

Eye gaze and aging: the role of working memory and inhibitory control

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Eye-tracking is increasingly used to study cognitive and biological markers for the early signs of neuropsychological and psychiatric disorders. However, in order to make further progress in our understanding of these early indicators, a more comprehensive understanding of the neurotypical age-related effects on eye-tracking is essential. Speculation on the cause of the observed age-related differences in the antisaccade task largely centers around two sources of cognitive dysfunction: inhibitory control and working memory. The inhibitory control account views cognitive slowing and task errors as a direct result of the declining of inhibitory cognitive mechanisms. An alternative theory considers that a deterioration of working memory is the cause of these age-related effects on behavior. The current study assessed inhibitory control and working memory processes underpinning saccadic eye movements in young and older participants. This was achieved with three experimental conditions that systematically varied the extent to which working memory and inhibitory control are taxed in the antisaccade task; a memory-guided task was used to explore the effect of increasing working memory load; a Go/No-go task was used to explore the effect of increasing inhibitory load; a 'standard' antisaccade task retained the standard working memory and inhibitory loads. The results revealed that neurotypical ageing is associated with changes in both inhibitory control and working memory. Increasing the inhibitory load was associated with increased reaction times in the older group, whilst the increased working memory load and the inhibitory load contributed to an increase in the anti-saccade errors.