

fMRI Research in Non-Clinical Older Populations.

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Functional magnetic resonance imaging (fMRI) is a well-established tool for investigating the cerebral basis of cognition, action, and emotion. Used in conjunction with structural analysis, fMRI can link neuroanatomic and metabolic substrates of brain activity. However, the majority of fMRI research on normal cognitive processes has been done with younger adults. There are far fewer functional imaging studies of basic cognitive processes in non-clinical older populations. fMRI results from healthy older subjects can be used to a) explore normal age-related changes in brain structure and function, b) provide a healthy reference group for exploratory diagnostic studies of age-related disorders, and c) suggest baseline and outcome measures for treatment trials of age-related disorders. The fMRI experiments listed below are among those successfully done at UW with healthy younger subjects. The listed tasks were chosen as sensitive to brain processes affected by aging, and can readily be adapted for older populations (e.g., presentation rate, stimulus clarity). Much of the data was analyzed with NeuroPlot, an interactive worksheet for visualizing correlations between metabolic activity of specific brain regions and variables such as age or cognitive test scores. Sample fMRI studies: Sleep disturbance (Sleep Loss); Divided Attention (Paced Auditory Serial Attention task); Working memory (N-back task); Reduced processing capacity (Dual Task); Simple motor function (Finger Tapping, Alternate Tapping); Logical reasoning (NeuroCog Number Reasoning task); Depression (Mood Induction); Substance Abuse (Alcohol intoxication).