EPISODIC TASK

In this tutorial, you will learn how to implement the MICA task-based functional MRI battery. This platform has been designed to tap into the different domains of relational memory, namely, episodic memory, semantic memory, and spatial memory. Tasks are python-based, implement a 3-alternative forced choice paradigm, and employ similar visual stimuli across two experimental conditions: easy & difficult. The current tutorial deals with the episodic memory task.

The episodic task is comprised of two phases: "encoding" & "retrieval". During the encoding phase, a pair of items is shown at each trial and the participant is required to passively memorize the pair. In total, 84 trials are allocated to two conditions: easy & difficult. In the easy condition, 28 pairs of stimuli are presented twice throughout the run to facilitate memorization, for a total of 56 trials. In the difficult condition, 28 pairs are shown only once, thus 28 trials. During the retrieval phase, the participant will have to recall these pairwise associations. At each trial, an object appears at the top with three others at the bottom. The participant must choose the option that was originally paired with the item at the top. There are 56 trials in total, 28 easy & 28 difficult.

All memory tasks are called from a common graphical user interface titled "Instructions".

Step 1:
From the 'micaopen/task-fMRI' directory, open a terminal and call the "Instructions" GUI by typing 'python instructions.py' and pressing 'enter'.

Step 2:
Choose "English". You will be prompted to a new GUI called "Cognitive task", which encompasses the three memory tests that make up the MICA task battery.

Step 3:
To call the episodic task, click "episodic", which will open a GUI called "episodic task". This new GUI will contain two options: "encoding" and "retrieval".

Step 4:
Click on "encoding" and you will be prompted to a new "episodic encoding" GUI. Enter the relevant information in the appropriate boxes. For example, for "session", enter "001"; for "subject name", enter "gilgamesh"; for "symbol list", enter "demo".

Note: For "symbol list", you have the choice between, "A", "B", and "demo". The demo list is an abridged version of the full task.

Click "OK" to continue.

Step 5:
The instructions will now appear on the screen. Read them carefully and when you are ready to proceed, press either '2', '3', or '4' on your keyboard.

Note: Participants inside the scanner are provided with a button box with 4 buttons, numbered '1', '2', '3', and '4'. Only buttons '2', '3', and '4' are used for the purposes of this task. Thus, when prompted to "Press any button to continue...", participants know that it's either '2', '3', or '4' that must be pressed.

Step 6:
You should now see "waiting for scanner..." on the screen. The program is now waiting for the scanner to send a trigger before commencing. To emulate this trigger, press '5' on your keyboard. The task will now begin.

Note: Should you wish to exit the program before the end of the task, press 'esc' during any fixation screen (i.e., any one of the repeating windows with a '+' in the center).

Step 7:
At the end of the run, you will see the "End of task" screen. Press 'space' to exit.

Note: A new folder will have been created in 'micaopen/task-fMRI/tasks/episodic' called 'data_encoding'. This folder will contain two corresponding log files for the episodic encoding phase that was just run: a .log file and a .csv file.

Step 8:
To start the retrieval phase, click on "retrieval" on the "episodic task" GUI. This will open a new GUI called "episodic retrieval". Fill in the boxes. Make sure that the information you put in corresponds exactly to that used during "episodic encoding". Thus, for the current example, for "session", enter "001"; for "subject name", enter "gilgamesh"; for "symbol list", enter "demo". Click "OK".

Step 9:
Once again, the instructions will appear on the screen. Read them carefully and press '2', '3', or '4' to continue.

Step 10:
At the "waiting for scanner..." screen, press '5' to commence the retrieval phase.

Step 11:
At each trial, you will see an item at the top and three items at the bottom. You must select from the bottom options the object that was originally paired with the item at the top during the encoding phase. To choose the leftmost option, press '2'; to choose the center option, press '3'; to choose the rightmost option, press '4'. Press only one key per trial and simply wait for the next trial to appear.

Note: Should you wish to exit the program before the end of the task, press 'esc' during any fixation screen (i.e., any one of the repeating windows with a '+' in the center).

Step 12:
At the "End of task" screen, press 'space' to exit.

Note: A new folder will have been created in 'micaopen/task-fMRI/tasks/episodic' called 'data_retrieval'. This folder will contain two corresponding log files for the episodic retrieval phase that was just run: a .log file and a .csv file.

Step 13:
Now that you have successfully completed the entire episodic task, you can verify how well you performed on it. Open a terminal from the 'micaopen/task-fMRI' directory, type 'python eval.py' and press 'enter'.

Step 14:
Choose "English" and you will be directed to a new GUI titled "Evaluator". Select "episodic".

Step 15:
In the new "Episodic Evaluator" GUI, enter the relevant information. Once again, you must ensure that all the information corresponds to what you entered during the episodic encoding and retrieval phases. For this example, for "session", enter "001"; for "subject name", enter "gilgamesh"; for "symbol list", enter "demo". Click "OK".

Note: A new folder will have been created in 'micaopen/task-fMRI/tasks/episodic' called 'data_score'. This folder will contain a single .csv file, which contains behavioral information, such as performance scores on each condition and various reaction time outputs.