

An alternative view of dual-tasking in older adults: Cognitive-motor interference while navigating in an ecological environment

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Introduction Cognitive-motor interference increases with age during dual-tasks, especially with visual/spatial cognitive tasks. We posit that visually and physically exploring a novel environment may constitute a dual-task for older adults (OA). Given known associations between gait modifications and structural brain alterations, we also consider whether a potential dual-task cost in this setting could be linked to age-related brain atrophy.

Material and methods Fourteen young and 14 OA had to find an invisible goal in a real, ecological environment; their body and eye movements were recorded. We calculated walking speed, trajectory efficiency (direct route over the route taken) and fixation ratio (fixations directed outside the goal area over fixations toward the goal). Dual-task cost was calculated for walking speed (DTCS) and learning indices (LI) for all three variables. 18 of these participants (10 young, 8 older) realized a MRI voxel-based morphometry evaluation. We performed a correlation analysis between DTCS and grey matter volume.

Results OA showed increased DTCS upon first exposure. The LI on walking speed correlated positively with those on trajectory efficiency and fixation ratio, likely indicating an alleviation of resource-sharing between walking and encoding the environment. DTCS correlated negatively with GM volume in the superior parietal area, precuneus and superior occipital gyrus.

Discussion-conclusion We interpret OAs' larger DTCS as indicative of cognitive-motor interference. This is supported by the correlations between the LIs and between DTCS and GM volume, especially considering that these brain regions are involved in visual attention and sensory integration. Our findings under ecological conditions question what constitutes dual-tasking in OA.

Keywords Aging; Cognitive-motor interference; Dual-task; Ecological environment; Spatial orientation; Visual encoding; Brain atrophy

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Do vestibular loss patients who complain of subjective cognitive impairments actually have objective cognitive impairments? An exploratory study

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Introduction Studies that have investigated cognitive and emotional problems in patients with bilateral vestibular loss have typically used questionnaires, with these regularly showing significant increased complaints compared to control participants. However, currently, no research has explored the specific link between these subjective complaints and objective cognitive assessments.

Material and methods In the present study, we compared patient's subjective responses to three subjective questionnaires, the Dizziness Handicap Inventory, the Hospital Anxiety Depression Scale, and the Neuropsychological Vertigo Inventory to an objective extended neuropsychological assessment battery. We tested 13 patients with bilateral vestibular loss and 13 age and sex matched controls on the same assessments. Data analyses were performed using between groups ANOVA, with various independent variables associated with the different measures.

Results The results showed a clear difference between groups for the subjective measures, replicating previous research, and showing that vestibular patients present more subjective cognitive complaints than matched controls. However, interestingly, results on the objective neuropsychological measures failed to show statistically significant effects.

Discussion These preliminary results suggest that even if patients believe that they have reduced cognition caused by their vestibular deficits, it remains challenging to demonstrate the effects using simple (standard) objective cognitive measures. We discuss the mismatch in results in terms of cognitive specificity, complexity and compensation. We propose that the objective measures may more likely show effects if combined with a dual task, or by performing complex imagery tasks, adding strain to cognitive resources.

Keywords Vestibular; Cognition; Neuropsychological; Subjective; Objective

Disclosure of interest The authors declare that they have no competing interest.

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Roue connectée et évaluation de l'activité physique et sportive des personnes en situation de handicap

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La Fédération française handisport (FFH) prend une place prépondérante en matière d'activités sportives adaptées pour les utilisateurs de FRM aussi bien pour la compétition, que pour la découverte et le loisir, incluant de ce fait les défis liés à la postures et l'équilibre. Un précédent projet de recherche réalisé en partenariat avec la FFH a permis d'acquies une roue instrumentée et d'analyser en situation écologique les paramètres biomécaniques de la propulsion qui rendent compte de la performance, de l'efficacité mais aussi du risque de blessures spécifiques chez les athlètes en fauteuil roulant (Astier et al., 2016 ; Faupin et al., 2013). Nous avons pu émettre des recommandations pour optimiser la propulsion et réduire le risque de blessures. Cependant, l'inconvénient des roues instrumentées est sa masse qui est supérieure à celle d'une roue de fauteuil roulant mécanique (FRM) et la configuration de la main courante qui peut perturber le pattern de poussée pour le sujet. C'est pourquoi

