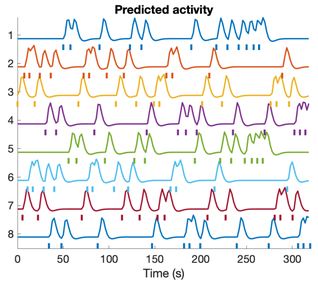
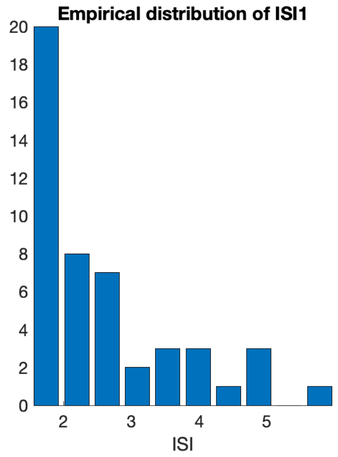
0117 update on ABCD simulation

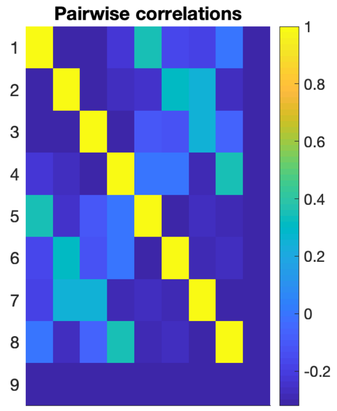
Instead of 2 events, Simulated as 4 events
- 3 PVC x 2 HL cue x 3 HML stim
- 4 event type: 1) cue, 2) expectation rating, 3) stimulus administration, 4) judgmen

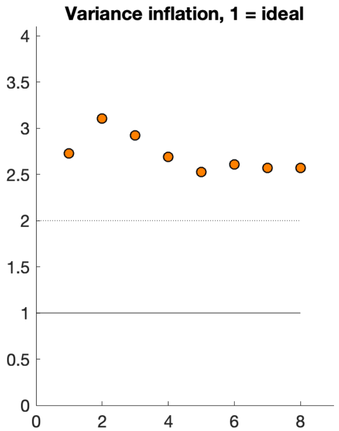
Power simulation with different configurations “Trial types”

- ISI: 2.5s
- Trial type: **4**
- Trials per type: 12

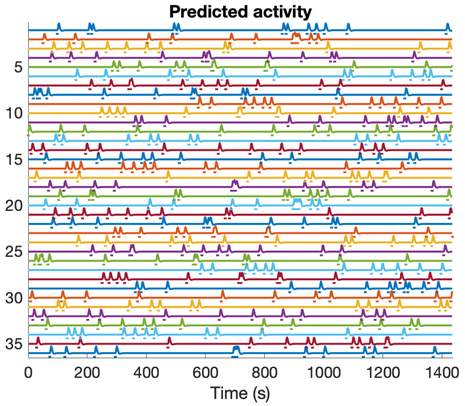


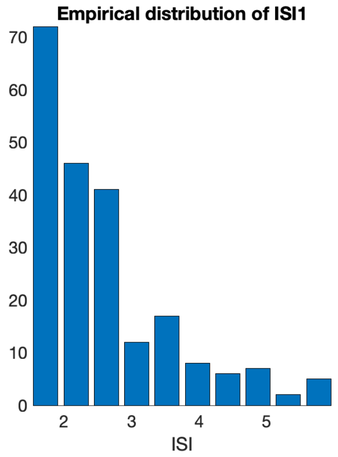


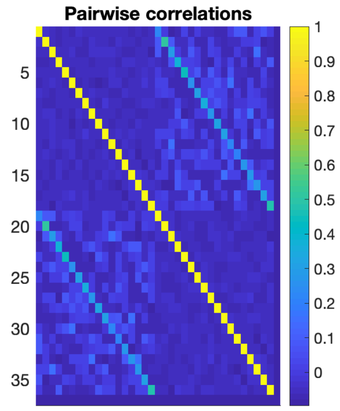


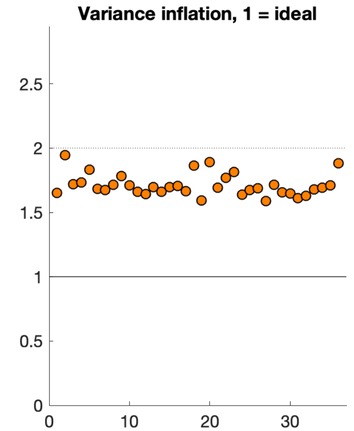


- ISI: 2.5s
- Trial type: **18**
- Trials per type: 12



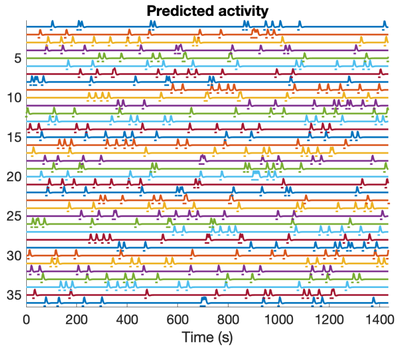


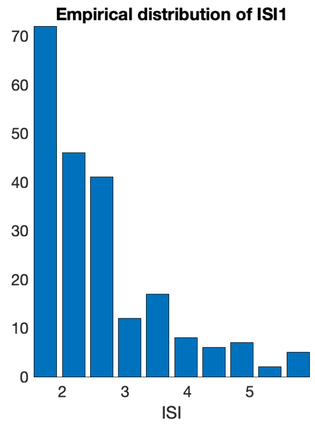


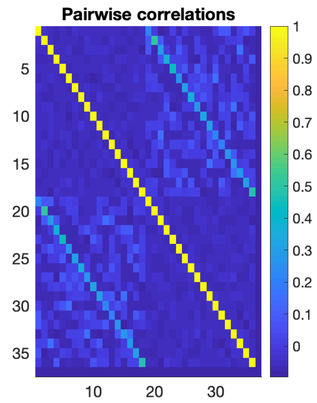


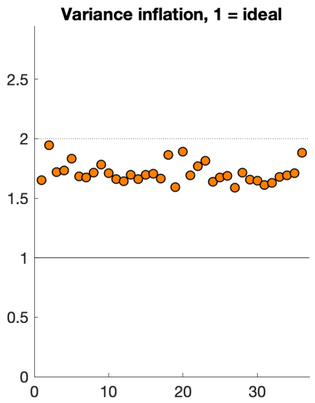
Power simulation with different configurations “ISI”

- ISI: **2.5s**
- Trial type: 18
- Trials per type: 12

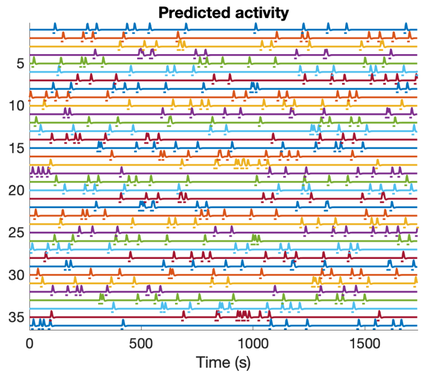


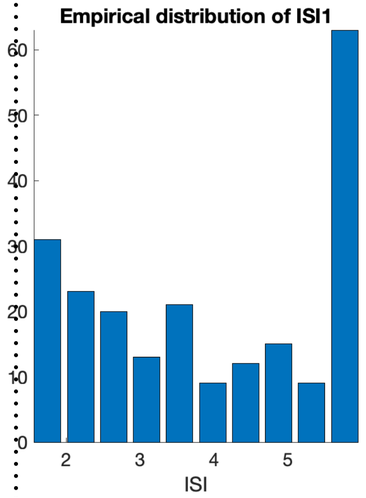


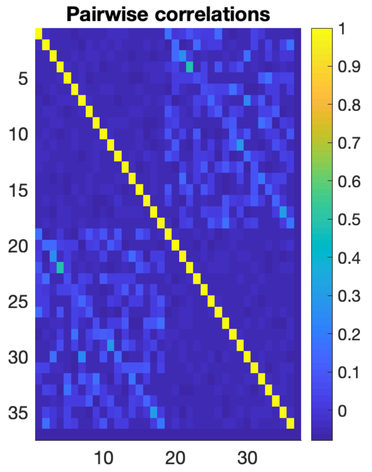


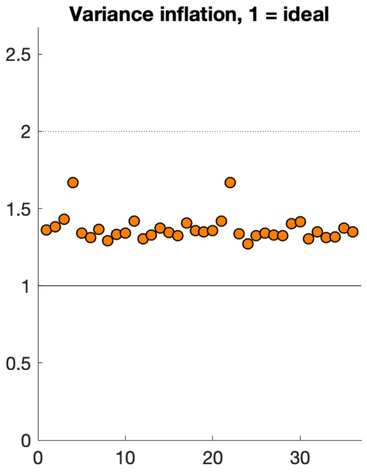


- ISI: **5s**
- Trial type: 18
- Trials per type: 12



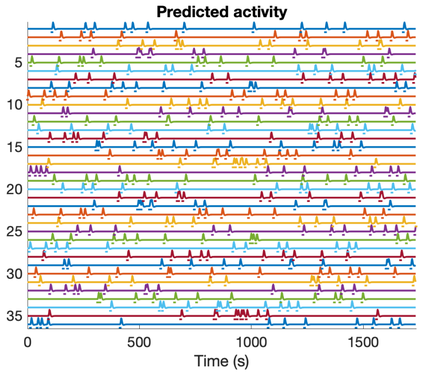


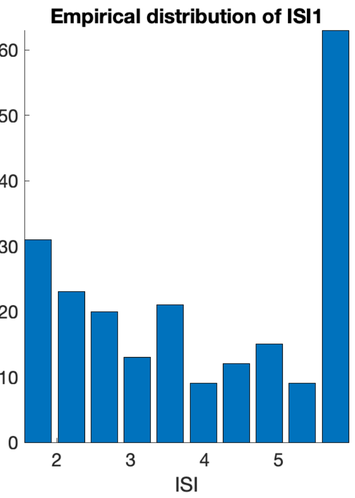


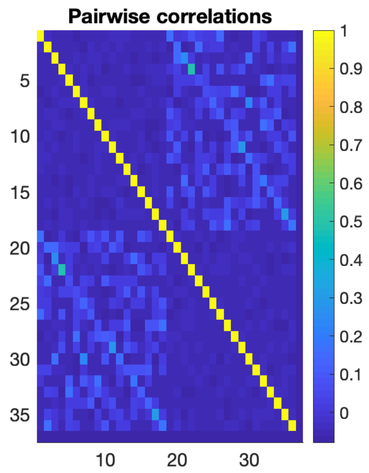


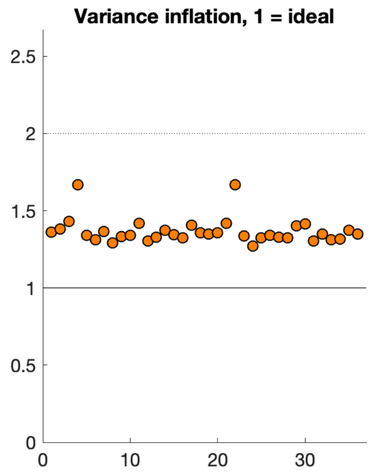
Power simulation with different configurations “Trials per type”

- ISI: 2.5s
- Trial type: 18
- Trials per type: **12**

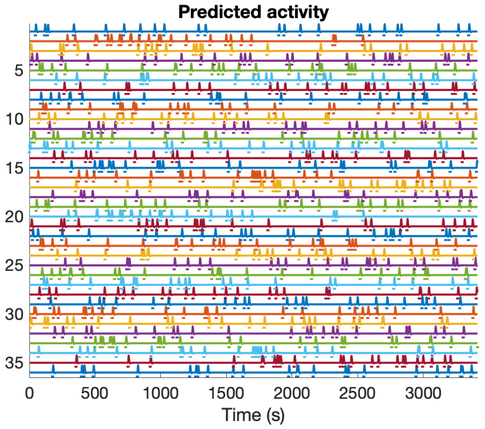


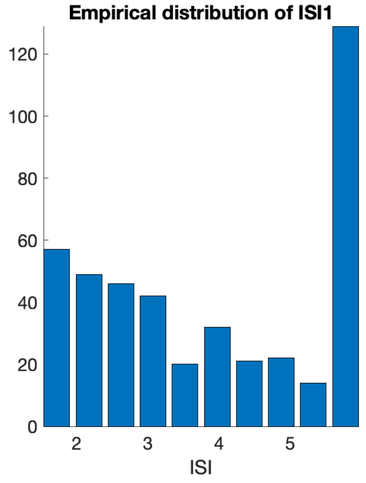


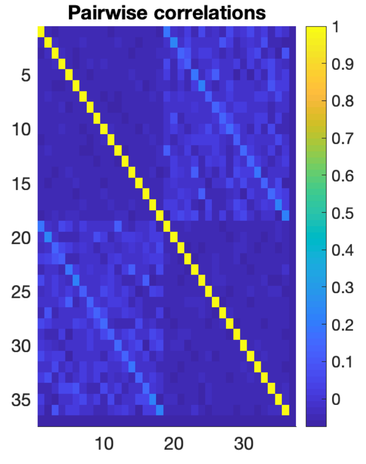


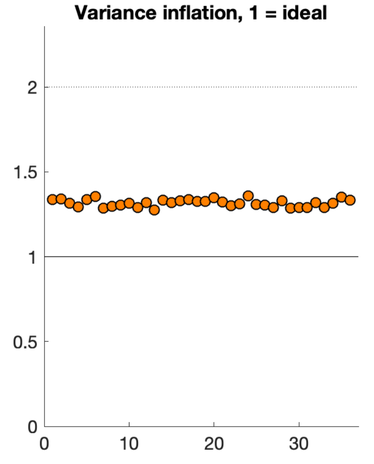


- ISI: 5s
- Trial type: 18
- Trials per type: **24**



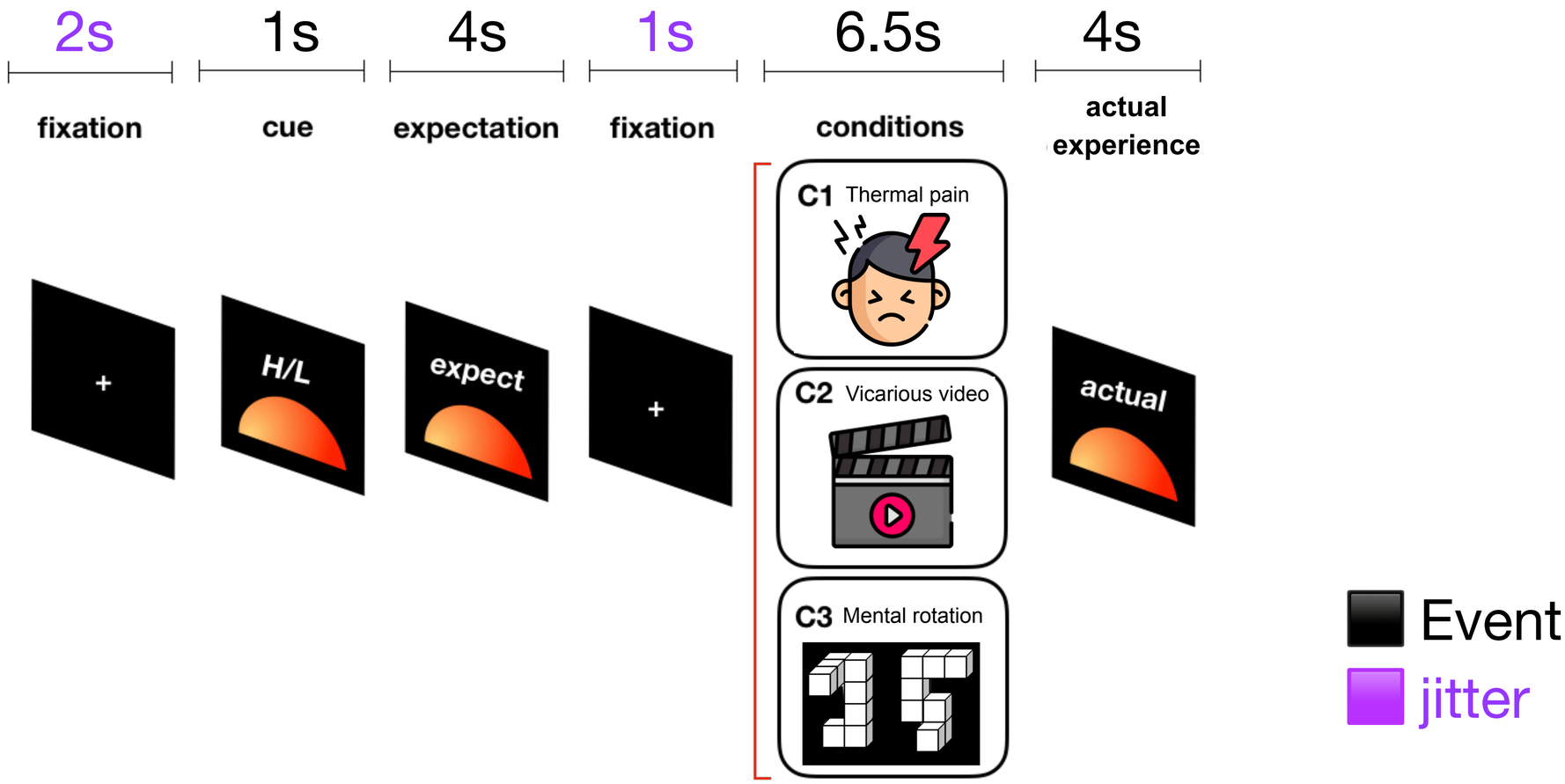






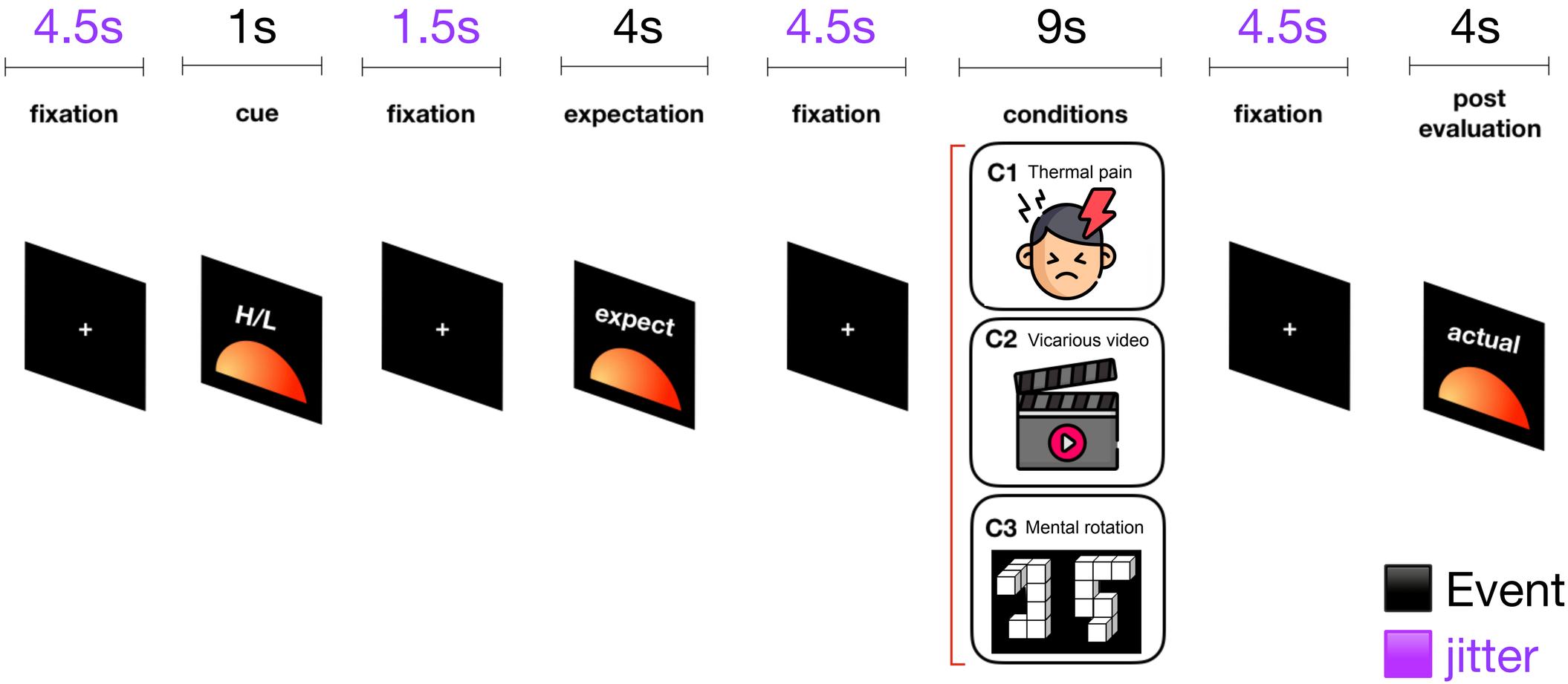
Original Design

- 1 trial: 18.5 sec
- 18 trial types: 3 PVC x 2 cue x 3 stim_intensity
- 36 trials per run, Total 6 runs
- 12 trial per trial type



Updated Design

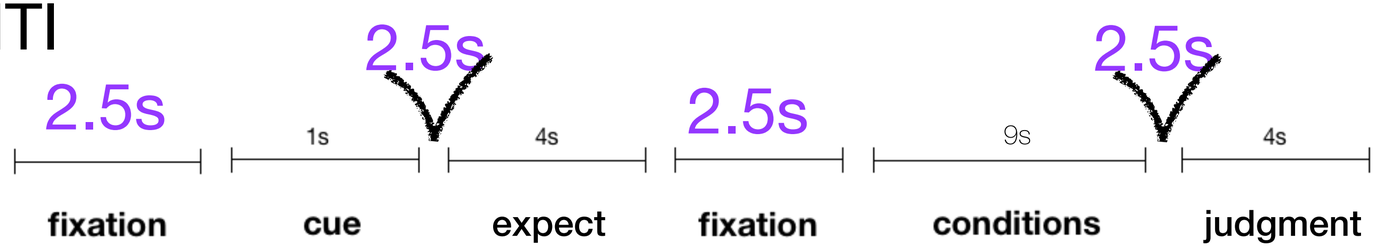
- 1 trial: 33 sec
- 18 trial types: 3 PVC x 2 cue x 3 stim_intensity
- 36 trials per run, total 6 runs
- 12 trial per trial type

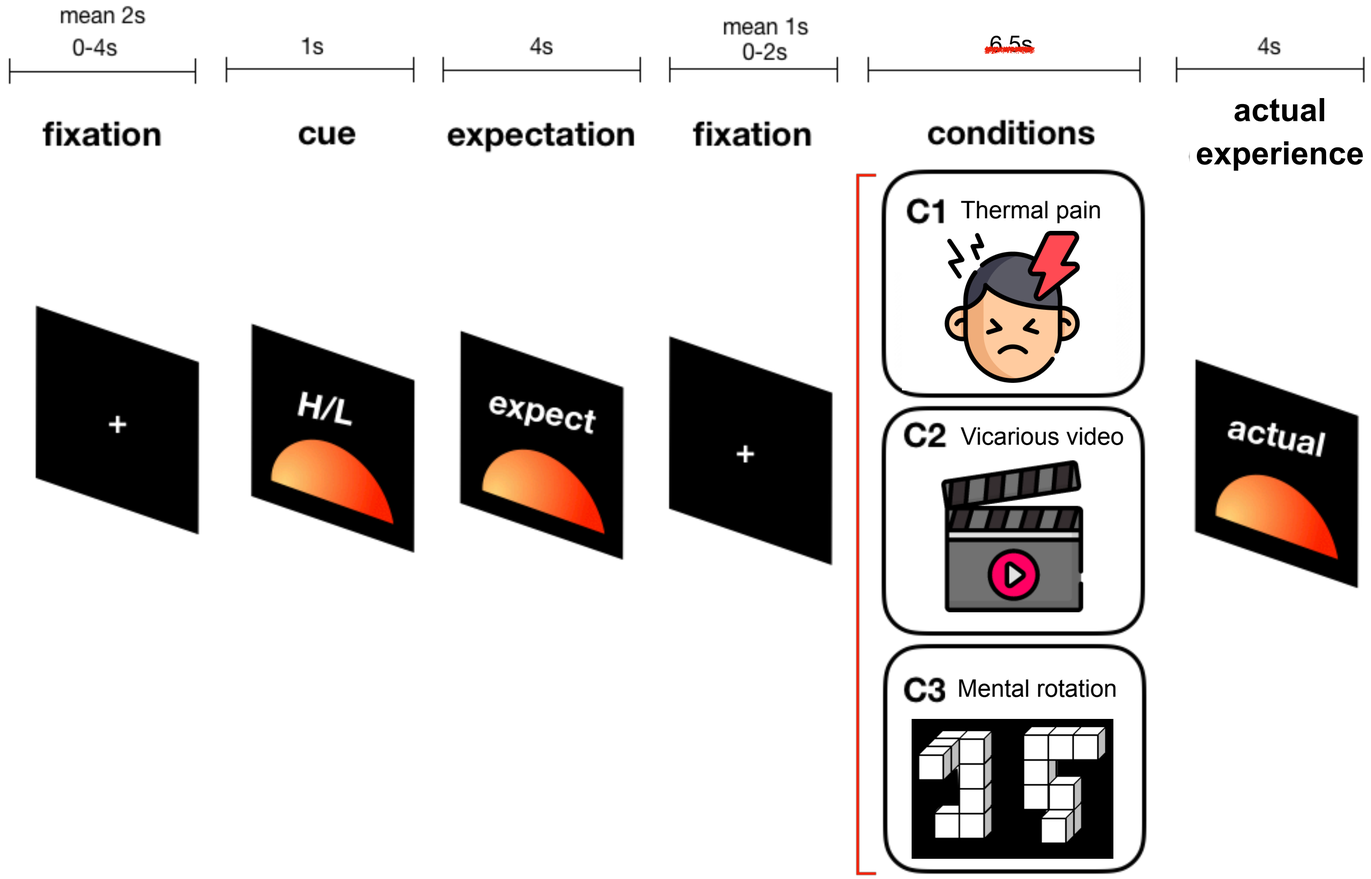


0115 update on ABCD simulation

Instead of 2 events, Simulated as 4 events
- 3 PVC x 2 HL cue x 3 HML stim
- 4 event type: 1) cue, 2) expectation rating, 3) stimulus administration, 4) judgmen

Design


ITI
2.5s
2.5s
2.5s
1s
4s
9s
4s
fixation
cue
expect
fixation
conditions
judgment

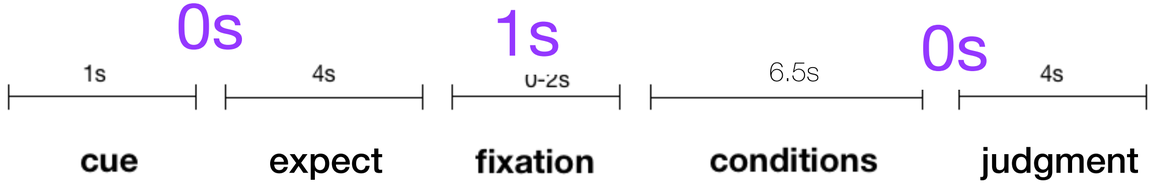

mean 2s
0-4s
1s
4s
mean 1s
0-2s
6.5s
4s
fixation
cue
expectation
fixation
conditions
actual
experience
+
H/L
expect
+
C1 Thermal pain
C2 Vicarious video
C3 Mental rotation
actual

Originally coded for 2 events (cue+expect / stimuli + actual) updated to code for 4 events with 4 jitters.

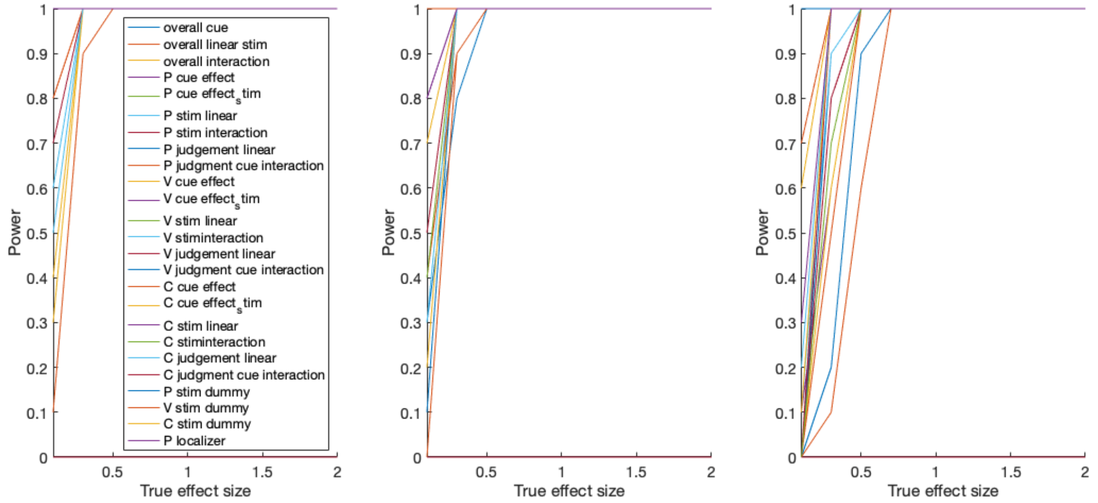
```
event1duration    = 1;    % duration of cue
event2duration    = 4;    % duration of expect
event3duration    = 9;     %
event4duration    = 4;
trialtypes        = 18;  %4      % neutral, 2 levels of loss, 2 levels of gain
trialspertype     = 36;
ISI1isconstant    = 0;    % ITI is constant (as opposed to jittered).
ISI1constantvalue = 0; % in seconds, used only if ISI2isconstant

% All ISI times in sec.
isidistribution = 'exponential';  % 'exponential' or 'geometric'
ISI1min   = 1;   %0       % Constraints: Psychological (can subjects process cue) and statistical (longer = less BOLD nonlinearity, which is difficult to model).
ISI1mean  = 2;    %2       % For 'exponential' only.  Includes ISImin.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit
ISI1step  = .65;         % For 'geometric' only.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit within total scan time c
ISI1max   = 5;    %4       % Truncate to avoid VERY long ISIs

ISI2min   = 0;   %0       % Constraints: Psychological (can subjects process cue) and statistical (longer = less BOLD nonlinearity, which is difficult to model).
ISI2mean  = 0;    %2       % For 'exponential' only.  Includes ISImin.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit
ISI2step  = 0;         % For 'geometric' only.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit within total scan time con
ISI2max   = 0;    %4       % Truncate to avoid VERY long ISIs

ISI3min   = 0.5;   %0       % Constraints: Psychological (can subjects process cue) and statistical (longer = less BOLD nonlinearity, which is difficult to model).
ISI3mean  = 1;    %2       % For 'exponential' only.  Includes ISImin.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit
ISI3step  = .65;         % For 'geometric' only.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit within total scan time c
ISI3max   = 5;    %4       % Truncate to avoid VERY long ISIs

ISI4min   = 0;   %0       % Constraints: Psychological (can subjects process cue) and statistical (longer = less BOLD nonlinearity, which is difficult to model).
ISI4mean  = 0;    %2       % For 'exponential' only.  Includes ISImin.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit
ISI4step  = 0;         % For 'geometric' only.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit within total scan time con
ISI4max   = 0;    %4       % Truncate to avoid VERY long ISIs
```

Check if this is correct?

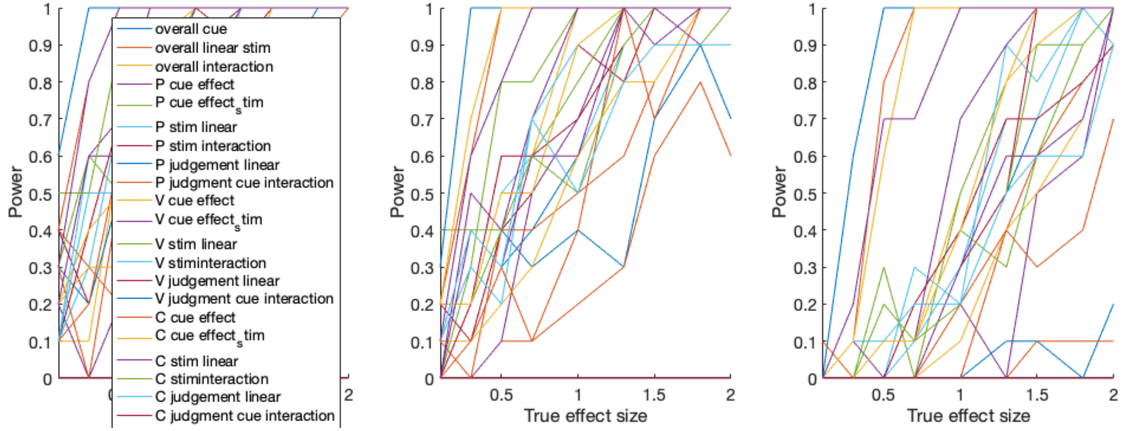
72 regressors
25 contrasts of interest
Trialtypes: 18
trialspertype:
Current version



trialspertype: 36



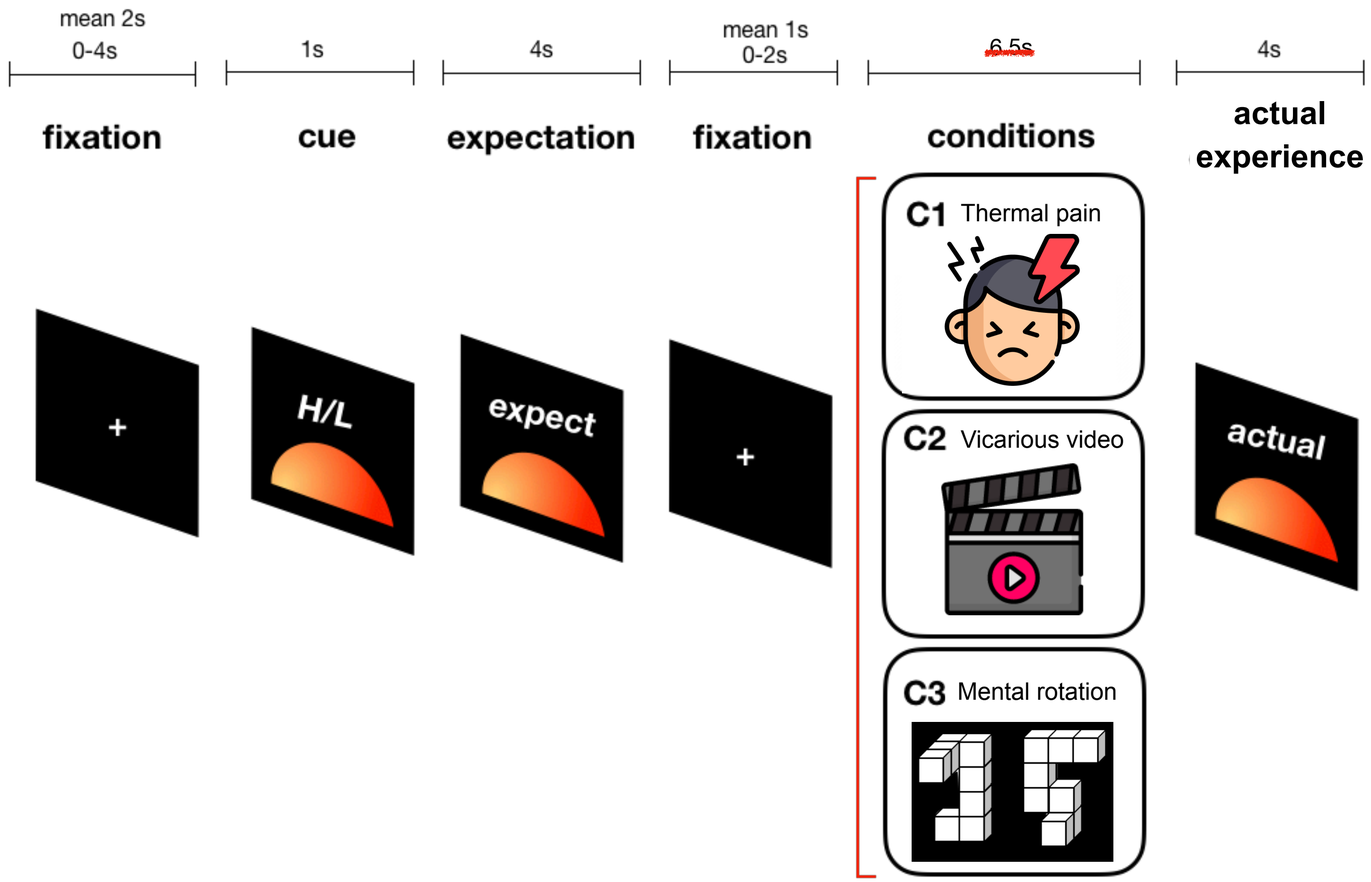
trialspertype: 1



0109 update on ABCD simulation

Instead of 2 events, Simulated as 4 events
- 3 PVC x 2 HL cue x 3 HML stim
- 4 event type: 1) cue, 2) expectation rating, 3) stimulus administration, 4) judgmen

Design

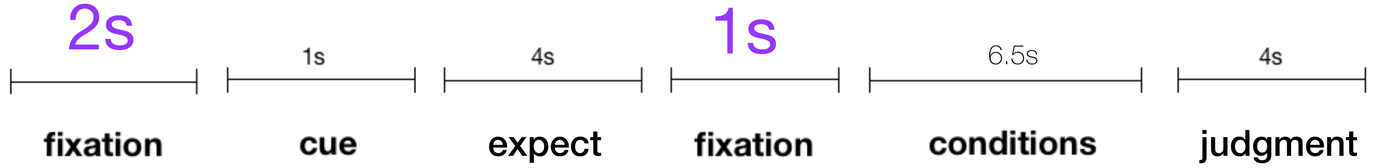

mean 2s
0-4s
1s
4s
mean 1s
0-2s
6.5s
4s
fixation
cue
expectation
fixation
conditions
actual
experience
+
H/L
expect
+
C1 Thermal pain
C2 Vicarious video
C3 Mental rotation
actual

Originally coded for 2 events (cue+expect / stimuli + actual) updated to code for 4 events with 4 jitters.

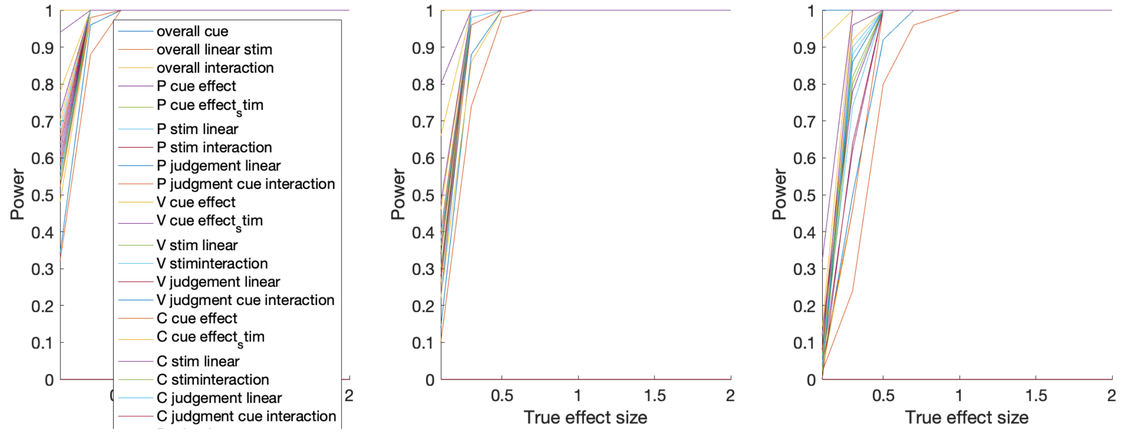
```
event1duration    = 1;    % duration of cue
event2duration    = 4;    % duration of expect
event3duration    = 9;     %
event4duration    = 4;
trialtypes        = 18;  %4      % neutral, 2 levels of loss, 2 levels of gain
trialspertype     = 36;
ISI1isconstant    = 0;    % ITI is constant (as opposed to jittered).
ISI1constantvalue = 0; % in seconds, used only if ISI2isconstant

% All ISI times in sec.
isidistribution = 'exponential';  % 'exponential' or 'geometric'
ISI1min   = 1;   %0       % Constraints: Psychological (can subjects process cue) and statistical (longer = less BOLD nonlinearity, which is difficult to model).
ISI1mean  = 2;    %2       % For 'exponential' only.  Includes ISImin.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit
ISI1step  = .65;         % For 'geometric' only.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit within total scan time c
ISI1max   = 5;    %4       % Truncate to avoid VERY long ISIs

ISI2min   = 0;   %0       % Constraints: Psychological (can subjects process cue) and statistical (longer = less BOLD nonlinearity, which is difficult to model).
ISI2mean  = 0;    %2       % For 'exponential' only.  Includes ISImin.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit
ISI2step  = 0;         % For 'geometric' only.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit within total scan time con
ISI2max   = 0;    %4       % Truncate to avoid VERY long ISIs

ISI3min   = 0.5;   %0       % Constraints: Psychological (can subjects process cue) and statistical (longer = less BOLD nonlinearity, which is difficult to model).
ISI3mean  = 1;    %2       % For 'exponential' only.  Includes ISImin.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit
ISI3step  = .65;         % For 'geometric' only.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit within total scan time c
ISI3max   = 5;    %4       % Truncate to avoid VERY long ISIs

ISI4min   = 0;   %0       % Constraints: Psychological (can subjects process cue) and statistical (longer = less BOLD nonlinearity, which is difficult to model).
ISI4mean  = 0;    %2       % For 'exponential' only.  Includes ISImin.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit
ISI4step  = 0;         % For 'geometric' only.  There is an optimal empirical value -- longer is better for deconvolution/FIR, but we also need to fit within total scan time con
ISI4max   = 0;    %4       % Truncate to avoid VERY long ISIs
```

Check if this is correct?

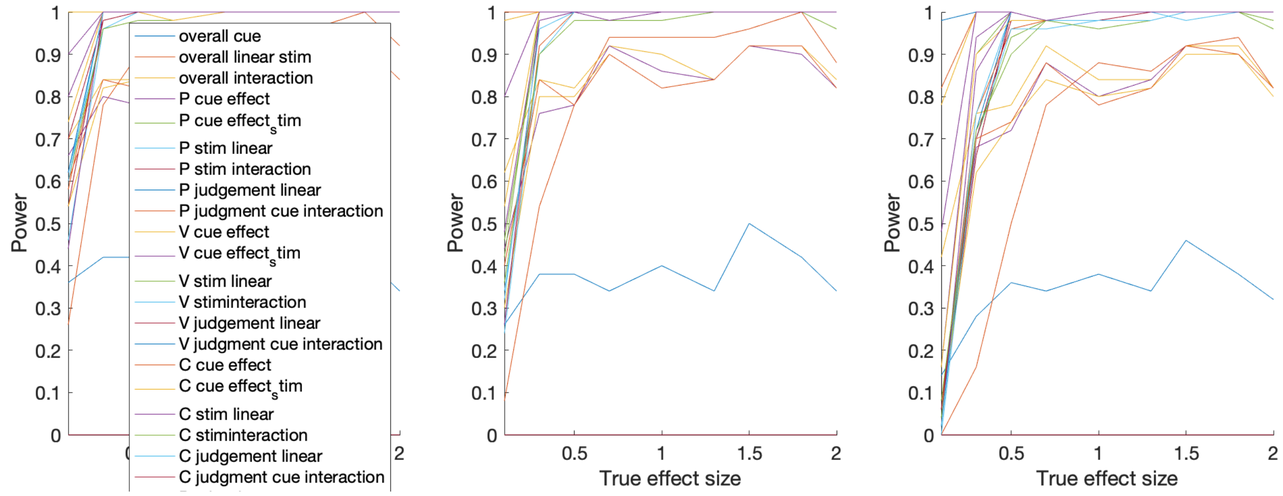
72 regressors
25 contrasts of interest
Current version



hrf fit



misfit



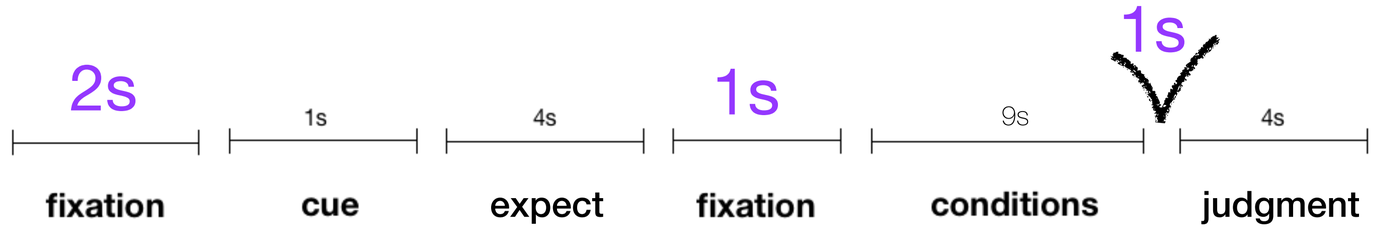
72 regressors
25 contrasts of interest

hrf fit

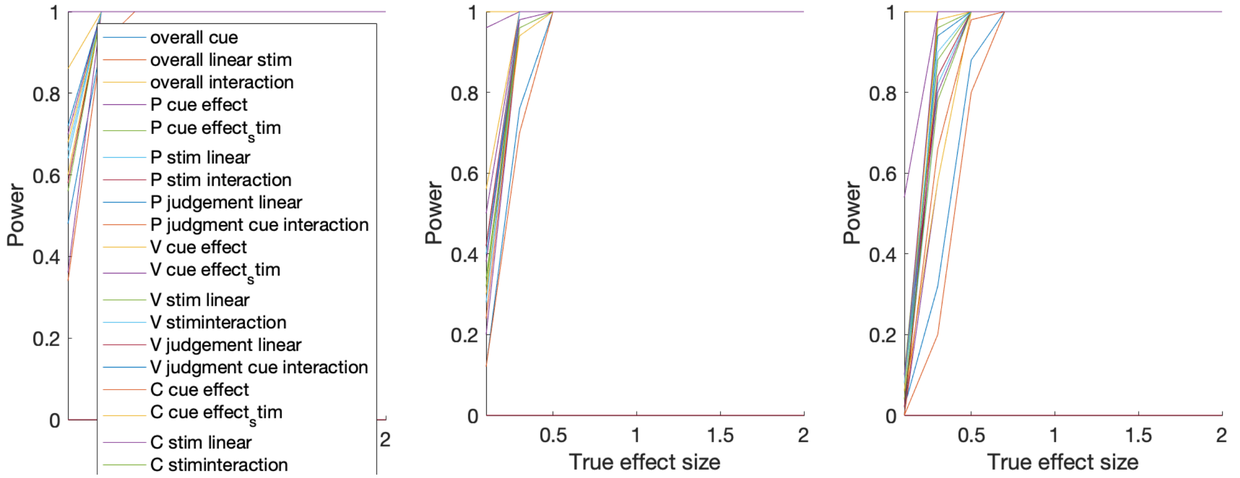
Wouldn’t simulate. Looking into it.

misfit

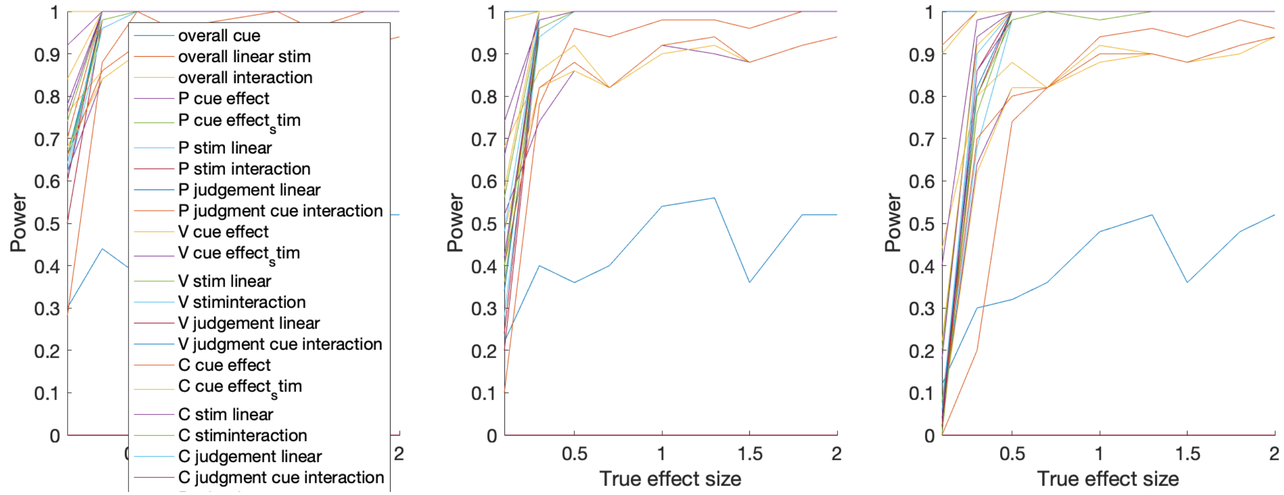
72 regressors
25 contrasts of interest



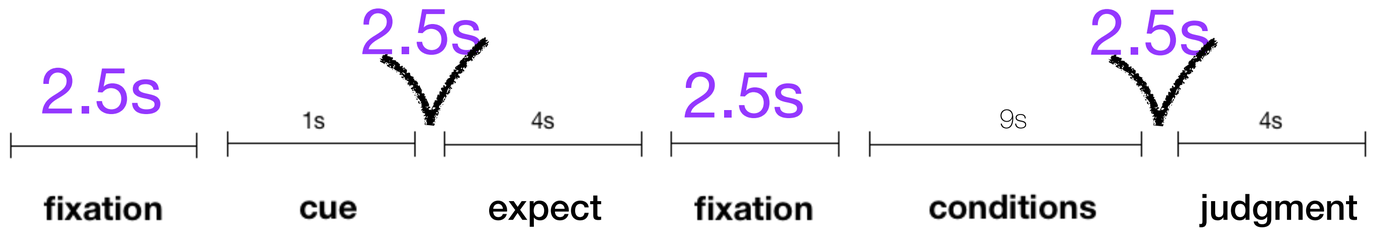
hrf fit



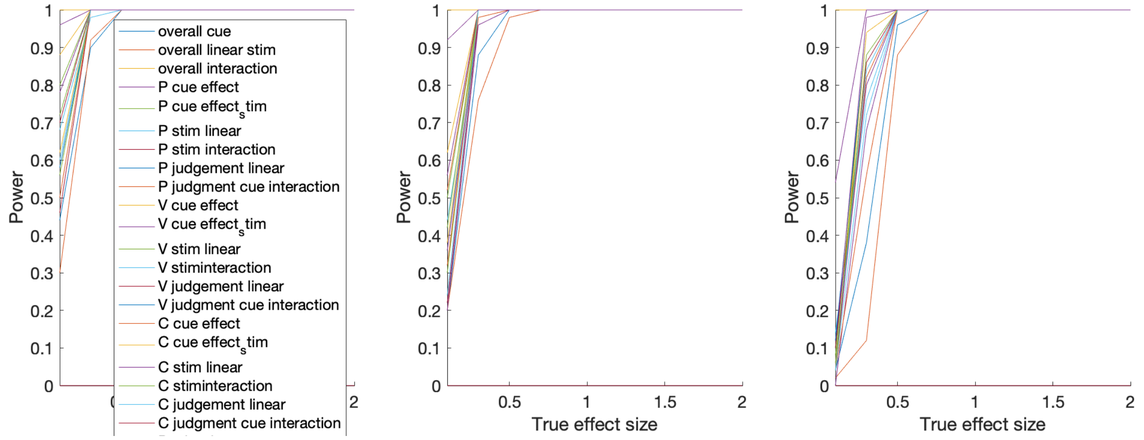
misfit



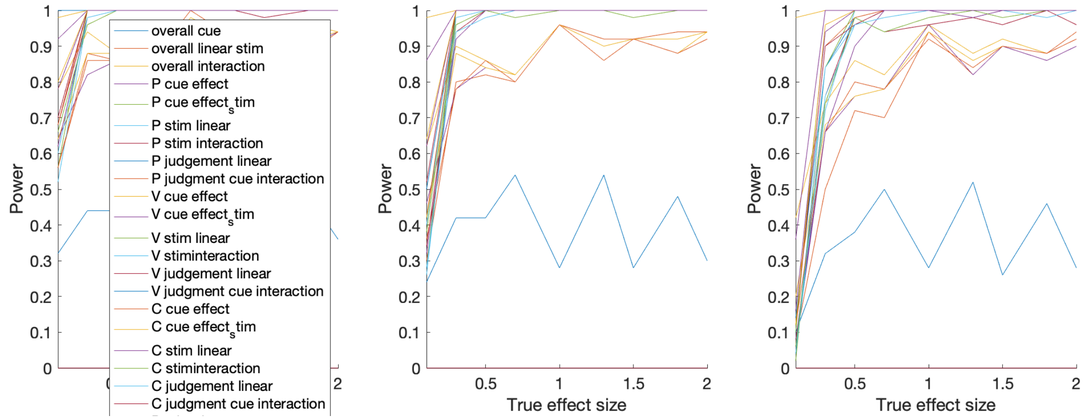
72 regressors
25 contrasts of interest



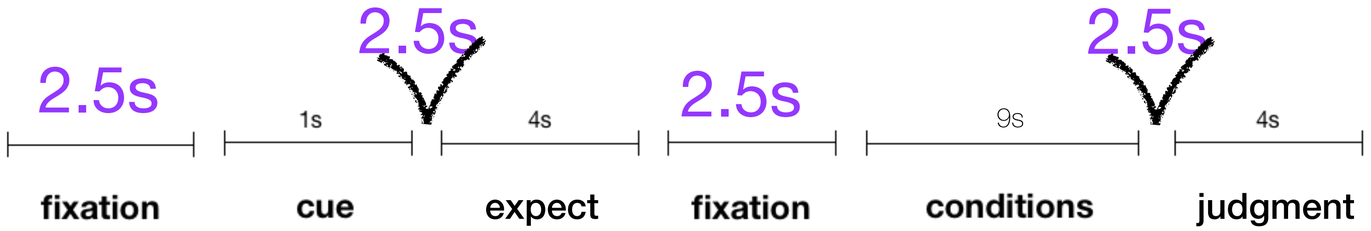
hrf fit



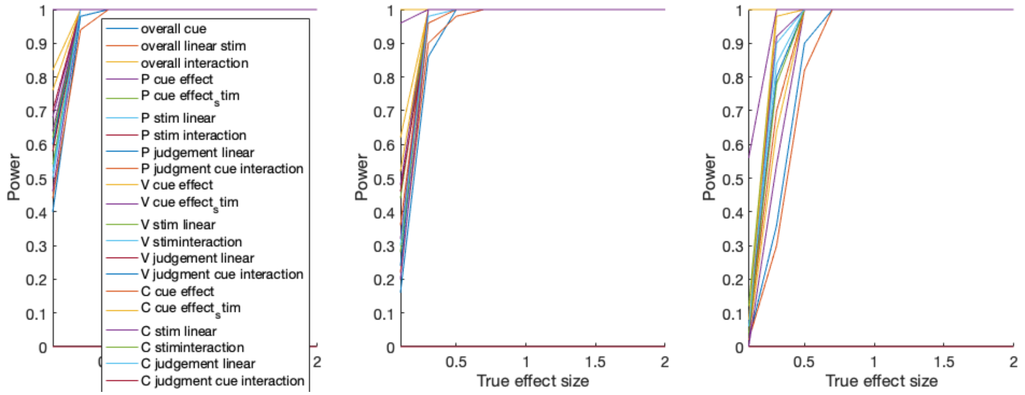
misfit



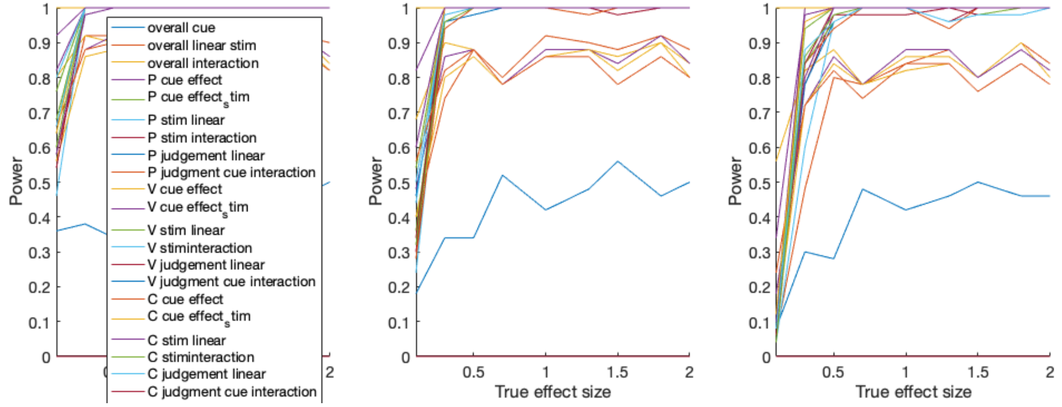
72 regressors
25 contrasts of interest
1 trial type per condition



hrf fit



misfit



0106
- code map
- 2 simulations

Code map

Example

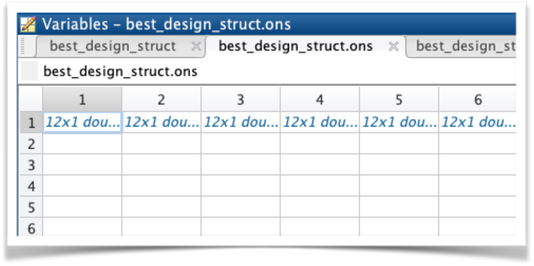
- 6 regressors (2 x 3 design)
- 12 trials per each cell

Input

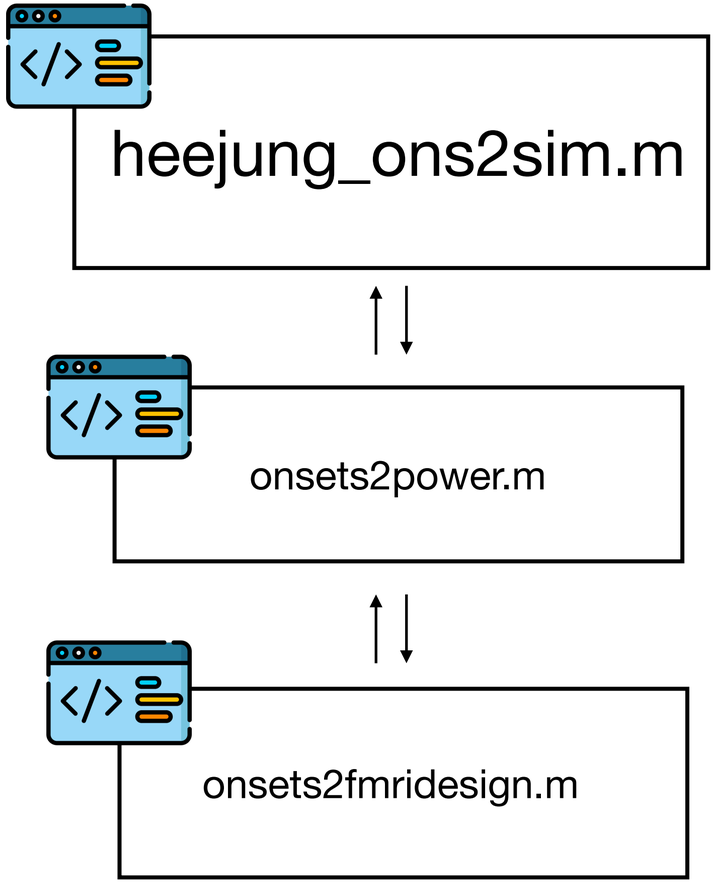
onset

- Cell structure
- Each regressor as column
- Each column has onsets

Example



Function



Output

OUT

- Cell structure
- Each “true effect size" as column
- Each column has two variables “regressor

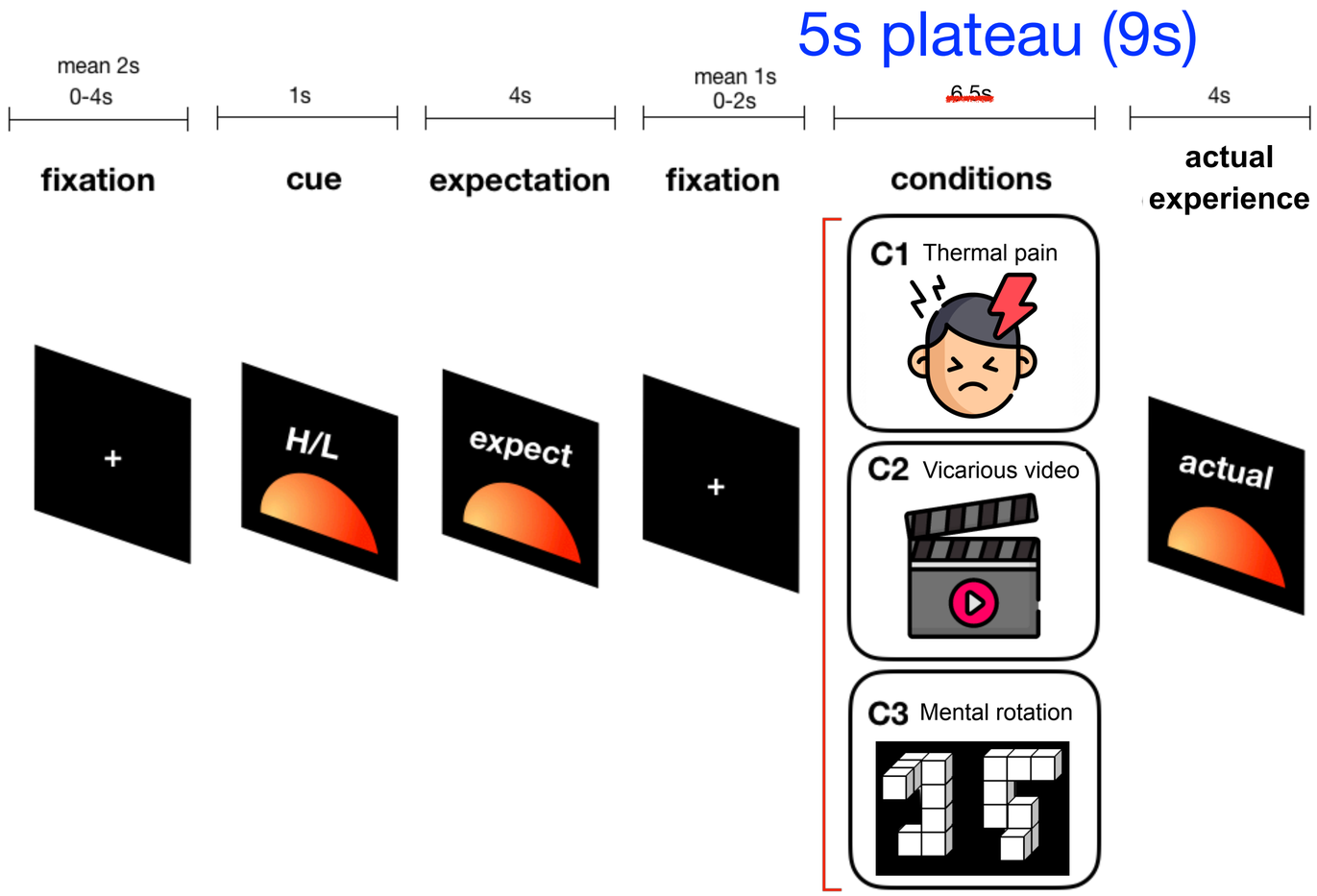
OUT{1,1} OUT{1,2}

true effect size as column
true_eff_size = [0.1 0.3 0.5 0.7 1]

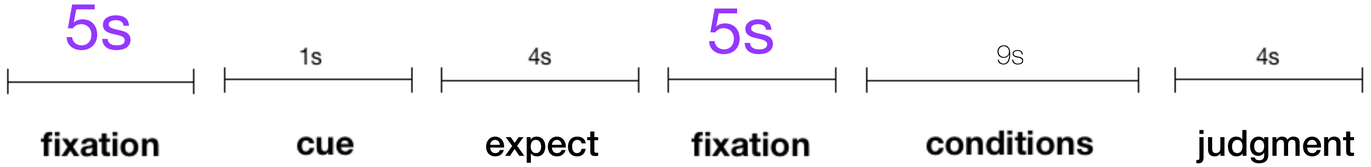
- Contrasts
  - t
  - p
  - sig05
  - power_est05
  - sig001
  - power_est001
  - ...
- Regressors
  - # type: double
  - # size: (regressors x iteration)
  - p
  - b
  - t

Design discussion (Dec 19)

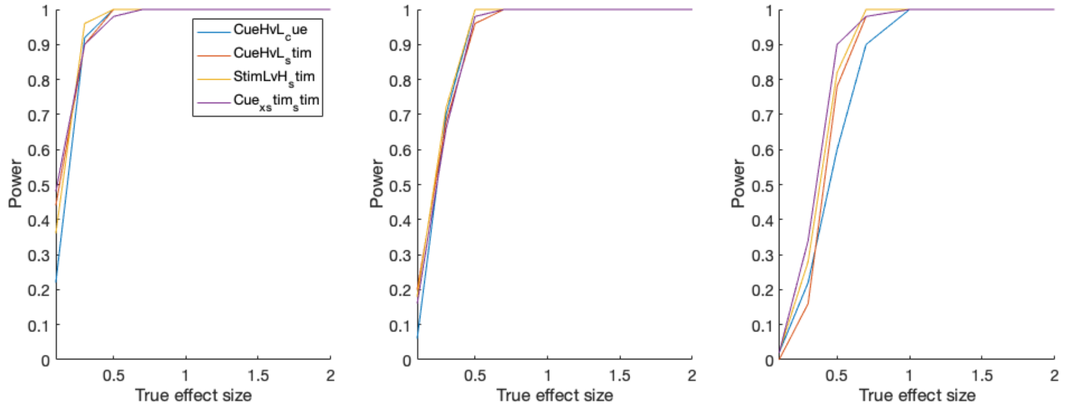
- Efficiency / run length (previous version. 1219 version)
- 5s plateau. 3 mental rotations.
- Arm - move the thermode. (after every session)
- Mix the trials (not separate PVC conditions)
- 48 49 50 celcius.
- Mental rotation - same and different is balanced out so not a problem



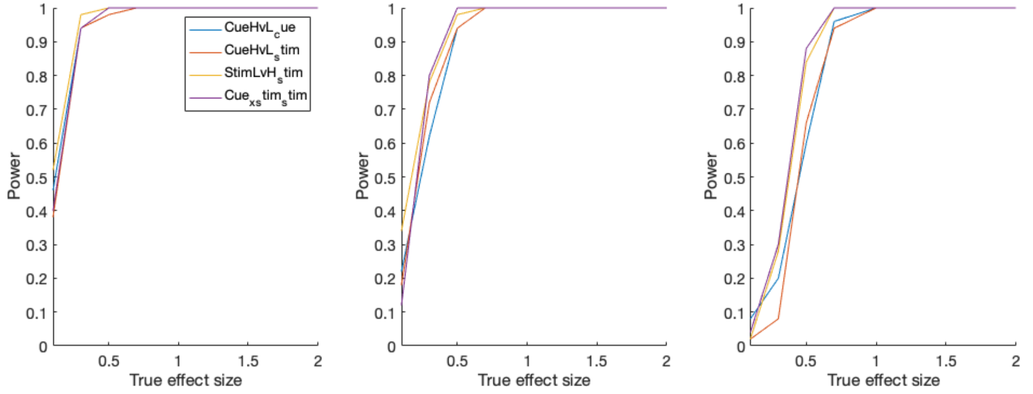
18 regressors
3 contrasts of interest



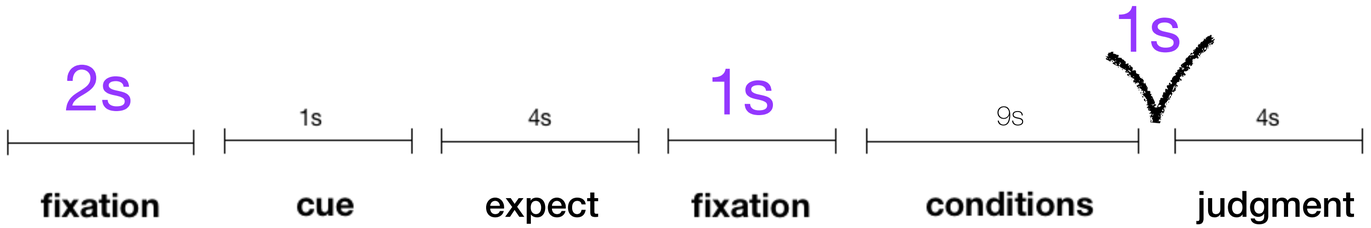
hrf fit



misfit



54 regressors
5 contrasts of interest



hrf fit

misfit