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# Age-related changes in working memory: Compensatory brain processes and cardiovascular costs

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## Abstract

Older people are assumed to be impaired in neuronal processes sub-serving maintenance of relevant information in working memory (WM) and compensate for these deficits by recruitment frontal mechanisms supporting early processing and cardiovascular mobilisation. Fifty younger (20-35 years) and 45 older (50-65 years) employees with flexible and repetitive work requirements had to perform visual 0-back and 2-back tasks. The age-related performance decline under high WM load was accompanied by longer N2 and P3b latencies of the event-related potentials while the P3b was reduced and more frontally distributed in older relative to younger employees. In contrast, older employees demonstrated the increase of early ERP components (N1 and P2) as well as a greater sympathetic and lower parasympathetic reactivity to WM load than younger employees. The P3b positively correlated with parasympathetic tone and negatively with sympathetic tone. Lowered WM performance and repetitive work requirements were associated with prolonged P3b latency. The results suggest that older employees have deficits in monitoring and sequencing of incoming stimuli in WM that may lead to less distinctive target/non-target representations and complicate the target categorization process. The recruitment of frontal mechanisms appears to partially compensate for age-related performance decline by allocation of processing resources to perceptual gating and focussed attention as well as by on-task effort associated with enhanced cardiovascular costs.

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