AB033. The impact of visual impairment on the Montreal Cognitive Assessment

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Background: Cognitive assessments, such as the Montreal Cognitive Assessment (MoCA), use components that assume intact sensory abilities, however, adults show concomitant decreases in visual acuity with increasing age. Scores on cognitive assessments are typically lower for individuals with visual impairments compared to individuals with normal/corrected to normal vision. But it is not clear if lowers scores on cognitive assessments are due to the assessments relying on visual stimuli, or if individuals with visual impairments are actually more likely to have cognitive impairments. Therefore we simulated visual impairments, i.e., reduced visual acuity and contrast sensitivity, in young healthy adults to determine how this impacts their scores on a measure of cognitive ability, i.e., the MoCA.

Methods: Participants (n=19) completed one of the three version of the MoCA under three conditions (20/20, simulated 20/80, simulated 20/200). The MoCA was administered following the clinical protocols. Only participants that scored >26 (i.e., normal cognitive function) at 20/20 were included in the analysis. For comparison, we included MoCA data from a sample of older adults with normal vision (n=19, Mage =74, Acuity M=0.04 logMAR, SD=0.16) or visual impairment (n=19, Mage =79, Acuity M=0.35 logMAR, SD=0.3).

Results: Acuity of participants at 20/20 (M=0.06 LogMAR, SD =0.1), simulated 20/80 (M=0.63, SD =0.18) and simulated 20/200 (M=0.88, SD =0.19) showed that the participants experienced simulated acuity loss with the goggles. For the MoCA scores, we found a main effect of acuity (F=16.22, P<0.001, η2=0.375, BF10 =5,618). Planned post hoc comparisons showed a significant difference between scores with a 20/20 acuity (M=27.26, SD=0.93) and 20/80 (M=24.74, SD=1.66, t=5.62, ptukey <0.001, d=1.88), and between 20/20 and 20/200 (M=25.63, SD =1.46, t=3.63, ptukey =0.002, Cohen's d=1.33). However, no difference was observed between 20/80 and 20/200 (t=−1.99, ptukey =0.125, d=0.572). The MoCA scores in older adults with normal vision (M=27.32, SD =2.41) and with visual impairment (M=26.68, SD =2.52), did not differ significantly (t36=−0.787, P=0.436, d=0.26, BF10 =0.4).

Conclusions: Our findings show that simulated reductions in visual acuity and contrast sensitivity lead to lower scores on measures of cognitive ability, specifically the MoCA. However, it appears that older adults with actual visual impairments may have developed compensatory strategies to adapt to this loss in visual acuity as there were no significant differences in scores of older adults with and without visual impairments. Therefore, we would recommend that when assessing an individual with visual impairments to conduct the cognitive test by re-scoring it without the visual components, e.g., the MoCA Blind, to magnify the visual components, or to substitue the visual component when possible using auditory alternatives, e.g., the oral trail making task.

Keywords: Visual impairment; cognitive assessment; simulated visual impairment; Montreal Cognitive Assessment (MoCA)

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