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## **EEG-CORRELATES OF WORKING MEMORY AND INHIBITION AS A FUNCTION OF AGE**

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**Background:** Prior research has focused on EEG differences across age or EEG differences across cognitive tasks/eye tracking. There are few studies linking age differences in EEG to age differences in behavioural performance which is necessary to establish how neuroactivity corresponds to successful and impaired ageing.

**Aims:** To understand neuropsychological mechanisms that underpin age-related cognitive decline using electroencephalography (EEG) and eye-tracking. This is the first study to our knowledge that combines EEG and eye tracking data in the context of ageing.

**Methods:** The current study investigated EEG predictors of inhibition and working memory in typically-aging older adults (n=44) and young adults (n=31). General mental state was assessed with the Geriatric Depression Scale, Mini Mental State Exam and Alzheimer's Disease Assessment Scale. General cognitive functioning was assessed using tests for verbal learning (Hopkins test), task switching (Trails a and b) and verbal IQ (National Adult Reading Test). In addition, participants completed tests of working memory (forwards and backwards digit and spatial span) and inhibition (day-night task). Inhibition was further investigated using eye tracking (saccades, antisaccades, and a Go-No-Go paradigm). Resting state EEG was assessed at 128 electrodes during eyes-open and eyes-closed conditions.

**Results:** Age deficits in cognition were aligned with the literature, showing working memory and inhibitory deficits along with an older adult advantage in vocabulary. Older adults showed poorer eye movement accuracy and response times, but we did not replicate literature showing a greater age deficit for antisaccades than for prosaccades. We replicated EEG literature showing lower alpha peak frequency in older adults but not literature showing lower alpha power. Older adults also showed higher beta power and less parietal alpha power asymmetry than young adults. Interaction effects showed that better prosaccade performance was related to lower beta power in young adults but not in older adults. Performance at the trail making test part B (measuring task switching and inhibition) was improved for older adults with higher resting state delta power but did not depend on delta power for young adults.

**Conclusions:** It is argued that individuals with higher slow-wave resting EEG may be more resilient to age deficits in tasks that utilise cross-cortical processing.

**Keywords:** EEG, Eye tracking, Working memory, Inhibition

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