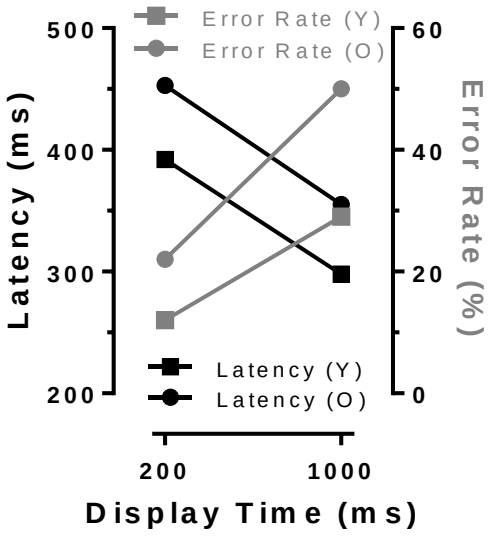
The effect of normal ageing on minimally delayed oculomotor response (MDOR) task performance

Paul C. Knox, Nikitha Pasunuru

The MDOR task (participants inhibit saccades to target onsets and instead saccade to target offsets), provides an oculomotor method of measuring behavioural inhibitory control (BIC; Wolohan & Knox, 2014, Exp Brain Res 232:3949). As the extent to which older patients with neurodegenerative disease show BIC deficits is of considerable interest, we investigated the effect of healthy ageing on MDOR task performance. We compared 13 older, healthy participants (Group O: mean age 60y; range 50-70y) and 51 younger participants (Group Y: mean age 22y; range 19-27y) using a synchronous MDOR task. After a randomised fixation period (1-1.5s), a central fixation target was extinguished and a saccade target immediately appeared 5° to either left/right with a display time (DT) of either 200ms or 1000ms (DT and direction randomised). Participants were instructed to maintain fixation centrally and saccade to the target position on target offset. Eye movements were recorded using an infrared eye tracker; latency and amplitude of target directed primary saccades was measured. Saccades occurring <80ms post target offset were classed as errors. The pattern of response in Group O was identical to that observed previously; latency to offsets was much longer than for reflexive prosaccades. Latency also increased and error rate decreased for DT 200ms tasks (intersubject mean±SD latency: 453±88ms; error rate: 22±13%) compared to DT 1000ms tasks (latency: 355±111ms; error rate: 50±18%). Latency (Fig: Black) was longer and error rate (Fig: Grey) higher in Group O. When tested with a repeated measures ANOVA (DT: 200 vs 1000 within; O vs Y between factor), both factors returned a statistically significant result for latency (DT: $F_{1,62}=51$; $p<0.001$; Group: $F_{1,62}=15$; $p<0.001$) with no interaction. Error rates were affected similarly (DT: $F_{1,62}=140$; $p<0.001$; Group: $F_{1,62}=16$; $p<0.001$; DT x Group: $F_{1,62}=8$; $p=0.006$). These results confirm a significant effect of normal ageing on MDOR task performance, implying that normal ageing affects both oculomotor inhibition specifically and BIC more generally.



To be presented at SFN18, San Diego, 5th November 2018, in Session 399: "*Eye Movements: Saccade Behavior and Psychophysics in Humans*". Presentation #: 399.15, board #: KK10. Presentation time: 3:00pm - 4:00pm