**Material and Method**

**Participants**

A total of thirty-five right-handed undergraduate and graduate students from Florida International University participated in this study. Participants were voluntarily recruited through flyers on bulletin boards within the university and they were paid $20 per hour. Prior to their participation, they were informed that they would not be able to participate in the experiment if they have non-removable metals such as tooth braces, if they are very sensitive to noise, if they have claustrophobia, if they have poor calibration vision, if they are color blindness, or if they are taking drugs for neurological and chronic pain. Also, they were strongly encouraged to wear contact lenses before participating in the experiment if they need to wear glasses due to poor eyesight. This is because the moisture inside the glasses can make it difficult to identify stimuli. Among twenty-four participants (seven females; mean age = 26.54; range = 19 – 40 y) who did not complete the entire experiment, seven participants were dropped out due to excessive motion (less than 20% of trials were flagged for removal), seventeen were excluded due to scheduling conflicts or poor task performance (the correct answer rate was 1.5 SD below the average performance, or they felt severe fatigue or drowsiness during the task). Data from ten (two females; mean age = 24.2; range = 20 – 32 y) were excluded from the final analysis due to technical problems with data acquisition. Therefore, this study will conduct an analysis with data from one participant (42 y, male). The participant had corrected to normal vision and completed informed consent. This study was approved by the Florida International University Institutional Review Board.

**Localizer Task Procedure**

The purpose of the localizer task is to identify brain regions related to face and scene recognition. The task was block-designed and consisted of three conditions of blocks; face, scene, and number (baseline). The face and scene blocks were presented randomly between number blocks, and the stimuli within each block were also randomized. There was no interval between each block. Face and scene blocks contained 20 stimuli and were presented 7 times per run (total 280 stimuli; faces 140, scenes 140 per run). The number block contained 10 stimuli and was presented 14 times per run (total 140 stimuli). Face stimuli were composed of 70 women and 70 men's faces, including race and ethnicity information. Facial images were extracted from Karolinska Directed Emotional Faces by selecting only images with neutral valence (Lundqvist, D., Flykt, A., Öhman, A., 1998). The scene stimuli were photos related to nature and consisted of 70 photos with water and 70 photos without water. Those photos were selected from the Unsplash website (Unsplash, n.d.) Both face and scene stimuli were presented in the center of the screen, measuring 15x20cm on a gray background. The number stimuli consisted of single digits from 1 to 9 excluding 5, and the numbers were presented in the middle of a gray background in black Arial font of 40pt. Each stimulus was presented for 0.5 seconds after a fixed inter-stimulus-interval(ISI) of 0.5 seconds. During ISI, a white fixation cross appeared on a gray background.

Participants were instructed that they would see faces, scenes, and numbers inside the scanner. They responded to stimuli with a button box. In the face condition, participants were asked to press 1 if the gender of the face is male, and 2 if the gender is female. In the scene condition, they pressed 1 if the scene contains water, and 2 otherwise. In the number condition, they pressed 1 if the number is less than 5 and 2 if it is greater than 5. Participants performed a total of two runs and they responded to a total of 560 stimuli: 140 male faces, 140 female faces, 140 scenes with water, 140 scenes without water, 280 one-digits except number 5.

**Neuroimaging Data Collection and Preprocessing**

fMRI data were acquired using a 3T Siemens Magnetom Prisma scanner with a 32-channel head coil at the Center for Imaging Science at Florida International University. Functional T2\*-weighted scans were acquired by using an echo planar imaging (EPI) sequence with the following parameters; 304 volumes; repetition time (TR) = 1760ms; echo time (TE) = 35ms; Slice thickness = 2.0 mm isotropic; 66 axial slices; Matrix size = 90100; Field of view(FOV) = 18001800 mm; Flip angle (FA) = 52°. A whole-brain T1-weighted anatomical scans for anatomical reference were collected by using a magnetization-prepared rapid acquisition with gradient echo (MPRAGE) sequence with the following parameters; TR = 2500ms; TE = 2.9ms; Slice thickness = 1.0 mm isotropic; 176 sagittal slices; Matrix size = 256256; FOV = 256256 mm; FA = 8°.

During each run of the visual recognition task, data acquisition began after the first one volumes was collected to allow for T1-equilibriazation. Anatomical and functional image data were preprocessed by using the following software packages; Neuroimaging in Python: Pipelines and Interfaces (Nipype version 0.12.01; Gorgolewski et al., 2011); Analysis of Functional Neuroimages (AFNI version 20.2.06; Cox, 1996); FMRIB Software Library (FSL version 5.0.11; Smith et al., 2004); FreeSurfer (version 7.1; Fischl, 2012) Functional volume data was preprocessed in the following order. 1) Prior to performing motion correction, Outliercount was performed to find abnormal data values due to sudden movements and problems with scanner hardware. The reference data for finding outliers was the first run closest to the data collection time of the anatomical scan. 2) Then, all volumes were realigned based on the middle volume of the first run (motion correction). 3) After correcting small movements through motion correction, artifact detection was performed to remove sudden movements. Motions greater than two standard deviations of the average motion were considered as artifacts and removed. 4) Next, slice timing correction was performed to align slices obtained at different times to the same temporal origin. In this study, the data was from only one participant and less head movement was expected, so motion correction was performed before slice timing correction. 5) After slice timing correction, coregistration was performed to align the functional image with the reference structural images. 6) Last, to increase the signal-to-noise ratio, spatial smoothing was performed with a 4mm kernel by using the Smallest Univalue Segment Assimilating Nucleus (SUSAN) algorithm (Smith & Brady, 1997). The kernel size was set to twice the size of the acquired voxel.

**Task Neuroimaging Data Analysis**

To identify the difference between the brain activation when faces are presented in contrast to the activation of the brain when scenes are presented, we used a general linear model analysis (AFNI’s 3Ddeconvolve function). The model included face and scene as regressors of interest. Regressors of non-interest consisted of six regressors estimating rigid-body head motion (x, y, z translations, pitch, roll, yaw rotations) and five regressors for each run modeling up to fourth-order polynomial trends in the fMRI data, which deals with low-frequency data. The response accuracy for each condition would be convolved with a gamma function that models a standard hemodynamic response function (HRF). The contrasts to be performed in this study would be as follows: face-scene; face-baseline; scene-baseline.

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