STUDY clustering overview

STEP 1
Build a STUDY

STEP 2
Precompute the data

STEP 3
Precluster the data

STEP 4
Cluster the data

STEP 5
Edit/view the clusters
STUDY clustering overview

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Build a STUDY

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Build a STUDY, cont'd
Edit dataset info

### Create a new STUDY set - pop_study()

#### Edit STUDY set information

<table>
<thead>
<tr>
<th>STUDY set name:</th>
<th>STUDY set task name:</th>
<th>STUDY set notes:</th>
</tr>
</thead>
</table>

#### Dataset information

<table>
<thead>
<tr>
<th>dataset filename</th>
<th>browse</th>
<th>subject</th>
<th>session</th>
<th>condition</th>
<th>group</th>
<th>Select by r.v.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDY/S01/S01_attend1_pos1.set</td>
<td></td>
<td>S01</td>
<td>1</td>
<td>TargAttnL</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S01/S01_attend1_pos5.set</td>
<td></td>
<td>S01</td>
<td>1</td>
<td>TargAttnR</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S01/S01_attend5_pos1.set</td>
<td></td>
<td>S01</td>
<td>1</td>
<td>NONTargAttnL</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S01/S01_attend5_pos5.set</td>
<td></td>
<td>S01</td>
<td>1</td>
<td>NONTargAttnR</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S02/S02_attend1_pos1.set</td>
<td></td>
<td>S02</td>
<td>1</td>
<td>TargAttnL</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S02/S02_attend1_pos5.set</td>
<td></td>
<td>S02</td>
<td>1</td>
<td>TargAttnR</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S02/S02_attend5_pos1.set</td>
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<td>S02</td>
<td>1</td>
<td>NONTargAttnL</td>
<td>normals</td>
<td></td>
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<td>IDY/S02/S02_attend5_pos5.set</td>
<td></td>
<td>S02</td>
<td>1</td>
<td>NONTargAttnR</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S03/S03_attend1_pos1.set</td>
<td></td>
<td>S03</td>
<td>1</td>
<td>TargAttnL</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S03/S03_attend1_pos5.set</td>
<td></td>
<td>S03</td>
<td>1</td>
<td>TargAttnR</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S03/S03_attend5_pos1.set</td>
<td></td>
<td>S03</td>
<td>1</td>
<td>NONTargAttnL</td>
<td>normals</td>
<td></td>
</tr>
<tr>
<td>IDY/S03/S03_attend5_pos5.set</td>
<td></td>
<td>S03</td>
<td>1</td>
<td>NONTargAttnR</td>
<td>normals</td>
<td></td>
</tr>
</tbody>
</table>

**Important note:** Removed datasets will not be saved before being deleted from EEGLAB memory

#### Update dataset info

- [x] Update dataset info - datasets stored on disk will be overwritten (unset = Keep study info separate).
- [ ] Delete cluster information (to allow loading new datasets, set new components for clustering, etc.)
- [ ] Re-save STUDY. Uncheck and use menu File > Save study as to save under a new filename

---

[Image of Edit dataset info interface]
STUDY structure

```matlab
STUDY =
    name: 'Synonyms'
    task: 'Word Recognition'
    notes: ''
    filename: 'workshop.study'
    cluster: [1x1 struct]
    history: [1x6654 char]
    datasetinfo: [1x10 struct]
    filepath: '/data/STUDY'
    subject: {'S02' 'S05' 'S07' 'S08' 'S10'}
    group: {}
    session: []
    condition: {'non-synonyms' 'synonyms'}
    setind: [2x5 double]
    etc: [1x1 struct]
    preclust: [1x1 struct]
    saved: 'no'
    changrp: []

>>
```
Subject info in STUDY structure

```matlab
>> STUDY.datasetinfo

ans =

1x10 struct array with fields:
    filepath
    filename
    subject
    session
    condition
    group
    comps
    index

>>
```
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Edit/view the clusters
Precompute data measures

![EEGLAB GUI](image)

**STUDY set: All**
- Study filename: [Stationary event-related data analysis](example)
- Study task name: [EEG analysis](example)
- Nb of subjects: 30
- Nb of conditions: 12
- Nb of sessions: 3
- Nb of groups: 4
- Epoch consistency: yes
- Channels per frame: 31
- Channel locations: yes
- Clusters: 1
- Status: Ready to precluster
- Total size (Mb): 30.4

- Precompute channel measures
- Plot channel measures
- Precompute component measures
- Build preclustering array
- Cluster components
- Edit/plot clusters
Precompute data measures

TIP: Compute all measures so you can test different combinations for clustering

Reccomend: 'alpha', .01 (time-consuming)
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Precluster the data

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

Build pre-clustering matrix for STUDY 'Attention'
Select the cluster to refine during sub-clustering (any existing sub-hierarchy will be overwritten)

ParentCluster 1 (181 ICs)

Load
- spectra
- ERPs
- dipoles
- scalp maps
- ERSPs
- ITCs


Freq. range [Hz]
Time range [ms]

Use channel values

Save STUDY to file
/home/julie/WorkshopSD2007/STUDY/attention.study

Cancel Help Ok
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Edit/view the clusters
Cluster components
Cluster info in 'STUDY'

```
>> STUDY.cluster
ans =
1x26 struct array with fields:
    name
    parent
    child
    comps
    sets
    algorithm
    centroid
    preclust
    dipole
    topo
    topox
    topoy
    topoall
    topopol
```

Gives information for each cluster (1st cluster is always the parent cluster)

```
>> STUDY.cluster(2)
ans =
    name: 'Cls 2'
    parent: {'ParentCluster 1'}
    child: []
    comps: [9 10 21 18 26 20 27]
    sets: [2x7 double]
    algorithm: {'Kmeans' [12]}
    centroid: []
    preclust: [1x1 struct]
```

More on cluster info in later tutorials
STUDY clustering overview

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Edit/view the clusters
View and edit clusters

![EEGLAB v6.0b window with study information and options]

- **STUDY set:**
  - Study filename:
  - Study task name:
  - Nb of subjects:
  - Nb of conditions:
  - Nb of sessions:
  - Nb of groups:
  - Epoch consistency: yes
  - Channels per frame: 31
  - Channel locations: yes
  - Clusters: 26
  - Status: Pre-clustered
  - Total size (Mb): 39.1

- **Options:**
  - Edit study info
  - Precompute channel measures
  - Plot channel measures
  - Precompute component measures
  - Build preclustering array
  - Cluster components
  - Edit/plot clusters
Plot cluster data

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Plot cluster data

Choose which cluster

Choose which components