

# Physical fitness and its association with cognitive performance in Chilean schoolchildren: The Cogni-Action Project

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## Abstract

This study aimed to establish the association and differences in a diversity of cognitive domains according to cardiorespiratory fitness (CRF), muscular fitness (MF), and speed-agility fitness (S-AF) level in a large sample of Chilean schoolchildren. 1171 Chilean schoolchildren aged 10–14 years participated. CRF, MF, and S-AF were assessed through the ALPHA-fitness test battery. Cognition was evaluated through the NeuroCognitive Performance Test, which involved eight tests related to four main domains: cognitive flexibility (CF), working memory (WM), inhibitory control (IC), and intelligence (IN). Both global (multivariate) and individual (univariate) analyses were performed to determine the differences in cognitive functioning according to low-, middle-, and high-fitness level. The global analyses showed a significant main effect for CRF,  $F_{(16,940)} = 3.08$ ,  $p \leq .001$  and MF groups,  $F_{(16,953)} = 2.30$ ,  $p = .002$ , but not for S-AF,  $F_{(16,948)} = 1.37$ ,  $p = .105$ . CRF shows a significant main effect in seven of eight tests, involving CF, WM, IC, and IN domains, whereas MF shows a significant main effect in five of eight tests without association with IN. S-AF shows a significant main effect only with IC. Statistical differences were found between the low- and middle/high-fitness groups but not between the middle- and high-fitness groups. At a global level, both CRF and MF seem to be associated with a higher cognitive profile in scholars; however, at an individual level, all fitness components show a favorable relationship to some cognitive domain. Then, future cognitive developing strategies should consider all fitness components, prioritizing those low-fitness schoolchildren.

## Author keywords

Adolescents  
Cognition  
healthy lifestyle  
muscle strength  
physical fitness  
schools