**Visual Working Memory Experiment Protocols – Pressure Iteration – No Pressure Condition (subject #s 200 and even)**

Notes: Instructions for the experimenter are written in roman. The script, to be read aloud to the participant, is written in italics. Do not read aloud text that is written in roman to the participant. Bolded italics should be memorized, to maintain the believability of the deceptions.

Condition Specific Notes: You must not ‘monitor’ the participant. Do not wear a lab coat. Maintain a relaxed and laid-back composure.

**FORMS & QUESTIONNAIRES**

* Have the participant complete the following forms:
  + Behavioral Consent Form
  + Participant Information Form
  + Receipt (leave amount fields blank; filling this out now ensures that the we have the subject’s SSN before they expect payment)
* Have the participant complete the following questionnaires, in the following order:
  + SA\_questions (in the SA folder; not SA2)
  + TA\_questions
* All questionnaires are psyexp files that can be located in C:\experiments\VWM\Experiment\_Files\questionnaires
* Each questionnaire will have instructions presented upon startup. Be sure to read these aloud to the participant before they continue. All questionnaires can be completed with the mouse.

**OPEN THE EXPERIMENT**

* Open an ipython terminal – click the Windows button in the bottom left of the screen and select the ipython terminal from the menu.
* Change directory – in the ipython shell, type “cd C:\experiments\ VWM\Experiment\_Files” without quotes and with a space between ‘cd’ and the path. Press enter.
* Run the experiment – type “run VWMmain.py” without quotes and with a space between ‘run’ and the filename. Press enter.
* Enter the participant information – Type the participant ID in the participant input, type 2 in the iteration input, and type 1 in the condition input.

**INSTRUCTIONS - TUTORIAL**

Have the participant read to themselves the instructions that are presented upon startup. When they’ve finished, you will guide them through a tutorial. The tutorial contains 5 slides. Press any key to continue past a slide. Make sure that you are reading aloud the following script while you are walking the participant through the tutorial.

* **Start-up Screen (after participant has read instructions).** *This experiment has two parts. First we’re going to train you on a simple memory game to get you familiar with the task and to learn to perform well. After training we’ll have you play the same memory game for a cash bonus.*
* **Slide 1.** *Throughout the experiment, a fixation diamond will be situated in the center of the screen – please try to keep your eyes on the fixation diamond at all times. You may be tempted to shift your gaze elsewhere during the task, but please do your best to stay fixated on the diamond at all times.*
* **Slide 2.** *On each trial you will be presented with a striped circle on each side of the screen. You’ll notice that these stripes are slanted at different orientations; they will always differ in orientation. Your job is to remember both of these circles. Prior research shows that this is best done by keeping the images in your mind’s eye, or visualizing them. Visualizing the stimuli is likely to benefit your performance on this task. Also, there are some strategies that you are not permitted to use. For example, you cannot hold out your hand and tilt it to represent the angles of the stripes. You must only rely on visualization to remember the circles.*
* **Slide 3.** *After one second, the circles will disappear and be replaced with two masks. These are not important to you. At this point, you should simply be maintaining the two striped circles in your mind’s eye.*
* **Slide 4.** *However, what will be important to you, is that shortly after the masks appear, a green arrow will appear centrally in the fixation diamond, indicating the relevant side of space. At this point, the striped circle that was in the relevant, cued side of the screen is the only circle that you need to remember; you can now forget about the other striped circle, that was in the irrelevant, non-cued side of the screen. You will only need to maintain the relevant, cued circle in your mind’s eye from this point on.*
* **Slide 5.** *After an eight-second delay, sped up for the purpose of this tutorial, a striped circle will reappear in the relevant, cued side of space. You can always expect this new circle to appear in the relevant side of space. Your task is to rotate this circle so that its stripes match the angle of the stripes on the circle that you are maintaining in memory. You can rotate the circle with the left and right arrow keys, right to move clockwise, left to move counterclockwise, and press the up arrow key to lock in your new angle. Note that you will only have 3 seconds to respond, so act quickly; that’s 3 seconds to make the rotation and lock in your answer. If you do not press the up arrow before 3 seconds have passed, your new angle will be locked in automatically wherever it is at that time. That said, I ask that you press up as often as possible, and if you do not, the program will remind you after the trial that you should be responding faster.*

**INSTRUCTIONS – TUTORIAL TRIALS**

* *Now that you’ve reviewed the procedures of the experiment, let’s try three trials without any interruptions. After each trial, you’ll be presented with your error in degrees. You will not be given feedback like this during the experiment; these trials are simply here to familiarize you with the timing of the task before we begin. Lastly, whenever you are presented with any text screens, such as what is displayed here, you can press any key to continue past that text screen. You can begin when ready.*

Watch the participant carefully during these tutorial trials. Correct them for any misunderstanding after the three tutorial trials. For example, if they are ‘tapping’ the arrow keys to rotate the circles, mention that they can hold down the arrow keys for a seamless rotation. Also after the tutorial trials, on the slide that says “Training Block #1”, read the following.

* *To wrap up, there will be 8 blocks of 25 trials each. Please use the breaks between blocks to take a short break up to 30 seconds or so as needed. Break points are located at the start of each block; whenever you reach a text screen that says ‘Experimental Block 3’, ‘Experimental Block 6’, etc., that is you opportunity to take a rest as needed. We will first have you go through a single practice block of 25 trials to get you familiar with the task. A text box will appear on screen after this practice block indicating that you should get the experimenter before continuing. Do you have any questions?*

Do NOT answer any questions about the performance blocks or the reward. Just make sure they understand the procedures of the task itself.

**AFTER TRAINING BLOCK #1**

* *For this next part, you will be playing for a $5 cash bonus. In order to win the bonus, you must improve your memory performance by 5% of your training score by the end of the experiment. Do you understand? You will be given a progress report at the end of the next block. After that, you will have 6 additional blocks of 25 trials each. You will not receive any feedback at the ends of those 6 blocks.*
* *Please continue when ready. Remember to keep the gratings in your mind’s eye for the best effect.*

You must press ‘p’ to continue on to Experimental Block #1. This is a precaution to keep the participant from continuing before you’ve read the script. The first trial of the block will begin as soon as you press ‘p’, so instruct the participant to have their fingers on the keyboard and be prepared before you continue on to the next block.

**AFTER EXPERIMENTAL BLOCK #1**

* ***You are doing well. You will not receive any feedback at the ends of the next 6 blocks. Please notify me when you’ve finished the experiment. Remember to keep the gratings in your mind’s eye for the best effect. Please continue when ready.***

Just as with the beginning of the first experimental block, press ‘p’ to continue with the experiment. Let the participant know that they will be able to transition between blocks at their own will going forward; you will not need to press ‘p’.

**QUESTIONNAIRES ROUND 2**

* Have the participant complete the following questionnaires in the following order:
  + SA\_questions (From the SA2 folder this time)
  + Loss\_aversion (see Loss Aversion protocol for instructions)
  + Bis\_Bas
  + Bis11
  + SCSR
* All questionnaires are psyexp files that can be located in C:\experiments\VWM\Experiment\_Files\questionnaires
* Each questionnaire will have instructions presented upon startup. Be sure to read these aloud to the participant before they continue. All questionnaires can be completed with the mouse.

**DEBRIEF**

* Ask and record the following questions in the subject information google sheet:
  + What do you think the purpose of the experiment was?
  + Were you at all stressed during the task? If so, when or from what?
  + What did you think of the task?
  + Did you use any kinds of strategies to remember the gratings aside from visualizing them?
  + Was it difficult to maintain your gaze on the fixation diamond? If so, how often, would you say that you shifted your gaze away from the diamond?
  + How motivated by the cash reward were you on a scale from 1-5, with 5 being a lot, and 1 being not at all?

IMPORTANT: Let the subject know that the manipulations were all deceptions, i.e., that the performance review was scripted.

Have the participant fill out a receipt. Their earnings will be as follows:

$5 per half hour of their time + ($5 automatic cash bonus +- Loss Aversion results)