

## **Gershman Lab fMRI Protocol**

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This document describes standard operating procedure for running a subject in an fMRI experiment. It's a good study guide for yellow badges who want to get their green badge certification.

### **Before the scan**

The subject spends about an hour in the scanner during a standard session—that includes structural, functional, and any other scanning procedures. It's standard book the scanner for an hour and a half. That allows the researcher enough time to set up plus a margin of error. It also usually makes sense to tell the participant to come 30 minutes before the scanner is booked. That allows time for any instructions and paperwork, having the subject change into scrubs, and is a nice buffer if they're late. In total, that's a 2 hour session. Our standard pay for that two hour session is \$35. That's \$25 for the hour they're in the scanner, \$10 for the rest of the time (commensurate with a regular in-lab experiment).

### **Checklist: things to bring for scanning**

- Cash for subject payment
- Stimulus computer
- MRI documents (fMRI consent form, metal safety screening, payment form)
- Jacket, non-perishable foodstuffs, and diversion to survive the endless hours in the dungeon

### **Safety and Subject briefing**

- consent form
  - subject signature
- go over particulars of MRI risks on consent form:
  - potential risks (i.e., you don't want to have any metal in your body or on your person)
  - no known riskers if you don't approach with the magnet with metal
- subject payment forms—unless they're doing study for credit
- metal prescreening safety form
  - subject yes/no and signature
  - ask if any questions
  - direct attention to bottom box just to double check
- subject change into scrubs and socks
  - put stuff in locker
  - does subject need MRI safe glasses?
    - can remind them in email to know prescription or ideally wear contacts
    - if so get frame and proper lenses from MRI glasses box on shelf in control room
  - remind subject to go to the bathroom beforehand
- when subject in MRI bay (not yet in scan room)

- ask if anything in pockets or attached to body
- go over everything in box of metal safety form
- scan with wand (do this *right* before they go in room, so they don't acquire any metal)
- subject is now ready to enter scan room

### **Setting up**

- before subject sits down on table:
  - explain some scanner stuff
    - have they scanned before? if not, explain basics
    - remind subject that it's important to keep head as still as possible
  - lay blue sheet over table (in cabinet: "linens")
  - put oddly shaped head cushion (cabinet: "") in pillowcase ("linens") and lay in head rest
  - prepare hearing protection (in vats on wall) and triangle cushions ("") with hairnets
- when subject lies down on table (before moving table up):
  - insert hearing protection
  - place triangle cushions by head
  - put large cushion under legs
  - give subject squeeze ball on left hand side; instructions on how/when to use
  - give subject button box on right hand side; instructions on how to use
- move table up with subject on it (press east-most "home" button on scanner):
  - put on 32 headset
  - double check that headset is plugged in (scanner screen says 32 anterior)
  - align laser with headset
    - ask subject to close eyes
    - turn laser on
    - align laser with headset
    - turn laser off
  - place mirror above head set
  - ask if subject is proper temperature or if they want a blanket
  - place pads around arms of subject
  - ready to send subject in—double check comfort
- press big button to send subject in

### **Register subject**

- this can be done any time before start of anatomical scan (ideally while changing, or second person)
- patient -> register
- fill in all bold information
- patient ID is YYMMDD\_TASK\_NUM
  - YYMMDD would be 160109 for Sept 1, 2016
  - TASK would be IMAGINATION for imagination task
  - NUM would be 007 for subject 7
- same information also for last name

- subject birthday is 01/01/YYYY where YYYY is their actual birth year
- enter height/weight (can toggle metric system)
- head (supine)
- press “Exam” when ready
- go to bottom right corner; select investigators, Gershman, your project
- information on left should be filled in
- click add study comment: “project:Gershman”
- ready to scan

### **Prepare stimulus computer**

- this can be done any time before start of experimental scans (including during anatomical scan)
- plug in HDMI to stimulus computer on control room table; should see image on desktop screen
- plug button box USB into stimulus computer
- make sure program is set up
- make sure projector is on

### **Scan**

- check in with subject from control room via intercom
- tell subject about to start first scan, which will be about 6 minutes
- remind subject to please keep head still as possible
- begin first scan by dragging anatomical scans from right pane to left
  - first two start automatically
  - third starts after double click (green check?)
  - should see “Scanning: 06:00” decrementing in bottom left corner
- when anatomical scan over, check in on subject over intercom
- test button box
  - e.g., ask subject “what button would you press to choose left option?”
- ask if subject ready to start trials
- make sure yellow box over whole brain; adjust if necessary
- drag task trial from right pane to left pane
  - begin task on stimulus computer
  - double click task trial
  - click green check mark
  - click continue
- once scan is started, double check that participant is doing task
- drag task trial (within left pane) to duplicate, do this for each task trial

### **During scan**

- go to viewing panel (on right)
- click file shortcut on keyboard (or patient, browse)
- choose anatomical scan (memprage)
  - scroll through brain
- choose most recent functional scan

- scroll through TRs
- look for movement
- call tell subject if moving a bunch
- good protocol to do this after every scan
- fill in scan log book
  - date; PI, green badges, yellow badges; time in, time out, archive (CBS central); subject (see sub ID from registration)
- select lollipop from bucket
- don't leave while subject is scanning (must be two researchers in room at all time)

### **Post scan**

- show subject their brain
- transfer data to CBS central
- put scrubs in laundry
- throw away socks
- make copies of subject forms, put in dropbox
- put scan room items away, wipe down with disinfectant
- turn projector off if last scan
- put in phantom if last scan
- no need to backup on DVD—our data are well secured on CBS central
- copy subject documents and put copies in folder into dropbox

### **For yellow badges:**

Questions Tammy will ask:

- are you wanding down subject slowly and comprehensively? (do it slowly and comprehensively)
- what are safety buttons? (quench and electrical power off)
- when do I use them? (quench: in life threatening situation where someone is pinned to scanner; electrical power off in case of fire)
- does electrical power off turn off magnet? (no)
- how do I get subject out if power in building goes off? (grey handle under table)
- where are fire extinguishers? (one in control room; one is side room, other door in control room)
- can you bring them into scan room? (yes, the ones labeled non magnetic)
- what happens if need to restart reconstruction system? (answer: consult instructions on wall)