Acute effects of moderate aerobic exercise on specific aspects of executive function in different age and fitness groups: A meta-analysis

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Author(s) Ludyga, Sebastian; Gerber, Markus; Brand, Serge; Holsboer-Trachsler, Edith; Pühse, Uwe
Author(s) at UniBasel Gerber, Markus ; Ludyga, Sebastian ; Brand, Serge ; Holsboer-Trachsler, Edith ; Pühse, Uwe ;
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Whereas a wealth of studies have investigated acute effects of moderate aerobic exercise on executive function, the roles of age, fitness, and the component of executive function in this relationship still remain unclear. Therefore, the present meta-analysis investigates exercise-induced benefits on specific aspects of executive function in different age and aerobic fitness subgroups. Based on data from 40 experimental studies, a small effect of aerobic exercise on time-dependent measures (g = .35) and accuracy (g = .22) in executive function tasks was confirmed. The results further suggest that preadolescent children (g = .54) and older adults (g = .67) compared to other age groups benefit more from aerobic exercise when reaction time is considered as dependent variable. In contrast to age, aerobic fitness and the executive function component had no influence on the obtained effect sizes. Consequently, high aerobic fitness is no prerequisite for temporary improvements of the executive control system, and low- as well as high-fit individuals seem to benefit from exercise in a similar way. However, a higher sensitivity of executive function to acute aerobic exercise was found in individuals undergoing developmental changes. Therefore, preadolescent children and older adults in particular might strategically use a single aerobic exercise session to prepare for a situation demanding high executive control.
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