Age Differences in Memory for Emotional Information: The Effect of Encoding Instructions and Emotional Valence

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Aging produces changes in how the brain processes emotional information. A predominant theory in the aging and emotion literature is the socioemotional theory (Carstensen, 1994), which predicts that older adults will devote more attention to positive information and have diminished reactivity to negative information. While this theory has been supported by some studies, the brain areas involved in this difference are currently unclear. Additionally, the attentional biases predicted by the socioemotion theory have been largely found during passive viewing, whereas deeper processing of emotional stimuli does not produce this effect consistently (Emery & Hess, 2008). The current study aimed to investigate the brain areas involved in encoding differences of emotional information in aging and the effects of encoding instructions on this emotion processing. Using event-related functional magnetic resonance imaging (fMRI), 12 younger adults (ages 18-30) and 12 older adults (ages 60 and older) viewed two sets of negative, positive and neutral pictures, which had balanced arousal ratings. Participants were asked to passively view the first set of pictures, and then were asked to make pleasantness ratings about the second set of pictures. Age differences in recognition memory were found for both encoding conditions and across all valence types. There was no effect of emotion on memory for either age group. With a subsequent memory analysis, there was greater activity in hippocampal regions during the passive viewing condition for both age groups during successful encoding of emotional stimuli. However, comparisons between age groups revealed that younger participants activated significantly more right hippocampal than older adults in the passive viewing condition. Additionally, there was more activity in insula areas in older adults in the passive viewing condition, an area crucial in emotion regulation, during encoding of emotional compared to neutral pictures. During the judgment condition, older adults once again had more insula activity but when viewing negative emotional pictures only. These findings demonstrate that cognitive performance differences seen in the prior literature putatively translate into biological activation differences, such that older adults are recruiting different brain regions than younger adults to process negative emotional information across these two different encoding manipulations.