

Cardiorespiratory Fitness Is Associated with Executive Function in Older Adults

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Background: Growing evidence suggests that physical activity and exercise have protective effects on brain health and executive function. The purpose of this study was to determine the relationship between cardiorespiratory fitness and executive function in healthy older adults.

Hypothesis: Cardiorespiratory fitness is associated with executive function.

Methods: Forty-two cognitively healthy adults (mean age=63.38, SD=2.96) participated in this study. A physician-supervised maximal graded exercise test was used to assess cardiorespiratory fitness, or peak VO₂. Secondary criteria were used to determine participants that achieved peak VO₂ while on the treadmill. Peak VO₂ was achieved if at least two of the following criteria were met: 1) a heart rate greater than or equal to 90% of the age-predicted maximum (220-age), 2) a respiratory exchange ratio ≥ 1.1 , and 3) a rating of perceived exertion ≥ 17 . A composite fitness score was generated using peak VO₂ and total time on the treadmill. Briefly, all values were normalized and then summed to yield an index that ranged from 0 to 2.

Higher values represent participants with higher peak VO₂ values and longer exercise times. Executive function was assessed via the Trail Making Test (TMT; Trail A and Trail B). The difference in the time it takes to complete Trail A and B (Trail B – Trail A) was used as a measure of executive function.

Results: After controlling for age and sex, cardiorespiratory fitness showed a significant negative relationship with the difference between time to complete Trail A and Trail B ($p=0.038$, $r=-0.444$).

Conclusion: Higher levels of cardiorespiratory fitness are associated with superior executive function. Our results build on previous findings that cardiorespiratory fitness helps to mitigate cognitive decline in older adults.