

Physical Activity and Academic Achievement: How Physical Activity Should Be Implemented to Enhance Mathematical Achievement and Mathematical Self-Concept

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Abstract : Being physically active has many benefits for children and adolescents. It is crucial for various aspects of physical and mental health, the development of a healthy self-concept, and also positively influences academic performance and school achievement. In addressing the still incomplete understanding of the link between physical activity (PA) and academic achievement, the current study scrutinized the open issue of how PA has to be implemented to positively affect mathematical outcomes in N = 138 fourth graders. Therefore, the current study distinguished between structured PA (formal, organized, adult-led exercise and deliberate sports practice) and unstructured PA (non-formal, playful, peer-led physically active play and sports activities). Results indicated that especially structured PA has the potential to contribute to mathematical outcomes. Although children spent almost twice as much time engaging in unstructured PA as compared to structured PA, only structured PA was significantly related to mathematical achievement as well as to mathematical self-concept. Furthermore, the pending issue concerning the quantity of PA needed to enhance children's mathematical achievement was addressed. As to that, results indicated that the amount of time spent in structured PA constitutes a critical factor in accounting for mathematical outcomes, since children engaging in PA for two hours or more a week were shown to be both the ones with the highest mathematical self-concept as well as those attaining the highest mathematical achievement scores. Finally, the present study investigated the indirect effect of PA on mathematical achievement by controlling for the mathematical self-concept as a mediating variable. The results of a maximum likelihood mediation analysis with a 2'000 resampling bootstrapping procedure for the 95% confidence intervals revealed a full mediation, indicating that PA improves mathematical self-concept, which, in turn, positively affects mathematical achievement. Thus, engaging in high amounts of structured PA constitutes an advantageous leisure activity for children and adolescents, not only to enhance their physical health but also to foster their self-concept in a way that is favorable and encouraging for promoting their academic achievement. Note: The content of this abstract is partially based on a paper published elsewhere by the authors.

Keywords : Academic Achievement, Mathematical Performance, Physical Activity, Self-Concept

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