

Initial Analysis of n back data

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The initial stimulus presentation has already been removed per Ted, so these data reflect the first blank (maintenance), probe (probe / next stimulus presentation), and feedback(response/feedback) starting with the first time a relevant probe can be presented (so the amount of data cut off at the beginning depends on the n in the n-back).

This analysis is delaying exclusion of mistakes made by participants until later in the process. This becomes a bit tricky because which trials to exclude might depend on the n of the n-back. We should consult prior literature to see how this is typically dealt with. Draw out the relationship between stimulus and probe number for the same presented information.

First some notes about the data:

Channels:

Channels labeled 15 and 16 - TP9 and TP10 are not actually placed, they are placed on the mastiod. There was also a reference channel on the ear (enobio 20 channel electrode setup), so these could either be ignored or used as a reference.

Might also need to remove CP5 and FPZ from the study, showing up as bad for lots of subjects.

Other analysis / setup notes:

- Need to install the LIMO plugin to do a full analysis.
- If you can't get fieldtrip on mac, you might need to: sudo xattr -r -d com.apple.quarantine fieldtrip-20230427

References for analysis choices:

EEG is better left alone: <https://www.nature.com/articles/s41598-023-27528-0#Sec18>

Analysis Setup

Each subject folder contains a subfolder called 1, 2, or 3 for the n of the nback.

```
dir_data = "nback_study_VR_EEG_data";
numBack = 1:3; % list of which n-back folders to include

%subjNames = {'A02','A04','A05','A07'};
subjNames = {'A02','A04','A05','A07','A08','A10','A11','A12','A13','A14','A15','A16','A17','A18','A19','A20','A21','A22','A23'
%subjNames = {'A02','A04','A05','A06','A07','A08','A09','A10','A11','A12','A13','A14','A15','A16','A17'};

options.plotsOn = true;
options.overwriteMarkerFiles = true; % Set to true if you want to redo from scratch (otherwise it will skip ones you've already done)
options.overwritePreprocFiles = true; % Set to true if you want to redo from scratch (otherwise it will skip ones you've already done)
options.preprocessingTag = 'D';

options.epochWindow = [0 3];
options.removebaseline = true;
```

```

options.refChannelsNames = {'TP9','TP10'}; % These are the mastiod channels, not actually TP9 and TP10. Either need to ignore
%not used options.refChannels = 'remove'; % Options are 'remove' or 'reference' or 'ignore'

conditions = {'blank_1','blank_2','blank_3','prob_1','prob_2','prob_3','feedback_1','feedback_2','feedback_3'}; % conditions
options.eventTypes = { 'blank','prob','feedback'};

subjeventsClean = zeros(length(subjNames),length(options.eventTypes));

% If eeglab not loaded, load it
if ~exist('pop_loadset'), eeglab; end %#ok<EXIST>

options.data_dir = '../nback_study_VR_EEG_data/';
options.filename_base = 'upevent';
options.prefixPhase1 = 'mark';
options.prefixPhase2 = 'Preproc';
%options.saveToPhase3 = '../nback_study_VR_EEG_data/Group/Preprocessing/EPOCH/';
%options.prefixPhase3 = 'epochByCode'; % Epoch them at the code marker
% Epoch the data again by each of the task phases
options.saveToPhase4 = strcat('./Data/Group/EPOCHSForAnalysis/','Preproc',options.preprocessingTag,'/');
options.prefixPhase4 = 'CBepoch_';

% If you don't have picard ica installed already:
%plugin_askinstall('PICARD','picard',1)
% Only store one dataset in memory at a time.
%pop_editoptions( 'option_storedisk', 1); % only one dataset in memory at a time

```

Phase 1: Fix markers

```

% Loop through all subjects.
for s = 1:length(subjNames)

    subjName = subjNames{s};
    fprintf("Processing subject: %s \n", subjName)

    for n = numBack
        fprintf("Processing subject: %s for folder %s \n",subjName, num2str(n))
        temp_subj_folder = fullfile(options.data_dir,subjName,num2str(n));
        temp_filename_in = strcat(subjName,'_',num2str(n),'_',options.filename_base,'.set');
        temp_filename_out = strcat(subjName,'_',num2str(n),'_',options.filename_base,'_',options.prefixPhase1,'.set');

        if ~options.overwriteMarkerFiles && exist(fullfile(temp_subj_folder,temp_filename_out),'file') > 0
            %If don't overwrite and file exists, then skip
            fprintf("File already exists... skipping... ")
        else
            % Find original raw data file
            rawDataFile = fullfile(temp_subj_folder,temp_filename_in);
            try
                EEG = pop_loadset('filename',rawDataFile);
            catch SE
                disp(SE)
                EEG = [];
            end
        end
    end

```

Fix event markers

Each subject did 50 of each n-back condition number (1,2,3) in ascending order.

Go through each of the events and organize them for grouping. Make sure you only run this once.

```

EEG = fixNBackMarkers(EEG,n);

EEG = eeg_checkset(EEG);
% Save data
fprintf(strcat("Saving data for ", subjName, " with filename: " , temp_filename_out,"\\n"))
EEG = pop_saveset(EEG,'filename',temp_filename_out,'filepath',temp_subj_folder);
end
end

```

```

Processing subject: A02 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A02/1/A02_1_upevent.set ...
Warning: Inconsistency between urevent (backup) and event structures, removing urevent structure
Reading float file '../nback_study_VR_EEG_data/A02/1/A02_1_upevent.fdt'...
Saving data for A02 with filename: A02_1_upevent_mark.set
Saving dataset...
Processing subject: A02 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A02/2/A02_2_upevent.set ...
Warning: Inconsistency between urevent (backup) and event structures, removing urevent structure
Reading float file '../nback_study_VR_EEG_data/A02/2/A02_2_upevent.fdt'...

```


Saving dataset...

Phase 2: Preprocessing Pre-Epoching

Analysis will be built based on: https://github.com/sccn/eeg_pipelines and this paper: <https://www.nature.com/articles/s41598-023-27528-0>

" We use the default EEGLAB filter (see "Methods" sections) to high-pass the data from all datasets at 0.5 Hz in all analyses ", but others say 1-2 hz better for ICA, but worse for ERP.

Now must decide on preprocessing. Lots of debate in the field about this. Going with option D, which is the same as used in the Sternberg paper, so trying to keep the same preprocessing code and choices.

Begin looping through the subjects

```
for s = 1:length(subjNames)
    subjName = subjNames{s};
    for n = numBack
        fprintf("Processing subject: %s for folder %s \n",subjName, num2str(n))
        temp_subj_folder = fullfile(options.data_dir,subjName,num2str(n));

        temp_filename_in = strcat(subjName,'_',num2str(n),'_',options.filename_base,'_',options.prefixPhase1,'.set');
        temp_filename_out = strcat(subjName,'_',num2str(n),'_',options.filename_base,'_',options.prefixPhase1,'_',options.pref
```

Check to see if the file already exists to determine if you should skip this subject.

```
if ~options.overwritePreprocFiles && exist(fullfile(temp_subj_folder,temp_filename_out),'file') > 0
    fprintf("File already exists... skipping... \n")
    continue
end
```

Load the data

```
try
    EEG = pop_loadset('filename',temp_filename_in,'filepath',temp_subj_folder);
catch SE
    input(strcat("Error loading dataset for ", subjName))
    SE
end
```

Preprocess the data: step 1

```
EEG = preprocessNBackEEG(EEG,'D1',options);
```

Save data

```
fprintf(strcat("Saving data for ", subjName, " with filename: " , temp_filename_out,"\\n"))
EEG = pop_saveset(EEG,'filename',temp_filename_out,'filepath',temp_subj_folder);
end
```

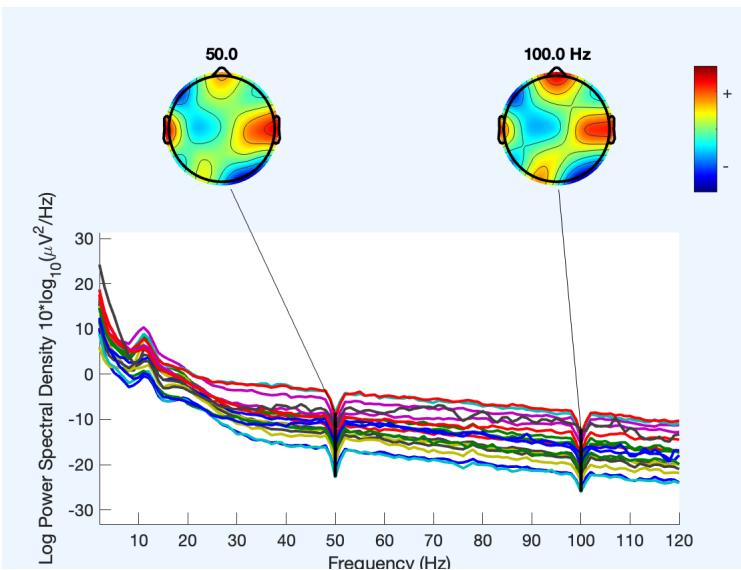
```
Processing subject: A02 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A02/1/A02_1_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A02 with filename: A02_1_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A02 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A02/2/A02_2_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
```

```
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A02 with filename: A02_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A02 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A02/3/A02_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A02 with filename: A02_3_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A04 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A04/1/A04_1_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A04 with filename: A04_1_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A04 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A04/2/A04_2_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
```

```
resampling data 250.0000 Hz
Saving data for A04 with filename: A04_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A04 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A04/3/A04_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A04 with filename: A04_3_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A05 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A05/1/A05_1_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A05 with filename: A05_1_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A05 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A05/2/A05_2_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A05 with filename: A05_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A05 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A05/3/A05_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
```

```
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
Saving data for A05 with filename: A05_3_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A07 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A07/1/A07_1_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A07 with filename: A07_1_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A07 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A07/2/A07_2_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A07 with filename: A07_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A07 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A07/3/A07_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
```

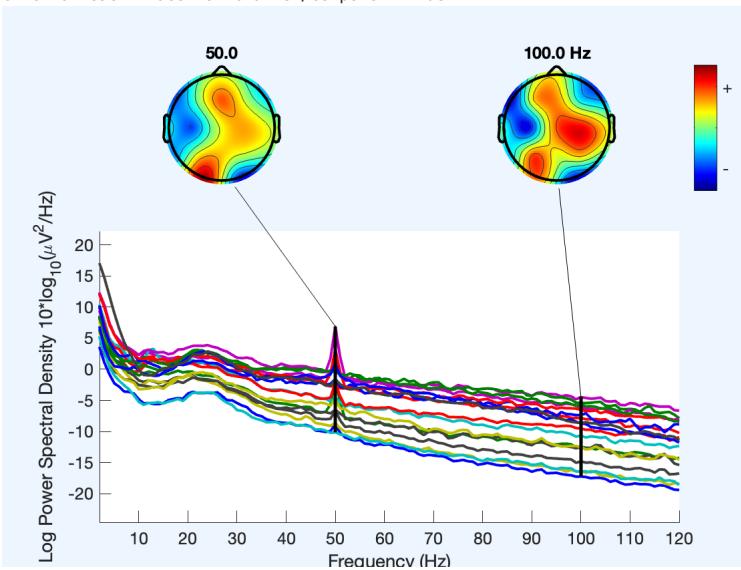
```
Saving data for A07 with filename: A07_3_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A08 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A08/1/A08_1_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A08 with filename: A08_1_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A08 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A08/2/A08_2_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Saving data for A08 with filename: A08_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A08 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A08/3/A08_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
```



```

resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A08 with filename: A08_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A10 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A10/1/A10_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(lies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

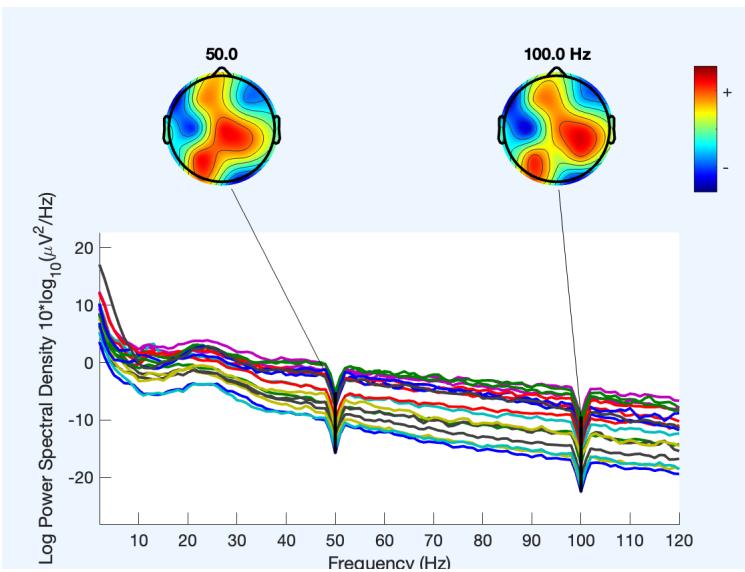
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

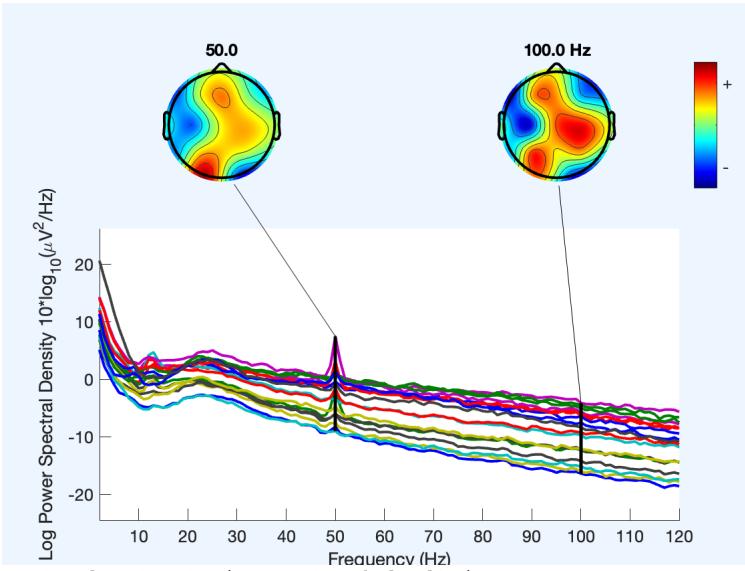
```



```

Saving data for A10 with filename: A10_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A10 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A10/2/A10_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

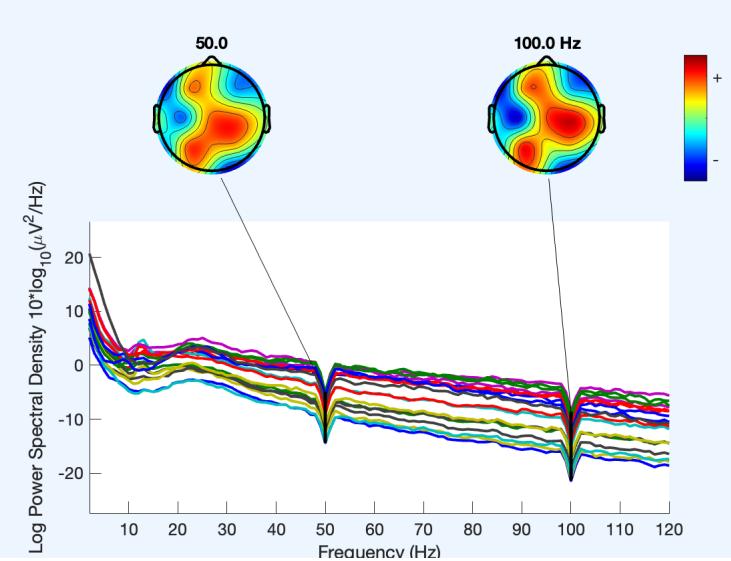
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

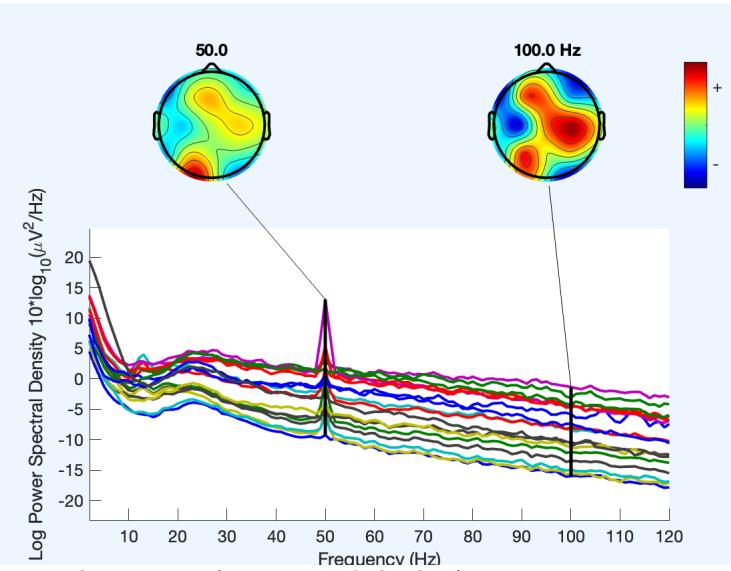
```



```

Saving data for A10 with filename: A10_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A10 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A10/3/A10_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

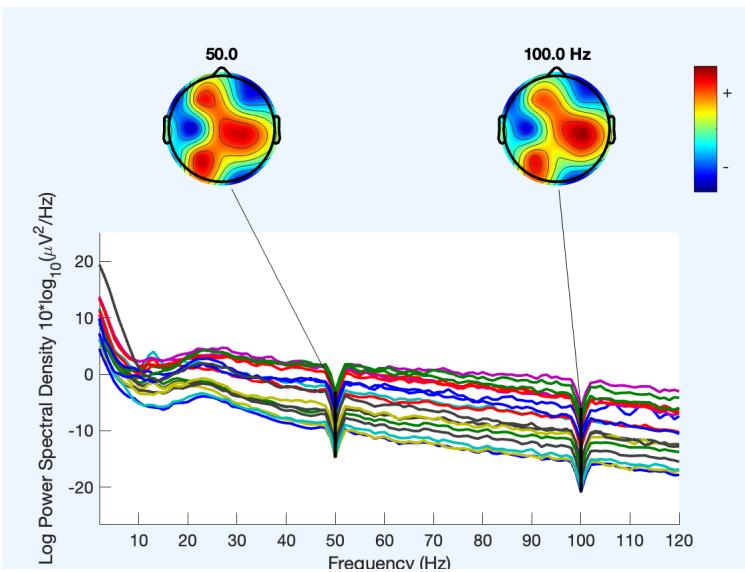
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

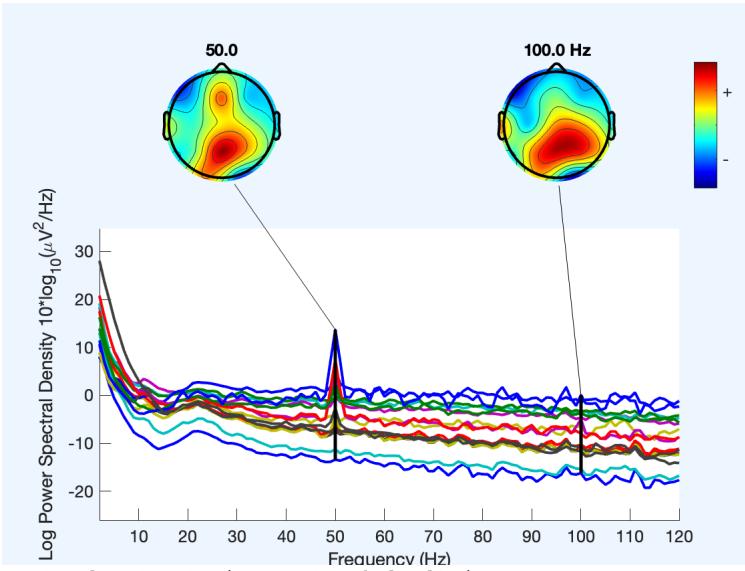
```



```

Saving data for A10 with filename: A10_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A11 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A11/1/A11_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

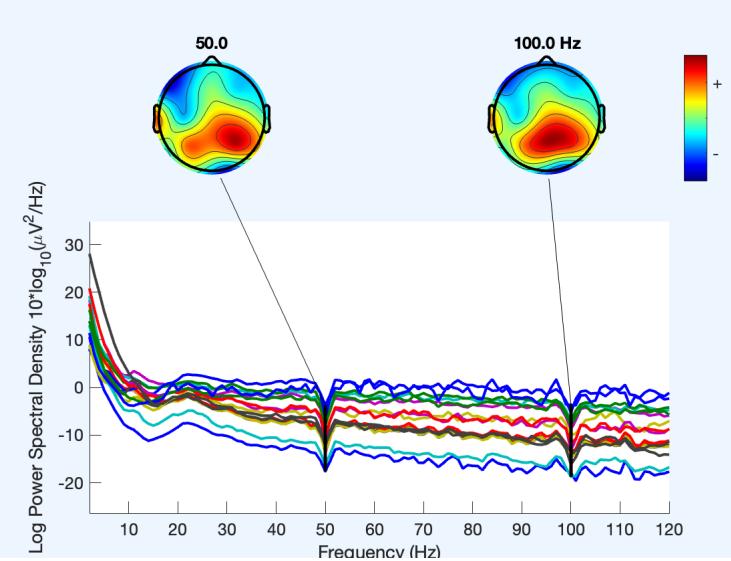
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

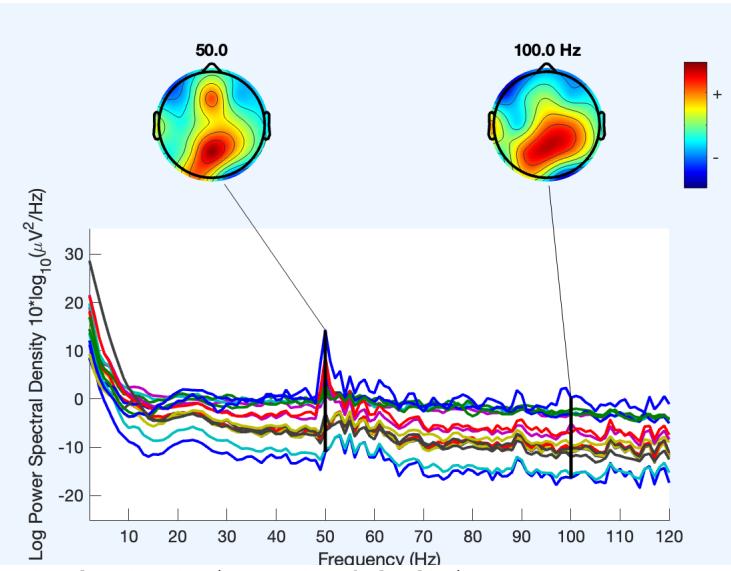
```



```

Saving data for A11 with filename: A11_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A11 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A11/2/A11_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

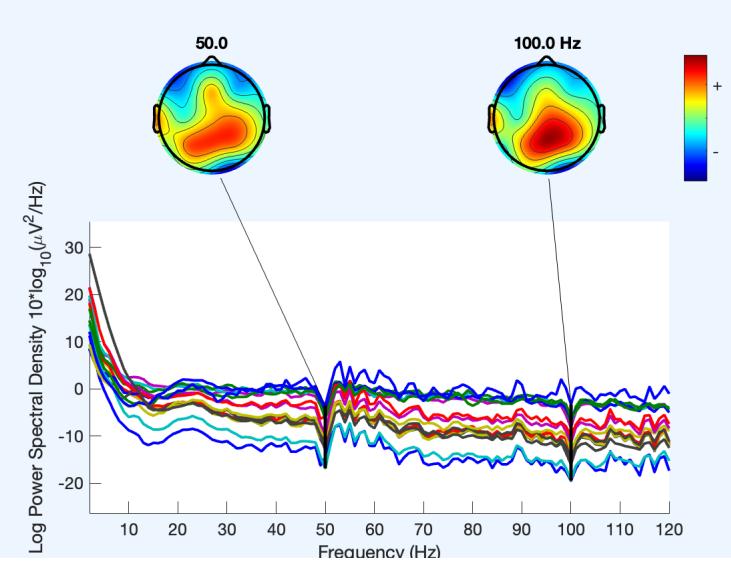
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

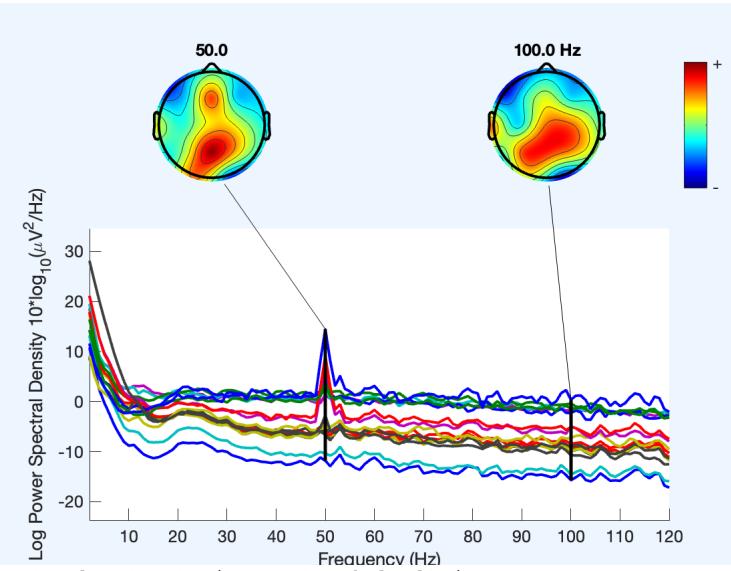
```



```

Saving data for A11 with filename: A11_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A11 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A11/3/A11_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

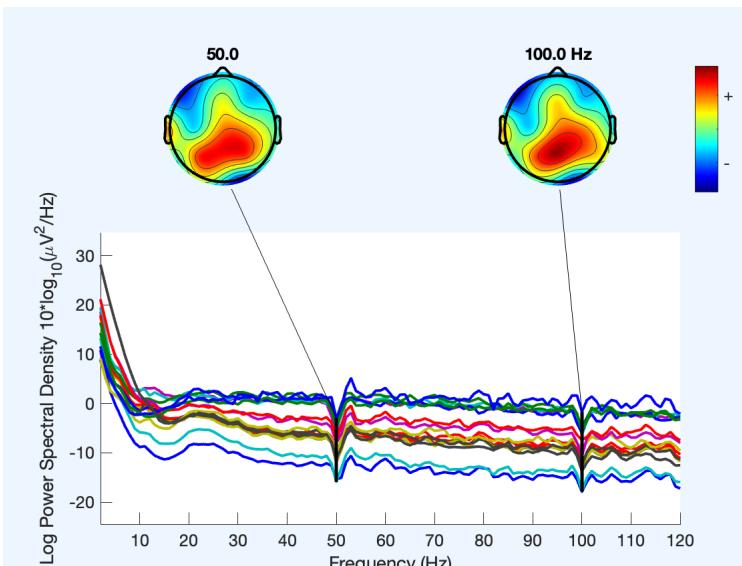
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

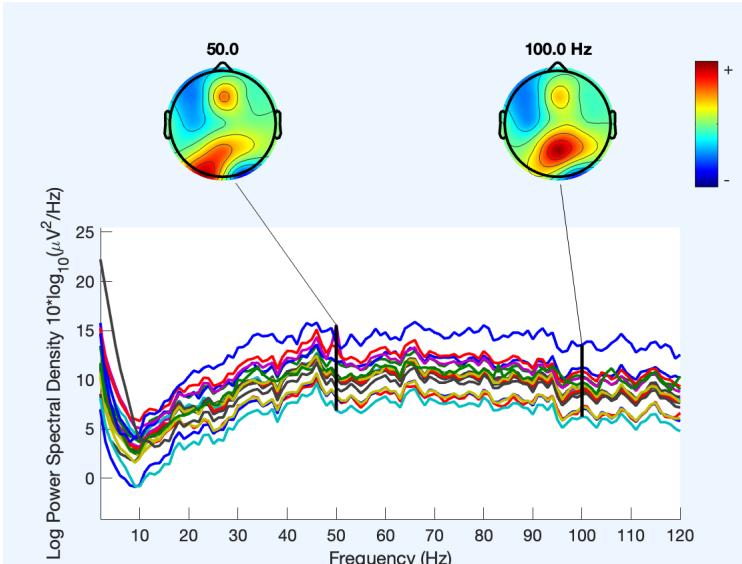
```



```

16 17 18
resampling event latencies...
resampling finished
Saving data for A11 with filename: A11_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A12 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A12/1/A12_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

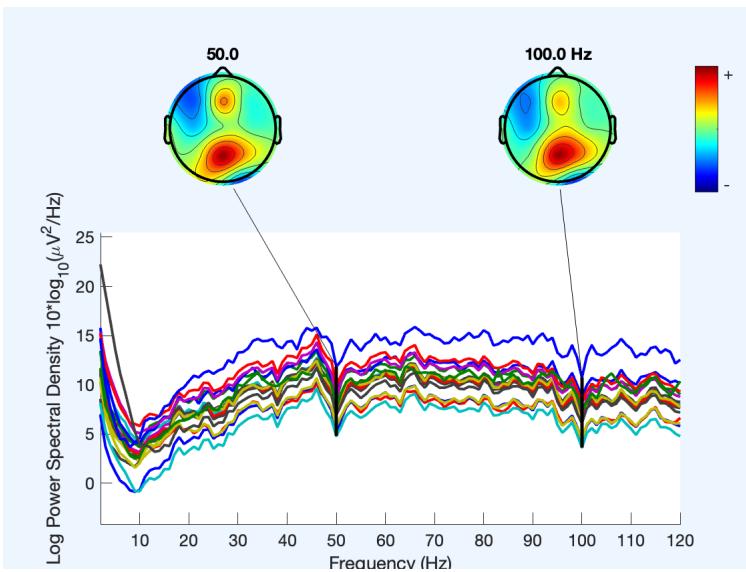
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

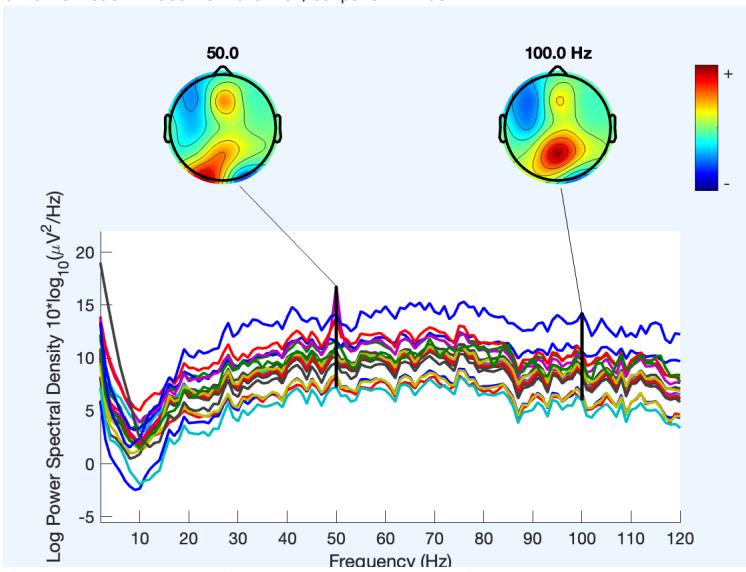
```



```

resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A12 with filename: A12_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A12 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A12/2/A12_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(lies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

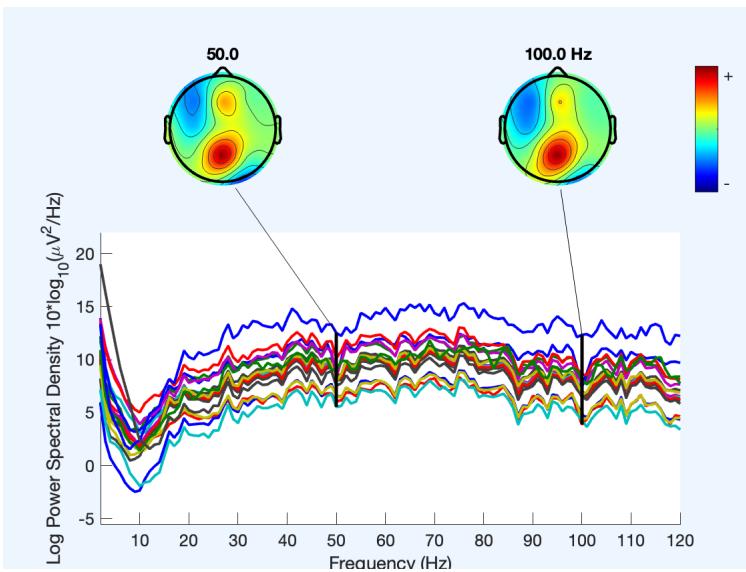
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

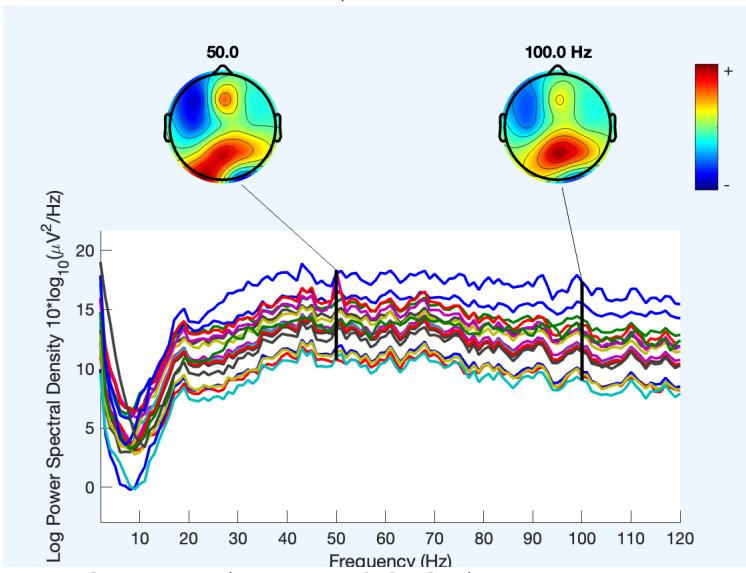
```



```

Saving data for A12 with filename: A12_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A12 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A12/3/A12_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

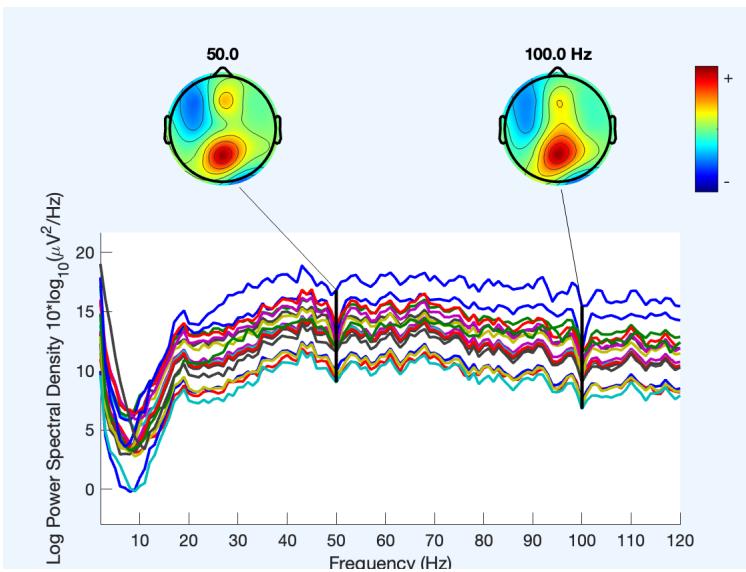
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

```



```
Saving data for A12 with filename: A12_3_uevent_mark_PrepocD1.set
Saving dataset...
```

```
Processing subject: A13 for folder 1
```

```
pop_loadset(): loading file .../nback_study_VR_EEG_data/A13/1/A13_1_uevent_mark.set ...
```

```
Re-referencing data
```

```
pop_eegfiltnew() - performing 33001 point highpass filtering.
```

```
pop_eegfiltnew() - transition band width: 0.05 Hz
```

```
pop_eegfiltnew() - passband edge(s): 0.05 Hz
```

```
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
```

```
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
```

```
firfilt(): |=====| 100%, ETE 00:00
```

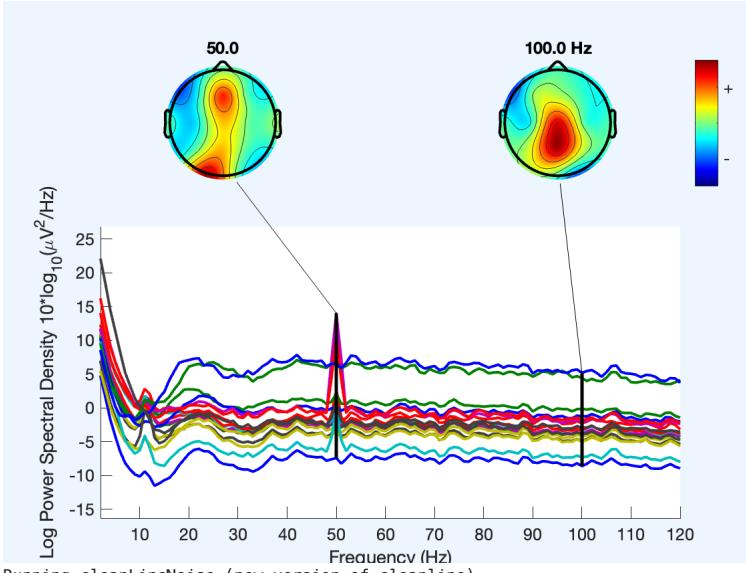
```
Pop_spectopo: finding data discontinuities
```

```
Computing spectra (window length 500; fft length: 500; overlap 0):
```

```
.....
```

```
Plotting scalp distributions: ..
```

```
Click on each trace for channel/component index
```



```
Running cleanLineNoise (new version of cleanline)...
```

```
Pop_spectopo: finding data discontinuities
```

```
Computing spectra (window length 500; fft length: 500; overlap 0):
```

```
.....
```

```
Plotting scalp distributions: ..
```

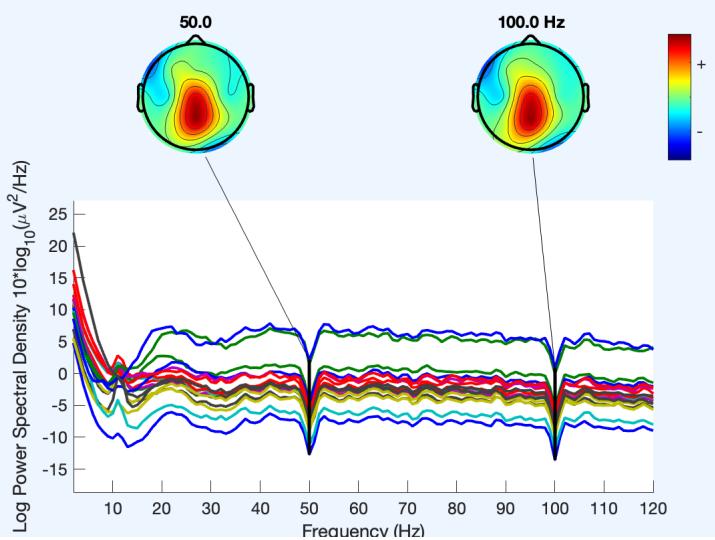
```
Click on each trace for channel/component index
```

```
resampling data 250.0000 Hz
```

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
```

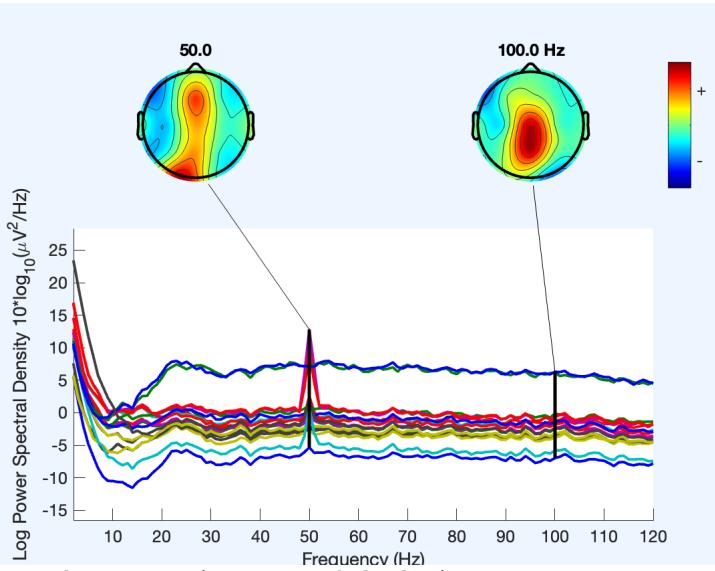
```
resampling event latencies...
```

```
resampling finished
```



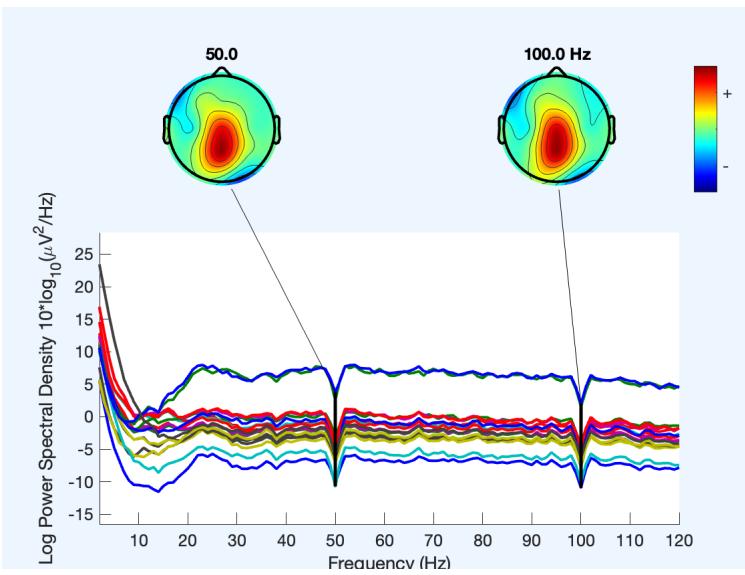
Saving data for A13 with filename: A13_1_uevent_mark_PrepocD1.set
 Saving dataset...
 Processing subject: A13 for folder 2
 pop_loadset(): loading file .../nback_study_VR_EEG_data/A13/2/A13_2_uevent_mark.set ...
 Re-referencing data
 pop_eegfiltnew() - performing 33001 point highpass filtering.
 pop_eegfiltnew() - transition band width: 0.05 Hz
 pop_eegfiltnew() - passband edge(s): 0.05 Hz
 pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
 pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
 firfilt(): |=====| 100%, ETE 00:00
 Pop_spectopo: finding data discontinuities
 Computing spectra (window length 500; fft length: 500; overlap 0):

 Plotting scalp distributions: ..
 Click on each trace for channel/component index



Running cleanLineNoise (new version of cleanline)...
 Pop_spectopo: finding data discontinuities
 Computing spectra (window length 500; fft length: 500; overlap 0):

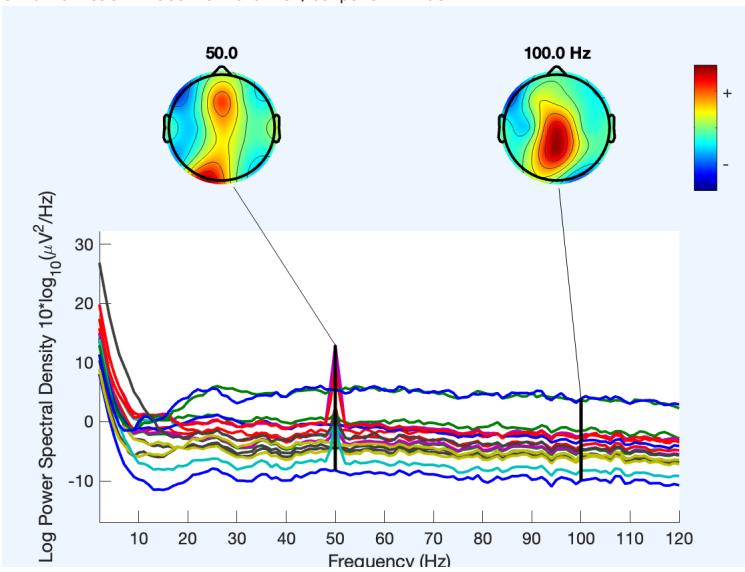
 Plotting scalp distributions: ..
 Click on each trace for channel/component index
 resampling data 250.0000



```

Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A13 with filename: A13_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A13 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A13/3/A13_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(lies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

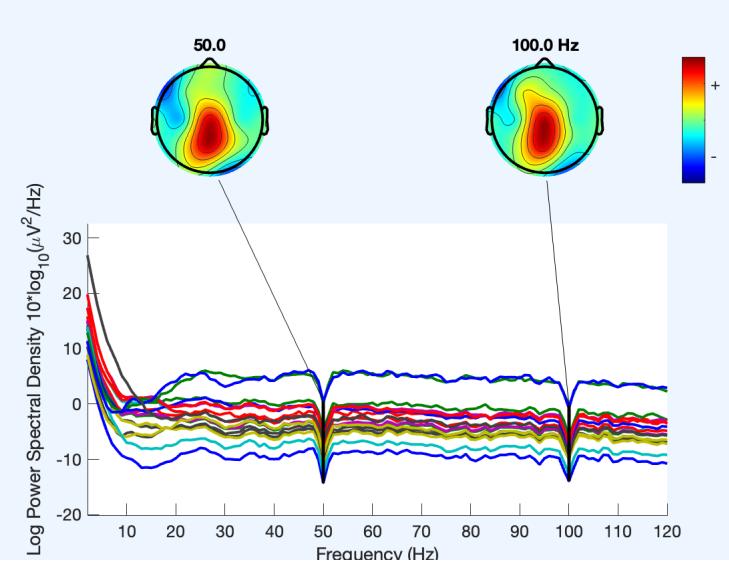
```



```

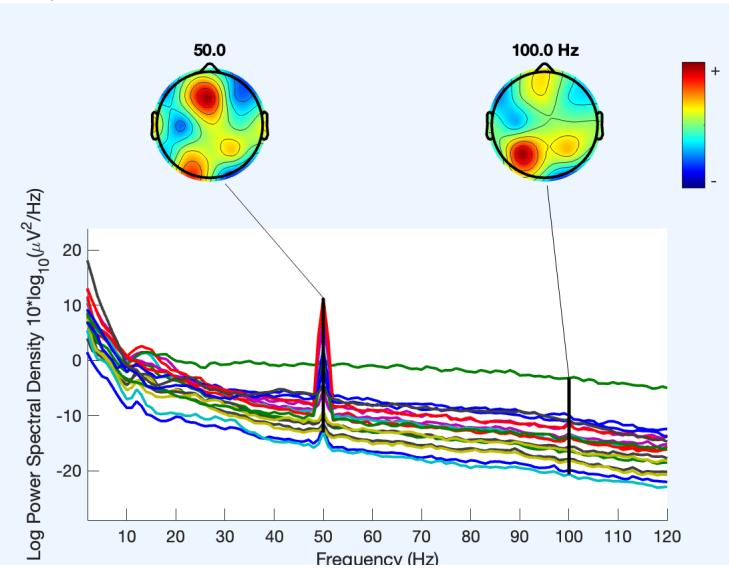
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

```



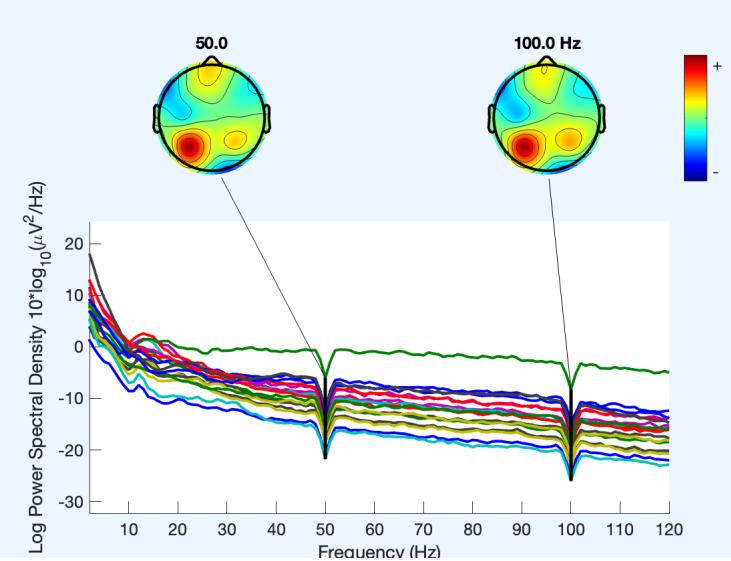
```

Saving data for A13 with filename: A13_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A14 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A14/1/A14_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)... 
```



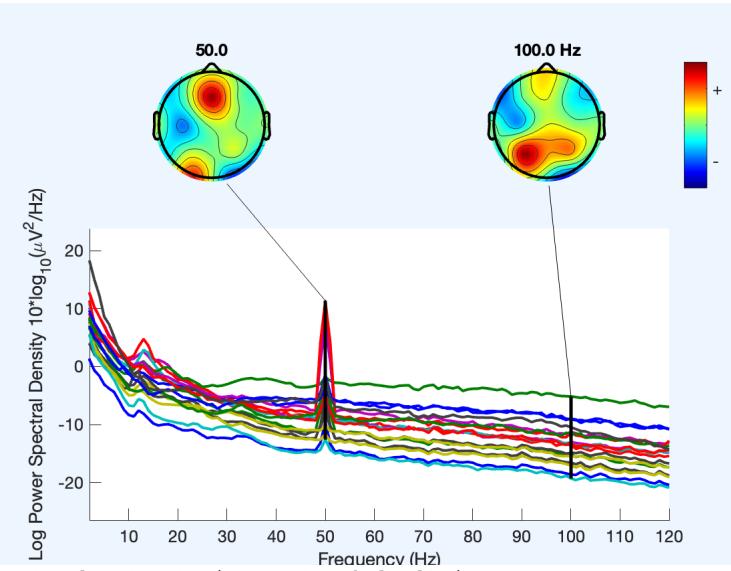
```

Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished 
```



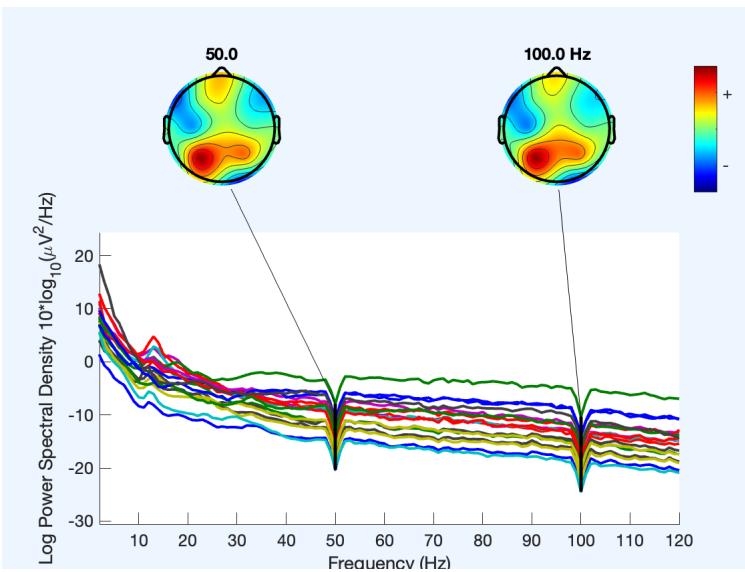
Saving data for A14 with filename: A14_1_uevent_mark_PrepocD1.set
 Saving dataset...
 Processing subject: A14 for folder 2
 pop_loadset(): loading file .../nback_study_VR_EEG_data/A14/2/A14_2_uevent_mark.set ...
 Re-referencing data
 pop_eegfiltnew() - performing 33001 point highpass filtering.
 pop_eegfiltnew() - transition band width: 0.05 Hz
 pop_eegfiltnew() - passband edge(s): 0.05 Hz
 pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
 pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
 firfilt(): |=====| 100%, ETE 00:00
 Pop_spectopo: finding data discontinuities
 Computing spectra (window length 500; fft length: 500; overlap 0):

 Plotting scalp distributions: ..
 Click on each trace for channel/component index



Running cleanLineNoise (new version of cleanline)...
 Pop_spectopo: finding data discontinuities
 Computing spectra (window length 500; fft length: 500; overlap 0):

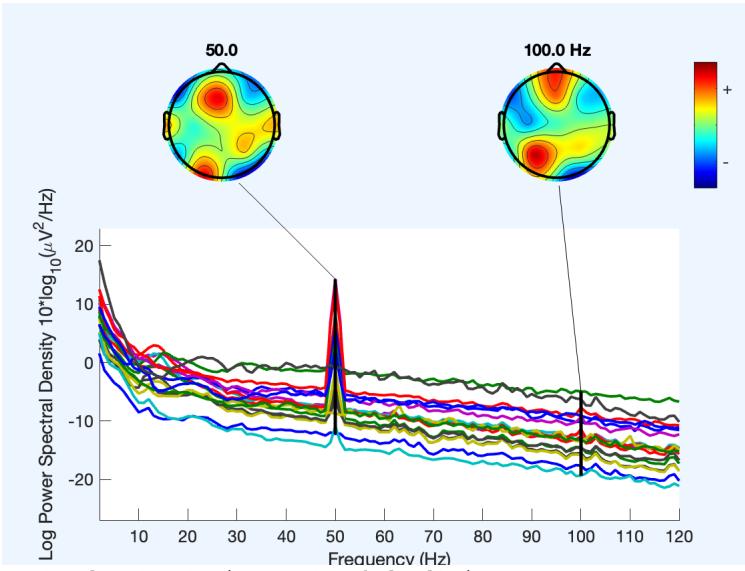
 Plotting scalp distributions: ..
 Click on each trace for channel/component index
 resampling data 250.0000 Hz
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
 resampling event latencies...
 resampling finished



```

Saving data for A14 with filename: A14_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A14 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A14/3/A14_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

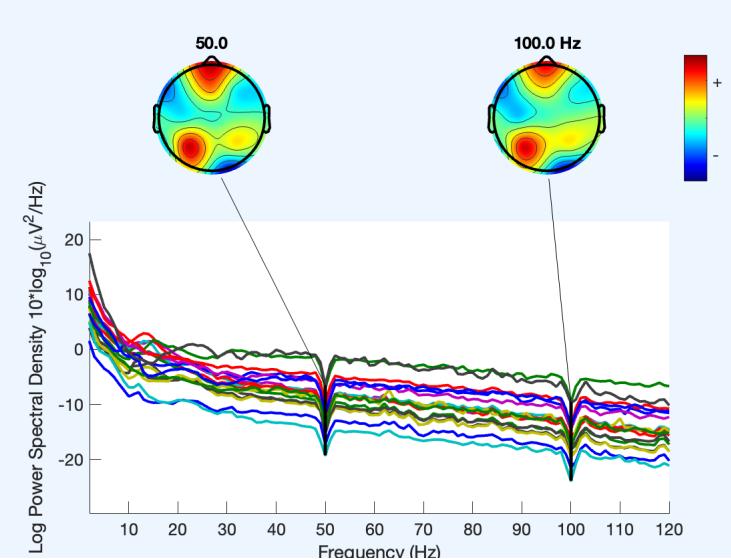
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

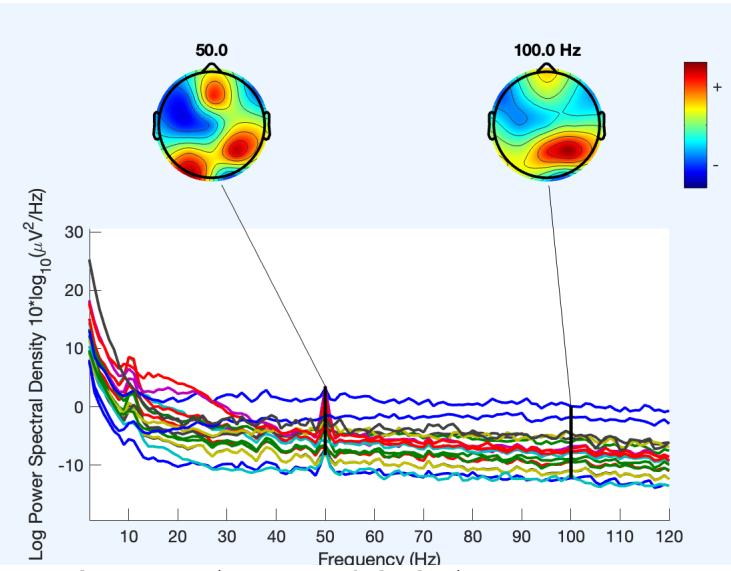
```



```

Saving data for A14 with filename: A14_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A15 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A15/1/A15_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

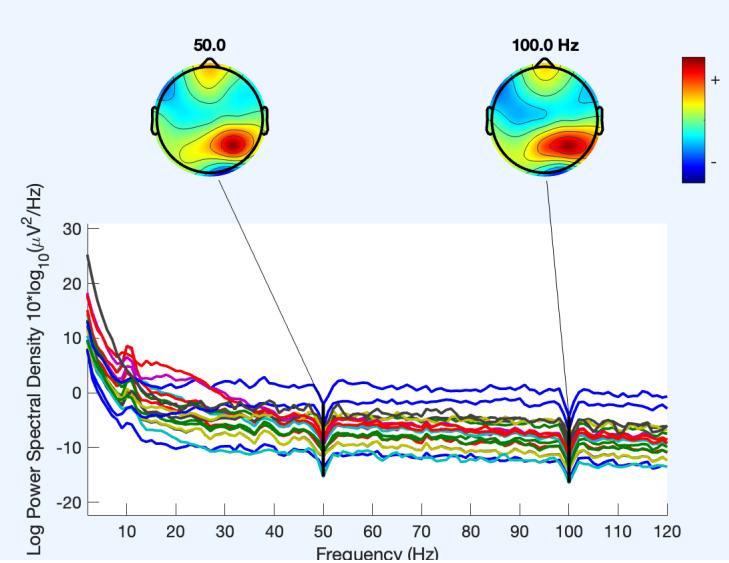
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

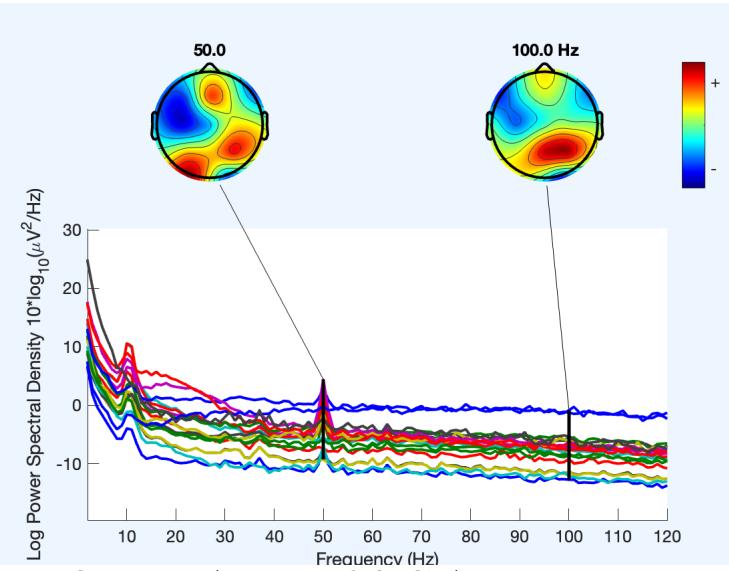
```



```

Saving data for A15 with filename: A15_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A15 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A15/2/A15_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

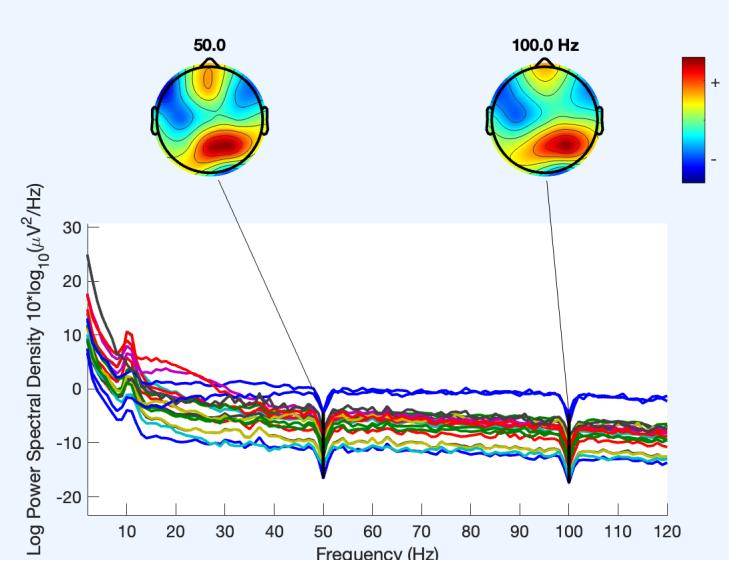
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

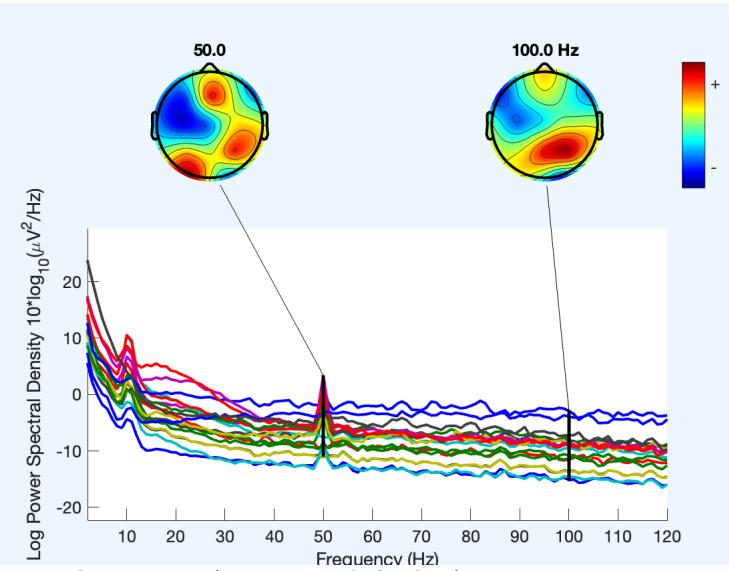
```



```

Saving data for A15 with filename: A15_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A15 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A15/3/A15_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

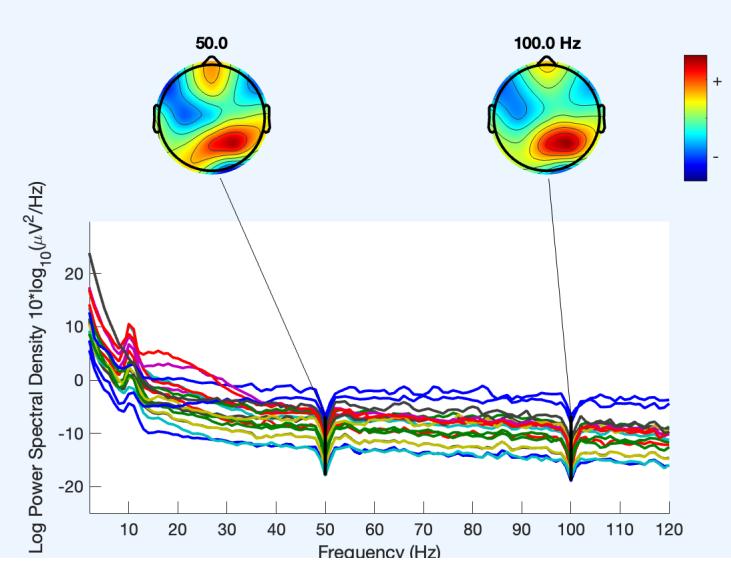
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

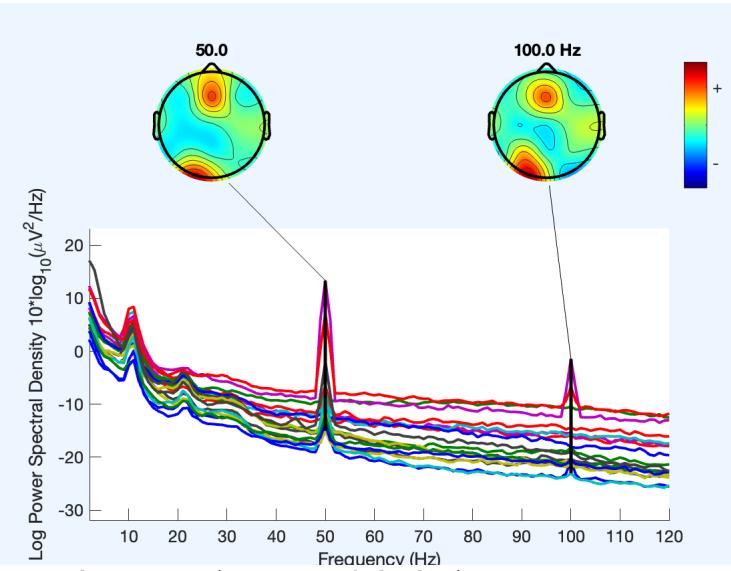
```



```

Saving data for A15 with filename: A15_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A16 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A16/1/A16_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

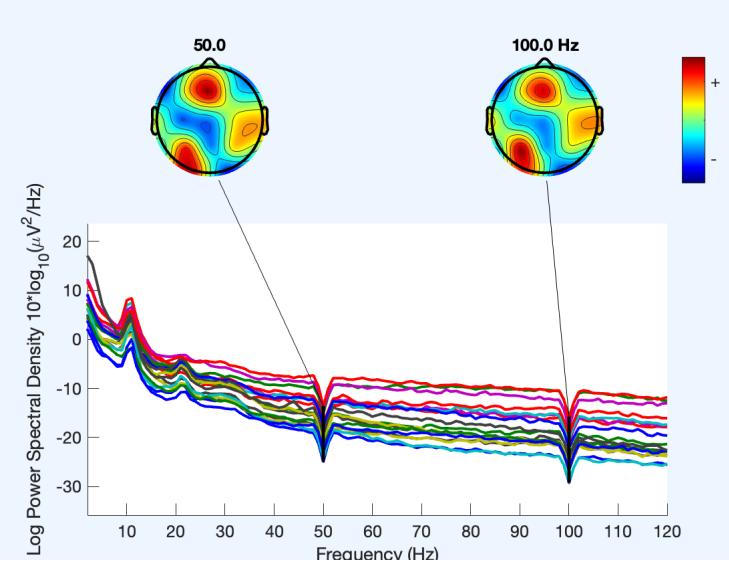
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

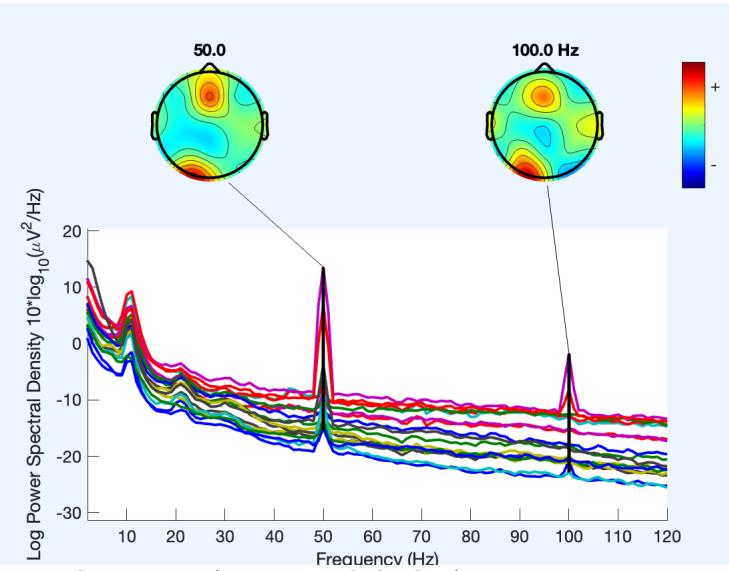
```



```

Saving data for A16 with filename: A16_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A16 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A16/2/A16_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

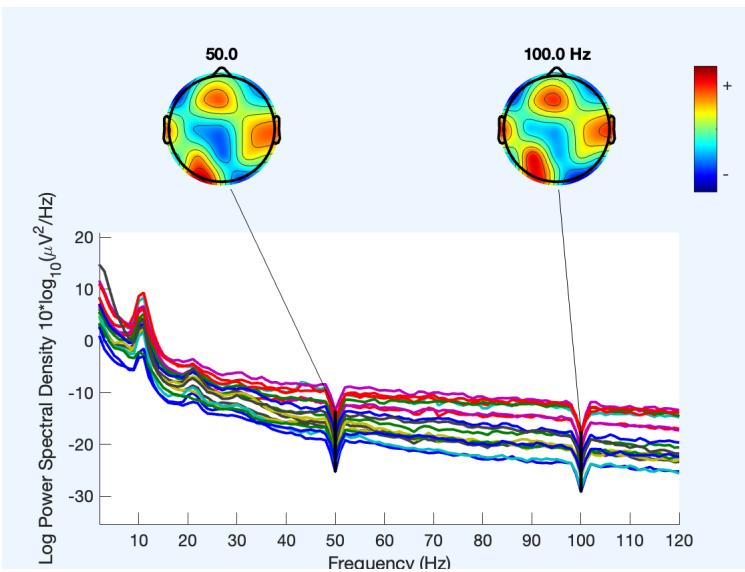
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

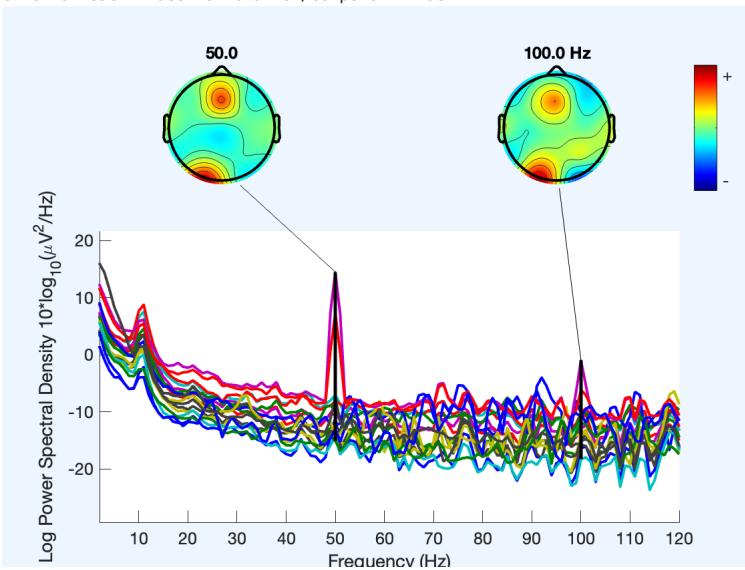
```



```

resampling data 250.000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A16 with filename: A16_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A16 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A16/3/A16_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(lies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

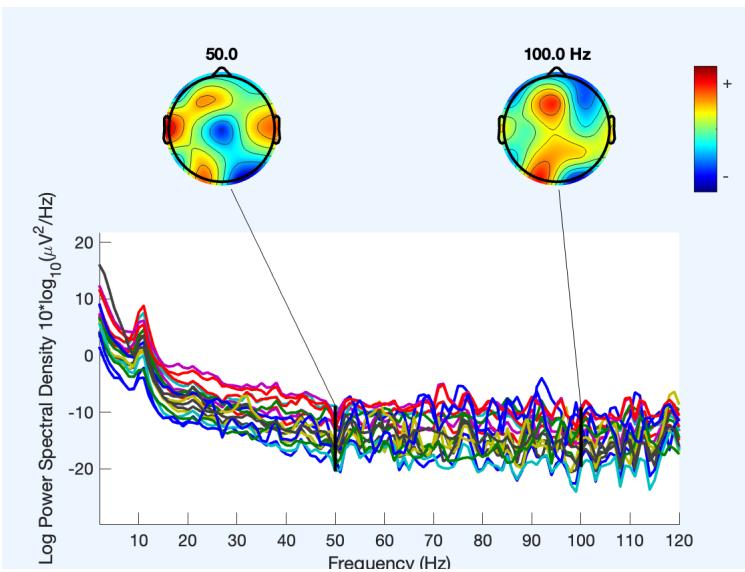
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

```



```
resampling data 250.000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
```

```
resampling event latencies...
```

```
resampling finished
```

```
Saving data for A16 with filename: A16_3_upevent_mark_PrepocD1.set
```

```
Saving dataset...
```

```
Processing subject: A17 for folder 1
```

```
pop_loadset(): loading file ../nback_study_VR_EEG_data/A17/1/A17_1_upevent_mark.set ...
```

```
Re-referencing data
```

```
pop_eegfiltnew() - performing 33001 point highpass filtering.
```

```
pop_eegfiltnew() - transition band width: 0.05 Hz
```

```
pop_eegfiltnew() - passband edge(s): 0.05 Hz
```

```
pop_eegfiltnew() - cutoff frequency(lies) (-6 dB): 0.025 Hz
```

```
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
```

```
firfilt(): |=====| 100%, ETE 00:00
```

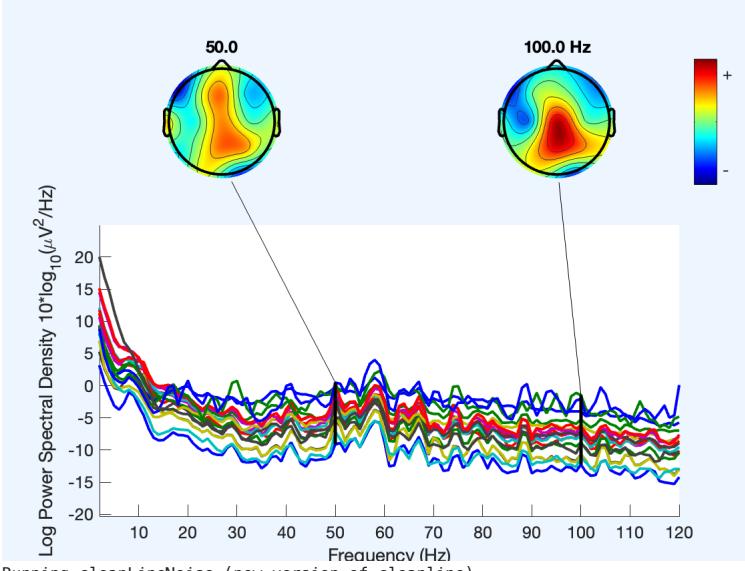
```
Pop_spectopo: finding data discontinuities
```

```
Computing spectra (window length 500; fft length: 500; overlap 0):
```

```
.....
```

```
Plotting scalp distributions: ..
```

```
Click on each trace for channel/component index
```



```
Running cleanLineNoise (new version of cleanline)... .
```

```
Pop_spectopo: finding data discontinuities
```

```
Computing spectra (window length 500; fft length: 500; overlap 0):
```

```
.....
```

```
Plotting scalp distributions: ..
```

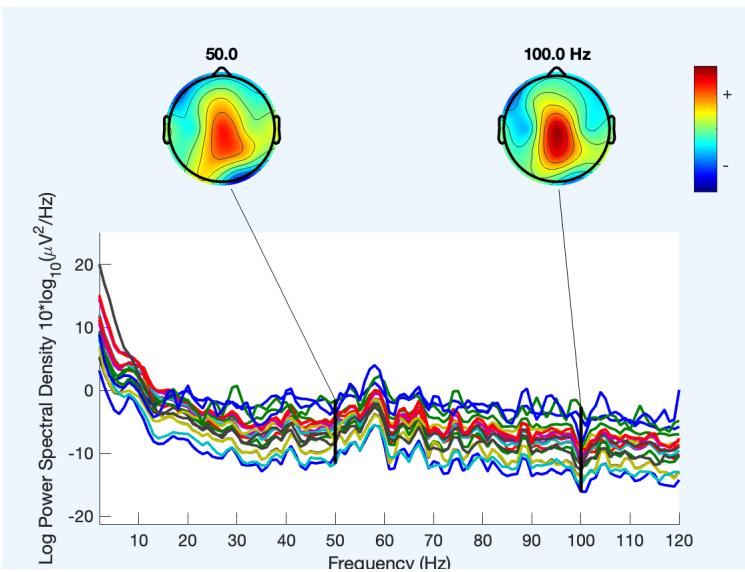
```
Click on each trace for channel/component index
```

```
resampling data 250.000 Hz
```

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
```

```
resampling event latencies...
```

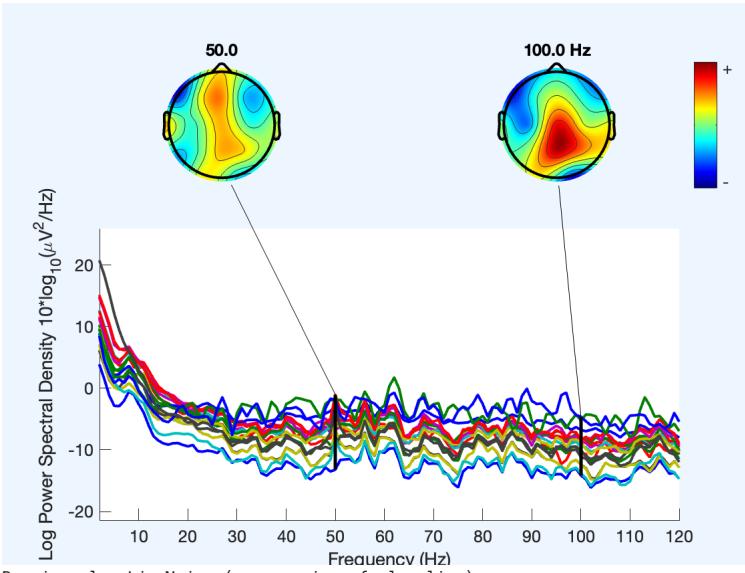
```
resampling finished
```



```

Saving data for A17 with filename: A17_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A17 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A17/2/A17_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

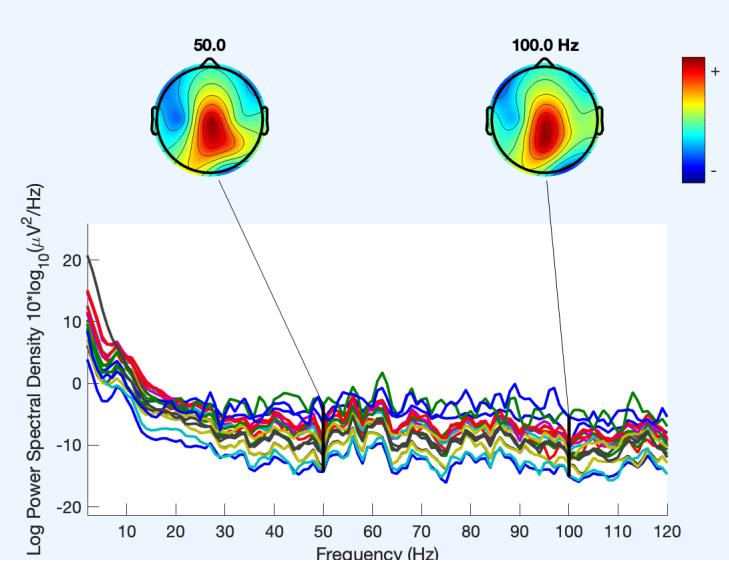
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

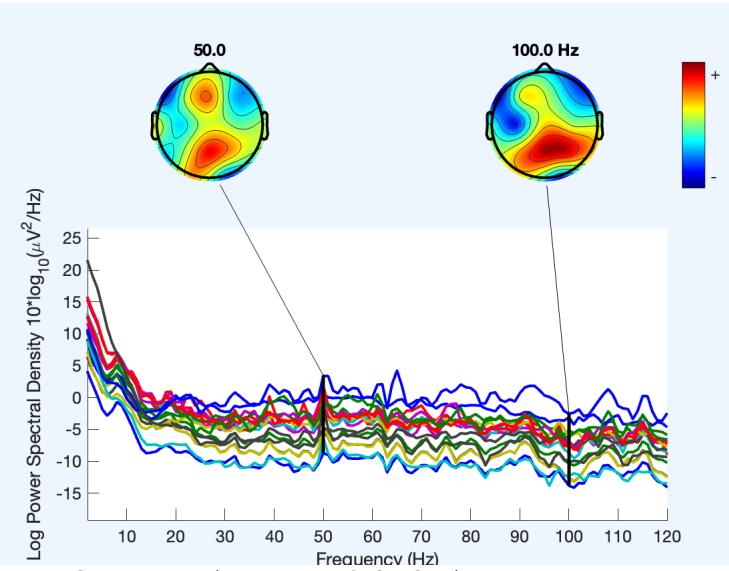
```



```

Saving data for A17 with filename: A17_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A17 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A17/3/A17_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

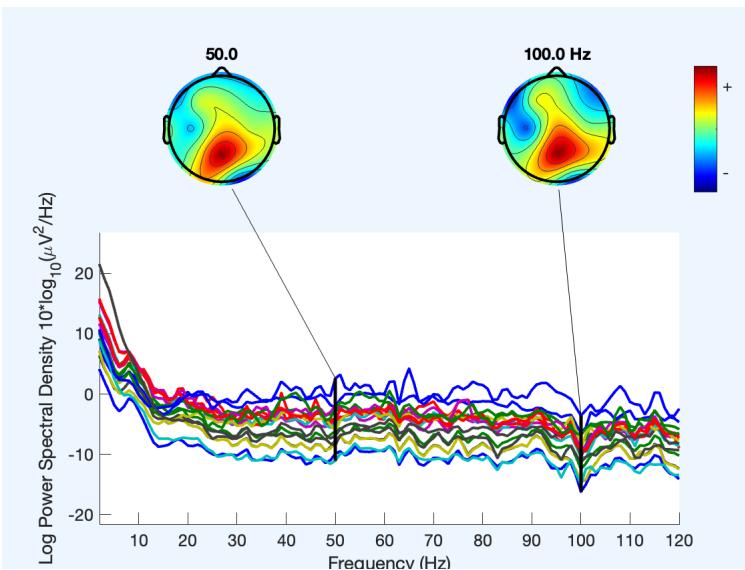
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

```



resampling data 250.000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

resampling event latencies...

resampling finished

Saving data for A17 with filename: A17_3_uevent_mark_PrepocD1.set

Saving dataset...

Processing subject: A18 for folder 1

pop_loadset(): loading file ../nback_study_VR_EEG_data/A18/1/A18_1_uevent_mark.set ...

Re-referencing data

pop_eegfiltnew() - performing 33001 point highpass filtering.

pop_eegfiltnew() - transition band width: 0.05 Hz

pop_eegfiltnew() - passband edge(s): 0.05 Hz

pop_eegfiltnew() - cutoff frequency(lies) (-6 dB): 0.025 Hz

pop_eegfiltnew() - filtering the data (zero-phase, non-causal)

firfilt(): |=====| 100%, ETE 00:00

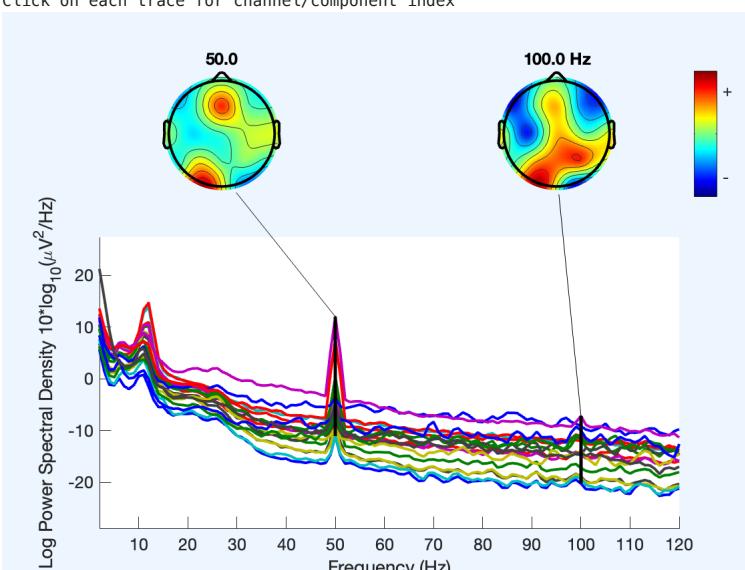
Pop_spectopo: finding data discontinuities

Computing spectra (window length 500; fft length: 500; overlap 0):

.....

Plotting scalp distributions: ..

Click on each trace for channel/component index



Running cleanLineNoise (new version of cleanline)... .

Pop_spectopo: finding data discontinuities

Computing spectra (window length 500; fft length: 500; overlap 0):

.....

Plotting scalp distributions: ..

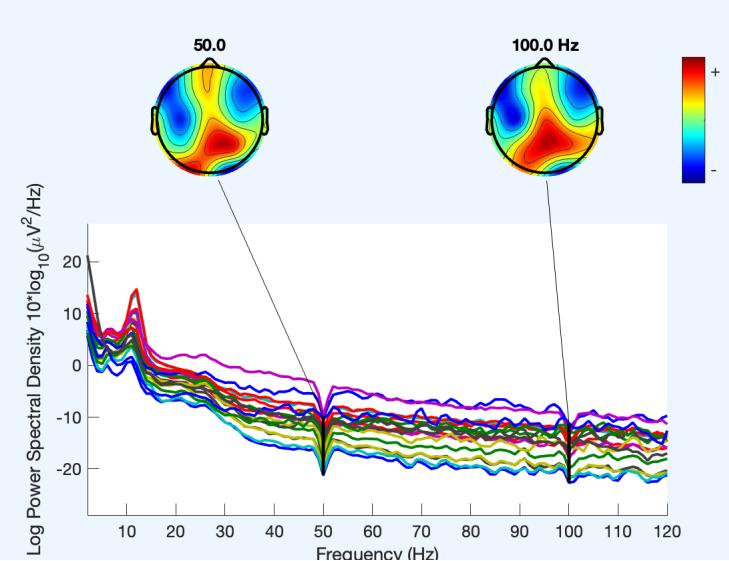
Click on each trace for channel/component index

resampling data 250.000 Hz

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

resampling event latencies...

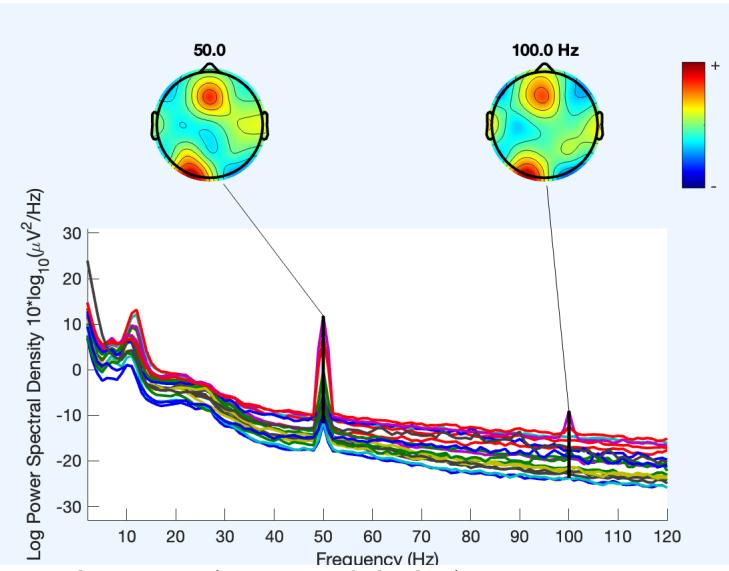
resampling finished



```

Saving data for A18 with filename: A18_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A18 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A18/2/A18_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

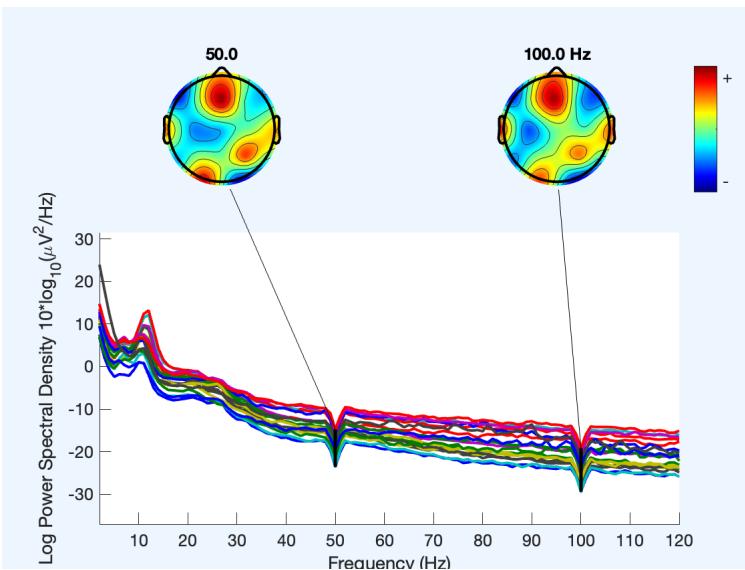
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14

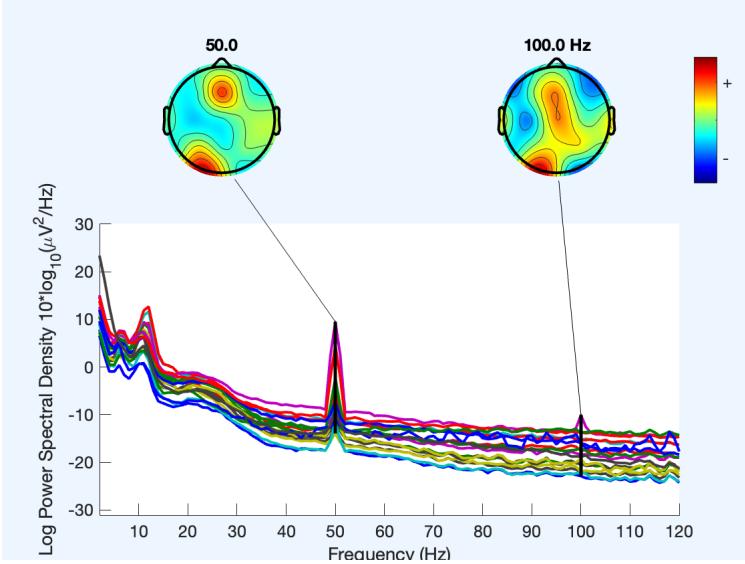
```



```

15 16 17 18
resampling event latencies...
resampling finished
Saving data for A18 with filename: A18_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A18 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A18/3/A18_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

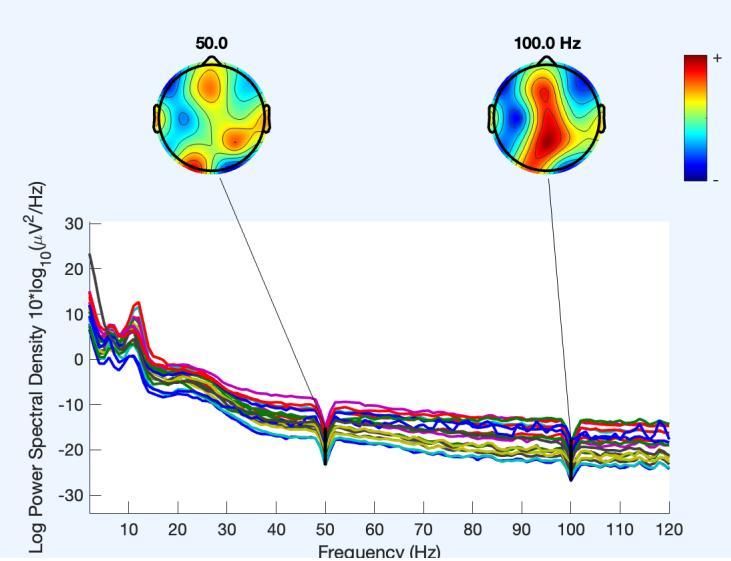
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

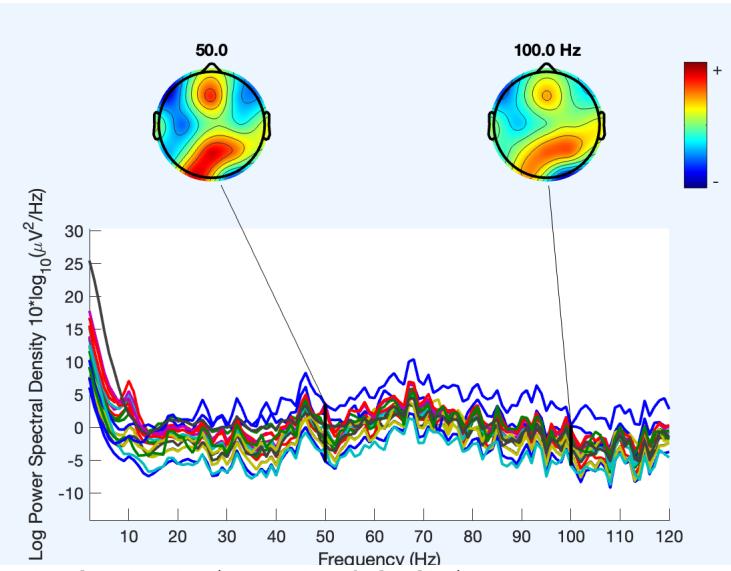
```



```

Saving data for A18 with filename: A18_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A19 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A19/1/A19_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

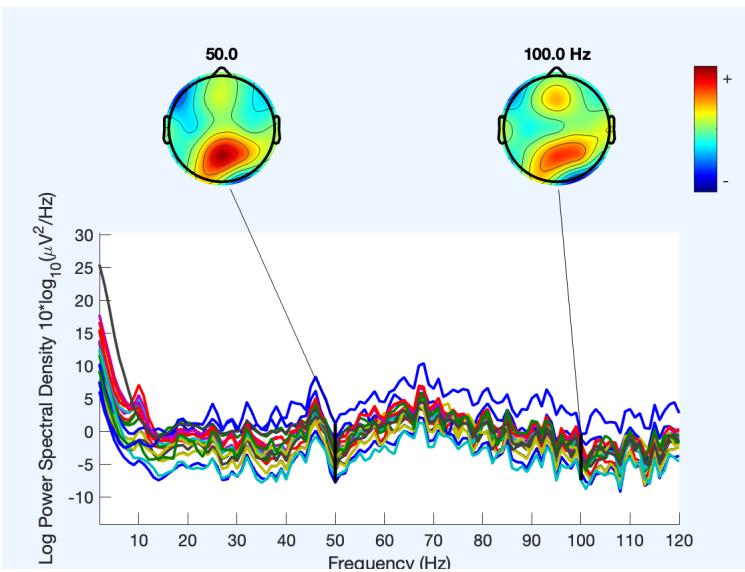
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

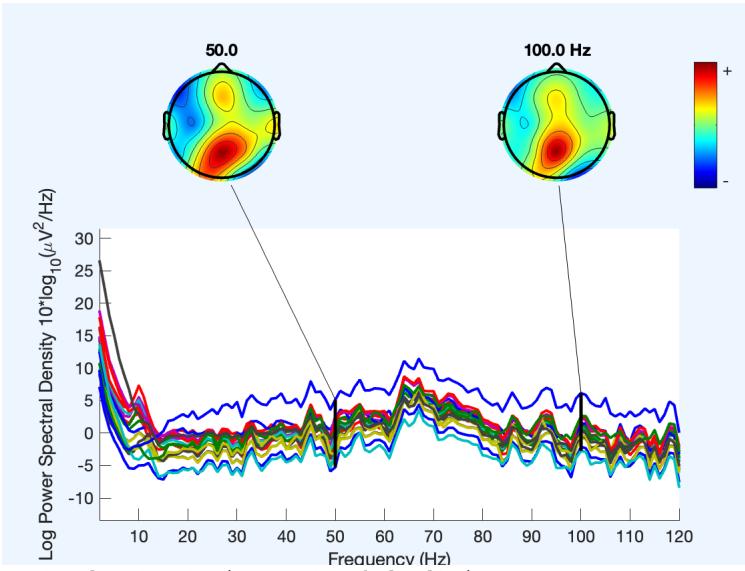
```



```

Saving data for A19 with filename: A19_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A19 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A19/2/A19_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

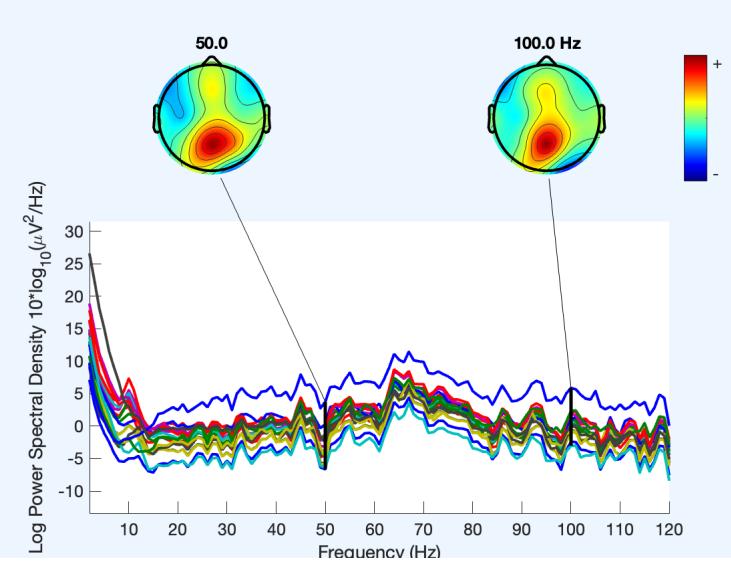
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

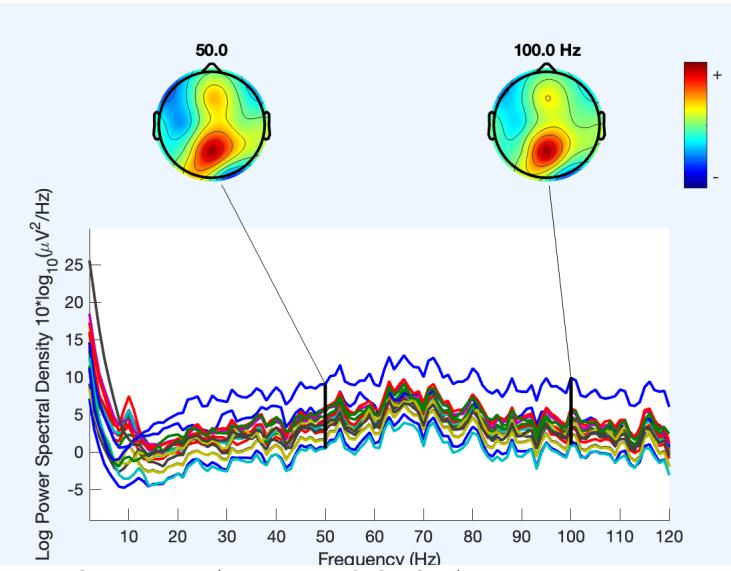
```



```

Saving data for A19 with filename: A19_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A19 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A19/3/A19_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

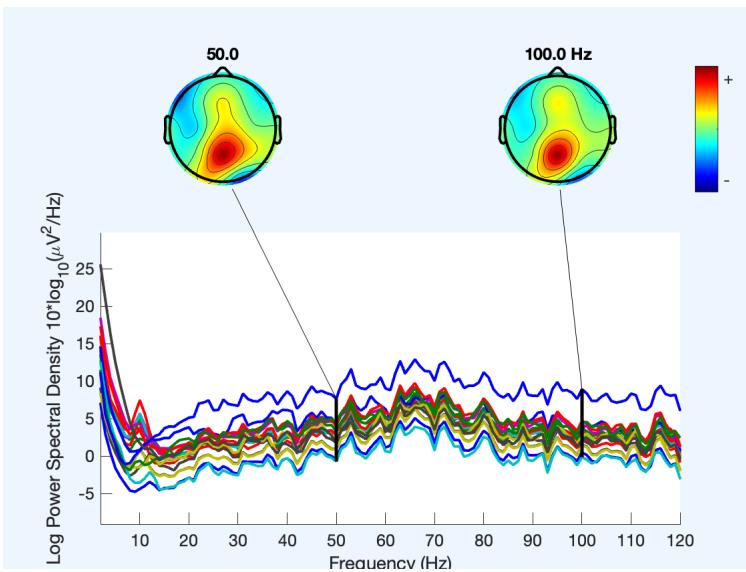
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

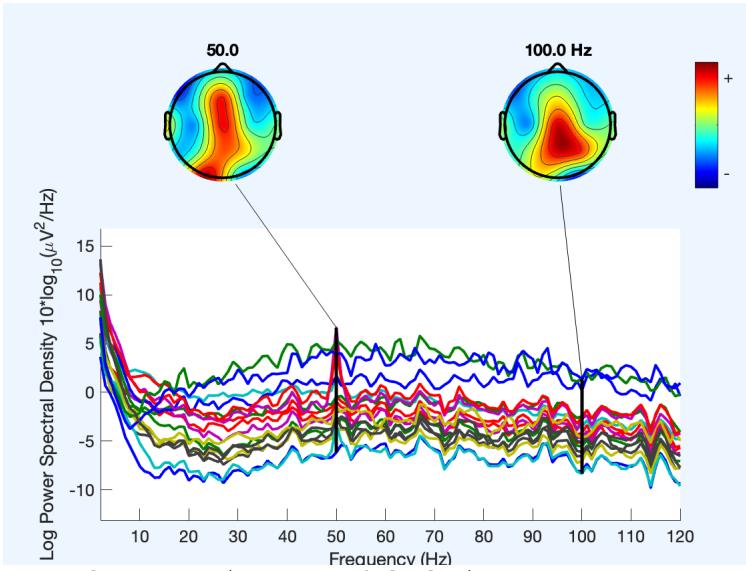
```



```

Saving data for A19 with filename: A19_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A20 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A20/1/A20_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

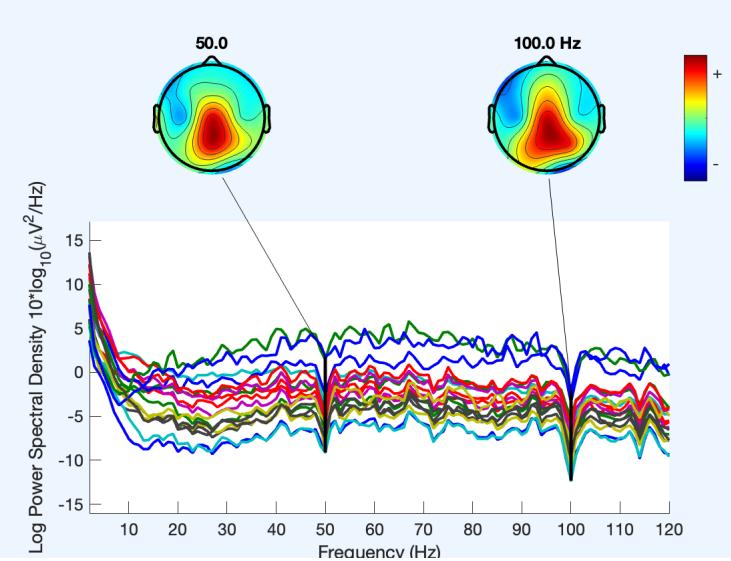
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

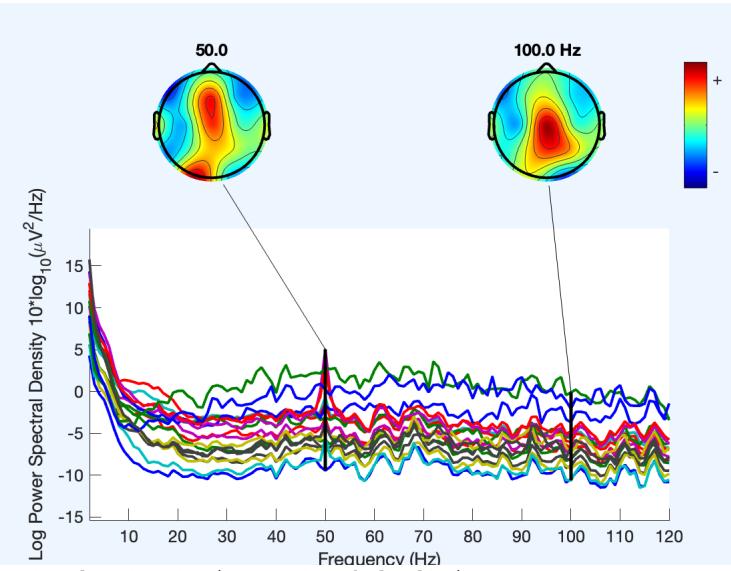
```



```

Saving data for A20 with filename: A20_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A20 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A20/2/A20_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

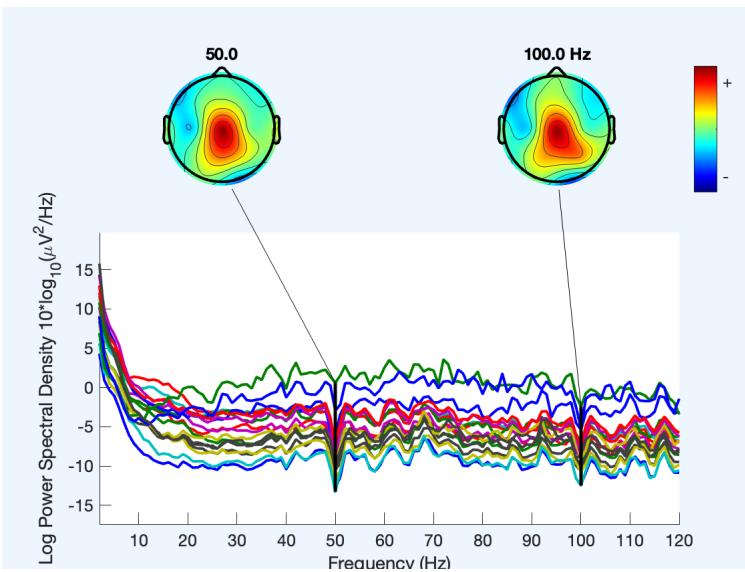
```



```

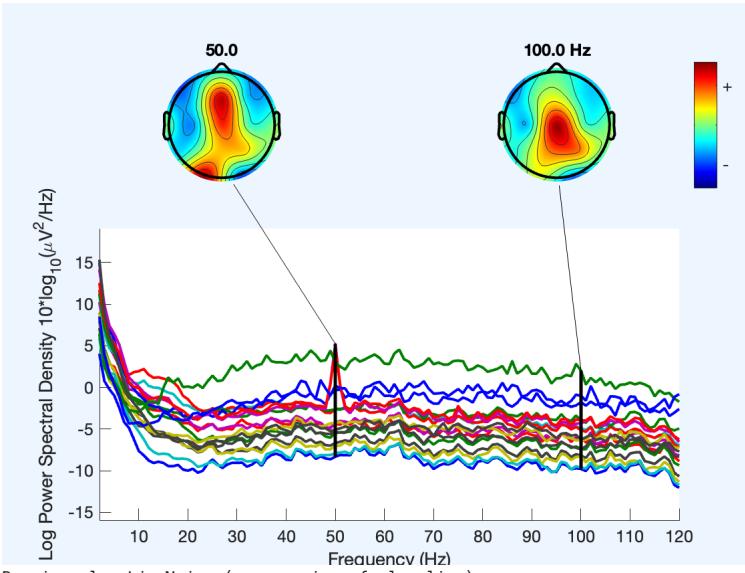
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

```



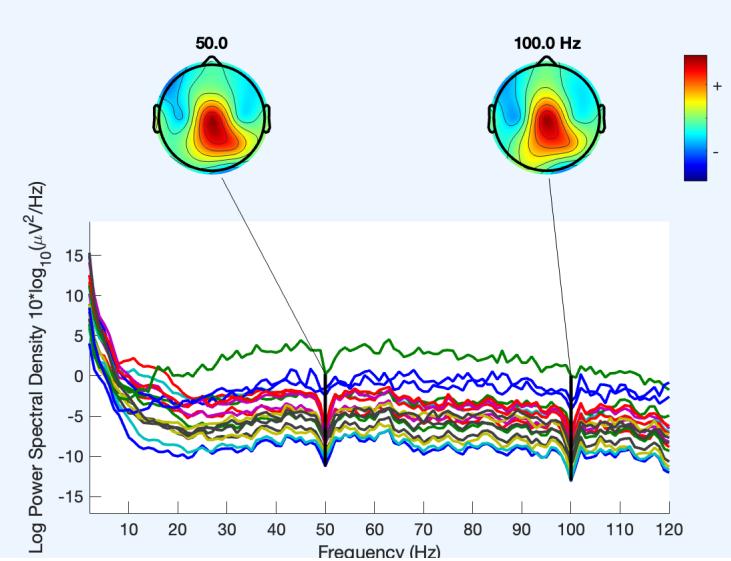
Saving data for A20 with filename: A20_2_uevent_mark_PrepocD1.set
 Saving dataset...
 Processing subject: A20 for folder 3
 pop_loadset(): loading file .../nback_study_VR_EEG_data/A20/3/A20_3_uevent_mark.set ...
 Re-referencing data
 pop_eegfiltnew() - performing 33001 point highpass filtering.
 pop_eegfiltnew() - transition band width: 0.05 Hz
 pop_eegfiltnew() - passband edge(s): 0.05 Hz
 pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
 pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
 firfilt(): |=====| 100%, ETE 00:00
 Pop_spectopo: finding data discontinuities
 Computing spectra (window length 500; fft length: 500; overlap 0):

 Plotting scalp distributions: ..
 Click on each trace for channel/component index



Running cleanLineNoise (new version of cleanline)...
 Pop_spectopo: finding data discontinuities
 Computing spectra (window length 500; fft length: 500; overlap 0):

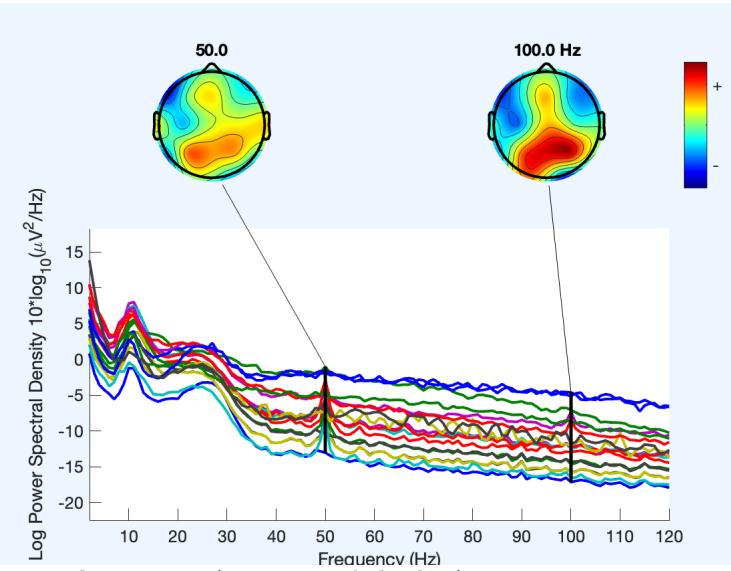
 Plotting scalp distributions: ..
 Click on each trace for channel/component index
 resampling data 250.0000 Hz
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
 resampling event latencies...
 resampling finished



```

Saving data for A20 with filename: A20_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A21 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A21/1/A21_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

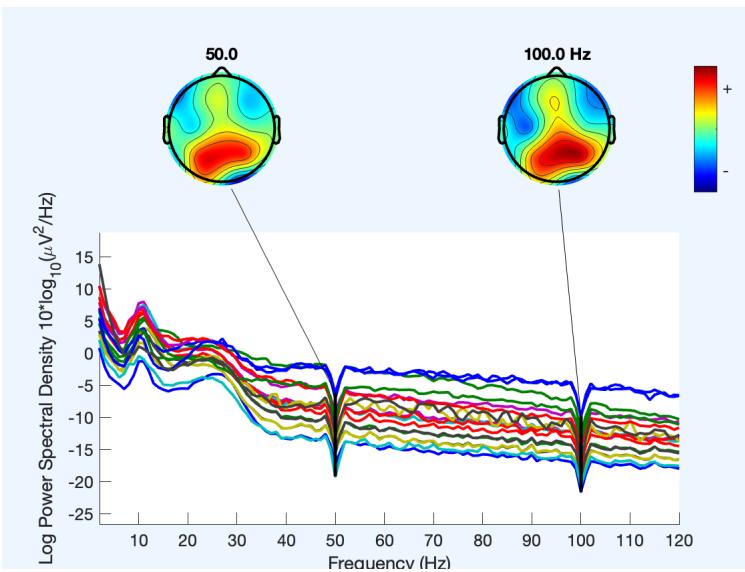
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

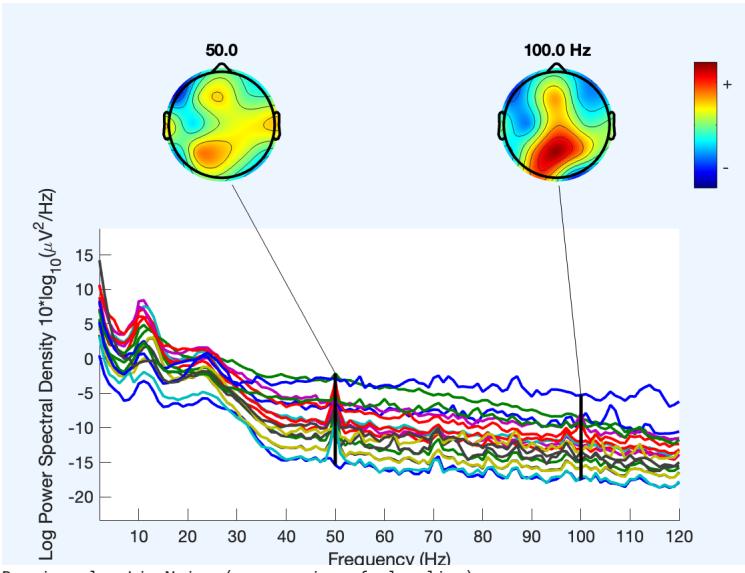
```



```

Saving data for A21 with filename: A21_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A21 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A21/2/A21_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

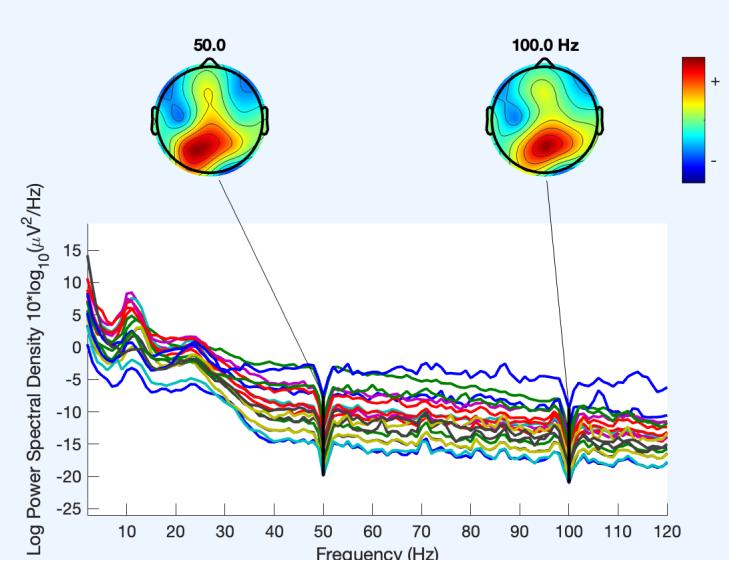
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

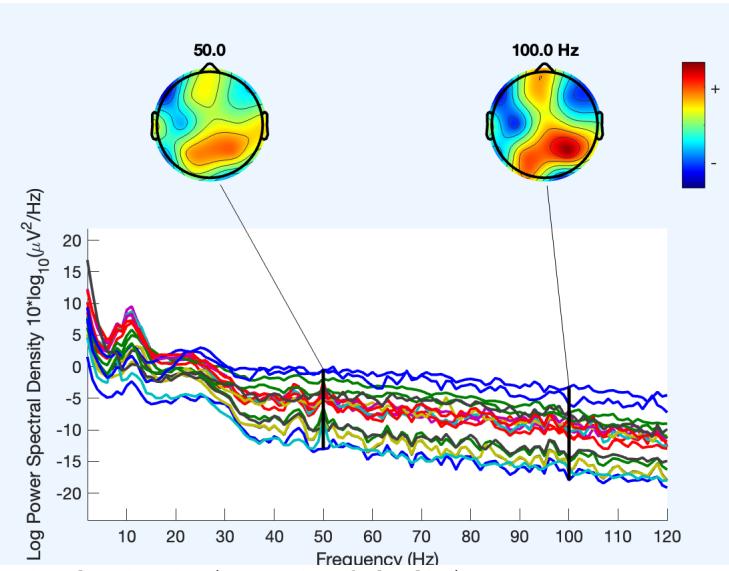
```



```

Saving data for A21 with filename: A21_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A21 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A21/3/A21_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

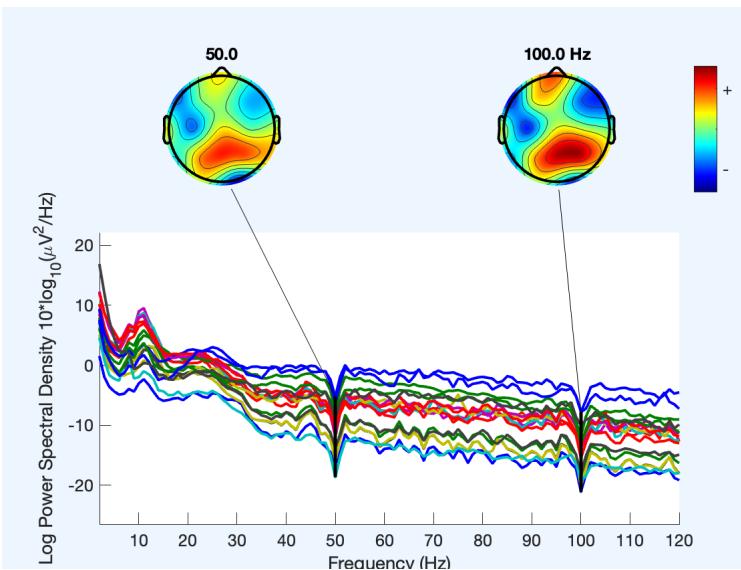
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13

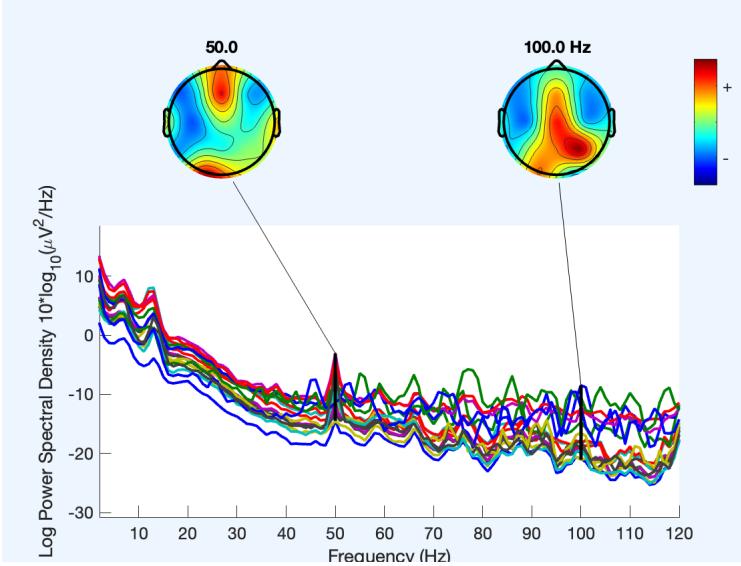
```



```

14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A21 with filename: A21_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A22 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A22/1/A22_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

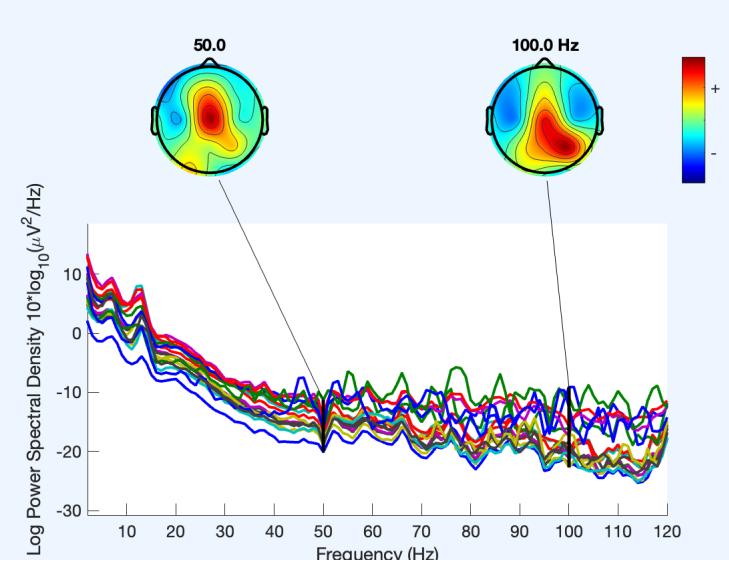
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

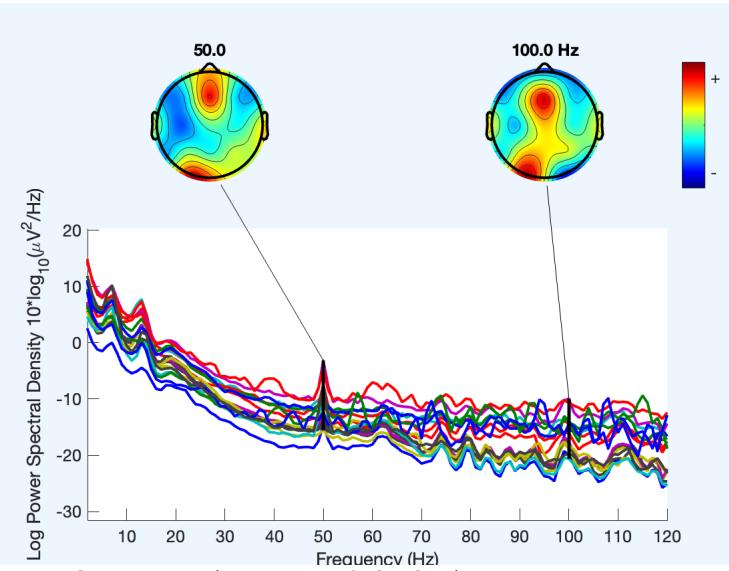
```



```

Saving data for A22 with filename: A22_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A22 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A22/2/A22_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

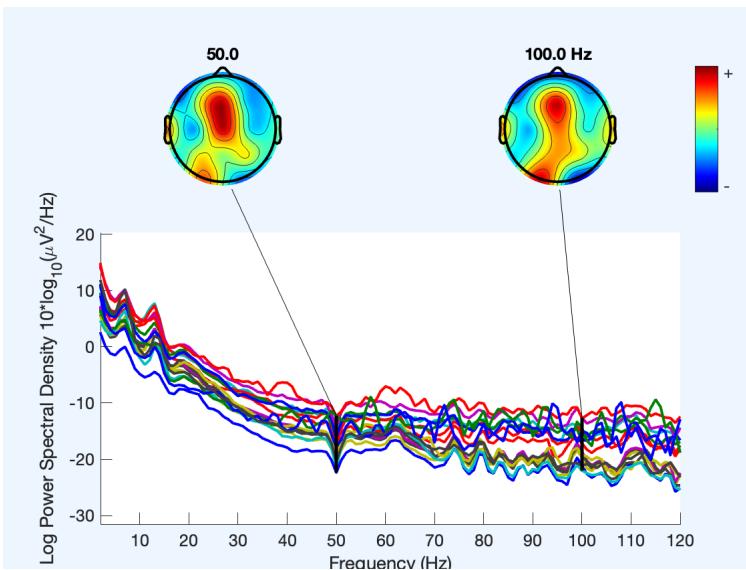
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

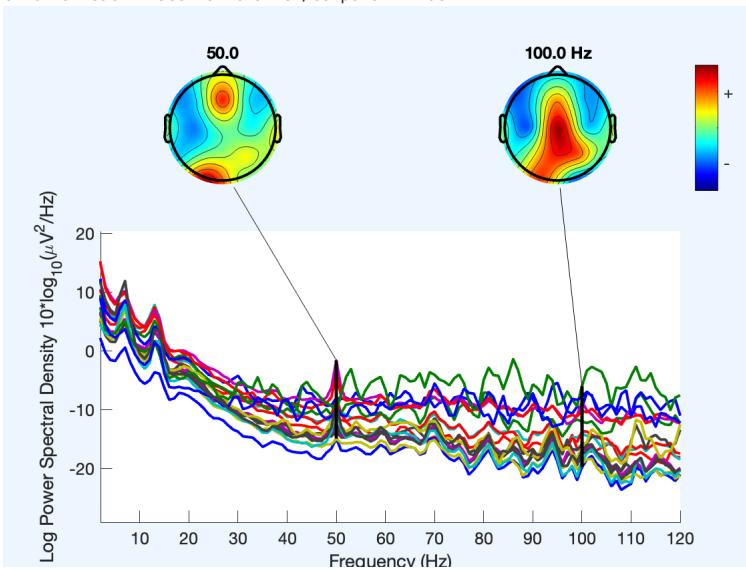
```



```

resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A22 with filename: A22_2_uevent_mark_PrefprocD1.set
Saving dataset...
Processing subject: A22 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A22/3/A22_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(lies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

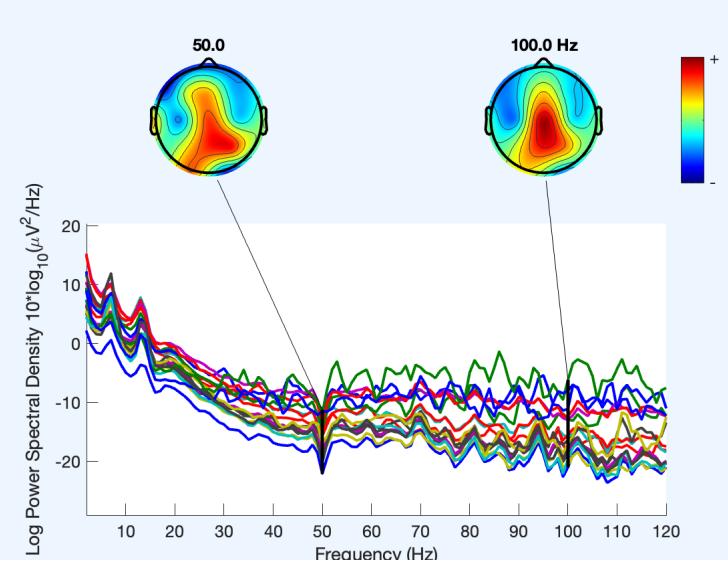
```



```

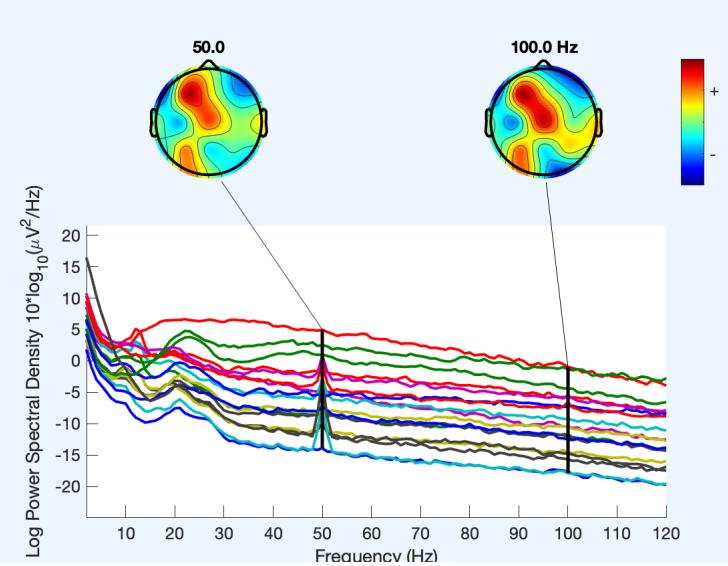
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

```



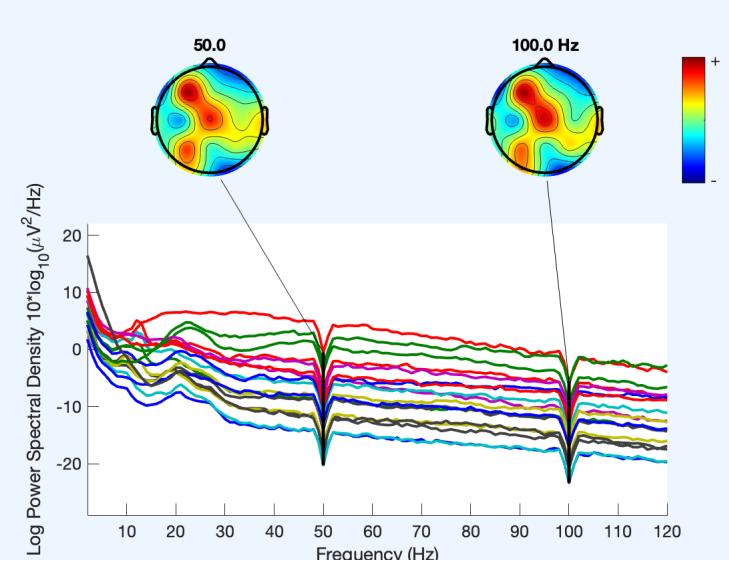
```

Saving data for A22 with filename: A22_3_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A23 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A23/1/A23_1_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)... 
```



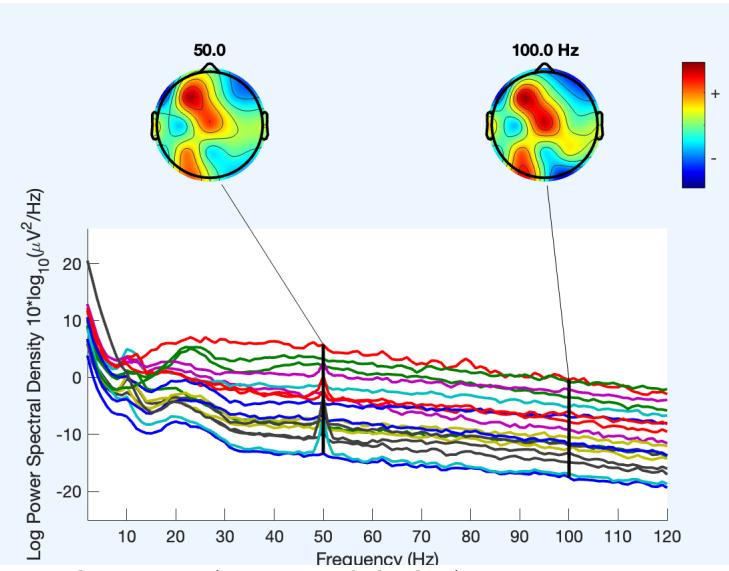
```

Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished 
```



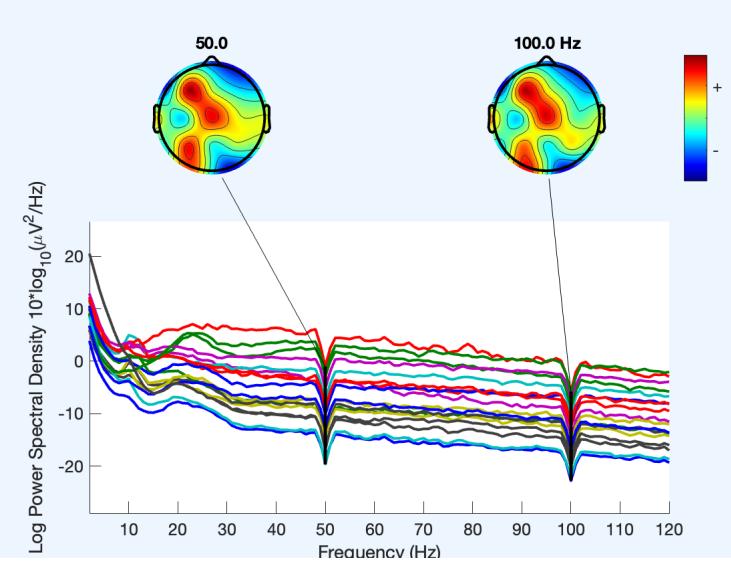
Saving data for A23 with filename: A23_1_uevent_mark_PrepocD1.set
 Saving dataset...
 Processing subject: A23 for folder 2
 pop_loadset(): loading file .../nback_study_VR_EEG_data/A23/2/A23_2_uevent_mark.set ...
 Re-referencing data
 pop_eegfiltnew() - performing 33001 point highpass filtering.
 pop_eegfiltnew() - transition band width: 0.05 Hz
 pop_eegfiltnew() - passband edge(s): 0.05 Hz
 pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
 pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
 firfilt(): |=====| 100%, ETE 00:00
 Pop_spectopo: finding data discontinuities
 Computing spectra (window length 500; fft length: 500; overlap 0):

 Plotting scalp distributions: ..
 Click on each trace for channel/component index



Running cleanLineNoise (new version of cleanline)...
 Pop_spectopo: finding data discontinuities
 Computing spectra (window length 500; fft length: 500; overlap 0):

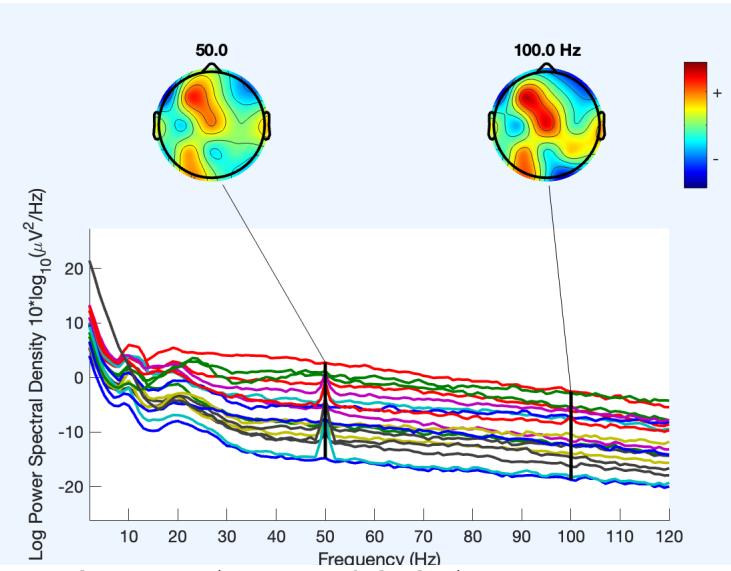
 Plotting scalp distributions: ..
 Click on each trace for channel/component index
 resampling data 250.0000 Hz
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
 resampling event latencies...
 resampling finished



```

Saving data for A23 with filename: A23_2_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A23 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A23/3/A23_3_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

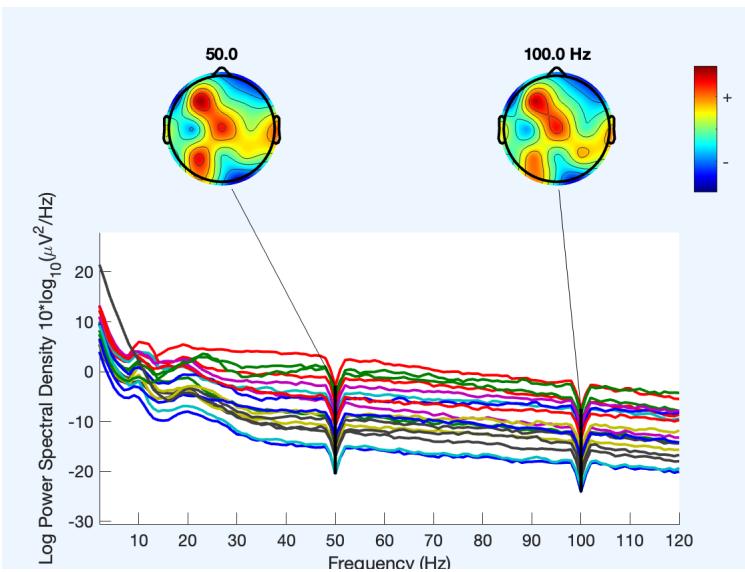
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

```



Saving data for A23 with filename: A23_3_uevent_mark_PrepocD1.set

Saving dataset...

Processing subject: A24 for folder 1

pop_loadset(): loading file .../nback_study_VR_EEG_data/A24/1/A24_1_uevent_mark.set ...

Re-referencing data

pop_eegfiltnew() - performing 33001 point highpass filtering.

pop_eegfiltnew() - transition band width: 0.05 Hz

pop_eegfiltnew() - passband edge(s): 0.05 Hz

pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz

pop_eegfiltnew() - filtering the data (zero-phase, non-causal)

firfilt(): |=====| 100%, ETE 00:00

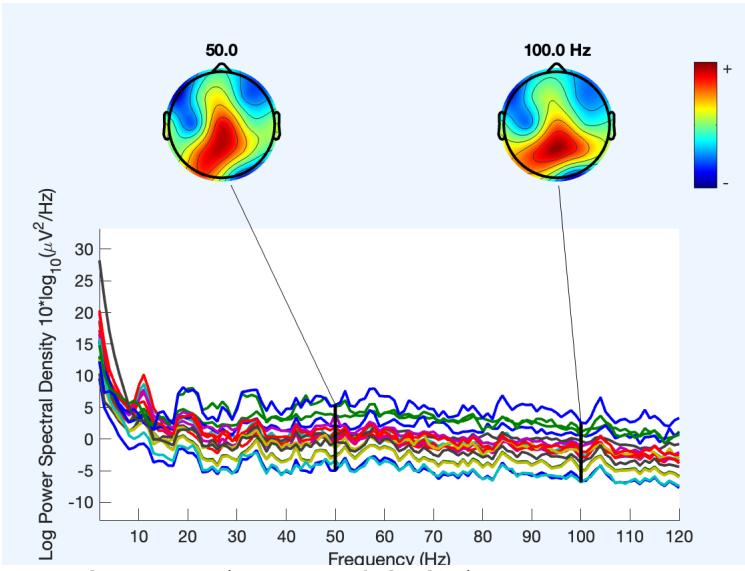
Pop_spectopo: finding data discontinuities

Computing spectra (window length 500; fft length: 500; overlap 0):

.....

Plotting scalp distributions: ..

Click on each trace for channel/component index



Running cleanLineNoise (new version of cleanline)...

Pop_spectopo: finding data discontinuities

Computing spectra (window length 500; fft length: 500; overlap 0):

.....

Plotting scalp distributions: ..

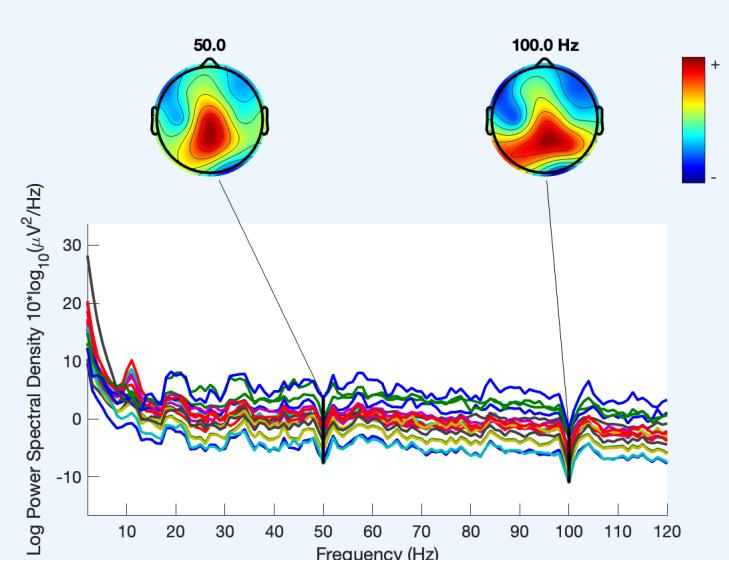
Click on each trace for channel/component index

resampling data 250.0000 Hz

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

resampling event latencies...

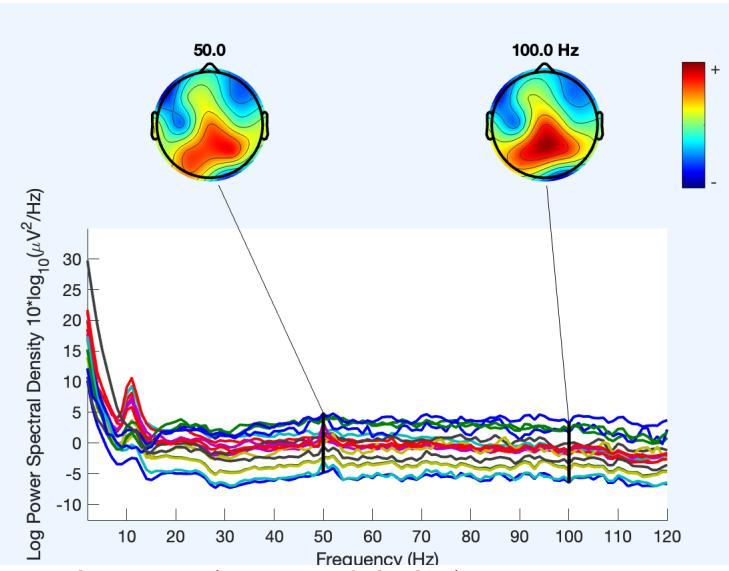
resampling finished



```

Saving data for A24 with filename: A24_1_uevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A24 for folder 2
pop_loadset(): loading file .../nback_study_VR_EEG_data/A24/2/A24_2_uevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

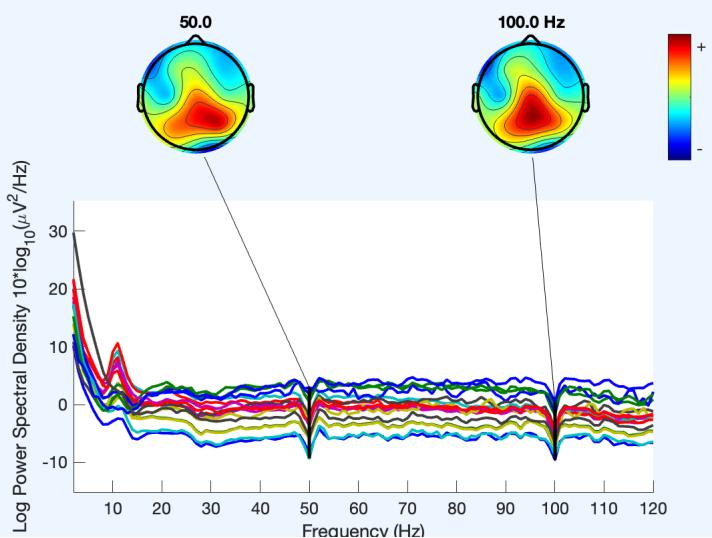
```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished

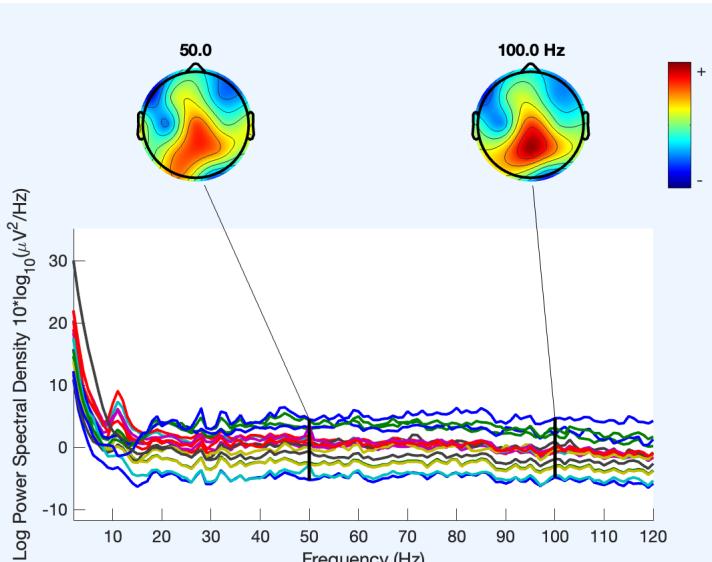
```



```

Saving data for A24 with filename: A24_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A24 for folder 3
pop_loadset(): loading file .../nback_study_VR_EEG_data/A24/3/A24_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index

```



```

Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18
resampling event latencies...
resampling finished
Saving data for A24 with filename: A24_3_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A27 for folder 1
pop_loadset(): loading file .../nback_study_VR_EEG_data/A27/1/A27_1_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz

```

```
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A27 with filename: A27_1_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A27 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A27/2/A27_2_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A27 with filename: A27_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A27 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A27/3/A27_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A27 with filename: A27_3_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A28 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A28/1/A28_1_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
```

```

.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A28 with filename: A28_1_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A28 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A28/2/A28_2_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
resampling event latencies...
resampling finished
Saving data for A28 with filename: A28_2_upevent_mark_PrepocD1.set
Saving dataset...
Processing subject: A28 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A28/3/A28_3_upevent_mark.set ...
Re-referencing data
pop_eegfiltnew() - performing 33001 point highpass filtering.
pop_eegfiltnew() - transition band width: 0.05 Hz
pop_eegfiltnew() - passband edge(s): 0.05 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 0.025 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
Running cleanLineNoise (new version of cleanline)...
Pop_spectopo: finding data discontinuities
Computing spectra (window length 500; fft length: 500; overlap 0):
.....
Plotting scalp distributions: ..
Click on each trace for channel/component index
resampling data 250.0000 Hz
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18
resampling event latencies...
resampling finished
Saving data for A28 with filename: A28_3_upevent_mark_PrepocD1.set
Saving dataset...

```

Phase 2: Preprocessing Pre-Epoching: ICA on files together

We want the same ICA components for all conditions, so we're going to concatenate the conditions here to run ICA.

Loop through each subject and set the directory out folder to be one level higher

```

for s = 1:length(subjNames)
    subjName = subjNames{s};
    temp_subj_folder_joint = fullfile(options.data_dir,subjName);
    temp_filename_out = strcat(subjName,'_',options.filename_base,'_',options.prefixPhase1,'_',options.prefixPhase2,options.pr

```

Check to see if the file already exists to determine if you should skip this subject.

```

if ~options.overwritePreprocFiles && exist(fullfile(temp_subj_folder,temp_filename_out),'file') > 0
    fprintf("File already exists... skipping...\n")
    continue
end

```

Load the data for each numBack

```

for n = numBack
    fprintf("Processing subject: %s for folder %s \n",subjName, num2str(n))
    temp_subj_folder = fullfile(options.data_dir,subjName,num2str(n));
    temp_filename_in = strcat(subjName,'_',num2str(n),'_',options.filename_base,'_',options.prefixPhase1,'_',options.prefixPhase2);
    try
        % Load data set
        EEG = pop_loadset('filename',temp_filename_in,'filepath',temp_subj_folder);

        % Trim to one second before and after markers
        EEG = pop_select(EEG,'point', [(EEG.event(1).latency - EEG.srate) : (EEG.event(end).latency + EEG.srate)]);
        % Save to a named EEG# file for concatenation
        eval(strcat("EEG",num2str(n), " = EEG;"));
    catch SE
        input(strcat("Error loading dataset for ", subjName))
        SE
    end
end

```

Concatenate the data

```

for n = numBack

    % For the first element, set this to EEG
    if n == numBack(1)
        eval(strcat("EEG = EEG",num2str(n),""));
    else
        % Otherwise merge with the first set
        eval(strcat("EEG = pop_mergeset(EEG,EEG",num2str(n),",0);"));
    end
EEG.subject = subjName;

```

Preprocess the data: step 2 (ICA and remove bad)

```
EEG = preprocessNBackEEG(EEG,'D2',options);
```

Save data

```

fprintf(strcat("Saving data for ", subjName, " with filename: " , temp_filename_out,"\\n"))
EEG = pop_saveset(EEG,'filename',temp_filename_out,'filepath',temp_subj_folder_joint);
end

```

Processing subject: A02 for folder 1
 pop_loadset(): loading file ..\nback_study_VR_EEG_data/A02/1/A02_1_uevent_mark_PrepocD1.set ...
 eeg_insertbound(): 2 boundary (break) events added.
 eeg_checkset note: event field format 'binlabel' made uniform
 eeg_checkset note: event field format 'codelabel' made uniform
 Processing subject: A02 for folder 2
 pop_loadset(): loading file ..\nback_study_VR_EEG_data/A02/2/A02_2_uevent_mark_PrepocD1.set ...
 eeg_insertbound(): 2 boundary (break) events added.
 eeg_checkset note: event field format 'binlabel' made uniform
 eeg_checkset note: event field format 'codelabel' made uniform
 Processing subject: A02 for folder 3
 pop_loadset(): loading file ..\nback_study_VR_EEG_data/A02/3/A02_3_uevent_mark_PrepocD1.set ...
 eeg_insertbound(): 2 boundary (break) events added.
 eeg_checkset note: event field format 'binlabel' made uniform
 eeg_checkset note: event field format 'codelabel' made uniform
 Merging datasets...
 Warning: second dataset has empty urevent structure.
 Concatenating events...
 Adding boundary event...
 Reconstituting epoch information...
 eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
 eeg_checkset note: event field format 'binlabel' made uniform
 eeg_checkset note: event field format 'codelabel' made uniform
 Warning: duplicate boundary event removed
 Event resorted by increasing latencies.
 Merging datasets...
 Warning: second dataset has empty urevent structure.
 Concatenating events...
 Adding boundary event...
 Reconstituting epoch information...
 eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
 eeg_checkset note: event field format 'binlabel' made uniform

```

pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02816
iteration 2, gradient norm = 0.0212
iteration 3, gradient norm = 0.01503
iteration 4, gradient norm = 0.01127
iteration 5, gradient norm = 0.01472
iteration 6, gradient norm = 0.007889
iteration 7, gradient norm = 0.006304
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 1 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A02 with filename: A02_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A04 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A04/1/A04_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A04 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A04/2/A04_2_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A04 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A04/3/A04_3_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02405
iteration 2, gradient norm = 0.01634
iteration 3, gradient norm = 0.02066
iteration 4, gradient norm = 0.006707
iteration 5, gradient norm = 0.004903
iteration 6, gradient norm = 0.00212

```

```
iteration 7, gradient norm = 0.001944
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
5 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 5 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A04 with filename: A04_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A05 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A05/1/A05_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A05 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A05/2/A05_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A05 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A05/3/A05_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.01805
iteration 2, gradient norm = 0.01737
iteration 3, gradient norm = 0.01548
iteration 4, gradient norm = 0.01559
iteration 5, gradient norm = 0.01137
iteration 6, gradient norm = 0.01113
iteration 7, gradient norm = 0.01236
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
2 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 2 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
```

```
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A05 with filename: A05_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A07 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A07/1/A07_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform

Processing subject: A07 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A07/2/A07_2_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform

Processing subject: A07 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A07/3/A07_3_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform

Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.

Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02022
iteration 2, gradient norm = 0.01993
iteration 3, gradient norm = 0.01565
iteration 4, gradient norm = 0.005493
iteration 5, gradient norm = 0.003835
iteration 6, gradient norm = 0.005593
iteration 7, gradient norm = 0.006505
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
2 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 2 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A07 with filename: A07_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A08 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A08/1/A08_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
```

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Processing subject: A08 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A08/2/A08_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A08 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A08/3/A08_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.01963
iteration 2, gradient norm = 0.02071
iteration 3, gradient norm = 0.01145
iteration 4, gradient norm = 0.01158
iteration 5, gradient norm = 0.006442
iteration 6, gradient norm = 0.003665
iteration 7, gradient norm = 0.0016
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 0 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.1 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A08 with filename: A08_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A10 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A10/1/A10_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A10 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A10/2/A10_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A10 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A10/3/A10_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
```

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Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02294
iteration 2, gradient norm = 0.01789
iteration 3, gradient norm = 0.01125
iteration 4, gradient norm = 0.00469
iteration 5, gradient norm = 0.004016
iteration 6, gradient norm = 0.00157
iteration 7, gradient norm = 0.002003
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
4 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 4 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.1 minutes remaining.
clean_channel: 2/270 blocks, 0.1 minutes remaining.
clean_channel: 3/270 blocks, 0.1 minutes remaining.
clean_channel: 4/270 blocks, 0.1 minutes remaining.
clean_channel: 5/270 blocks, 0.1 minutes remaining.
clean_channel: 6/270 blocks, 0.1 minutes remaining.
clean_channel: 7/270 blocks, 0.1 minutes remaining.
clean_channel: 8/270 blocks, 0.1 minutes remaining.
clean_channel: 9/270 blocks, 0.1 minutes remaining.
clean_channel: 10/270 blocks, 0.1 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A10 with filename: A10_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A11 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A11/1/A11_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A11 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A11/2/A11_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A11 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A11/3/A11_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
```

```

pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02474
iteration 2, gradient norm = 0.02154
iteration 3, gradient norm = 0.01549
iteration 4, gradient norm = 0.009791
iteration 5, gradient norm = 0.003526
iteration 6, gradient norm = 0.002542
iteration 7, gradient norm = 0.004599
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
5 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 5 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A11 with filename: A11_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A12 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A12/1/A12_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A12 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A12/2/A12_2_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A12 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A12/3/A12_3_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
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Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.0306
iteration 2, gradient norm = 0.02528
iteration 3, gradient norm = 0.02305
iteration 4, gradient norm = 0.008978
iteration 5, gradient norm = 0.01051
iteration 6, gradient norm = 0.02108
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iteration 7, gradient norm = 0.03329
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
5 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 5 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A12 with filename: A12_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A13 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A13/1/A13_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A13 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A13/2/A13_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A13 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A13/3/A13_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.03048
iteration 2, gradient norm = 0.02551
iteration 3, gradient norm = 0.02486
iteration 4, gradient norm = 0.008431
iteration 5, gradient norm = 0.005591
iteration 6, gradient norm = 0.003208
iteration 7, gradient norm = 0.001477
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
4 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 4 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
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clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A13 with filename: A13_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A14 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A14/1/A14_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A14 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A14/2/A14_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A14 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A14/3/A14_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.03502
iteration 2, gradient norm = 0.02581
iteration 3, gradient norm = 0.006503
iteration 4, gradient norm = 0.003893
iteration 5, gradient norm = 0.006133
iteration 6, gradient norm = 0.006603
iteration 7, gradient norm = 0.005237
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 1 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.1 minutes remaining.
clean_channel: 2/270 blocks, 0.1 minutes remaining.
clean_channel: 3/270 blocks, 0.1 minutes remaining.
clean_channel: 4/270 blocks, 0.1 minutes remaining.
clean_channel: 5/270 blocks, 0.1 minutes remaining.
clean_channel: 6/270 blocks, 0.1 minutes remaining.
clean_channel: 7/270 blocks, 0.1 minutes remaining.
clean_channel: 8/270 blocks, 0.1 minutes remaining.
clean_channel: 9/270 blocks, 0.1 minutes remaining.
clean_channel: 10/270 blocks, 0.1 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A14 with filename: A14_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A15 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A15/1/A15_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
```

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Processing subject: A15 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A15/2/A15_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A15 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A15/3/A15_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.0125
iteration 2, gradient norm = 0.01189
iteration 3, gradient norm = 0.01635
iteration 4, gradient norm = 0.01568
iteration 5, gradient norm = 0.01619
iteration 6, gradient norm = 0.01831
iteration 7, gradient norm = 0.0194
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 1 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A15 with filename: A15_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A16 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A16/1/A16_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A16 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A16/2/A16_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A16 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A16/3/A16_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
```

```
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02666
iteration 2, gradient norm = 0.009269
iteration 3, gradient norm = 0.01509
iteration 4, gradient norm = 0.009185
iteration 5, gradient norm = 0.008597
iteration 6, gradient norm = 0.002663
iteration 7, gradient norm = 0.00146
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 0 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.1 minutes remaining.
clean_channel: 2/270 blocks, 0.1 minutes remaining.
clean_channel: 3/270 blocks, 0.1 minutes remaining.
clean_channel: 4/270 blocks, 0.1 minutes remaining.
clean_channel: 5/270 blocks, 0.1 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A16 with filename: A16_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A17 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A17/1/A17_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A17 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A17/2/A17_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A17 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A17/3/A17_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
```

```

pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02087
iteration 2, gradient norm = 0.01901
iteration 3, gradient norm = 0.02241
iteration 4, gradient norm = 0.0175
iteration 5, gradient norm = 0.01206
iteration 6, gradient norm = 0.009148
iteration 7, gradient norm = 0.004504
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 1 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.1 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A17 with filename: A17_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A18 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A18/1/A18_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A18 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A18/2/A18_2_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A18 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A18/3/A18_3_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
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Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.03179
iteration 2, gradient norm = 0.01003
iteration 3, gradient norm = 0.0148
iteration 4, gradient norm = 0.007493
iteration 5, gradient norm = 0.004318
iteration 6, gradient norm = 0.003485
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iteration 7, gradient norm = 0.001958
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 0 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A18 with filename: A18_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A19 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A19/1/A19_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A19 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A19/2/A19_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A19 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A19/3/A19_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02738
iteration 2, gradient norm = 0.02623
iteration 3, gradient norm = 0.02114
iteration 4, gradient norm = 0.01535
iteration 5, gradient norm = 0.0229
iteration 6, gradient norm = 0.01371
iteration 7, gradient norm = 0.01118
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
2 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 2 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
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clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A19 with filename: A19_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A20 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A20/1/A20_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A20 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A20/2/A20_2_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A20 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A20/3/A20_3_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.0183
iteration 2, gradient norm = 0.01452
iteration 3, gradient norm = 0.01477
iteration 4, gradient norm = 0.01134
iteration 5, gradient norm = 0.009328
iteration 6, gradient norm = 0.007196
iteration 7, gradient norm = 0.005587
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
2 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 2 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A20 with filename: A20_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A21 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A21/1/A21_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
```

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Processing subject: A21 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A21/2/A21_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A21 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A21/3/A21_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02504
iteration 2, gradient norm = 0.0203
iteration 3, gradient norm = 0.02099
iteration 4, gradient norm = 0.02207
iteration 5, gradient norm = 0.01279
iteration 6, gradient norm = 0.00868
iteration 7, gradient norm = 0.003585
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
2 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 2 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.1 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A21 with filename: A21_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A22 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A22/1/A22_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A22 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A22/2/A22_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A22 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A22/3/A22_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
```

```
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.01551
iteration 2, gradient norm = 0.01236
iteration 3, gradient norm = 0.007924
iteration 4, gradient norm = 0.005051
iteration 5, gradient norm = 0.003344
iteration 6, gradient norm = 0.001819
iteration 7, gradient norm = 0.002222
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 0 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A22 with filename: A22_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A23 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A23/1/A23_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A23 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A23/2/A23_2_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A23 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A23/3/A23_3_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
```

```
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.03501
iteration 2, gradient norm = 0.01264
iteration 3, gradient norm = 0.01283
iteration 4, gradient norm = 0.01074
iteration 5, gradient norm = 0.003027
iteration 6, gradient norm = 0.004548
iteration 7, gradient norm = 0.002603
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
3 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 3 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A23 with filename: A23_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A24 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A24/1/A24_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A24 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A24/2/A24_2_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A24 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A24/3/A24_3_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00
```

```
Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.01941
iteration 2, gradient norm = 0.01907
iteration 3, gradient norm = 0.02327
iteration 4, gradient norm = 0.01066
iteration 5, gradient norm = 0.008339
iteration 6, gradient norm = 0.008871
```

```
iteration 7, gradient norm = 0.009618
Warning: ICLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
4 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 4 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A24 with filename: A24_uevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A27 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A27/1/A27_1_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A27 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A27/2/A27_2_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A27 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A27/3/A27_3_uevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.03401
iteration 2, gradient norm = 0.02568
iteration 3, gradient norm = 0.03411
iteration 4, gradient norm = 0.01602
iteration 5, gradient norm = 0.01082
iteration 6, gradient norm = 0.005096
iteration 7, gradient norm = 0.005014
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 1 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
```

```

clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A27 with filename: A27_upevent_mark_PrepocDAll.set
Saving dataset...
Processing subject: A28 for folder 1
pop_loadset(): loading file ../nback_study_VR_EEG_data/A28/1/A28_1_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A28 for folder 2
pop_loadset(): loading file ../nback_study_VR_EEG_data/A28/2/A28_2_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Processing subject: A28 for folder 3
pop_loadset(): loading file ../nback_study_VR_EEG_data/A28/3/A28_3_upevent_mark_PrepocD1.set ...
eeg_insertbound(): 2 boundary (break) events added.
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
Warning: duplicate boundary event removed
Event resorted by increasing latencies.
Merging datasets...
Warning: second dataset has empty urevent structure.
Concatenating events...
Adding boundary event...
Reconstituting epoch information...
eeg_checkset note: upper time limit (xmax) adjusted so (xmax-xmin)*srate+1 = number of frames
eeg_checkset note: event field format 'binlabel' made uniform
eeg_checkset note: event field format 'codelabel' made uniform
pop_eegfiltnew() - performing 415 point highpass filtering.
pop_eegfiltnew() - transition band width: 2 Hz
pop_eegfiltnew() - passband edge(s): 2 Hz
pop_eegfiltnew() - cutoff frequency(ies) (-6 dB): 1 Hz
pop_eegfiltnew() - filtering the data (zero-phase, non-causal)
firfilt(): |=====| 100%, ETE 00:00

Attempting to convert data matrix to double precision for more accurate ICA results.
iteration 1, gradient norm = 0.02591
iteration 2, gradient norm = 0.01516
iteration 3, gradient norm = 0.01185
iteration 4, gradient norm = 0.005331
iteration 5, gradient norm = 0.004921
iteration 6, gradient norm = 0.003967
iteration 7, gradient norm = 0.001886
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
1 components flagged for rejection, to reject them use Tools > Remove components from data
Computing projection and removing 1 components ....
Detecting flat line...
Scanning for bad channels...
clean_channel: 1/270 blocks, 0.0 minutes remaining.
clean_channel: 2/270 blocks, 0.0 minutes remaining.
clean_channel: 3/270 blocks, 0.0 minutes remaining.
clean_channel: 4/270 blocks, 0.0 minutes remaining.
clean_channel: 5/270 blocks, 0.0 minutes remaining.
clean_channel: 6/270 blocks, 0.0 minutes remaining.
clean_channel: 7/270 blocks, 0.0 minutes remaining.
clean_channel: 8/270 blocks, 0.0 minutes remaining.
clean_channel: 9/270 blocks, 0.0 minutes remaining.
clean_channel: 10/270 blocks, 0.0 minutes remaining.
Warning: ICLLabel: defaulting to uncompiled matlab code (about 80x slower)
ICLabel: saving results...
0 components flagged for rejection, to reject them use Tools > Remove components from data
Saving data for A28 with filename: A28_upevent_mark_PrepocDAll.set
Saving dataset...

```

HERE

Phase 3: Epoch data based on the condition

This is an n-back task, so a continuous stream of information is presented with the 'prob' (probe) acting as both a stimulus and a probe. Here is the timing:

blank to probe: 3 seconds

probe to feedback: 3 seconds

feedback to blank: 3 seconds

It generally seems inappropriate to do baseline correction (unless it's done before the stimuli even start, because otherwise the participant is holding items in their working memory).

Most likely, we will just break into 3 second epochs for each condition starting right at the marker time.

OLD: Based on advice in (https://sccn.ucsd.edu/wiki/Makoto%27s_preprocessing_pipeline#High-pass_filter_the_data_at_1-Hz_.28for_ICA.2C_ASR.2C_and_Cleanline.29.2805.2F18.2F2022_updated.29), we are going to keep this as one .set file for each subject with the conditions inside.

```
for s = 1:length(subjNames)
    subjName = subjNames{s};
    fprintf("Processing subject: %s \n", subjName)

    % Make output directory if it doesn't already exist
    if ~exist(strcat(options.saveToPhase3,subjName),'dir')
        mkdir(strcat(options.saveToPhase3,subjName))
    end
```

Load the data

```
try
    EEG = pop_loadset('filename',strcat(options.prefixPhase2,options.preprocessingTag,'_',subjName,'.set'),'filepath',opti
catch SE
    input(strcat("Error loading dataset for ", subjName))
    SE
end

EEG = pop_epoch( EEG, conditions, options.epochWindow, 'newname', 'epochs for all cons', 'epochinfo', 'yes');
% Remove baseline for the whole long trial
if options.removebaseline
    % Remove 500 ms baseline
    EEG = pop_rmbase( EEG,[options.epochWindow(1) 0] ,[] );
end
```

Remove incorrect trials

```
disp('Number of trials before removing incorrect: ')
disp(num2str(sum([EEG.event.correct])))
EEG = pop_selectevent( EEG, 'correct',1,'deleteevents','off','deleteepochs','on','invertepochs','off');
disp('Number of trials after removing incorrect: ')
disp(num2str(sum([EEG.event.correct])))
EEG = eeg_checkset(EEG);
```

Save the data

```
EEG = pop_saveset(EEG,'filename',strcat(options.prefixPhase3,'_',options.prefixPhase2,options.preprocessingTag,'_',subjNa
```

Epoch again for all stim types separately and save with a different name

```
EEG = pop_epoch( EEG, options.eventTypes, [-0.5 2.0], 'newname', 'epochs for all events', 'epochinfo', 'yes');

% Create counts of events

eventType = {EEG.event.type}
for eT = 1:length(options.eventTypes)
    subjeventsClean(s,eT) = sum(strcmp(eventType,options.eventTypes{eT}));
end

% Make output directory if it doesn't already exist
if ~exist(strcat(options.saveToPhase4,subjName),'dir')
    mkdir(strcat(options.saveToPhase4,subjName))

    EEG = pop_saveset(EEG,'filename',strcat(options.prefixPhase4,options.prefixPhase3,'_',options.prefixPhase2,options.prepro
fprintf(strcat("Saving data for ", subjName, " with filename: " , temp_filename_out,"\\n"))
EEG = pop_saveset(EEG,'filename',temp_filename_out,'filepath',temp_subj_folder_joint);

end
%save(strcat(options.saveToPhase4,'subjectConditionCountPreproc',options.preprocessingTag,'.mat'),"subjeventsClean","subjNames
```

