AB060. Peripheral attentional allocation during visual search in the presence of an artificial scotoma in younger and older adults

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Background: Age related macular degeneration (AMD) is one of the main causes of vision loss in older adults, generating, in most cases, a central scotoma that reduces central visual acuity (Noble & Chaudhary, 2010). People affected by AMD have to rely on peripheral visual information and would highly benefit from efficiently allocating their attention to the periphery. Indeed, attention can improve peripheral spatial resolution (Carrasco, Ling & Read, 2004) and can be allocated to a certain expanse of space outside of the central visual span, known as the attentional span. Attentional span has been shown to be decreased in people with AMD with less attention allocated to the periphery and more to the central visual field (Cheong *et al.*, 2008), however it remains unknown whether aging is also a contributing factor.

Methods: Fourteen healthy younger (mean age =21.8 years, SD =1.5) and 8 older adults (mean age =69.6 years, SD =7.3) performed a pop-out and a serial version of a visual search task, in the presence of different sized gaze-contingent invisible and visible artificial central scotomata (no scotoma, 3° diameter, 5° and 7°). Participants were asked to indicate as quickly as possible whether a target was present or not among distractors whose number varied (16, 32 or 64 objects). We wished to determine whether the size of the scotoma, occluding different degrees of central vision, affected visual search differently for younger *vs.* older participants.

Results: Both the younger and older participants showed higher reaction times (RTs) to find the target for the serial version (M =2,074 ms for younger adults, M =3,853 ms for older adults) compared to the pop-out version (M =866 ms, M =1,475 ms, $P<0.001$) and for more distractors (32 distractors compared to 16, and 64 compared to 32, $P<0.01$). Older adults showed longer RTs than younger adults for both versions of the task ($P<0.01$). We found a significant effect of scotoma size on older adults (3° scotoma M =3,276 ms; 7° scotoma M =3,877 ms, $P<0.05$), however, accurate performance was higher with no scotoma (96% *vs.* 92%, $P<0.05$) in the pop-out search task. This suggests that older participants privileged a fast decision at the expense of performance in those cases. For the younger adults, RTs were higher in the serial search task in the presence of a scotoma (M =2,074 ms) compared to the control condition (M =1,665 ms, $P>0.05$).

Conclusions: These results suggest that older adults take longer to perform visual search compared to younger adults and tend to use peripheral visual less than younger adults; larger central scotomas disrupted their performance but not that of younger participants, who performed equally well with different central scotoma sizes. These findings suggest that aging is a contributing factor in the decrease of the peripheral attentional span.

Keywords: Visual attention; scotoma; visual search

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