STUDY design and plotting overview

STEP 1
Build a STUDY

STEP 2
Build design(s)

STEP 3
Precompute the data

STEP 4
Plot the data

Exercise...
Memory options should change when using STUDY vs single dataset.
Create simple ERP STUDY

This interface creates a simple STUDY and computes its condition grand average ERPs. For each subject, trials for each condition must first be stored in a separate dataset. Create other STUDY using the standard editor.

Number of conditions: 2
Number of subjects: 15
Create simple ERP STUDY

**STUDY set name:** Letter memorization task

<table>
<thead>
<tr>
<th>Condition 1 name</th>
<th>Condition 2 name</th>
</tr>
</thead>
<tbody>
<tr>
<td>letter-ignore</td>
<td>letter-memorize</td>
</tr>
</tbody>
</table>

**Condition 1 datasets**

<table>
<thead>
<tr>
<th>/data/STUDY/S01/Ignore.set</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>/data/STUDY/S02/Ignore.set</td>
<td></td>
</tr>
<tr>
<td>/data/STUDY/S03/Ignore.set</td>
<td></td>
</tr>
</tbody>
</table>

**Condition 2 datasets**

<table>
<thead>
<tr>
<th>/data/STUDY/S01/Memorize.set</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>/data/STUDY/S02/Memorize.set</td>
<td></td>
</tr>
<tr>
<td>/data/STUDY/S03/Memorize.set</td>
<td></td>
</tr>
</tbody>
</table>

When using more than 1 condition, datasets on each line must correspond to the same subject.
Create simple ERP STUDY
Suggestion for exercise

1. From the GUI, select “File > Create STUDY > Simple ERP STUDY”

2. Enter 2 conditions “letter-ignore” and “letter-memorize”

3. In the column for “letter-ignore” select datasets “ignore.set” for 3 subjects S01, S02, S03 (in the STUDY folder)

4. In the column for “letter-memorize” select datasets “memorize.set” for 3 subjects S01, S02, S03 (in the STUDY folder)

5. Press OK.
Create design

1x3 design
Design independent of # of files per subject
Other design examples
Other design examples
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Exercise...
Precompute data measures
Choose which channel

Choose which subject

Choose which channel

Choose which subject
Computing Spectrum

Select and compute component measures for later clustering -- pop_precomp()

Pre-compute channel measures for STUDY 'Sternberg' - 'STUDY.design 1'

Channel list (default: all)
- Spherical interpolation of missing channels (performed after optional ICA removal below)
- Remove ICA artifactual components pre-tagged in each dataset
- Remove artifactual ICA cluster or clusters (hold shift key)

List of measures to precompute
- ERPs
- Power spectrum
- ERSPs
- ITCs

Baseline ([min max] in ms)
- Spectopo parameters
- Time/freq. parameters

Save single-trial measures for single-trial statistics - requires disk space
Recompute even if present on disk

Help Cancel Ok
Choose which channel

Choose which subject
Computing ERSP

'cycles', [3 0.8], 'nfreqs', 50, 'ntimesout', 100
Figure 4

ERSP - CZ, ignore
ERSP - CZ, memorize
ERSP - CZ, probe

Set ERSP/ITC plotting parameters -- pop_erspparams()

ERSP/ITC plotting options
Time range in ms [Low High] -500 1000
Freq. range in Hz [Low High] 3 30
Power limits in dB [Low High]

Plot scalp map at time [ms]
Plot scalp map at freq. [Hz]
ITC limit (0-1) [High]

Compute common ERSP baseline (assumes additive baseline)
ERP-image across subjects

STUDY name 'Sternberg' - 'Comparing conditions'

Select channel to plot  Sel. all  Select subject(s) to plot
All P6  All P8  All PO9  All PO7  All PO3  All POZ  All PO4  All PO8  All PO10  All O1
All subjects  S01 All  S02 All  S03 All  S04 All  S05 All  S06 All  S07 All  S08 All  S09 All

Plot ERPs  Stats  Plot ERP(s)
Plot spectra  Params  Plot spectra
Plot ERPimage(s)

Figure 5: Channel ERP

ERP - ignore, 200-300ms  ERP - memorize, 200-300ms  ERP - probe, 200-300ms  (p-value) param with fdr
std_stat() function in EEGLAB
Exercises

1. Load “stern.study” file in STUDY folder

2. Edit STUDY design and delete current variable(s)

3. Create a new indep. Variable design to compare Ignore vs. Memorize letter

4. Recompute spectrum and ERP.

5. Plot spectrum and ERP for electrode Fz

6. Plot scalp topography at 10 Hz (spectrum) and 200-300 ms (ERP) for both conditions

7. Spectrum for electrode Fz within 1 to 50 Hz and compute parametric statistics (with and without FDR correction)

8. Plot scalp topography at 10Hz for both conditions using permutation statistics cluster correction (Fieldtrip – statistics)