Older adults perform worse than young in a dual task when response inhibition is required

[1]Zrinka Potocanac, [2]Ellen Smulders, [3]Mirjam Pijnappels, [1]Sabine Verschueren, [1, 4]Jacques Duysens

[1]KU Leuven

[2]Tolbrug RC 's-Hertogenbosch

[3]VU Amsterdam

[4]SMK Nijmegen

BACKGROUND AND AIM: Motor inhibition plays an important role in adjusting ongoing steps and impairments are associated with falls in the elderly. Therefore it is of interest to assess the inhibitory abilities of older adults (OA) in situations resembling everyday circumstances of falling such as walking combined with a dual task. We compared the inhibitory abilities of OA to those of young adults (YA) when combining a motor and a cognitive (auditory Stroop) task [1] that both require response inhibition. We expected OA to perform worse on both tasks, in particular when incongruent Stroop stimuli are given, since those require inhibiting a response. In this abstract we focus on the results of the Stroop task and assess inhibitory abilities by the difference in performance between congruent and incongruent stimuli [2].

METHODS: Twelve healthy OA (age 66-78 years) and 9 YA (age 22-30 years) performed a task consisting of walking on virtual stepping stones and requiring sudden avoidance (response inhibition) of steps on stones that changed color. The walking task was performed at 4 difficulty levels. Simultaneously the subjects performed an auditory Stroop task that consisted of the words 'high' and 'low' spoken in a congruent or incongruent high or a low pitch. Subjects had to correctly indicate the pitch used. Rates of incorrect responses to Stroop stimuli were analyzed using repeated measures ANOVA for congruent and incongruent stimuli separately.

RESULTS: On average OA had 23.44% more incorrect responses to incongruent stimuli than YA (OA 34.92% and YA 11.48%, $p = 0.01$) but only 1.05% more incorrect responses to congruent stimuli (OA 7.73% and YA 6.67%, $p = 0.83$). Effect of walking task difficulty was significant only for rates of incorrect responses to incongruent stimuli ($p = 0.02$).

CONCLUSIONS: OA show clear deficits in dual tasking when response inhibition is required (incongruent Stroop stimuli) whereas they can perform as YA when inhibition is not involved (congruent Stroop stimuli). This difference persisted at all levels of difficulty of the walking task.

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