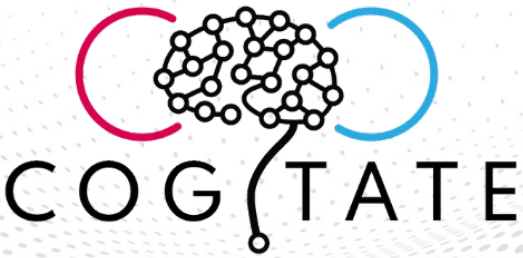

COGITATE DATA RELEASE

fMRI Standard Operating Procedure (SOP)

Version	Author(s)
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Date	**Editor(s)**
December 19, 2023	Brown, T.

TABLE OF CONTENTS

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1. fMRI Technical Checklist

Subject ID: _____ Session: _____ Date: _____

1.1 Before subject arrives

1.1.1. Have the following forms ready:

- MRI safety sheet
- COVID questionnaire
- COVID information sheet
- signed consent form
- exit questionnaire
- case report form (CRF)

1.1.2 Get the experiment laptop, the charger, and the eye chart.

1.2 Participant setup

- *Experiment 1:* Bring the participant to the lab and check their visual acuity at 20-feet distance from Snellen chart and note down the last row they can read.

- Take the participant to one of the MRRC behavioral rooms.
- Ask the participant to complete the MRI safety sheet, COVID questionnaire, and demographics form.
- Ask the participant to take a pregnancy test in case the participant is female
- *Experiment 1:* Explain the task instructions
- *Experiment 2:* Explain task instructions briefly and have the participant complete the preparation module
- Ask the participant whether he/she needs to use the restroom
- De-metal the participant
- Ask the participant to walk through the full-body metal detector
- Take the participant to the MR control room and hand the informed consent, MRI safety questionnaire, and the PI billing number to the MR technician to review.
- Siemens scanners have an 'Additional information' field. Ask the technician to set it to:
    - Experiment 1: Set it to S?1xx_V1
    - Experiment 2: Set it to S?1xx_V2
- The MR technician will take the subject to the magnet and instruct the participant on placing earbuds.
- Ask the technician to use the optoacoustic headphones
- *Experiment 1:* Ask the technician to place subject's right index finger on the blue button
- *Experiment 2:* Ask the technician to place subject's right index finger on the blue button and the left index finger on the red button

1.3 Equipment Setup: Experiment PC and Connections

- Plug in the experiment laptop to a power source
- Double check display refresh rate (60 Hz)
- Double check display resolution (1920×1080)
- Make sure there is no abnormality on stimulus displays
- Connect the button box and the projector to the experiment laptop via USB
- *Experiment 2:* Connect the audio jack to the experiment laptop
- Connect the experiment laptop via ethernet to the EyeLink 1000 Plus then turn on the EyeLink computer and initiate the software
- Open a text editor and ask the subject to press right index then middle index finger buttons. You should see the number 12.
- Move the cursor around the edges of the screen and see if the subject still sees it.

1.4 Equipment Setup: Eye Tracking

- Adjust eye tracking camera focus

- Optimize corneal reflection and pupil thresholds
- Switch off the lights.

1.5 Experiment Code Setup:

1.5.1 Experiment 1

- Open MATLAB 2019b and switch directory to runExp1.m directory
- Run: runExp1(participant_ID) [note IDs are: 1XX for real acquisition]

1.5.2 Experiment 2

- Run 'Orange & Blue - A Tale of Falling Essences.exe
- Check if screen resolution = 1920x1080; graphic quality = ultra; Eyelink must be in camera mode.
- Enter participant ID [note IDs are: 1XX for real acquisition]
- Use Run ID = B for practice outside scanner.
- Use Run ID = 1 for full MRI session inside scanner (increment to 2, 3, … for restarts)

1.5 Experiment Procedure

- Scan localizer while starting the task.
- When the instruction screen pops up, tell the subject that we will scan during the practice, which starts after the instructions, and that the scans will continue sometime after the practice is over
- The subject reads instructions, practice levels starts, and we start the T1
- Practice finished; the T1 continues; we immediately run the head scout and the 1st inverted scan
- Explain eye tracking instructions to the subject
- Confirm the camera lens is optimally focused
- Optimize corneal reflection and pupil thresholds if needed
- Proceed with calibration and validation.
- Ask if the subject is ready to start
- Start run 1
- *Experiment 1:* Manually stop MR sequence a few seconds after performance screen is shown, but before clicking space bar to continue to next run. Click space to continue the 'we will continue shortly screen' only when the scanner is NOT scanning.
- *Experiment 2*: Manually stop MR sequence when leaderboard is shown.
- Proceed normally and communicate with the participant between runs to make sure that they understand the task and they take breaks as much as they need.

- Give the tech the account number and ask them to give you the study pa number
- *Experiment 2*: After it ends, run EVC localizer
- Open matlab 2019b. Switch directory to run EVC_localizer.m
- Enter participant ID note IDs are: 1XX for real acquisition and run number (usually 1, unless restarted localizer)

1.6 Scanning sequences & notes: Experiment 1

- Localizer
- T1: MPRAGE (during practice; continue with headscout + DC1 immediately)
- Headscout
- DistCor1: Inv. ET calibration (explain calibration)
- R1: MB4
- R2: MB4
- R3: MB4
- R4: MB4
- DistCor2: Inv. (run during 'we will continue shortly' screen)
- R5: MB4
- R6: MB4
- R7: MB4
- R8: MB4
- DistCor3: Inv.

1.7 Scanning sequences & notes: Experiment 2

- Localizer
- HeadscoutET calibration
- DistCor1: Inv. (during practice)
- VG1: MB4
- VG2: MB4
- VG3: MB4
- VG4: MB4
- DistCor2: Inv.
- VG5: MB4
- VG6: MB4
- VG7: MB4
- VG8: MB4
- DistCor3: Inv.
- Replay1: MB4
- Replay2: MB4
- Replay3: MB4

- Replay4: MB4
- DistCor4: Inv.
- EVCLoc: MB4

1.8 End of the Experiment

- Ask the participant to fill the exit questionnaire
- Give the participant his allowance, and make him sign the receipt

1.9 Data Saving and Sharing

Before leaving the control room, make sure that the following data types are saved:

- Eyetracker data
- Behavioral data
- PsychToolBox Code

Note: At Yale, the MRI technician uploads the structural and functional MRI data to the MRI center (MRRC) server. The data will be available for access in 1-2 hours post session. If the session is performed at night, the data might not be available until the next day.

- Get the MRI data from the MRRC server when available

- Before upload to XNAT:
    - Run anonymization script on ET data

- Upload data to XNAT: MRI data, ET data, Behavioural log files, Codes, Case report form, Questionnaire.