Objectively versus subjectively measured physical activity: associations with cognition and academic achievement in adolescents

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Background

Physical activity has a positive effect on cognitive performance in adults. Therefore, physical activity may stimulate cognitive performance and thereby academic achievement in adolescents as well.
However, the association between physical activity and cognitive performance in adolescents is still unclear, because only a few studies investigated this association and reported mixed results. One shortcoming of these studies is the lack of an objective instrument to measure physical activity. Physical activity was generally based on self-report, a method that is sensitive for social desirability and recall bias. Therefore, we investigated associations in adolescents between objectively and subjectively measured physical activity on the one hand and cognition and academic achievement on the other hand, controlling for covariates.

Methods

Cross-sectional study in 441 students (grade 7 and 9). Physical activity measured objectively by accelerometry. Participants wore an accelerometer (ActivPAL3™) one week (24 hrs/day). Physical activity measured subjectively by questionnaire (IPAQ-A). Cognitive performance measured by two neuropsychological tests (D2 test of attention, Symbol Digit Modalities Test). Academic achievement (Dutch, mathematics, English) provided by the school. Aerobic fitness, BMI measured objectively. Socioeconomic status, pubertal phase measured by self-report. Regression analysis was used to analyse associations between physical activity and cognition and academic achievement.

Results

Objectively measured physical activity showed a negative association with academic achievement in adolescents ($\beta = -.110$, $P = .030$). Subjectively measured physical activity showed a positive trend with cognition, however not significant.

Conclusion

Objective results in contrast, while subjective results are in line with most studies measuring physical activity subjectively.