

Supplementary Methods

Stimuli

Face-stimuli were grayscale images of faces, and consisted of sets of “morph families”, half were female, half were male (Jaeger et al., 2005; Endl, 1998: Supplementary Fig. 1A). Each morph family consisted of two parent natural-faces (“0% morph” and “100% morph”) and 2 intermediate morph-faces (morphed 35 % and 70 %, respectively, from the 0% parent towards the 100% parent). Scene-stimuli were grayscale images of outdoor scenes, and consisted of similar scene-pairs (Supplementary Fig. 1B); half were “man-made”, i.e., scene contained at least one man-made object; half were “nature”, i.e., scene contained no man-made objects. Similar scene-pairs were pictures of different outdoor locations, chosen to be as similar as possible within scene-pairs, but as distinct as possible between different scene-pairs. Stimuli were presented to participants using Presentation software (Neurobehavioral Systems Inc.) run on a Dell Latitude D820 laptop computer, projected onto a screen positioned at the head of the MRI scanner bore using JVC (model SX21/s) D-ILA projector, viewed by participants via a mirror attached to the head coil.

Behavioral Tasks

During the face-task, participants viewed pictures of faces, and for each, made a single 2-alternative forced-choice gender judgment (“female” or “male”), using the left middle and index fingers, respectively, with an MRI compatible button-box response device. During study-runs, participants first viewed 40 different novel faces (half were female, half were male; half were natural, half were morphs) repeated 3 times each, presented in random order. Each study-run face-trial (2000 ms) consisted of the presentation of a face image (800 ms) and an inter-stimulus fixation crosshair (1200 ms). During the test-run following each study-run, participants viewed

60 faces, interspersed with 20 “null fixation-trials”, presented in random order: 20 faces were repeat presentations of faces viewed in the previous study-run; 20 faces were morph-pairs of faces viewed during the previous study-run (i.e., 35% morph-change from study face); 20 faces were novel faces. Of the faces in all test conditions (i.e., repeat, morph, novel), half were morphs, half were naturals; half were female, half were male. Each test-run face-trial (2500 ms) consisted of the presentation of a face image (800 ms) and an inter-stimulus fixation crosshair (1700 ms). Null fixation-trials consisted of the presentation of a centrally located crosshair (2500 ms). (Supplementary Fig. 2A)

During the scene-task, participants viewed pictures of outdoor scenes, and identified each scene as “man-made” or “nature” as quickly and accurately as possible, in the same manner as for the face-task. During the study-runs, participants viewed 40 different scenes (half were man-made, half were nature) repeated 3 times each, presented in random order. During the test-run that followed each study-run, participants viewed 60 scene-trials, interspersed with 20 null fixation-trials, presented in random order: 20 scenes were repeat presentations of scenes viewed in the previous study-run; 20 scenes were similar scene-pairs of scenes viewed during the previous study-run; 20 scenes were novel scenes. Of the scenes in all test conditions (e.g., repeat, similar, novel) half were nature, half were man-made. Scene-trials and null fixation-trials for the study- and test-runs had the same presentation parameters as for the corresponding trials in the face-task. (Supplementary Fig. 2B)

The “rest-runs” consisted of continuous presentation of a centrally located crosshair for the duration of the run (4 min 40 s). Participants were instructed to remain alert and fixate on the crosshair for the duration of the rest-runs. Each rest-run was preceded by a brief “primer-run” consisting of the presentation of 10 consecutive novel face-trials for “face-rest runs” or novel

scene-trials for “scene-rest runs”. Primer-run trials had the same presentation parameters as for study-run trials, and participants performed the same classification judgments as in the corresponding face- and scene-tasks. The purpose of these short primer runs was to ensure that participants had been exposed to the relevant category of stimuli within a moderate degree of recency (i.e., within ~4.6 min). The intent was to maximize the likelihood that LF-BOLD fluctuations could be modulated by the recent task.

Half of the participants first performed the face-task twice (i.e., face study-run followed by face test-run, repeated twice), followed by 2 face-rest runs (i.e., face-rest primer-run followed by face-rest run, repeated twice), then the same sequence of runs for scenes. The other half of the participants performed the same sequence of runs, but starting with scenes, followed by faces.

Finally, each participant performed 2 recognition/localizer runs that served a dual purpose, both as 1) a traditional task-based functional localizer to individually identify a face-preferential (FP) and scene-preferential (SP) region of interest (ROI) for each participant, and 2) an incidental subsequent recognition task to assess memory for faces and scenes viewed previously in the face- and scene-tasks. The recognition/localizer runs consisted of alternating “recognition blocks” of face and scene recognition tasks, interleaved with short “fixation-blocks” (i.e., presentation of a centrally located crosshair for the duration of the 20 s block). Each recognition block contained 20 successive recognition-trials (2500 ms: 800 ms face or scene presentation; 1700 ms inter-stimulus fixation crosshair), consisting of 10 novel pictures and 10 repeated pictures from the previous face- or scene-tasks, presented in random order. Half of the blocks were “easy-recognition” blocks, wherein repeated pictures had been viewed 4 times previously in the face- and scene-tasks; half of the blocks were “difficult-recognition” blocks, wherein the repeated pictures had only been viewed once previously in the face- and scene-tasks.

For each picture, participants were required to make an “old/new” judgment as accurately as possible, indicating whether they recognized the picture as having been viewed previously in the experiment. Responses were made in a similar manner as for previous tasks. The overall design and order of runs presented for a participant starting with the face-task is shown (Supplementary Fig. 3).