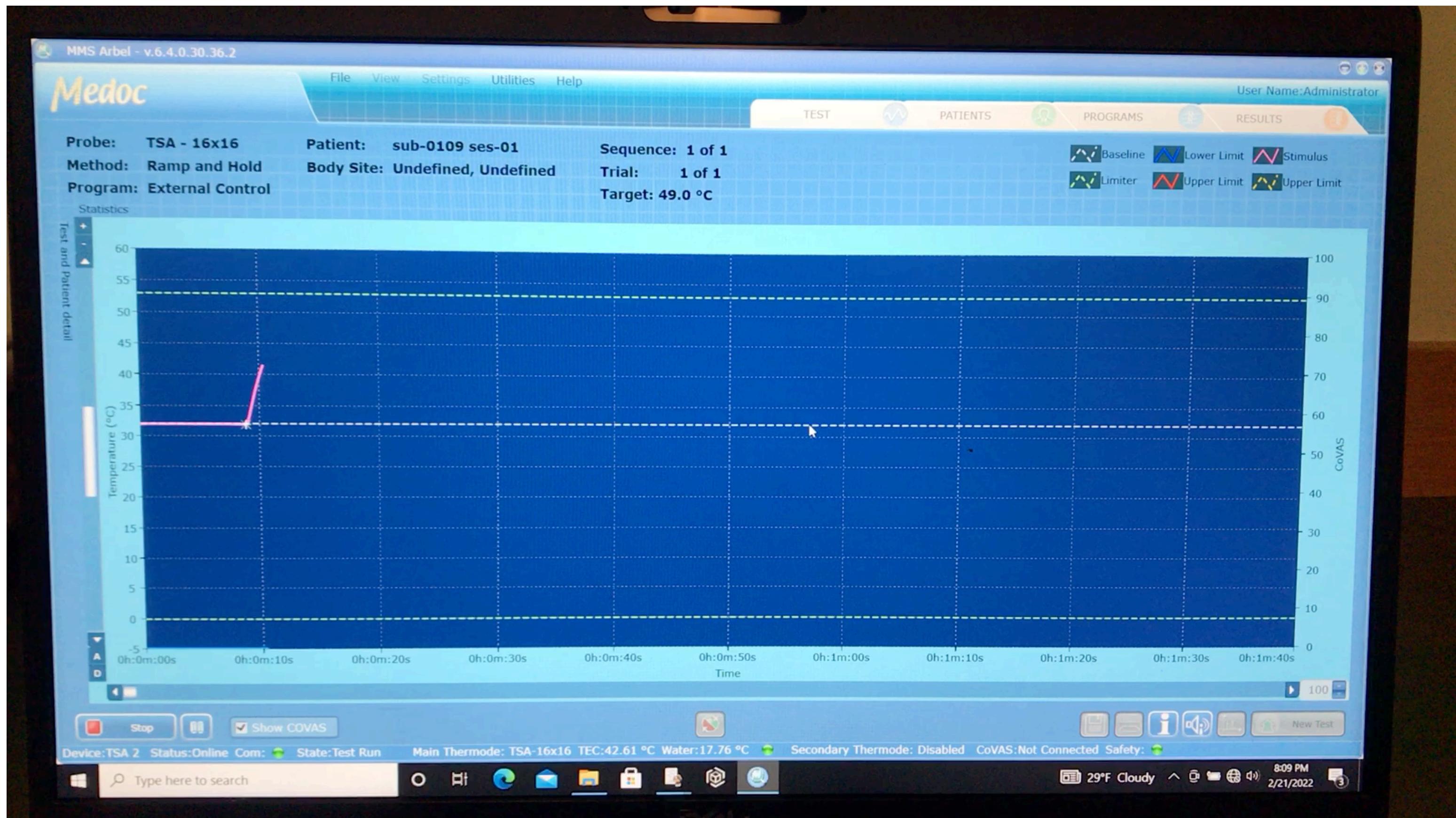
Priority Support Community Forum Automatic Installer Download PTB ZIP File

The most well tested AMD models are currently from the AMD "Polaris" gpu family, with the most exhaustive set of low-level features supported by Psychtoolbox on Linux. AMD "Vega" family gpu's should provide the same quality and features, and additionally have improved FreeSync support, if you need it. They are expected to work well with Psychtoolbox on Linux, according to testing by one lab so far. The latest generation "Navi" gpu's seem to also work well, according to some user reports, but are not yet tested by the developers due to lack of hardware, and they do lack support for some special, but rarely needed, Psychtoolbox low-level debug features at the moment. So the

Medoc program



Medoc program

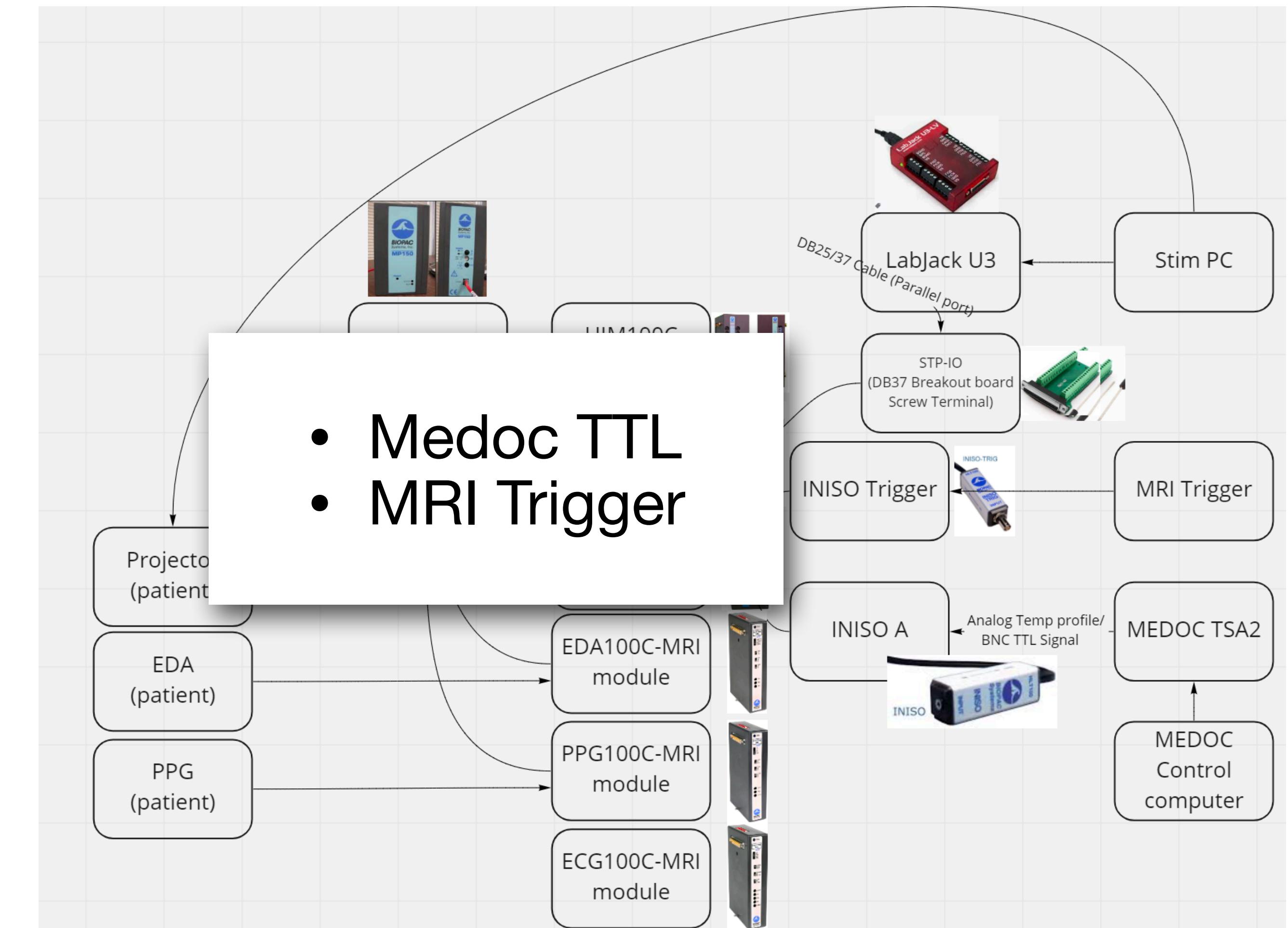


Tools

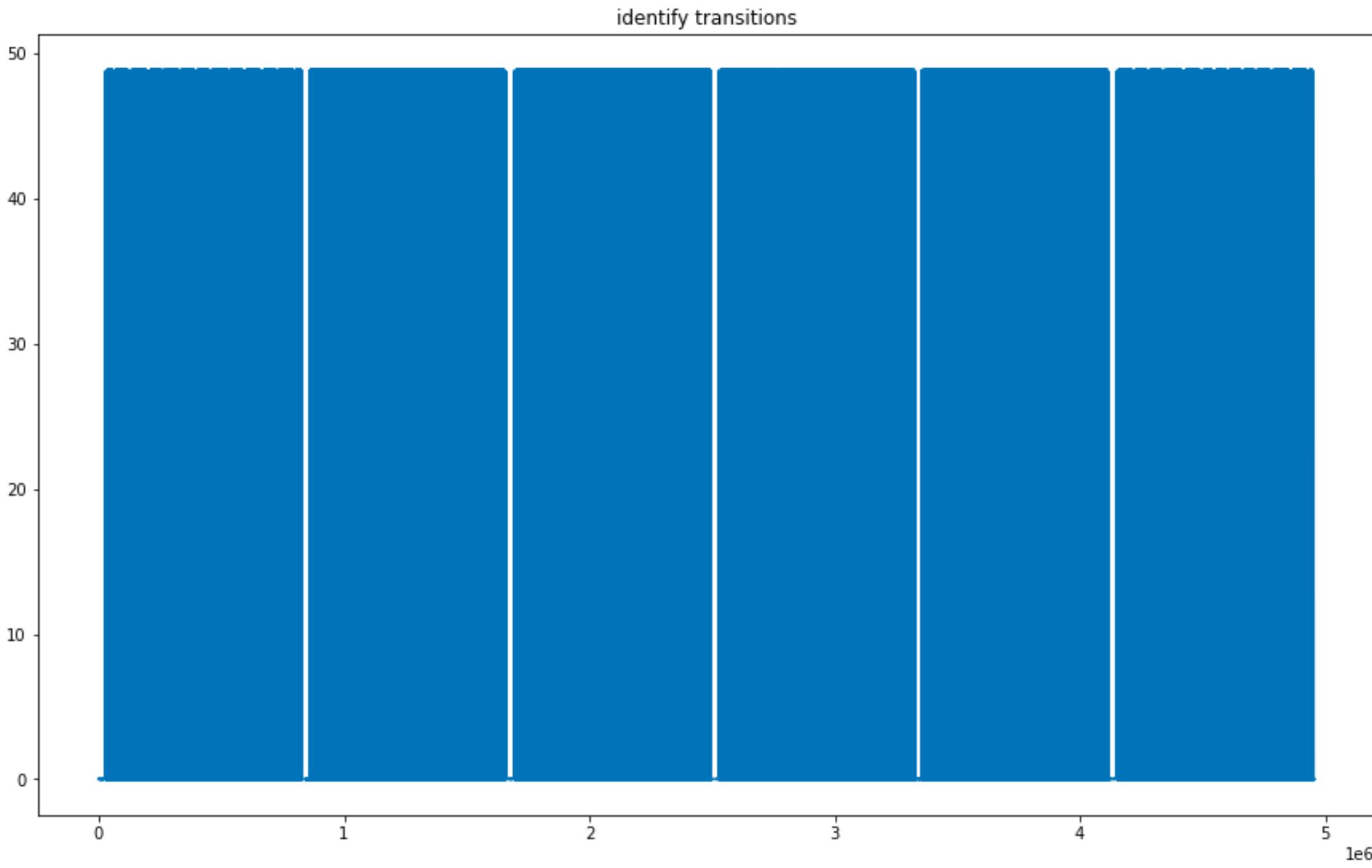
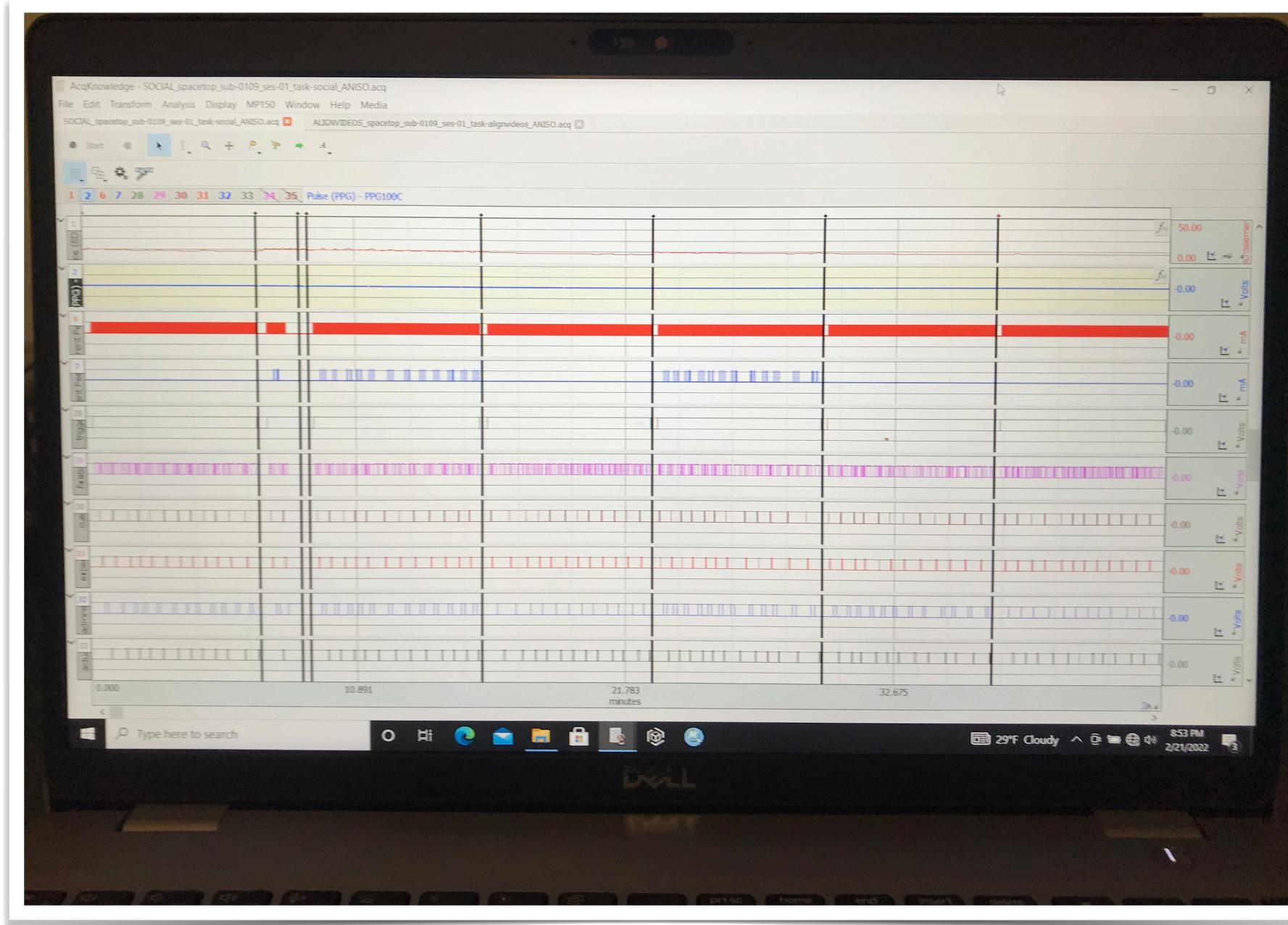
Biopac pain onset sanity check



Are the Medoc programs delivered on intended time?

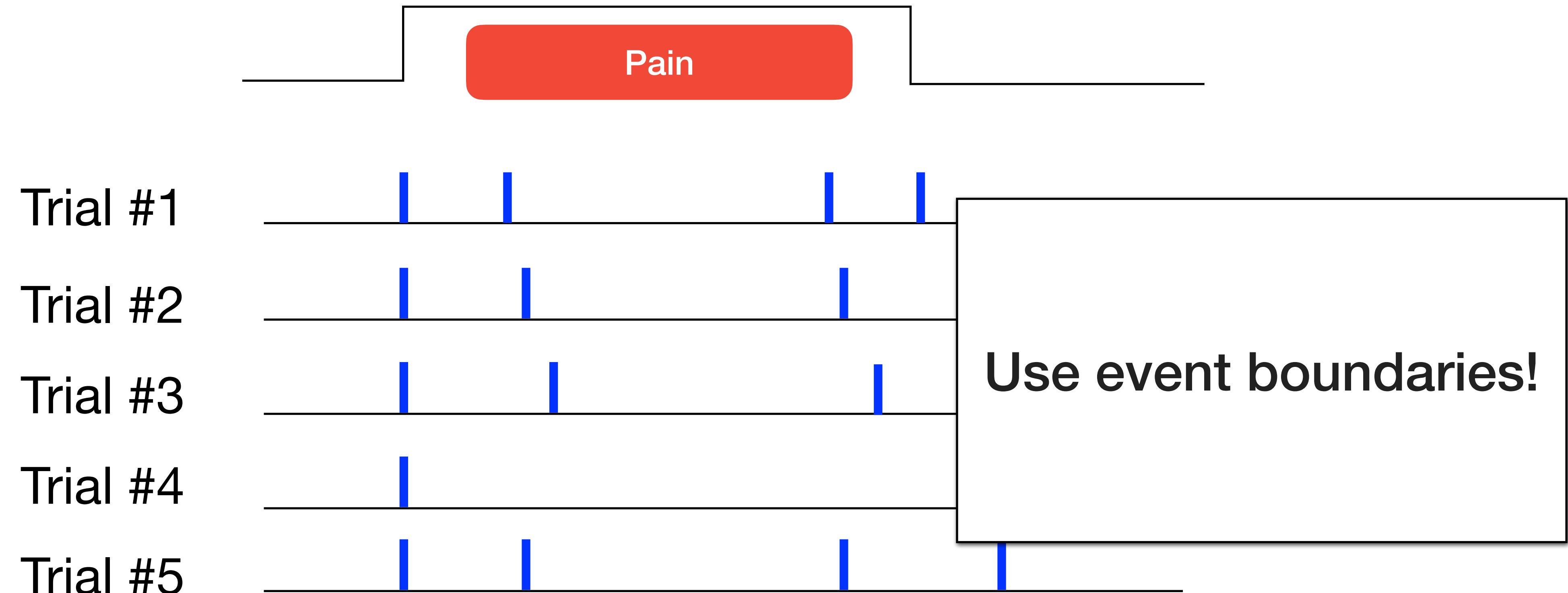


Biopac TTL extraction



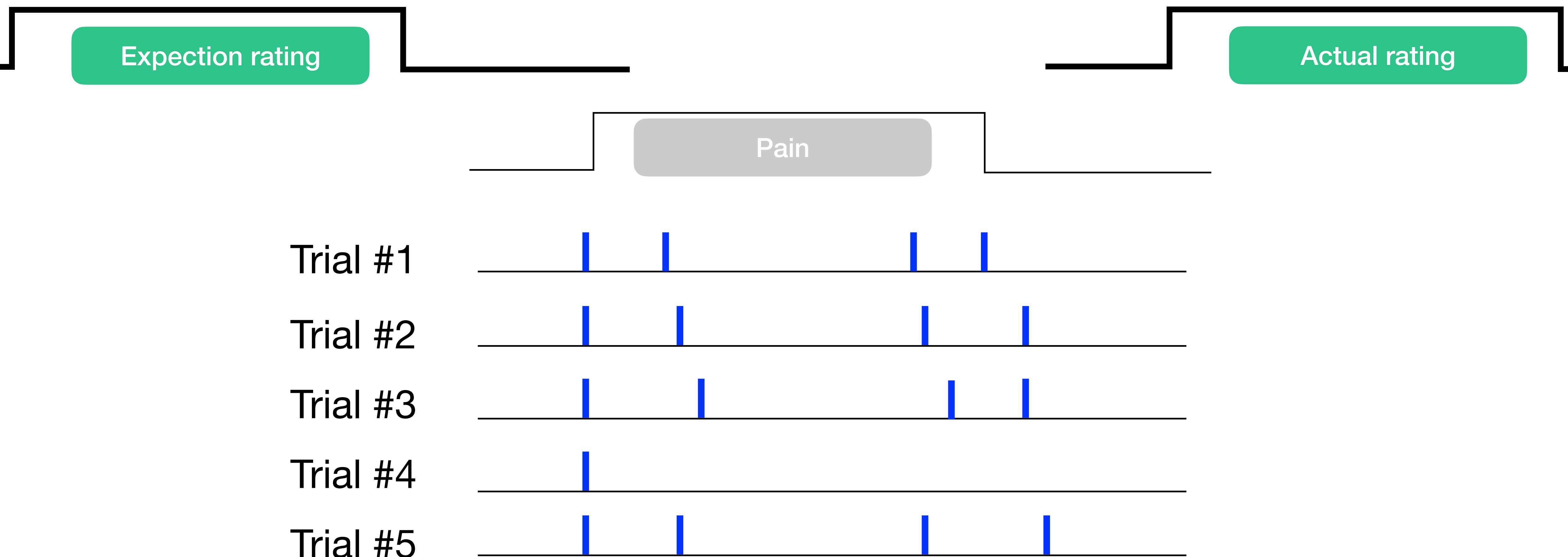
Biopac TTL extraction

How do we know which TTL belongs to which trial



Biopac TTL extraction

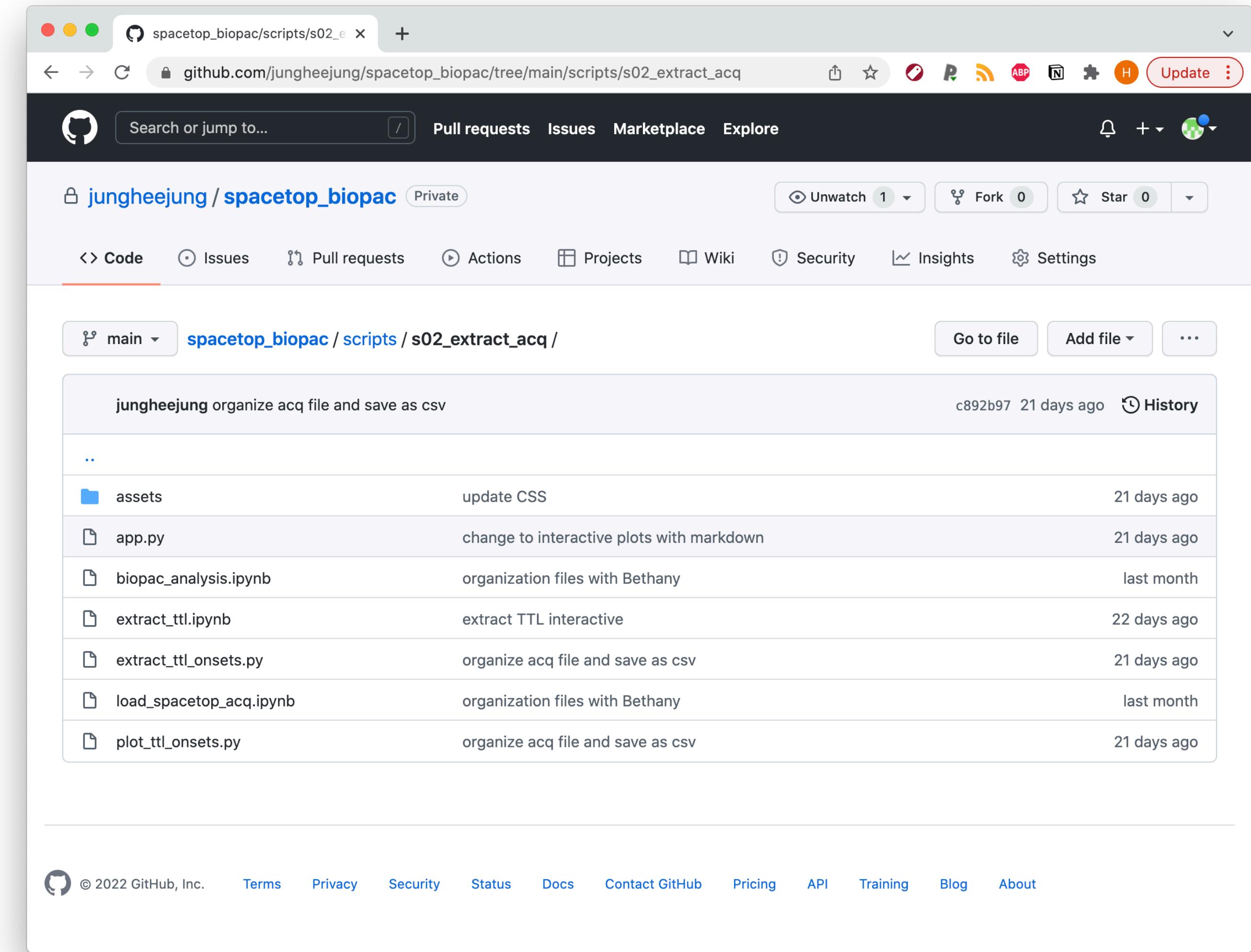
How do we know which TTL belongs to which trial



Biopic TTL extraction code on github

To be enhanced:

 [jungheejung/spacetop_biopac](#)
→  [CANlab/biopac](#)

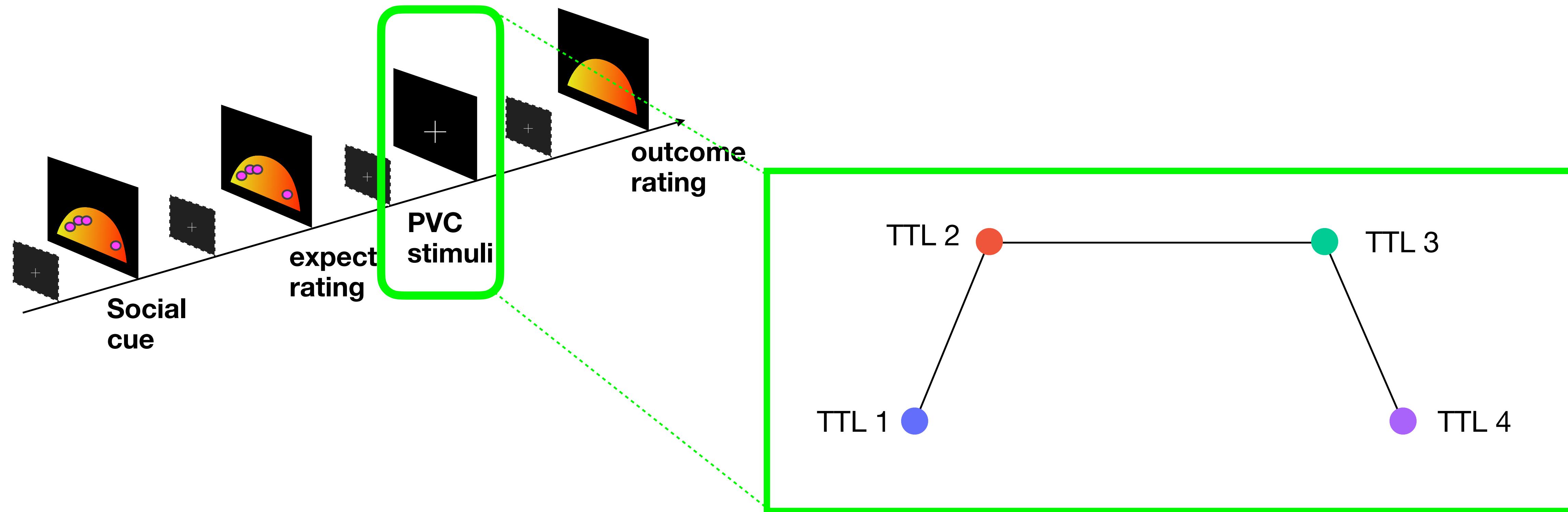


The screenshot shows a GitHub repository page for `jungheejung / spacetop_biopac`. The repository is private. The main tab is selected, showing a list of recent commits:

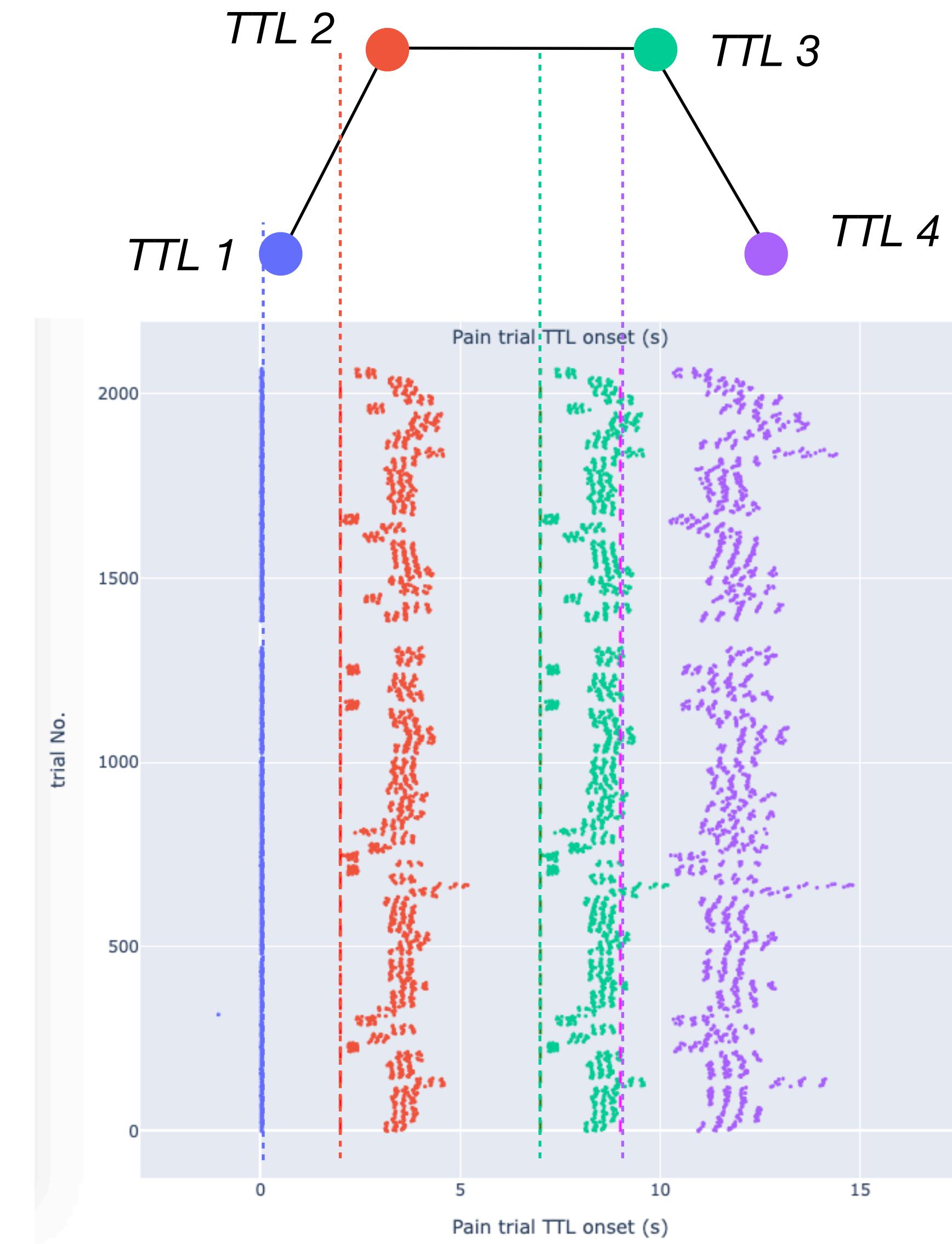
Commit Message	Author	Date
jungheejung organize acq file and save as csv	c892b97	21 days ago
..		
assets update CSS		21 days ago
app.py change to interactive plots with markdown		21 days ago
biopac_analysis.ipynb organization files with Bethany		last month
extract_ttl.ipynb extract TTL interactive		22 days ago
extract_ttl_onsets.py organize acq file and save as csv		21 days ago
load_spacetop_acq.ipynb organization files with Bethany		last month
plot_ttl_onsets.py organize acq file and save as csv		21 days ago

At the bottom of the page, there is a footer with links to GitHub's terms of service, privacy policy, security information, status, documentation, contact form, pricing, API, training, blog, and about page.

Are the Medoc programs delivered on intended time?

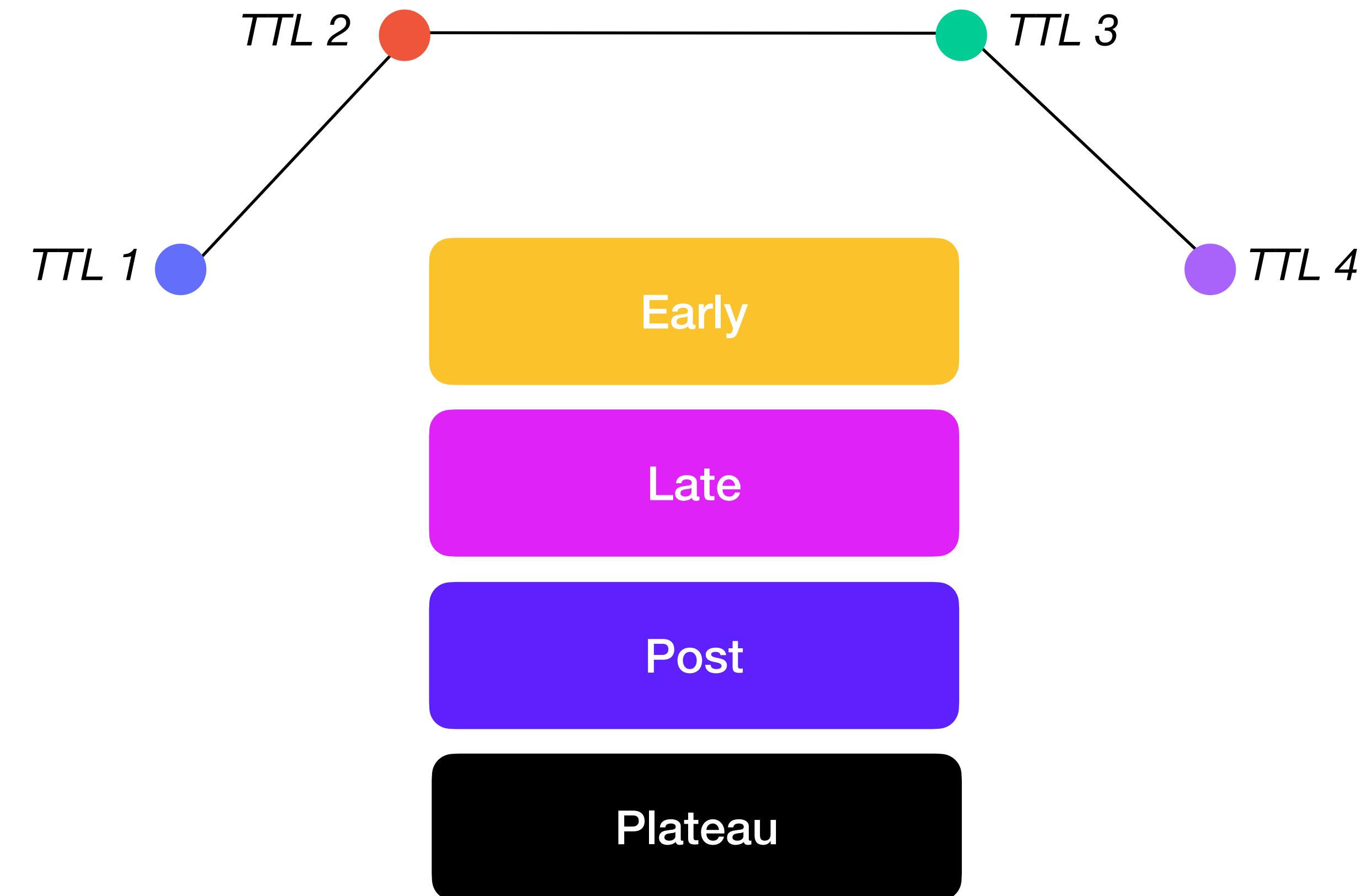


Delays are driven by ramp-up and ramp-downs



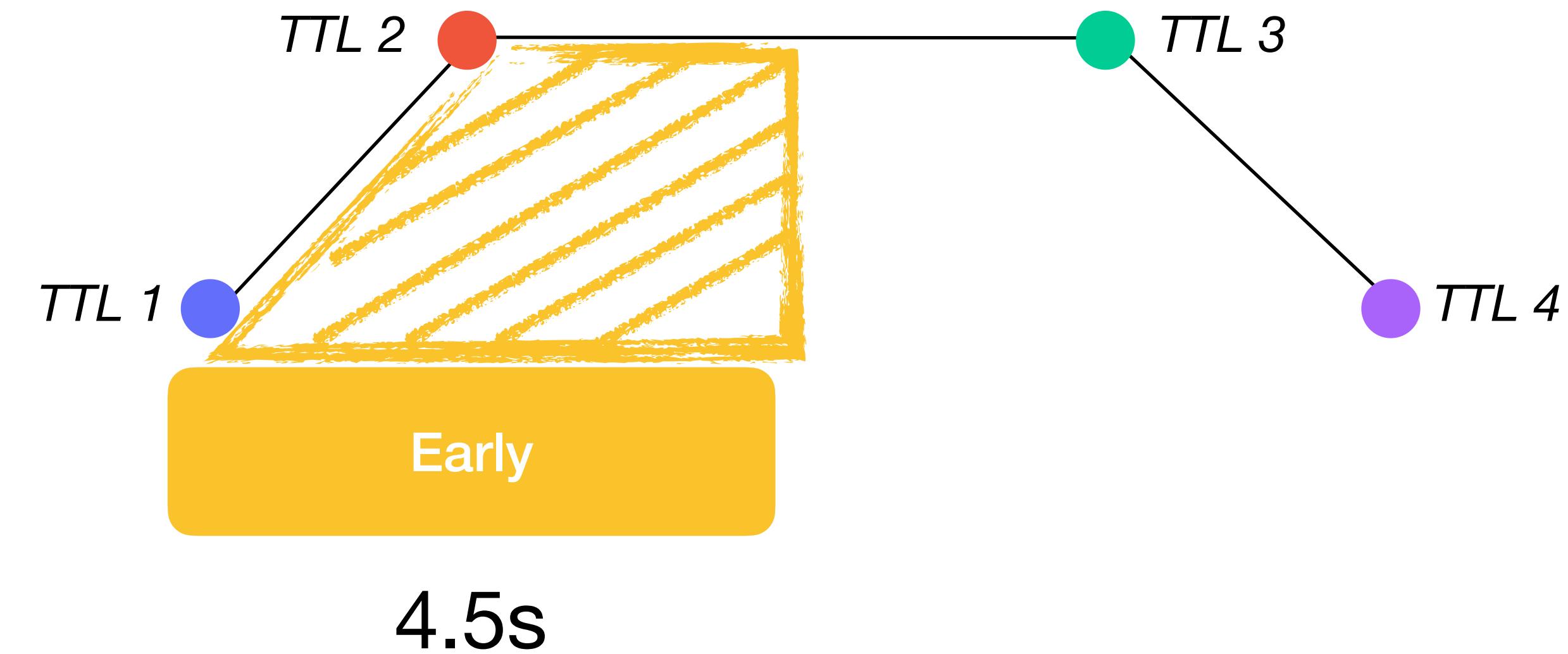
Modeling the pain trials based on TTL data

Are they similar to the NPS?



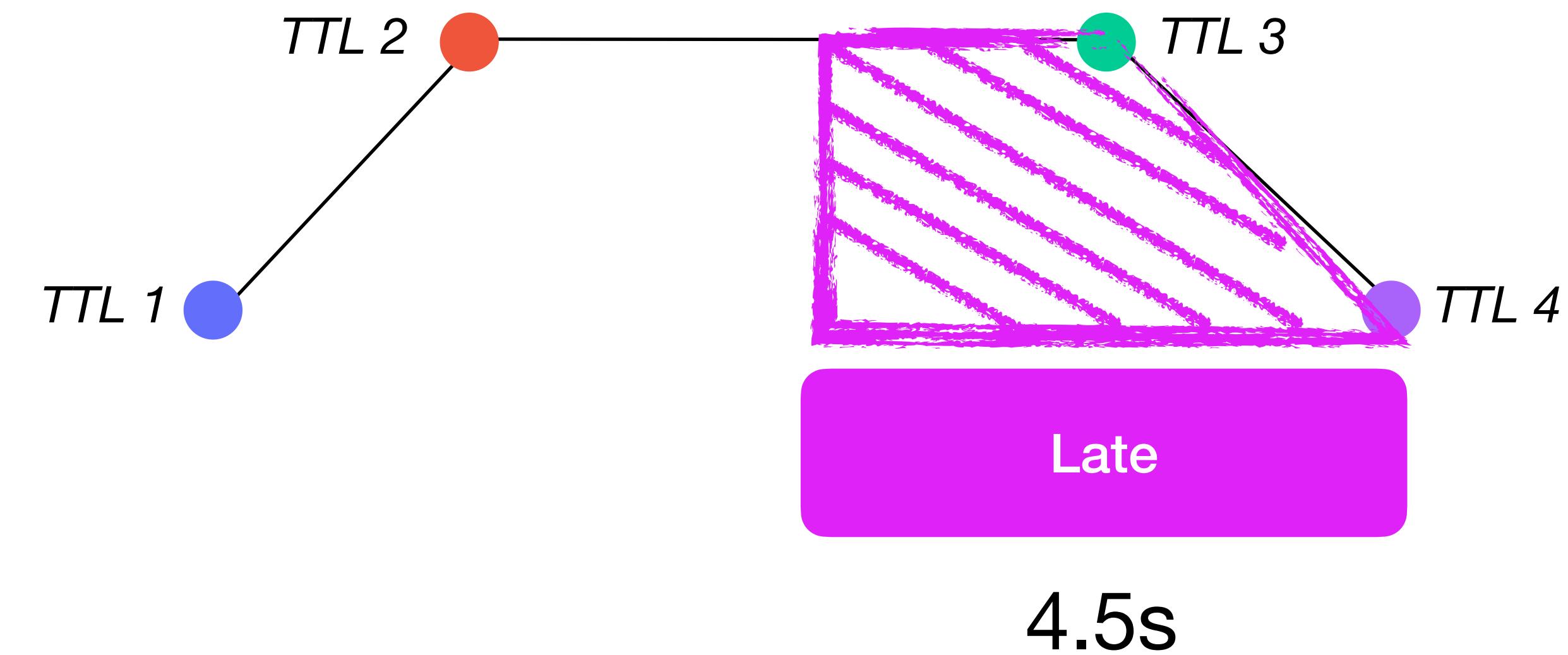
Modeling the pain trials based on TTL data

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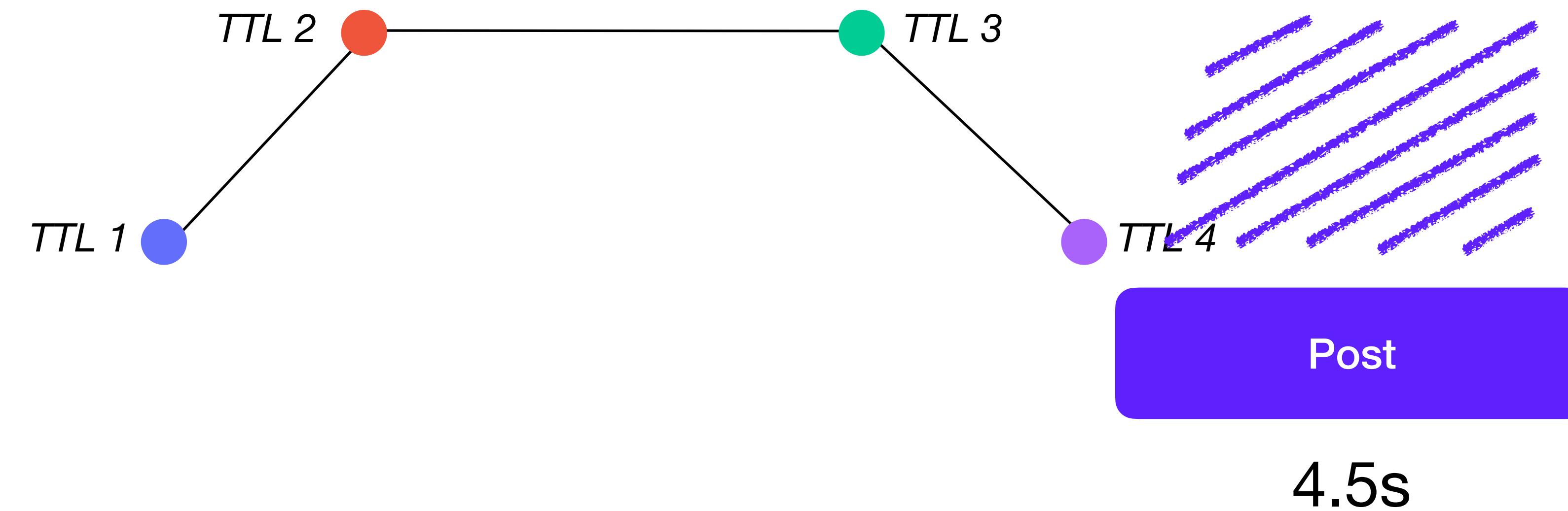
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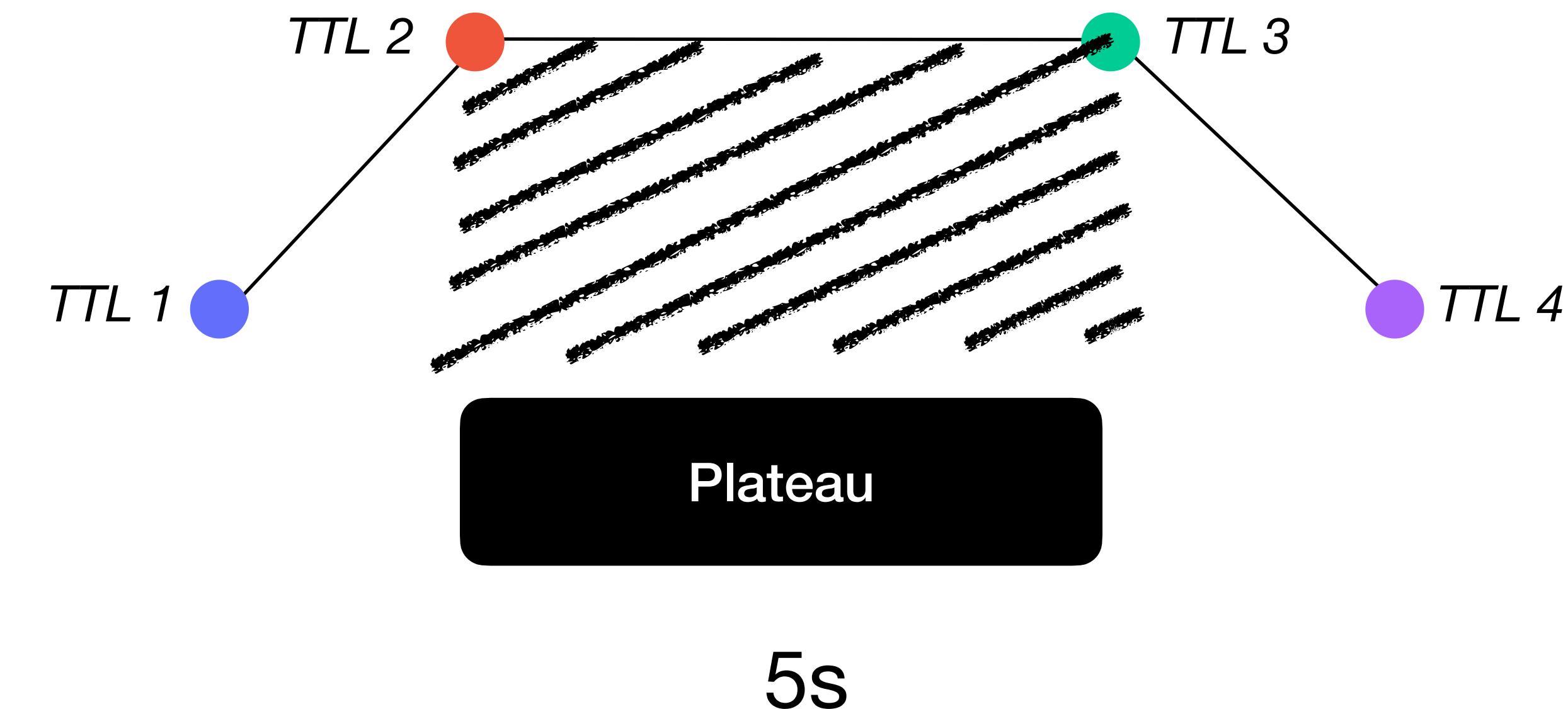
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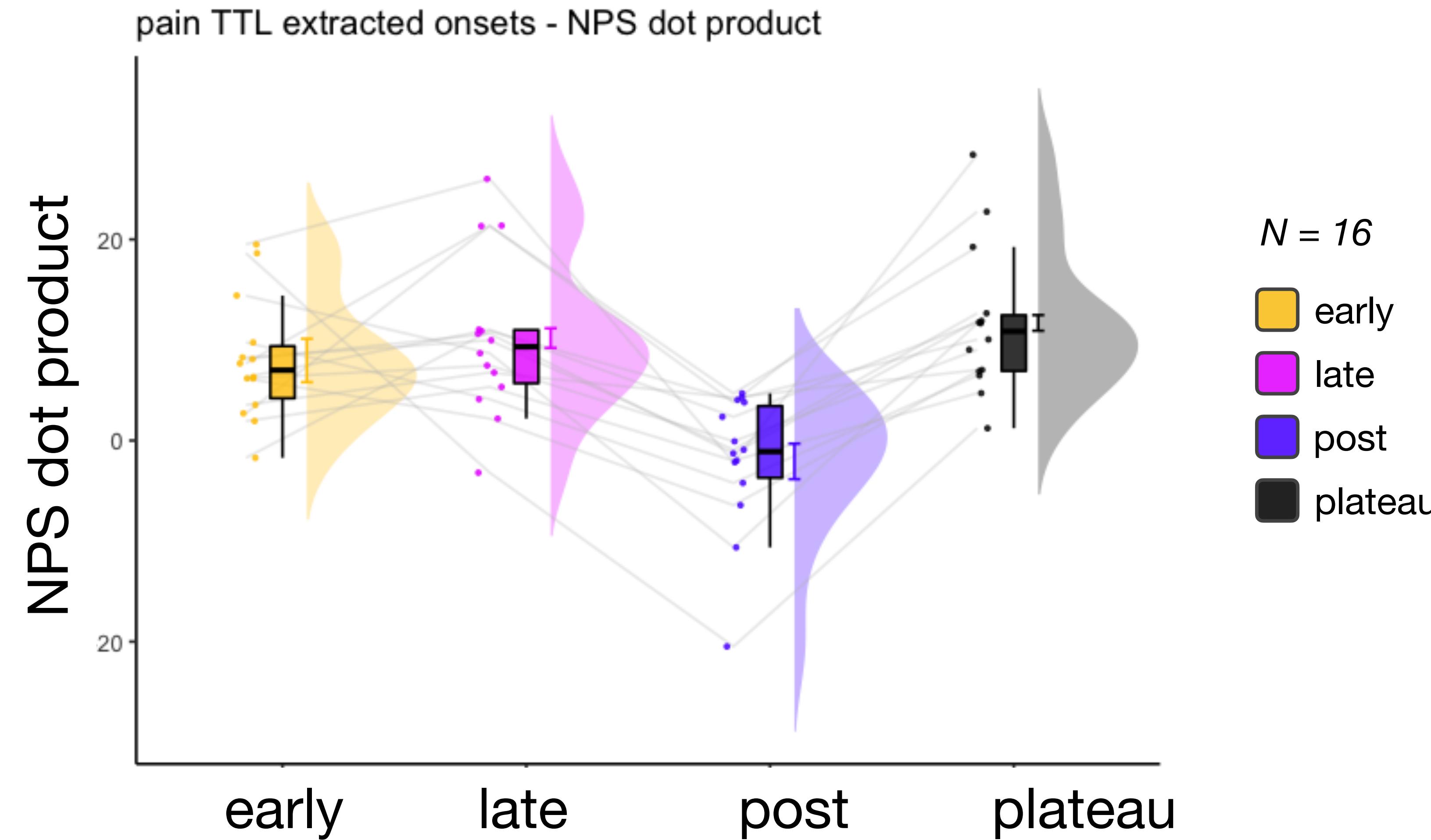
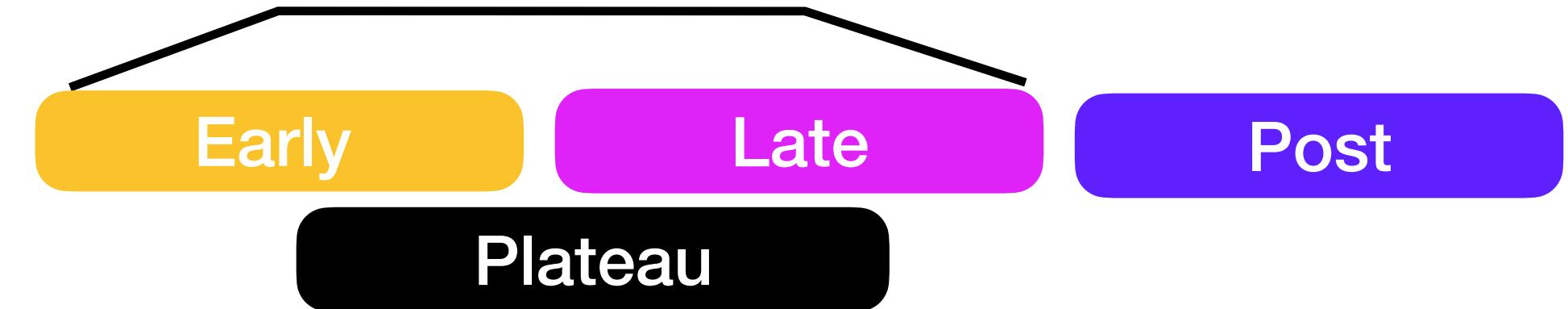
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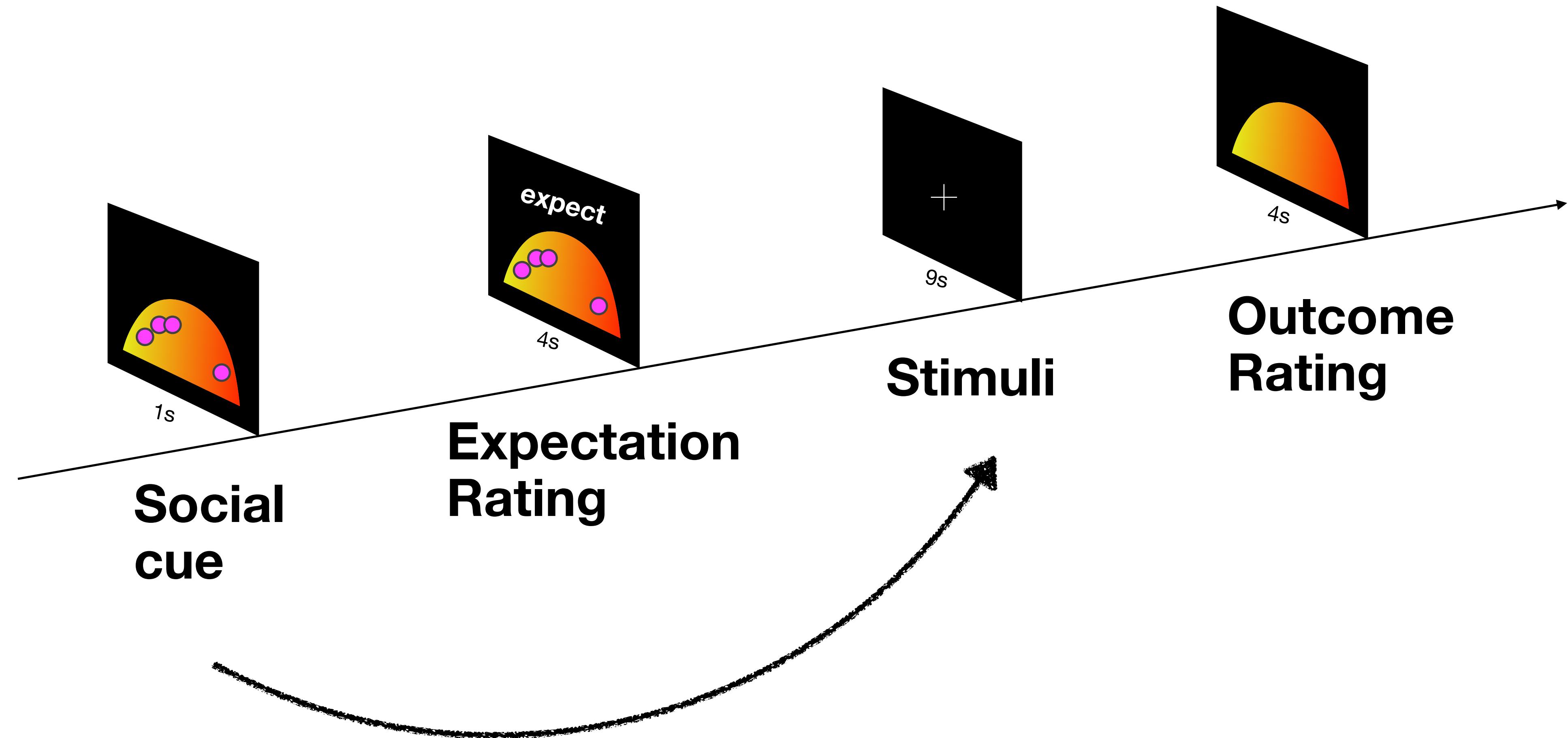
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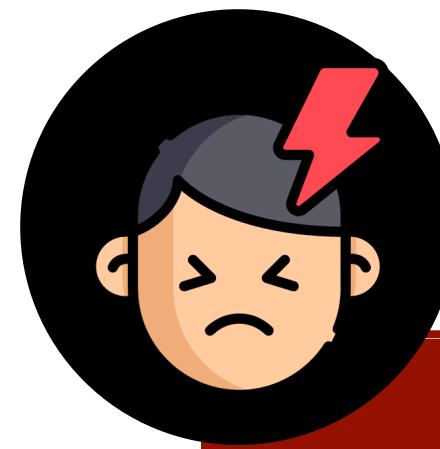


Behavioral analysis

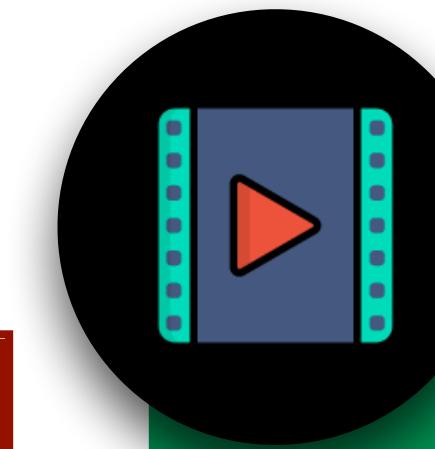
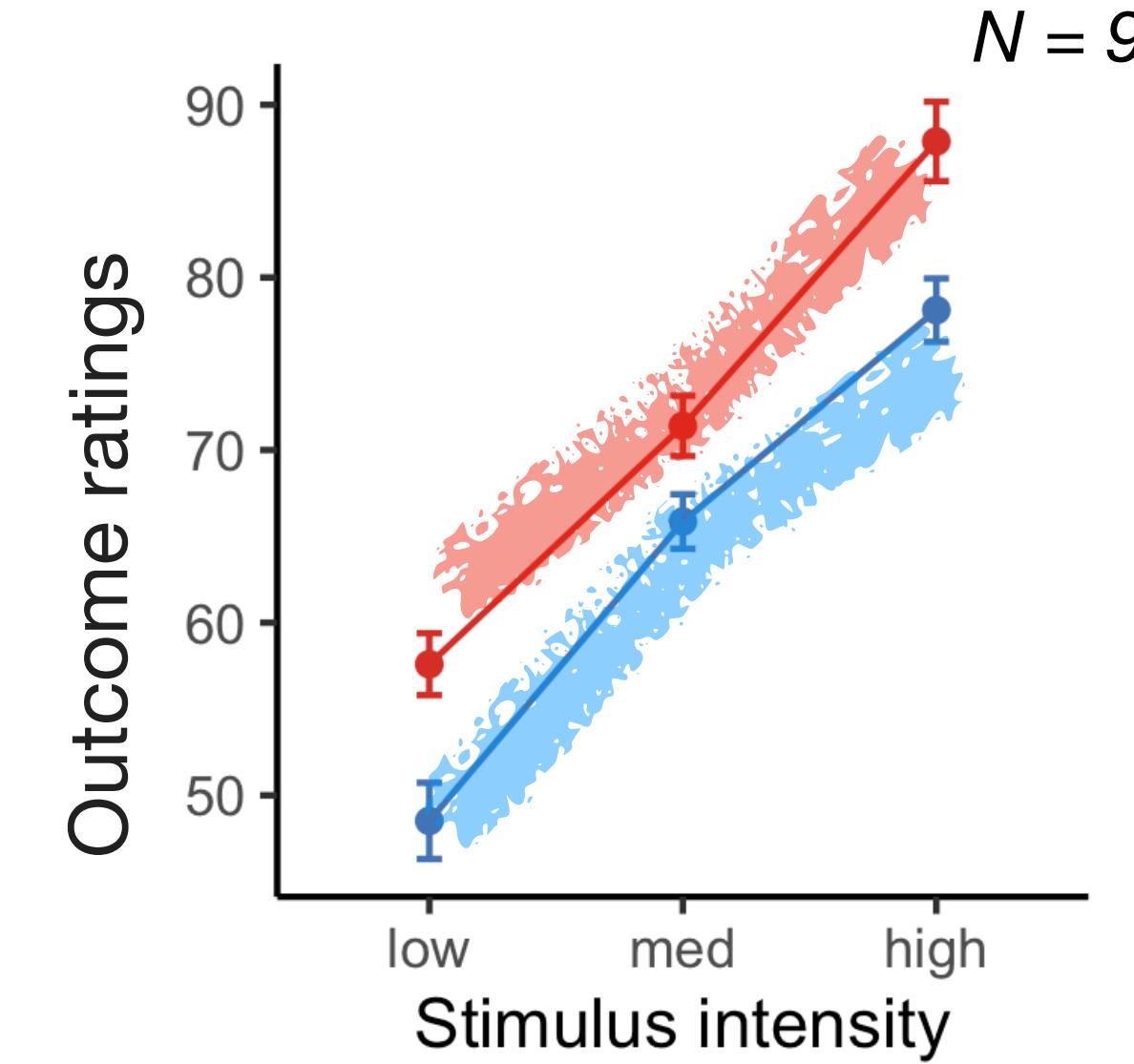
Experimental design: one trial



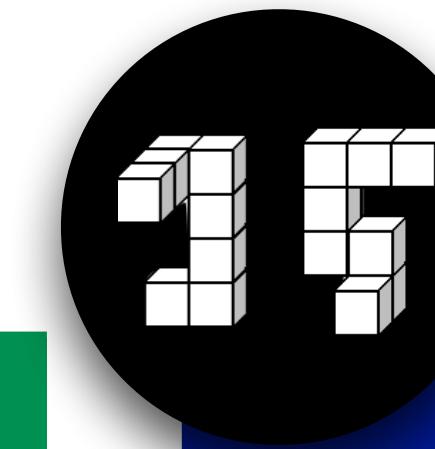
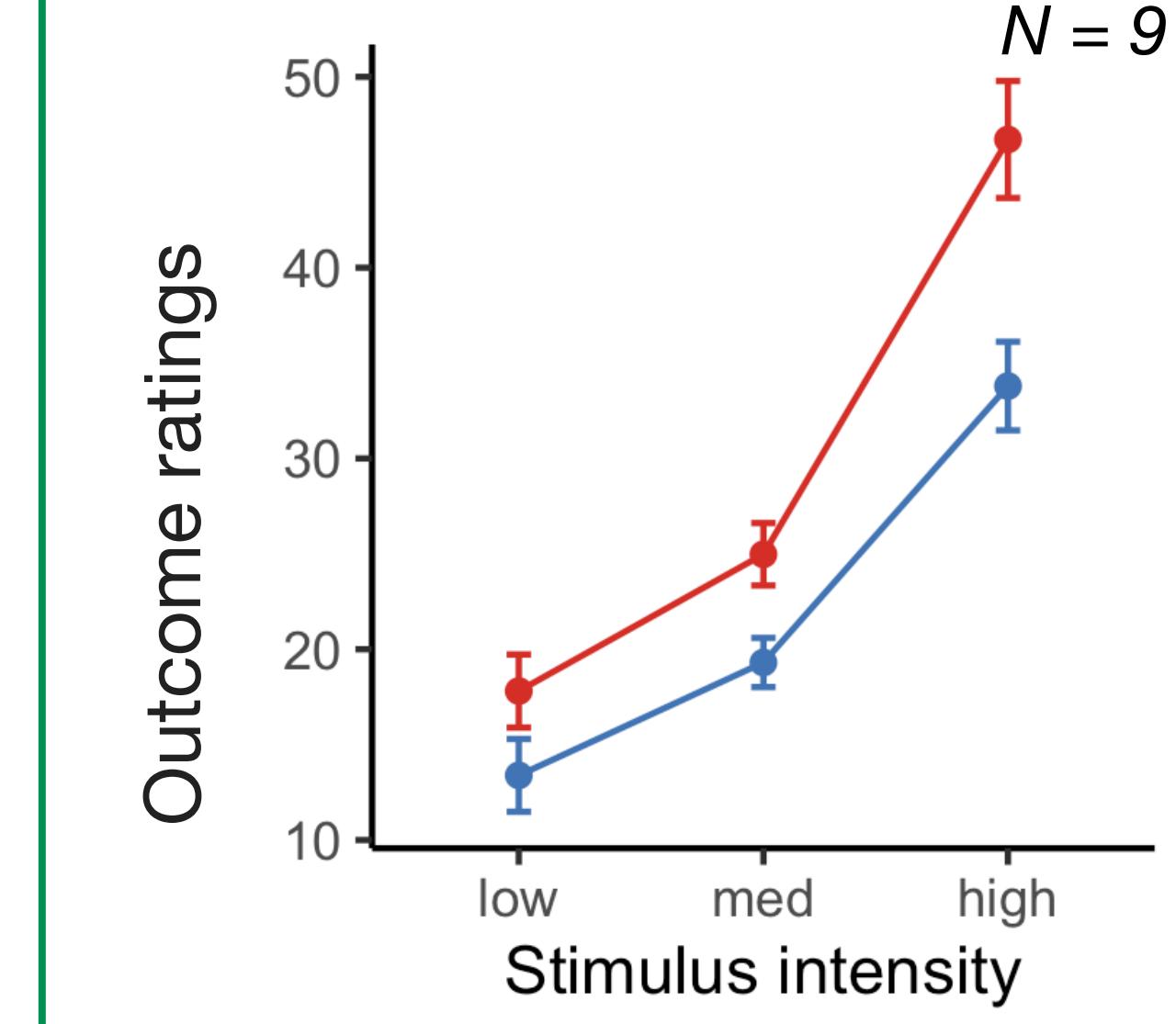
Cue effect :: Cues modulate outcome ratings



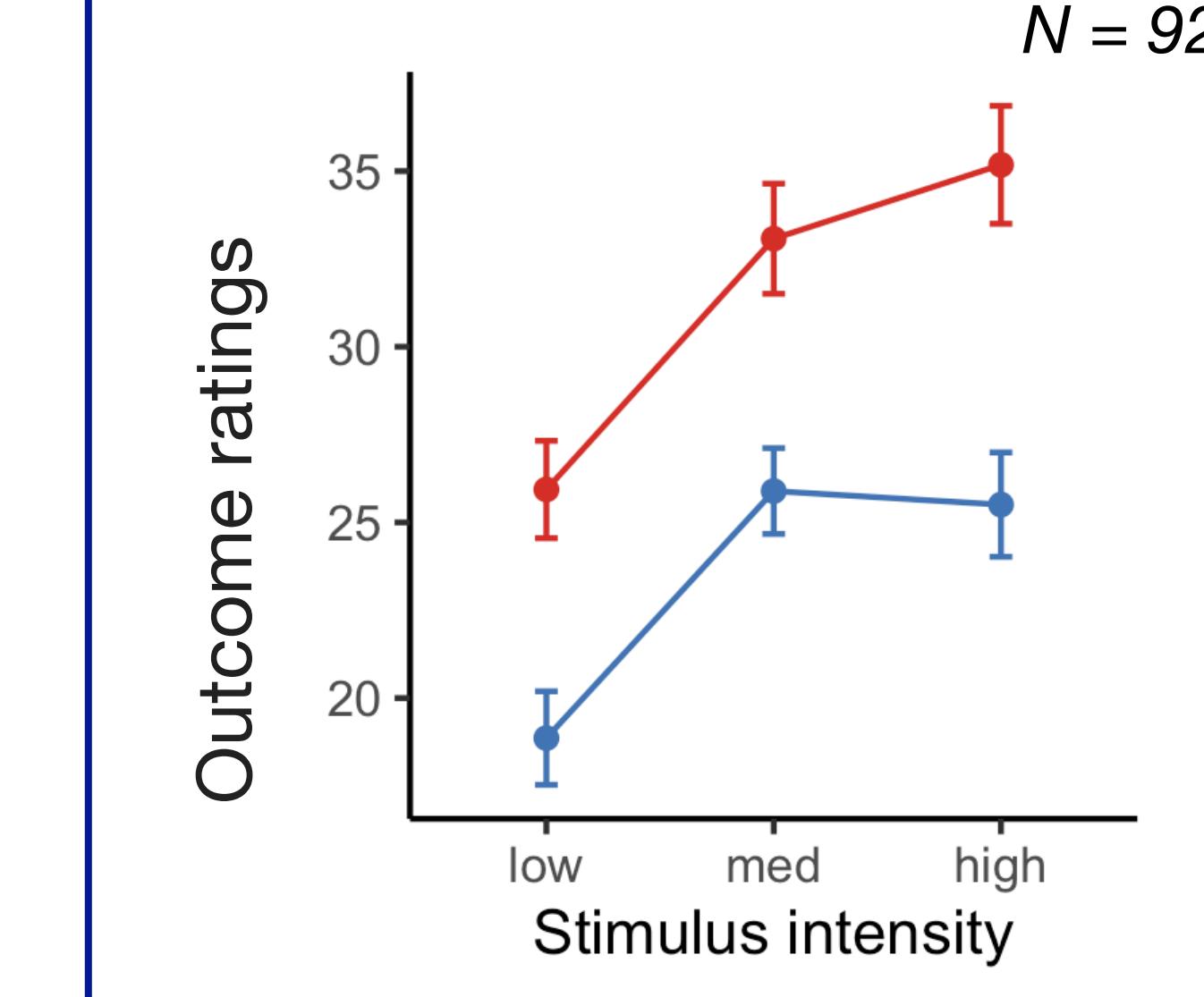
Pain



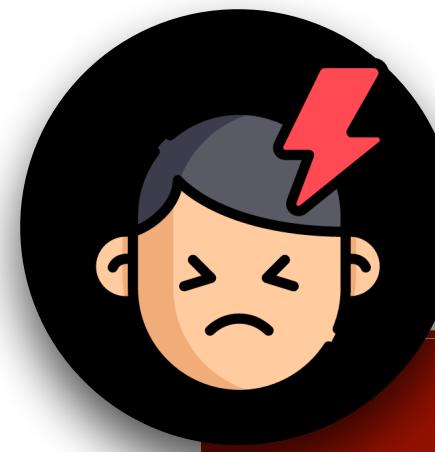
Vicarious



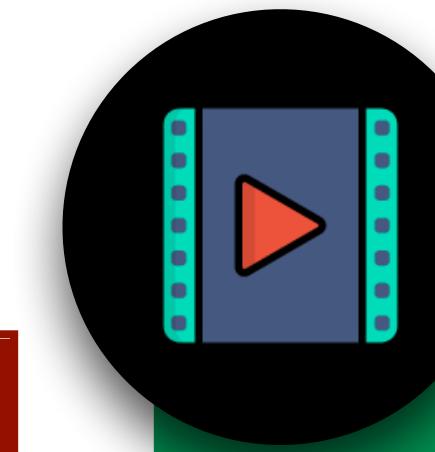
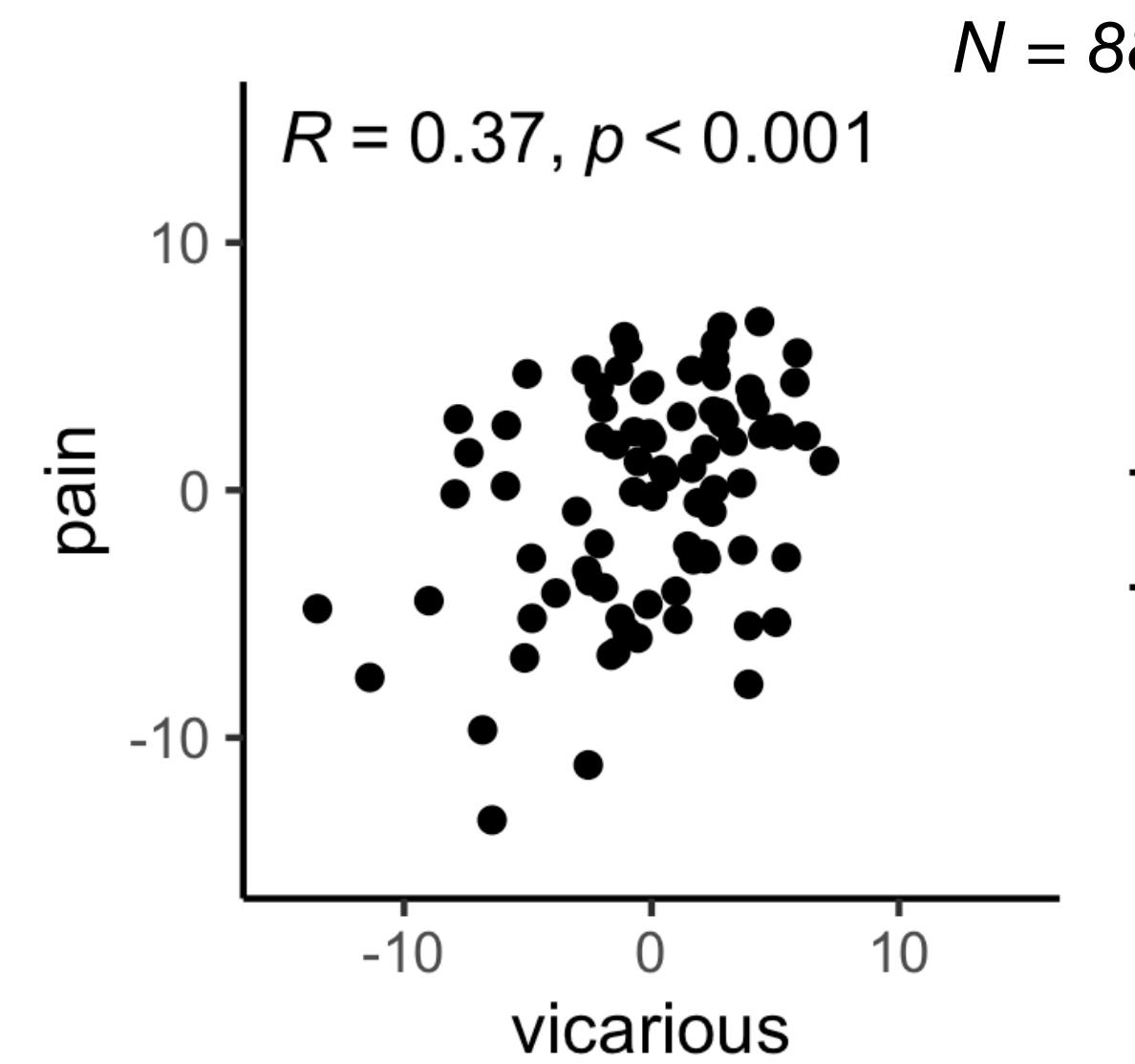
Cognitive



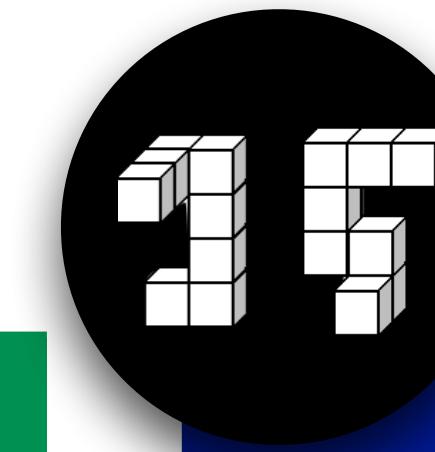
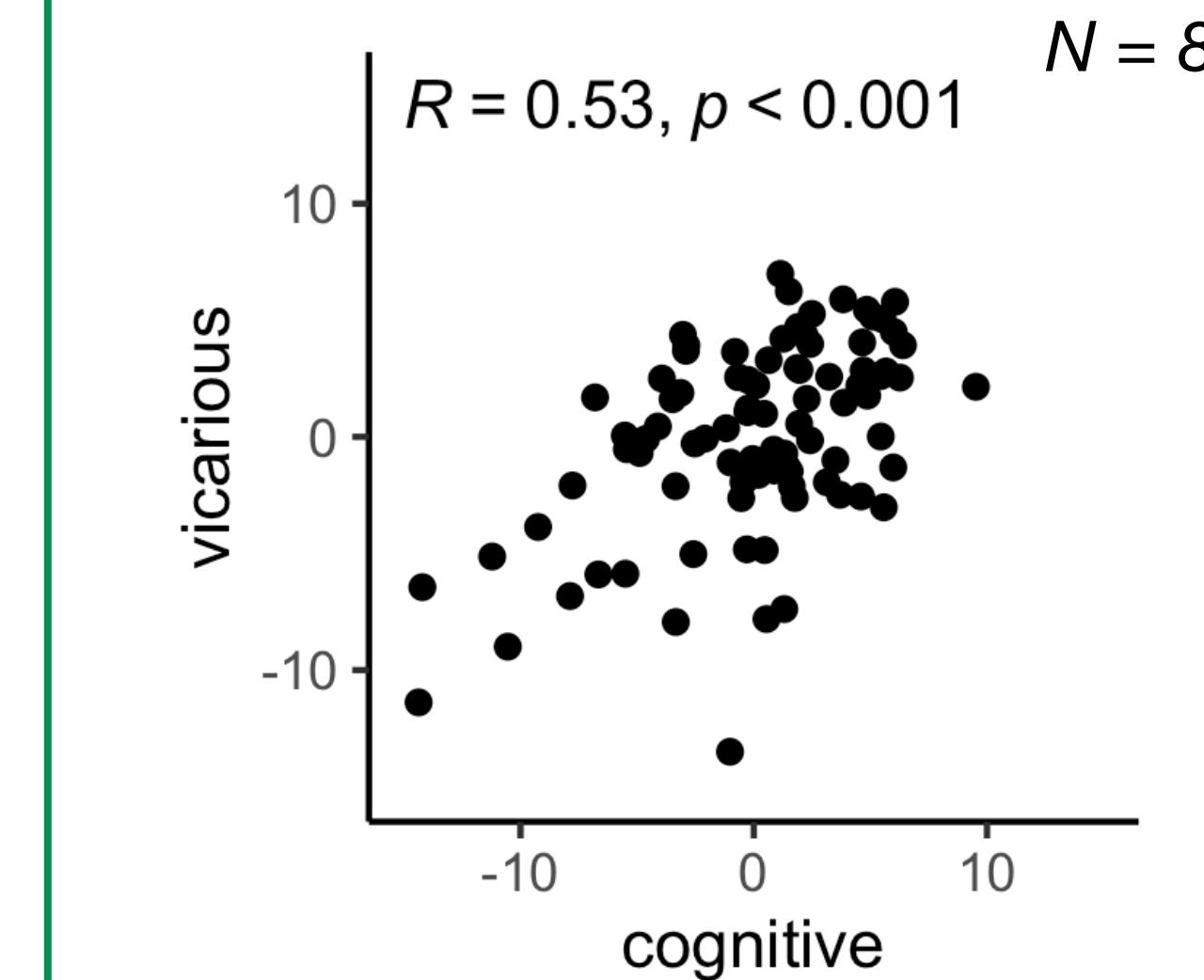
Individual differences in cue effects are domain-general



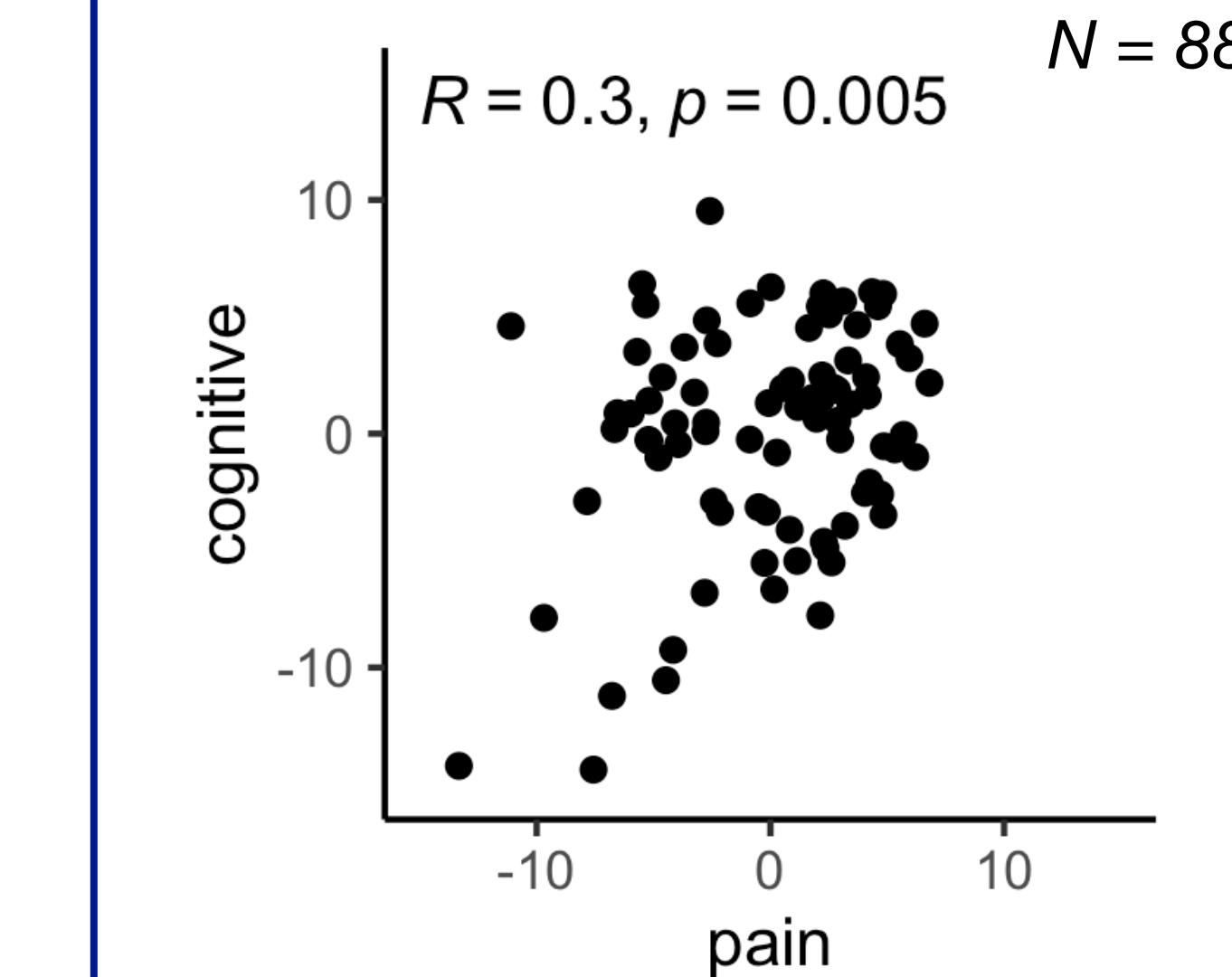
Pain



Vicarious

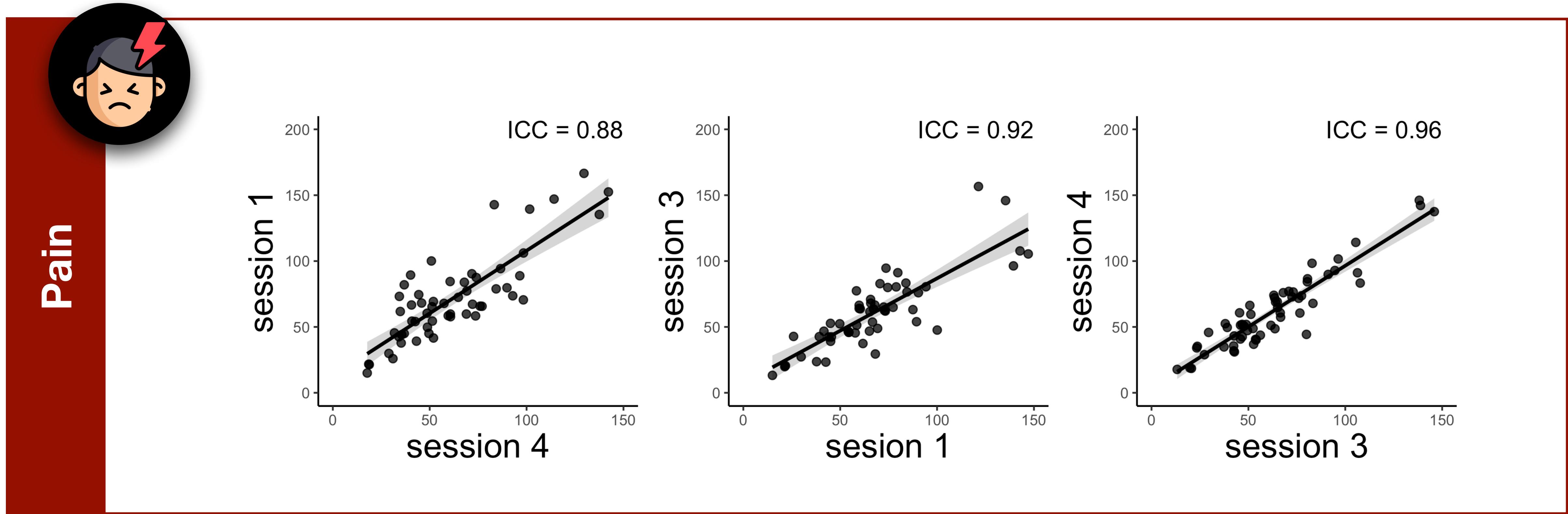


Cognitive

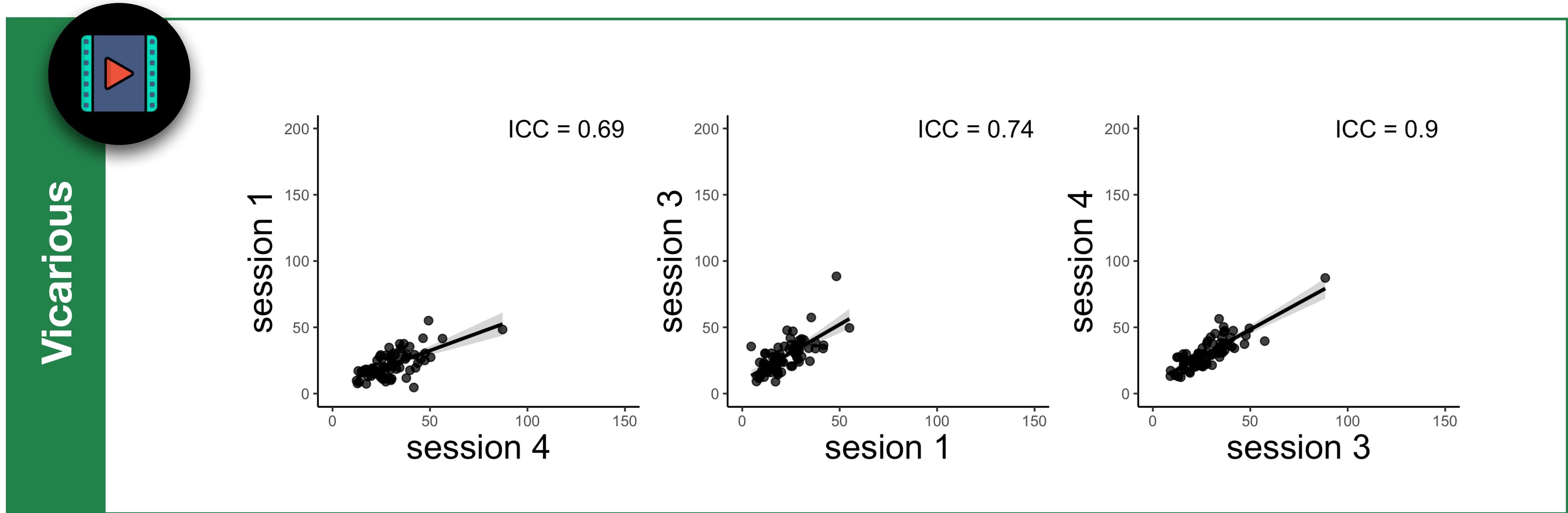


- high cue
- low cue

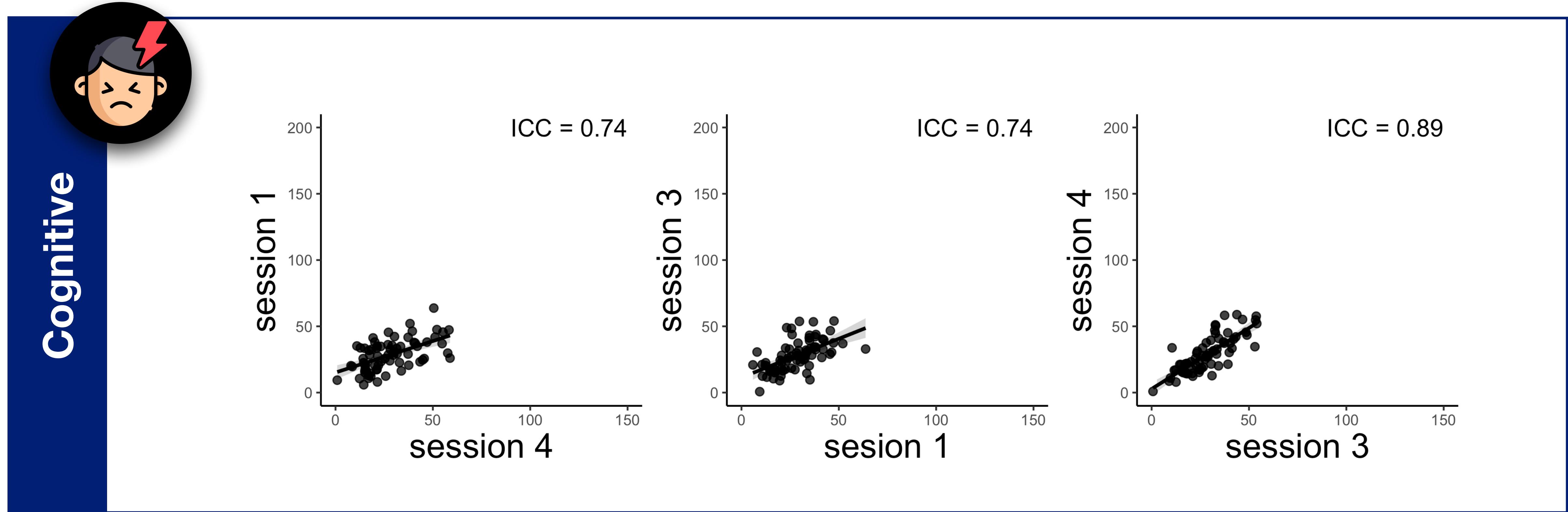
Behavioral ratings across sessions are similar



Behavioral ratings across sessions are similar

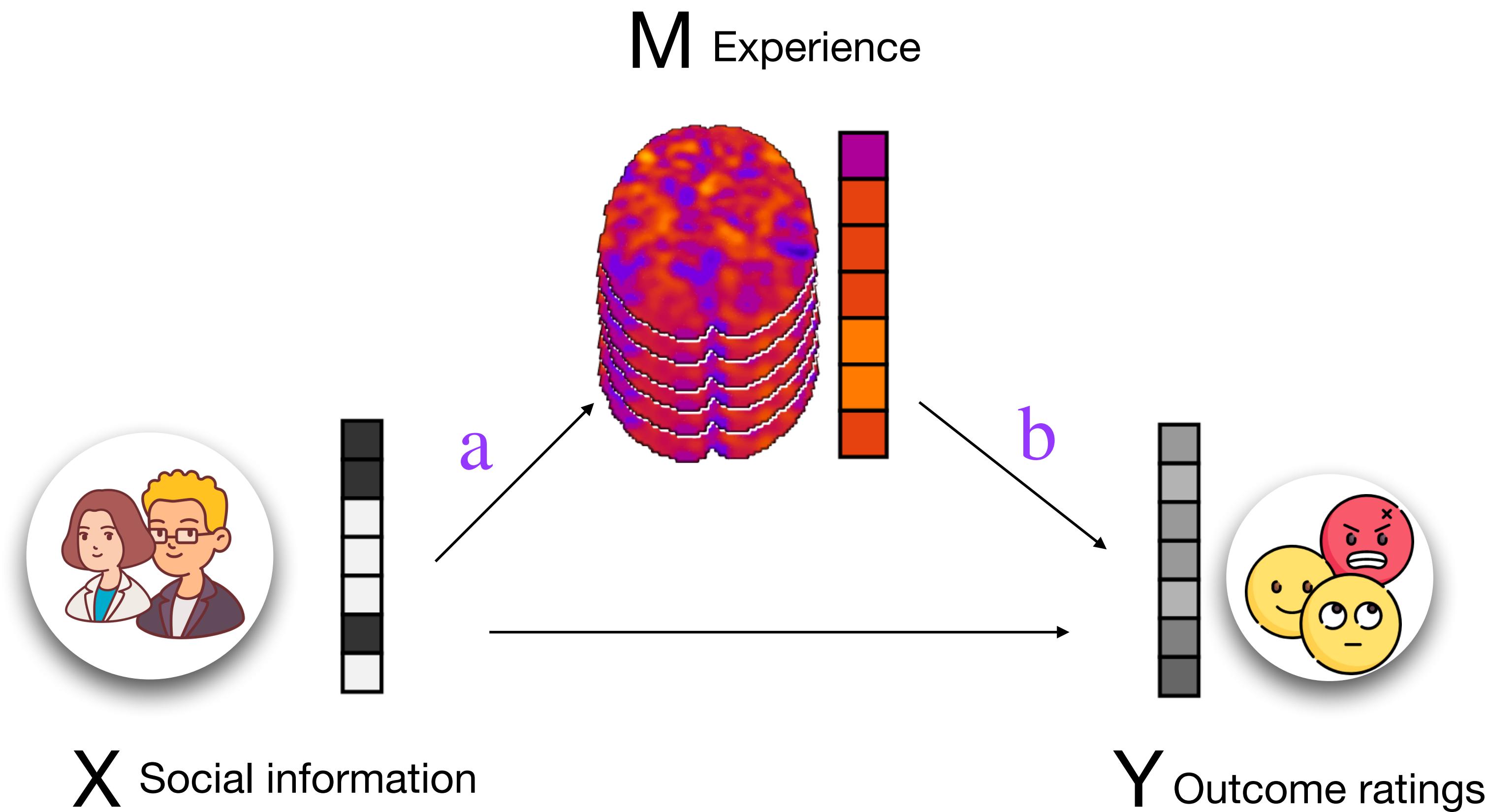


Behavioral ratings across sessions are similar



Future plans

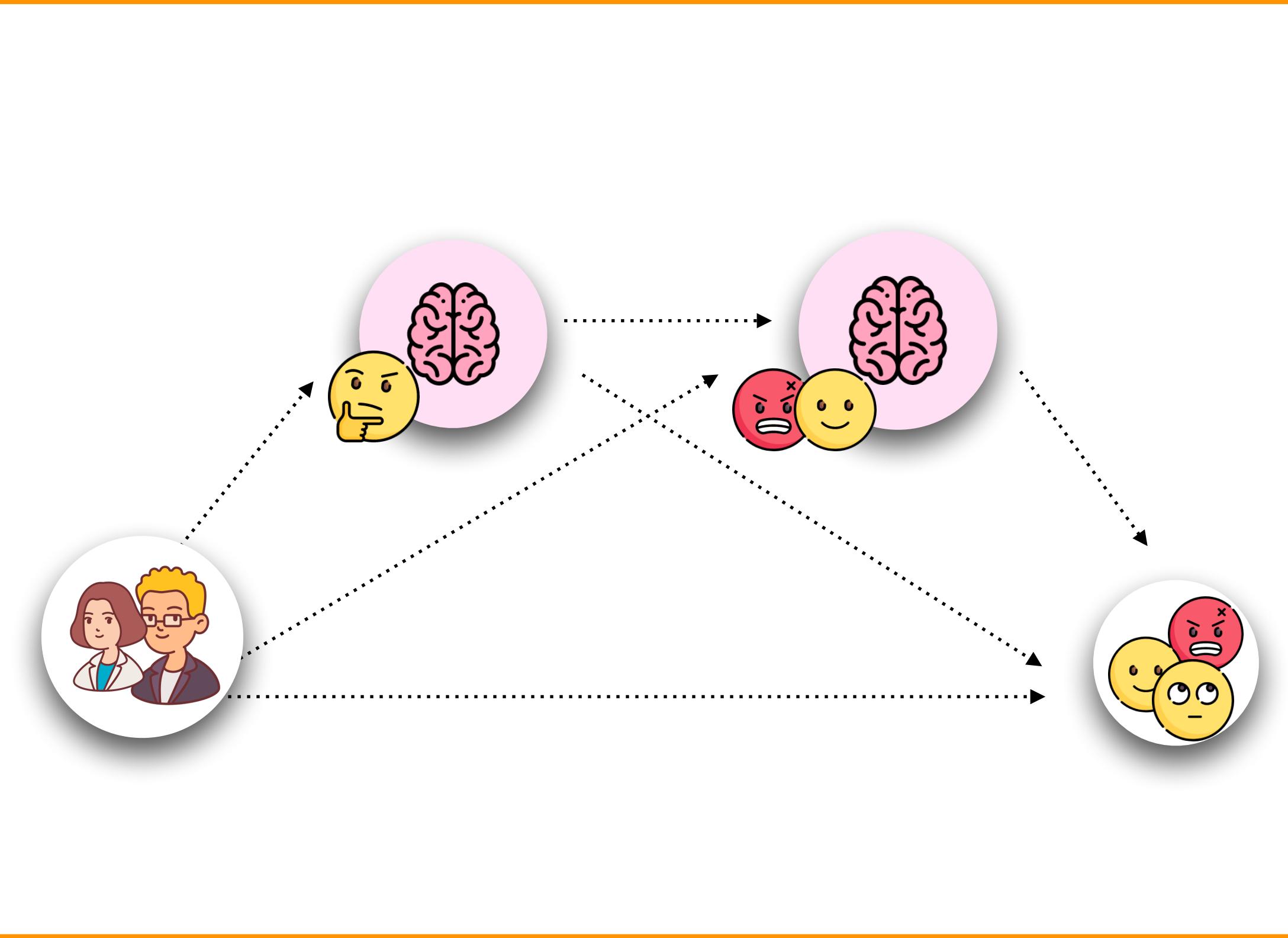
Multilevel-mediation analysis...



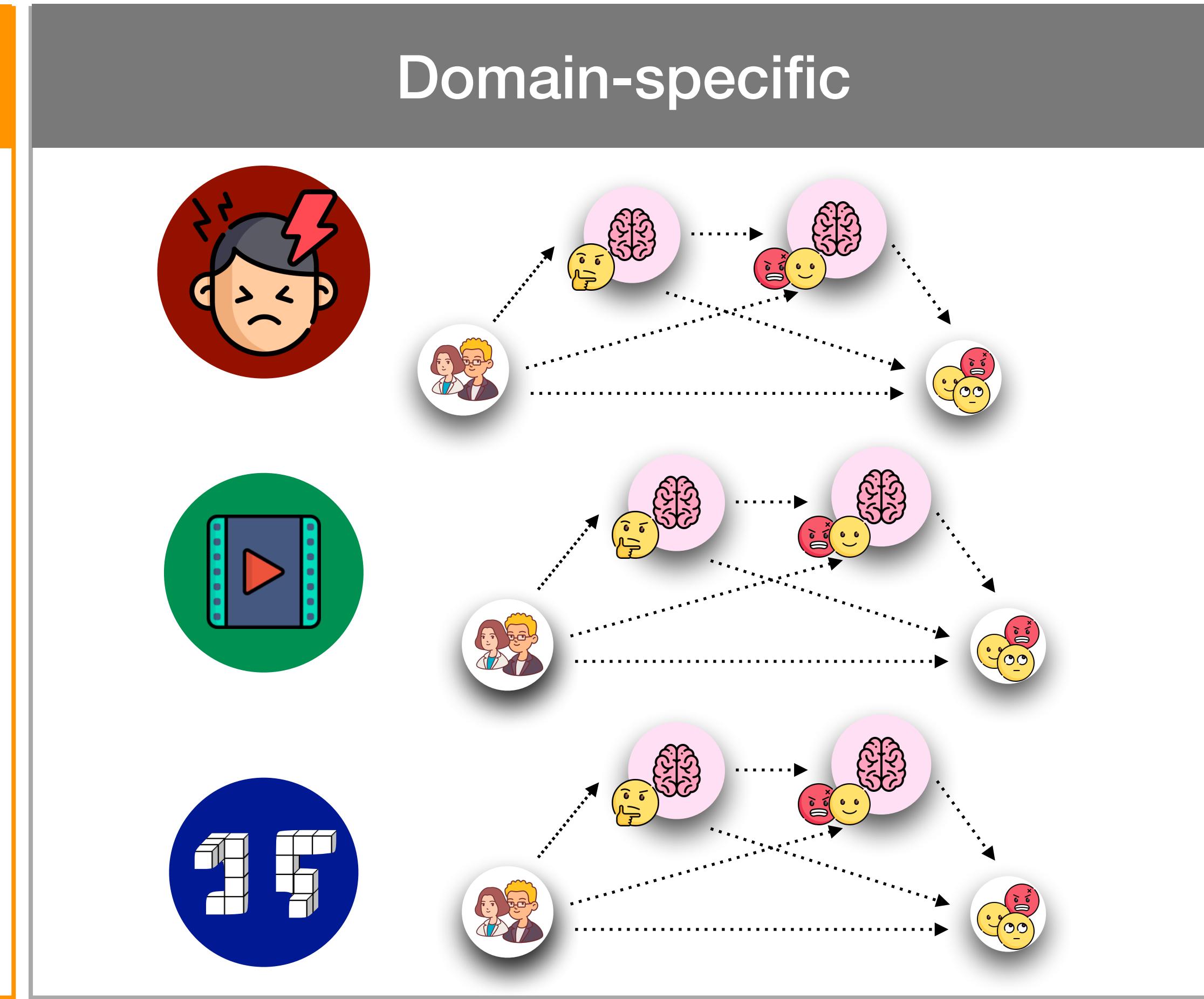
Future analysis will be based on pre-registration



Domain-general



Domain-specific



Voxel wise robust regression

**canlab/
RobustToolbox**

Robust regression toolbox for neuroimaging data

4 Contributors 2 Issues 10 Stars 8 Forks

 CANlab.canlab.github.io

