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PREVENTION (NONPHARMACOLOGICAL)

# Physical Performance and its Association with Executive Function in Latin American Older Adults: Evidence from the LatAmFINGERS Multicenter Randomized Controlled Trial

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## Abstract

**Background:** The accelerated aging process in low- and middle-income countries (LMIC) has led to an increased prevalence of non-communicable diseases, including dementia, a leading cause of disability in Latin America and the Caribbean (LAC). Executive and physical performance dysfunction accelerates functional decline in older adults. While physical performance measures predict cognitive decline, evidence linking gait speed and executive function remains scarce, particularly in LAC. This study examines the association between physical performance and executive function in older adults from 12 LAC countries.

**Methods:** A cross-sectional study was conducted with 1,243 participants aged 60–77 from the LatAm-FINGERS initiative. Face-to-face assessments gathered sociodemographic, lifestyle, and health data. Physical performance was measured using the Short Physical Performance Battery (SPPB), including balance tests, a 4-meter gait speed test, and the five-chair sit-to-stand (STS) test. The Unipedal Single-Leg Stance (USLS) test was also included. Executive and processing speed measures included neuropsychological tests: Trail Making Test B (TMT-B), Stroop interference

index (SII), semantic fluency (animal), and phonological fluency (*p* and *M* letter), alongside Concept Shifting Test motor speed (CST-MS) and TMT-A. Linear regression and composite scores for executive function and speed processing were computed.

**Results:** The median sample per country was 100 participants, with a mean age of 67.46 ± 4.67 years; 67.46% were female, 56.88% of mixed ethnicity, and 35.40% sedentary. Mean education level was 12.84 ± 3.76 years. Gait speed was directly associated with Stroop C ($p$ <0.00001), Stroop P ($p$ = 0.001), and semantic fluency ($p$ = 0.02). STS was inversely associated with Stroop C ($p$ <0.00001), and CST-MS ($p$ = 0.010); and also directly associated with working memory ($p$ <0.0001). Non-significant associations were found between gait speed and CST-MS, STS and semantic fluency, and TMT tests. Gait speed correlated with Mini-Mental State Examination (MMSE) scores.

**Conclusions:** Higher physical functional performance (gait speed) associated with higher cognitive level (MMSE) is correlated with better performance in executive functions (Stroop C) in older people. This study is the first effort in LAC to associate gait speed with executive tests such as Stroop C, contributing to the understanding of physical performance utility for future preventive and diagnostic dual-task applications.

**Figure 1.** Association between physical performance (gait speed) and executive function measured by A) semantic fluency in animal categories, B) Stroop test part C; C) verbal working memory (Reverse Digit Span); and D) phonological fluency in P letter.

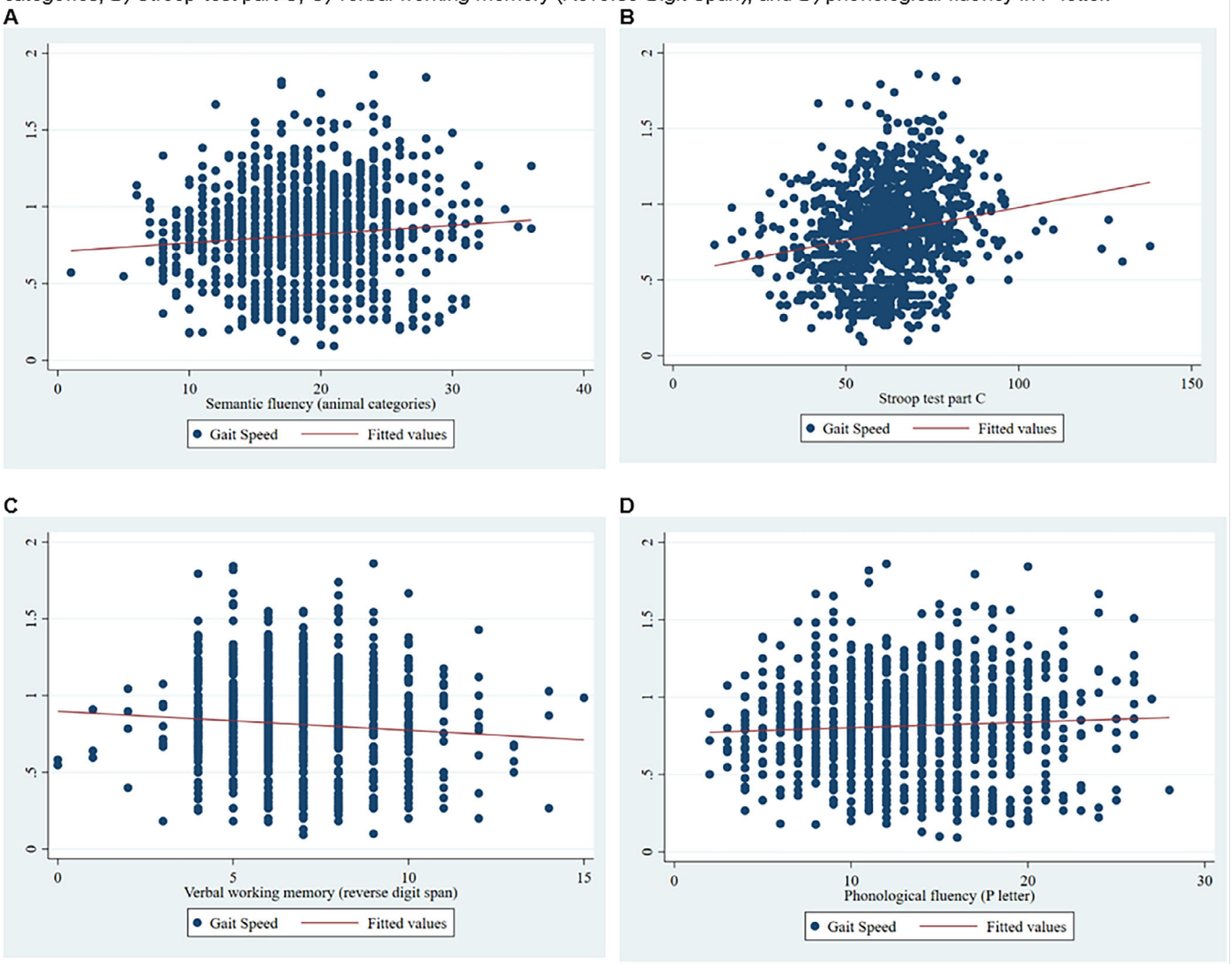

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**Figure 2.** Association between physical performance (sit to stand, STS) and executive function measured in: A) Stroop C, B) CST motor speed; C) verbal working memory (Reverse Digit Span).