

Homework #4

Data Analysis in Event-related Design

Zhu's Intro. fMRI

Due date: April 17, 2013

1. (10 points) With the “deconv.s” as an example in the event-related design study (the “Flanker study”), in one or two sentences, please explain what AFNI program “3dDeconvolve” does. Then explain how I got the following files or numbers: “reg_cat_TSall+orig”, the “2” in “-polort”, the “9” in “-num_stimts”, the content of “concat.1D “, what is the “2” in “TSall_analy.1D[2]”, the “0” and “6” in “-stim_minlag 3 0 -stim_maxlag 3 6”, “mask800+orig”, “-tout”, the “3” in “-num_glt 3”, “-gltsym 'SYM: +ICong[0..6] -Cong[0..6]”, and “-iresp 2 IRF_ICong”.
2. (5 points) How % signal change is calculated in event-related design?
3. (15 points) For the subjects in the flanker study, I have assumed that the homodynamic responses would come back to the baseline after 15 sec. In one subject, I found that the homodynamic responses should be modeled a bit longer. It looks like 20 sec will be good. Could you modify the script and analyze this dataset with this new model?

The dataset is /fmri/PI/training/Class_Intro_fmRI/ZhuFlanker/zhu_E12708.tar.gz.

Please copy this dataset to your directory and analyze it.

Please attach the section of your scripts with the modifications. Show me the homodynamic response curves for the Incongruent and Congruent conditions at a voxel of the brain where significant differential activation is found. Attach the plots for the curves and the differential activation maps. Please also let me know the directory where you analyze the data.

Hint:

Run the following for auto Talairach transformation:

```
@auto_tlrc -base TT_icbm452+tlrc -input T1Volume+orig
```

4. (20 points) Please include the above subject to the group analysis that you did in the lab exercise. Re-run the group analysis. Please attach your script and representative pictures showing the differential activation between the Incongruent and Congruent conditions, and their activations versus baseline at this same anatomical location.

Hints:

Copy "PerSigChan.s" to the "/E12708/Afni_analy" directory. Open "afni" at this directory with "T1Volume" as "Underlay" and "deconv_TS" as "Overlay". Update the "PerSigChan.s" for this subject according to the "deconv_TS". All numbers inside the "[]" should be checked and/or updated. Then run "PerSigChan.s" to generate all the % signal change "*_per_sig_ch" files.