

Prefrontal and hippocampal contributions to the generation and binding of semantic associations during successful encoding: A parametric fMRI study  
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The ability to form and bind associations between items is crucial to successful memory formation. We hypothesise that the hippocampus is important in binding associations between items at encoding and the left inferior frontal gyrus (IFG) supports generation of associations between items. This study examined the parametric responses of these regions to varying amounts of generative and relational processing during successful encoding (i.e., for subsequently recognised items). Encoding trials involved presentation of word triads varying in the number of semantic associations amongst them (zero, one or two); participants judged the number of associations within each triad (cf. Lepage et al., 2000). Thus, triads with fewer associations had higher generative load while triads with more associations provided had higher relational load. Control trials consisted of triads of a number word (zero, one or two); participants responded with the same number. Participants then completed a forced-choice recognition test for triads. Successful encoding (*vs.* the control task) resulted in activation of left hippocampus, right IFG and bilateral thalamus, fusiform, and inferior parietal lobule. Parametric modulation analyses revealed that increasing relational load resulted in increased activity of left hippocampus, while increasing generative load resulted in increased activation of bilateral IFG. Thus, we were able to isolate the IFG and hippocampal contributions to the generative and relational stages of associative encoding. Similar modulation of hippocampal activity is seen during retrieval of associative information (e.g., autobiographical and/or recollective memories), suggesting that integrative processing is a key function of the hippocampus.