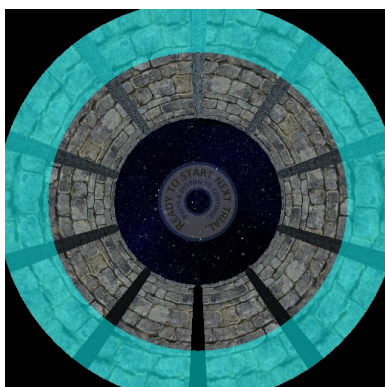
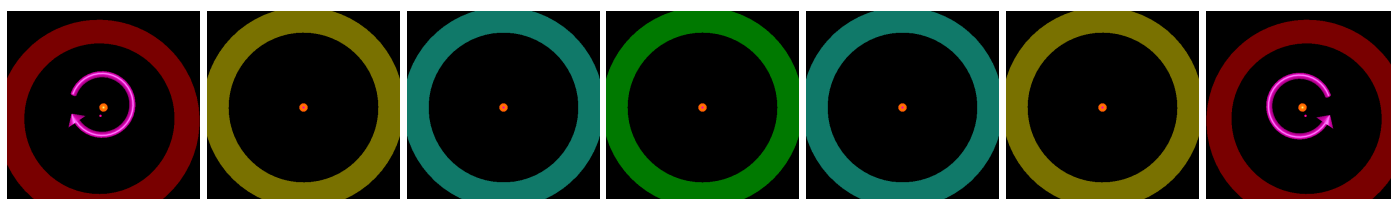


The Manual-Manual task starts with a welcome screen that prompts the subject to press a button in order to start a block of trials:

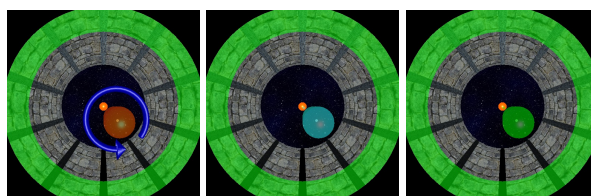


He or she is then guided to look straight ahead and bring the head to an upright position with respect to the shoulders. A 'laser pointer' (red dot) indicates the direction of gaze, which must be made to fall on the orange central target through pitch and yaw movements of the head. Simultaneously, the halo around the subject's viewpoint into the virtual world changes color, from red when the head is tilted far from the upright position through yellow and cyan until it turns suddenly bright green to indicate that the head is at the proper orientation. A circular arrow may appear when the head is far from the desired posture, giving the subject an indication of which way to tilt the head:

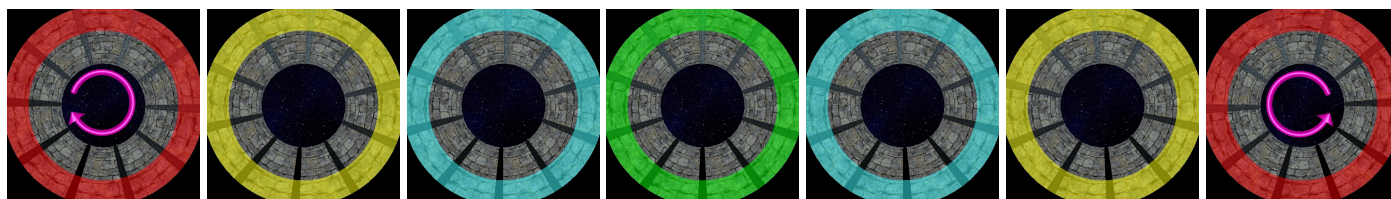


Tilted to the Left ----- Correct Orientation ----- Tilted to the Right

The subject is then guided to place the hand at the target orientation. The subject sees a) an orange spherical target at the end of the tunnel, b) a virtual representation of a tool in the visual scene (a cylinder) that moves with the hand in 3D visual space and c) a 'laser pointer' that projects from the tool along the axis of the fingers. The virtual tool changes color according to the roll orientation of the hand (pronation/supination). The subject must raise the arm in front of the body, aim the tool by moving the arm in azimuth and elevation until the laser pointer falls on the spherical target and then rotate the hand until the tool turns green. If the orientation of the hand is far from the target orientation, an arrow appears around the virtual tool showing which way to rotate the hand.

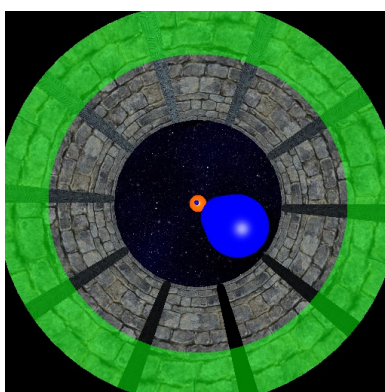


Once the target orientation has been achieved and held for 1 second, the tool and laser pointer disappear. The subject must lower the arm and is then prompted to tilt the head to a new orientation through the same system of halo colors and direction arrows as described previously:

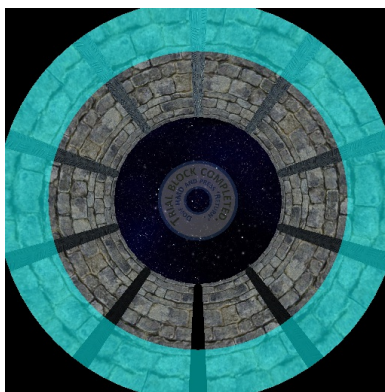


Tilted to the Left ----- Correct Orientation ----- Tilted to the Right

Finally subject then reproduces the remembered target orientation with the hand. The virtual tool, laser pointer and spherical target reappear, but this time the tool and laser pointer are constantly blue. The subject must raise the hand and aim with the laser pointer at the spherical target but then rotate the hand to the remembered orientation without any further visual cues:



The subject presses the Center Button on the Remote Control to validate the trial and move on to the next. If the block of trials is completed, a message is displayed to let the subject know:



Note that other circular prompt with text instructions may appear at different times in response to different conditions or actions by the subject. For instance, a message will be generated if the subject does not maintain the head in the specified tilted position. All possible messages are shown in a separate section of this document.