**Mindography**

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## Participant Task Instructions

A screenshot of a computer game

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## PsychoPy Instructions

Download the codebase off GitHub: <https://github.com/PaulScotti/MindEye_2back>

Open “psychopy/MindEye\_2back.psyexp” in PsychoPy Builder.

### Setup Monitor Center for your MRI screen



Add a New monitor and name it “prismaMonitor”  
Specify your Screen Distance, Monitor Size, and Screen Width (to get these values you may need to check your MRI facility setup)

A screenshot of a computer

Description automatically generated

Now exit the Monitor Center and click the Cog icon at the top of the Builder. Click the Screen tab and set Monitor to “prismaMonitor”.

A screenshot of a computer and gears

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### Configure button box / pulse button

RF pulse triggers

The code assumes that your pulse triggers are sent as the equal sign (=). If this is not the case, then you will need to change the Allowed keys in both the waiting\_fmri and waiting\_fmri\_2 routines. For each routine click the keyboard icon and change the Allowed keys to whatever your pulse triggers are sent as.

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Button box

Our task does not involve pressing buttons, but at the end of every run the participant will be asked to push a button when they are ready to proceed to the next run. The code is expecting a button press that is either 1, 2, 3, or 4 for this. If your button box does not trigger as 1, 2, 3, or 4 then you will need to click into the “testing\_continue” and “run\_wait2\_2” routines, click the keyboard icon, and change the Allowed keys to match your setup.

A screenshot of a computer

Description automatically generated

If you are unsure about what your button box inputs are you can instead leave “Allowed keys” as entirely blank to accept all inputs.



### Running the experiment

When you click to run the experiment a popup box will appear that looks like this:

A screenshot of a computer

Description automatically generated

* participant should always be set to 1 (will error otherwise)
* session should be set to 1, 2, or 3 depending on which session you are currently running
* starting\_run should be left as 1 unless you need to, for some reason, resume from a run midway through the experiment. There are 14 total runs per session, and starting\_run here is 1-indexed
* skip\_practice should be set to 1 if you want to skip the initial practice phase of the experiment. I recommend you initially set this to zero when you first introduce the task to the participant outside of the MRI machine; after the brief 10-trial practice phase is over you can use the Escape key to quit out of the experiment. Then, whenever running the task in the MRI machine set skip\_practice to 1 to skip the practice phase.

### Sending Paul the PsychoPy experiment logs

All behavioral data gets automatically saved in a folder named “data” which is located inside the psychopy folder. Keep this folder accessible as Paul will need this data folder sent to him.

## Siemens Protocol Instructions

See **Prisma\_MindEye\_HighRes\_protocol.pdf** for Siemens Prisma protocol to copy.

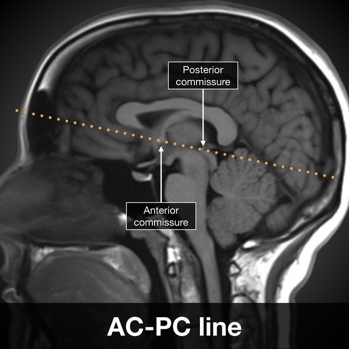
Run structure is Scout 🡪 MPRAGE 🡪 14 runs of task (each 5 min 40 sec) 🡪 field map (AP) 🡪 field map (PA)

This protocol assumes three scan sessions where each scan session includes 1.5 hours of active scanning (not including the time before and after getting subject into the MRI machine).

Functional runs have 1.8mm isotropic voxels, FOV/Matrix=198/110, Slices=40, TR=1800ms, TE=31ms, multiband accel factor=2, phase partial fourier=7/8

### FOV boundary box alignment (protocol is not whole brain coverage!)

After MRPAGE, align to ACPC and then manually adjust the FOV yellow boundary box to cover visual cortex.

A close-up of a brain

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The yellow alignment box will not be large enough to cover the whole brain, so you will need to exclude most of the cerebellum and the topmost/dorsal parts of the brain. The below blue regions of the brain are what needs to be included in the alignment box, so please adjust the box to include these regions (visual cortex + inferotemporal cortex).

A close-up of a brain scan

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### Correcting for possible bug with Siemens field map runs

For the fmap\_dir-PA field map scan, there’s a bug with Siemens machines that may flip the phase encoding direction to R>>L when it should be P>>A. You can check if this happens by looking at the “Phase enc. dir" and seeing if it says R >> L. If so, change it to A >> P and then click the “…” button and change the rotation to 180 to set it to P >> A. Once complete, you should see P>>A as the “Phase enc. dir”.

A screen shot of a computer

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A screenshot of a computer

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