**Supplementary Methods 1**

**fMRI Associative Memory Paradigm**

 We employed a mixed block and event-related memory-task design that was adapted from previous face-name learning fMRI paradigms [1-3]. As visual stimuli, we used a series of novel faces (i.e. faces that are unfamiliar to the subject), which were randomly paired with first names. The faces were taken from the Glasgow Unfamiliar Face Database and were chosen based on direct gaze, European ethnicity, neutral facial expression, and no jewellery or accessories. First names were chosen from the Leipzig Corpora Collection (http://corpora.informatik.uni-leipzig.de) based on a log-transformed name-frequency and a character length of five or six. The fMRI task was divided into 14 separate blocks of face-name encoding each followed by a block of face-name recall. Between each trial, task instructions for encoding or recall were displayed. During an encoding block, a face-name pair was presented for 5 s via a vision goggle system (Nordic Neuro Lab, Bergen, Norway) attached to the head coil, with a subsequent face-name pair being presented after a randomized inter-trial-interval of 1500 – 3000 ms. Each of the 14 encoding blocks comprised 8 face-name pairs. Each encoding block was followed by a recall block, during which the previously shown faces were again presented in a randomized order (for a 5-s duration each, inter-trial-interval of 1500-300 ms), with two names presented below each face (correct name versus distractor). Via button press on fiber-optic response grips, subjects had to select the name that had been presented together with the face during the encoding block (correct name). No feedback regarding accuracy was given. Half of the recall trials included a distractor name that was novel, whereas the other half included a distractor name that was the correct name matching a different face in that block. Correct responses during the recall block were classified as successful recall, incorrect responses as incorrect recall. Based on responses during the recall block, the corresponding encoding trials were classified as successful encoding or incorrect encoding, respectively. Task accuracy was measured as the number of successfully recalled face-name pairs relative to the total number of face-name pairs shown. Overall, the subjects saw 112 different faces and 168 names with balanced male/female face and name frequencies. Prior to fMRI scanning, all subjects were trained in the task on a local notebook with face-name pairs not included in the fMRI task. The task was programmed using E-prime (Psychology Software Tools, Inc., Pittsburgh, PA).

**REFERENCES**

[1] Celone KA, Calhoun VD, Dickerson BC, Atri A, Chua EF, Miller SL, DePeau K, Rentz DM, Selkoe DJ, Blacker D, Albert MS, Sperling RA (2006) Alterations in memory networks in mild cognitive impairment and Alzheimer's disease: an independent component analysis. *J Neurosci* **26**, 10222-10231.

[2] Sperling RA, Laviolette PS, O'Keefe K, O'Brien J, Rentz DM, Pihlajamaki M, Marshall G, Hyman BT, Selkoe DJ, Hedden T, Buckner RL, Becker JA, Johnson KA (2009) Amyloid deposition is associated with impaired default network function in older persons without dementia. *Neuron* **63**, 178-188.

[3] Sandstrom CK, Krishnan S, Slavin MJ, Tran TT, Doraiswamy PM, Petrella JR (2006) Hippocampal atrophy confounds template-based functional MR imaging measures of hippocampal activation in patients with mild cognitive impairment. *AJNR Am J Neuroradiol* **27**, 1622-1627.