

The relationship between physical fitness and executive function in first year pre-vocational students

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Abstract

Recent investigation has shown that only forty per cent of the Dutch child population, is exercising enough to stay physically healthy. Recent literature, however, revealed the relation of physical fitness in relation to different executive functions for example inhibition, planning, cognitive flexibility and working memory. The purpose of this study was to investigate the relation between physical fitness and executive function in first year pre-vocational students. The additional purpose is to explore the differences in physical fitness between the two educational levels within pre-vocational education.

The sample consisted 186 first year Dutch pre-vocational students who completed all tests. Of those students, 92 came from pre-vocational-theoretical practice (TL) (males: 48) and another 94 came from the education level pre-vocational-basic vocational (BB) (males: 45). Three aspects of the Eurofit-test (aerobic fitness, speed and muscle strength) were used to measure physical fitness and a total physical fitness score (TPF) was computed out of these three measurements. Four tests were used to measure different characteristics of executive function (cognitive flexibility, visual working memory, planning and inhibition).

Results showed that higher TPF was related to higher performance on execution time of the planning task, working memory (forward and backward) and cognitive flexibility. For inhibition, better scores on TPF related to lower inhibition skills. Mean scores of the four executive function tests show that students at the pre-vocational-TL perform significantly better, compared to pre-vocational-BB students on planning, working memory and cognitive flexibility. Students in higher education, run significant faster on the ten times five meter run.

Physical fitness has a relationship with aspects of executive functioning in first year pre-vocational students. Where students in higher education (TL) are performing better on both physical fitness as executive function. The direction of this result is not clear yet.