Supplemental Note 2: Recognition memory for faces, objects and places

During the encoding session, participants viewed blocks of images of faces, abstract objects and scenes, and pressed a button when an image was presented twice successively (one-back task on 1.4% of images). Accuracy was high during the one-back task (> 90%) across age groups and image categories, showing no significant effects of age ($F_{2, 42} = 1.0, P = 0.38$), image category ($F_{2,42} = 0.07, P = 0.79$) or age by image-category interaction ($F_{6, 264} = 0.31, P = 0.74$). Response times were longer for children (ages 7 – 11) than adolescents (ages 12 – 16, $t_{28} = 2.20, P < 0.03$) and adults ($t_{33} = 4.75 P < 0.0001$) with no significant effects of image category ($F_{2, 42} = 1.07, P = 0.35$), or interactions between age and image category ($F_{6, 264} = 0.84, P = 0.44$).

We asked whether the size of the rFFA was specifically associated with face recognition memory or more generally with memory for other image categories as well, by applying a multivariate analysis of variance (MANOVA) with the dependent variables of face, object and place memory, and covariates of age and FFA size, among subjects matched for rFFA BOLD-related confounds (Suppl. Table 1). Results showed main effects of age ($F_{2, 29} = 5.44, P < 0.006$) and rFFA size ($F_{2, 29} = 3.27, P < 0.04$), and an age by rFFA-size interaction ($F = 2.70, P < 0.04, 1\text{-tailed}$). This interaction occurred because there was a significant correlation between rFFA size and face recognition memory for children (all children: $r = 0.49, P < 0.03, n = 20$; BOLD-confound-matched children: $r = 0.66, P < 0.04, n = 10$) and adolescents (all adolescents: $r = 0.61, P < 0.03, n = 10$; BOLD-confound-matched adolescents: $r = 0.63, P < 0.03, 1\text{-tailed} n = 9$), but no correlation for adults ($r = 0.32, P = 0.24, n = 15$), perhaps due to the limited variance in adults’ performance. Nonetheless, across age groups the size of the rFFA was a significant factor for explaining recognition-memory performance for faces ($F_{2, 29} = 10.04, P < 0.004$), but not objects ($F_{2, 29} = 0.13, P = 0.72$) or places ($F_{2, 29} = 3.50, P = 0.17$).
We performed a similar analysis for the lPPA on the subset of subjects that were matched for BOLD-related confounds (Suppl, Table 2), using age and lPPA size as covariates. Results showed main effects of age ($F_{2, 27} = 4.02, P < 0.02$) and lPPA size ($F_{2, 27} = 3.63, P < 0.03$), and age by lPPA-size interaction ($F = 4.26, P < 0.05$). We found that lPPA size was a significant factor for explaining memory for places ($F_{2, 27} = 9.45, P < 0.005$), but not faces ($F_{2, 27} = 0.06, P = 0.80$) or objects ($F_{2, 27} = 0.72, P = 0.40$).