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HST.583 Functional Magnetic Resonance Imaging: Data Acquisition and Analysis  
Fall 2008

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## HST.583 Lab 2 - fMRI scan checklist

Date: \_\_\_\_\_ Subject ID: \_\_\_\_\_ Weight: \_\_\_\_\_ lbs

### **Before subject arrives:**

- \_\_\_\_\_ Check the scanner bay that patient scanner and comfort devices are in place. (Steve)
- \_\_\_\_\_ Comfort devices: sheet, knee rest, pillow, pillow cover, headphones, headphone covers and squeeze bulb. (Steve)
- \_\_\_\_\_ Mirror, proper head coil (Siemens Head Matrix Coil), head supports and button press devices (Steve)
- \_\_\_\_\_ For Computer Settings: (Sheeba: 1-8)
  1. Complete luminance setup and ensure that projector is turned on and the projector screen is properly adjusted in concordance to the luminance of E-Prime and SuperLab files.
  2. Confirm that the display settings for E-Prime and your computer monitor are the same. To do this, press “Fn and F7” buttons.
  3. Hook up USB cable from button box system to computer.
  4. Follow instructions posted on the wall to connect response box system depending on which stimulus software you are using.
  5. Make sure that Response Box devices and Trigger are switched on (Turn ‘Power’ ON)
  6. Hook up Laptop Monitor Display cable.
  7. Make sure that the trigger switch is set to “bypass” position.
  8. As a final check, trace the course of all of the cables from the button press devices to the amplifier, and ensure everything is plugged in (black plugs on scan room floor and response system on the console room table).

## **After subject arrives:**

### **In the MRI waiting room (Sheeba)**

- \_\_\_ Subject time of arrival: \_\_\_\_\_
- \_\_\_ Consent Form
- \_\_\_ Go through MRI metal screening form. Have subject change clothes and empty metal from subject's pockets.
- \_\_\_ Practice paradigms
- \_\_\_ Confirm the following with the subject
  - Number alcoholic drinks the night before the scan: \_\_\_\_\_
  - Any caffeine intake the day of the scan: \_\_\_\_\_
  - Hours of sleep the night before the scan: \_\_\_\_\_
- \_\_\_ Ask subject to please use the restroom
- \_\_\_ Put completed forms (1<sup>st</sup> scan, 1<sup>st</sup> and last page of signed informed consent + metal screening form) in folder in MRI control room.

### **At the Control Room/ Scanner Room (Steve)**

- \_\_\_ Conduct last metal screen.
- \_\_\_ Enter subject into magnet room. Have subject sit upright on scan table, put in earplugs.
- \_\_\_ Provide subject with button press devices. Make sure subject is able to comfortably reach left and right hand buttons.
- \_\_\_ Place subject supine on scan table with head restraint system, in the head coil.
- \_\_\_ Position button press devices in subject's hands, and emergency squeeze ball (tape to upper thigh for example).
- \_\_\_ Make a note of which response box number is on the left/right hand of the subject.
- \_\_\_ Confirm proper fitting of mirror, headphones, coil, and button press devices.
- \_\_\_ Landmark subject and advance subject inside magnet.
- \_\_\_ Focus projector (Please confirm with subjects that Crosshair is centered and that they are able to see the entire screen.)
- \_\_\_ Confirm that subject is comfortable (e.g. not claustrophobic) and can communicate with you in the control room.

\_\_\_ Time of subject in magnet: \_\_\_\_\_.

\_\_\_ Bring up scan protocol in scanner console browser.

Investigators → HST\_583

\_\_\_ Make sure that Neuro3D application is open

\_\_\_ **(Scan1) Initial localizer scan (Steve)**

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Pulse sequence = GRE or 3-plane localizer GRE  
3 slice groups with Scan plane = Sagittal/Transversal/Coronal  
FOV = 25.6 cm  
1 slice in each slice group, 4mm interleaved (0.8mm skip)  
256x128 matrix  
Scan time = 9.2 sec

\_\_\_ **(Scan 2) AAScout**

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Pulse sequence = AAScout 3D Adjustment sequence for AutoAlign method  
Scan plane = Sagittal  
FOV = 32 cm  
Slice Thickness=2.5mm (128 slices per slab)  
96x128 matrix  
Scan time = 46 sec

\_\_\_ **(Scan 3) T1\_MPRAGE 3D scan**

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Pulse sequence = MP-Rage (Siemens)  
Scan plane = Sagittal  
FOV = 25.6x25.6 cm  
256x192 matrix  
128 slices, 1.33x1x1.33 mm  
Scan time = 4:32 min  
3D scan start time: \_\_\_\_\_

\_\_\_ **(Scan 4) Test functional Scan (2 measurements)**

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\_\_\_ **(Scan 5) Field Map, Phase & Magnitude**

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B0 Field Map (Siemens) field\_mapping  
Pulse sequence = Siemens field map sequence or equivalent  
Scan plane = oblique axial, AC-PC, make sure you have the same coverage as the fMRI  
(ge\_functionals)

FOV = 22 cm  
27 slices  
4mm slice thickness, w/1mm gap  
TR = 500ms  
TE1 = Minimum Full  
TE2 = TE1 + 2.46ms  
FA = 55 degrees  
64x64 matrix  
Sequence generates two image series;  
1) Magnitude  
2) Phase

Scan time = 1:05 min

## **Prepare to begin Functional Scans**

### **(Scans 6-10 Functional Scans)**

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Pulse sequence = EPI GRE  
Scan plane = oblique axial, AC-PC, full head coverage as defined from AutoAlign functionality  
FOV = 22 cm  
27 slices  
4mm slice thickness, w/1mm gap  
TR = 2000ms/3000ms  
TE = 30ms  
FA = 90 degrees  
BW = 2298 Hz/px  
64x64 matrix, 1 shot

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### **Order of cognitive tasks:**

#### **1) Self referential scans x 3 (Use Mac running SuperLab Stimulus)**

##### **\_\_\_ Review self-referential task directions verbally with the subject**

“During this task, you’ll be seeing words – followed by the question

**Does the word apply to you? / Is the word positive?**

**Does the word apply to your mother? / Is the word upper case?**

Using your thumbs, please press the button on your RIGHT hand if your answer is “YES” and please press the button on your LEFT hand if your answer is “NO”. Please respond quickly and accurately. If everything is ok and if you understand the instructions please press the squeeze ball.”

##### **\_\_\_ Begin self-referential task (72 frames + 4 DDAs)**

## 2) SIRP (Use PC running E-prime Stimulus)

\_\_\_ Review SIRP task directions verbally with the subject:

“During this task, you are to learn the digits sets (set of 1, 3 or 5) shown to you in red. After each set, you will be shown some single numbers in green. If you see a green number that was in the previous red set, press the button using the thumb of your RIGHT hand for “YES”. If you see a green number that was NOT in the previous red set, press the button using the thumb on your LEFT hand for “NO”. Please respond quickly and accurately. If everything is ok and if you understand the instructions please press the squeeze ball.”

\_\_\_ Begin SIRP task (177 frames + 4 DDAs)

## 3) Sensory-motor (Use PC running E-prime Stimulus) with Neuro3D

**\*\* DO NOT tell subjects that the next scan is the last scan! \*\***

\_\_\_ Review sensory-motor task directions verbally with the subject

“During this task, when the checkerboard flashes on and off the screen, I want you to tap fingers on your dominant hand as soon as the checkerboard appears on the screen. During the times when you see a cross, just rest - you won’t need to finger tap. I just want you to keep your eyes open and on the cross. If everything is ok and if you understand the instructions please press the squeeze ball.”

Load MPRAGE to Neuro3D

Draw ROIs:

- a) *motor*
- b) *visual*

\_\_\_ Start Neuro3D

\_\_\_ Begin **sensory-motor task** (240 frames + 4 DDAs)

\_\_\_ **Subject out of magnet.** Time of exit from magnet: \_\_\_\_\_

\_\_\_ **Administer post scan debriefing questionnaire, per scan site protocol. ()**

\_\_\_ Subject time of departure: \_\_\_\_\_.

\_\_\_ Push to Sigma, Burn CDs for fMRI. Functionals may require 2 CD’s to be burned. (SA)

**Additional notes:**

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