Neural Circuits for Source Memory and Imagination

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Introduction: The purpose of this research project is to identify the differences in brain functions associated with imagination and experience and how those regions correlate to imagery vividness and false memories. In the case of people with delusions and psychosis, false memories can be so detailed and vivid it can be difficult to tell dreamed events from physically experienced memories. **Methods**: Undergraduate students participated in this two-session study. The first phase consists of behavioral assessments and the second, a scanning session of an auditory and visual slideshow. In the slideshows, participants are either shown an image or sentence as the experience condition or they are asked to imagine a sentence being read to them for the imagined task. The primary regions of interest include Brodmann's areas 45 (semantic processing), 46 (sustaining attention and working memory) /47 (syntax processing) and 7 (language processing) along with interest in the superior temporal gyrus and prefrontal cortex. The neuroimages were preprocessed using DPARSF to correct for head movement, normalization and a 6 mm smoothing. SPM8 was used to analyze the imaging data for single subject and group analysis adding in the desired conditions. The contrast conditions of imagine against experienced stimuli, and the imagine and experience baselines were added at this time. **Results**: The goal for this stage of the study was to view both experienced and imagined overall activity in the selected regions of interest. The experience of seeing and hearing the images and sentences activated the expected sensory areas. As for the imaginary event, there was far lesser activity in the occipital and temporal lobes but had some overlapping in the inferior prefrontal cortex with the BA 6 and 46/47 areas. **Conclusions:** Between the visually imagine and auditory sentence task, they both show high activity overlap in the prefrontal cortex areas. These results show a mapping of neural processes of imagery that can later be used for comparison in later experimental groups.