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How anxiety and incremental secondary task demands impact processing efficiency, visual search, and gait kinematics in older adults

We examined the impact of anxiety, in combination with incremental cognitive dual-task demands, on visual attentional control, processing efficiency, and gait during adaptive walking in older adults. Moreover, we tested the application of Attentional Control Theory (ACT) to the domain of fall risk in older adults. High- ($n = 10$) and low-trait anxious older adults ($n = 10$) traversed along a novel adaptive walking path, which was reminiscent of navigating along paving stones within a designated pattern. The secondary task involved increasing difficulties of serial subtraction. Subtraction was conducted from a designated number in twos (low-difficulty), threes (medium-difficulty), and sevens (high-difficulty). Dual-task performance was assessed using mental effort ratings, proportion of correct responses to cognitive tasks, gaze behaviour, stepping accuracy, and gait velocity. Higher levels of cognitive demand produced incrementally larger ratings of mental effort and increases in absolute stepping error. Dual-task costs on cognitive performance were found to be greater in low- and high-difficulty conditions when compared to medium-difficulty. Greater anxiety coupled with increasing secondary task demands caused a reduction in visual planning behaviour and a decrease in mean gait velocity when under higher cognitive loads. Higher anxiety was shown to result in higher and more variable decelerations. Findings provide support for the applications of ACT to the study of gait and posture within older adults. Further application and analysis of theoretical frameworks within gait research is encouraged.