Electroencephalographic (EEG) Data Analysis Script
(Using EEGLAB)

1) Import the Biosemi raw data file (.bdf): File->Import Data->From Biosemi BDF and EDF files (BDF plugin). Use reference channel 48 (Cz) upon import.

2) Remove *real* channel mean:

   for numChans = 1:size(EEG.data,1);
       EEG.data(numChans,:) = single(double(EEG.data(numChans,:)) - mean(double(EEG.data(numChans, :))));
   end

3) Tools->Filter the data->Basic FIR filter. Input [0.1] for 'Lower edge of the frequency pass band'. Leave everything else blank and unchecked.

4) Edit->Channel locations->OK.

   File->Save current dataset as->choose a meaningful name and location.

5) Tools->Filter the data->Basic FIR filter. Input [40] for 'Higher edge of the frequency pass band'. Leave everything else blank and unchecked.

   File->Save current dataset as->choose a meaningful name and location.

6) Tools->Extract epochs. Choose 'Time-locking event types': [15, 25, 35, 45, 55, 65, 75, 85] (target stimuli). Input 'Epoch limits': [-0.1, 0.5]. Click 'OK'.

7) Click 'OK' on the 'Epoch baseline removal window': [-100, 0].

   File->Save current dataset as->choose a meaningful name and location. Check 'Overwrite it in memory'.

8) Plot->Channel data (scroll). Skim through the data by eye to find any consistently 'bad' electrode channels. OR

   Tools->Reject data epochs->(all methods). Under 'Find abnormal values', input [50] and [-50] for the Upper and Lower limits. Click 'Calc/Plot'. On plot window, click 'Cancel'.

   Set any bad electrode channel activity to 0:

   EEG.data(XX,:) = 0;

   If there are bad channels: File->Save current dataset as->choose a meaningful name and location.

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10) Tools->Reject data epochs->(all methods). Under 'Find abnormal values', input [75] and [-75] for the Upper and Lower limits. Click 'Calc/Plot'. On plot window, click 'Update Marks'. Click 'Reject marked trials'.

File->Save current dataset as->choose a meaningful name and location.

11) Tools->Extract epochs. Choose 'Time-locking event types': [15] (one condition's target stimuli). Input 'Epoch limits': [-0.1, 0.5]. Click 'OK'.

Choose a meaningful name and location to save the new file. Do not check 'Overwrite it in memory'.

Click 'Cancel' on the 'Epoch baseline removal window'.

12) Datasets->reselect the last dataset (which has all 8 target types). Redo the previous step (11) for each of the remaining 7 conditions.

13) Plot->Sum/Compare ERPs. Create ERP plots which compare the cued vs. uncued conditions for both retinotopic and spatiotopic targets.

14) Combine all 5 subjects in the plots.

EVENT CODE LIST:

list = ['TL_TL', TL, TL, 500, 500, 1, 11, 12, 13, 14, 15] # L Spatio Cued
['TL_TR', TL, TR, 500, 500, 2, 21, 22, 23, 24, 25] # R Spatio Cued
['TL_BL', TL, BL, 500, 500, 3, 31, 32, 33, 34, 35] # L Retino Cued
['TL_BR', TL, BR, 500, 500, 4, 41, 42, 43, 44, 45] # R Retino Cued
['TR_TL', TR, TL, 500, 500, 5, 51, 52, 53, 54, 55] # L Spatio Uncued
['TR_TR', TR, TR, 500, 500, 6, 61, 62, 63, 64, 65] # R Spatio Uncued
['TR_BL', TR, BL, 500, 500, 7, 71, 72, 73, 74, 75] # L Retino Uncued
['TR_BR', TR, BR, 500, 500, 8, 81, 82, 83, 84, 85] # R Retino Cued