**Monitoring of dementia using eye movements: Research update**

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Dementia is a condition associated with cognitive decline. A number of domains would appear to become increasingly impaired. Emerging evidence reveals that eye movement deficits develop with dementia (Crawford, et al., 2005). Specifically, the anti-saccadic eye movement task is able to distinguish between healthy controls and participants with Alzheimer’s Dementia (AD). People with AD have difficulty in preventing gaze toward (or indeed, corrected gaze away from) salient stimuli. It has been hypothesised that this deficit is related to inhibitory deficits rather than working memory (WM) decline as generally assumed (Crawford & Higham, 2016). There is increasing evidence that people with early AD development have subtle impairments in cognitive inhibition that are often undetected by traditional cognitive assessments. If this is indeed the case then eye movement tasks designed to measure inhibitory deficits may have important practical implications for disease monitoring and assessment.

The Monitoring of Dementia using Eye Movements study (MoDEM) aims to recruit 50 people with AD, 50 healthy older adult controls, and 150 people with mild cognitive impairment (MCI). The aim of the study is to develop a screening tool that can predict dementia by measuring eye movements. Participants complete a battery of cognitive assessments e.g. Montreal Cognitive Assessment (MoCA: Nasreddine, et al., 2005), digit & spatial span (Weschler, 1997a,b), and Free and Cued Selective Reminding Test (FCSRT: Grober & Buschke, 1987) and eye movement tasks (pro-saccade, recent distractor, anti-saccade: see Crawford, et al., 2005) in order to establish between-groups differences, which may indicate a decline in inhibitory function that is associated with cognitive performance. Participants also have their eye movements measured whilst watching a series of videos. These tasks are designed so that cognition can be inferred from eye movements (cf. Yarbus, 1967). Some of the trials require the participant to fixate on stimuli that are not necessarily the most visually salient on the screen. Given, the AD impairment in the inhibition of gaze towards (or indeed, corrected gaze away from) salient stimuli, we expect that during trials where the gaze is instructed toward task-related stimuli, participants with AD may exercise less top-down executive control over eye movements away from salient stimuli (compare to the anti-saccade task). Thus, participants with AD are expected to show a greater number of eye movements towards salient, task-unrelated stimuli. This should also be reflected in the MCI group but will be mediated by performance on the cognitive assessments. Ethics Committee approval was awarded by Lancaster University and NHS Health Research Authority.

Preliminary findings suggest that healthy controls are able to inhibit eye movements toward task-unrelated stimuli. However, further participant recruitment is required. Currently participants have been obtained from local Memory Assessment Services. But as our equipment is portable and our study is now on the Join Dementia Research (JDR) network, we are aiming to recruit many more participants across the UK. It is hoped our tasks could eventually be developed into screening tools for the early detection of AD. However, we are working closely with the NHS to increase awareness of this research opportunity in patients with MCI and an established AD diagnosis. Therefore, we request that if you know of any suitable candidates for our study, please inform them of this research. For further information, please search MoDEM on JDR, or email Dr Thomas Wilcockson (t.wilcockson@lancaster.ac.uk).

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