Academic achievement and physical activity: A meta-analysis

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CONTEXT: The effect of physical activity (PA) on different areas of academic achievement and classroom behaviors and how different characteristics of PA interventions could modify the effect remain unclear. OBJECTIVE: The objective was twofold: (1) to assess the effect of PA interventions on academic achievement and classroom behaviors in childhood and (2) to determine the characteristics of individuals and PA programs that enhance academic performance. DATA SOURCES: We identified studies from the database inception to October 16, 2016. STUDY SELECTION: We selected intervention studies aimed at examining the effect of exercise on academic achievement and classroom behaviors at developmental age. DATA EXTRACTION: Random-effects models were used to calculate pooled effect size for all primary outcomes (language-and mathematics-related skills, reading, composite score, and time in on-task behavior). Positive values represent a direct relationship between PA programs and academic achievement scores or on-task behaviors. RESULTS: A total of 26 studies (10 205 children, aged from 4 to 13) were included. Pooled effect size (95% confidence interval) estimates were as follows: (1) 0.16 (-0.06 to 0.37) for language-related skills; (2) 0.21 (0.09 to 0.33) for mathematics-related skills; (3) 0.13 (0.02 to 0.24) for reading; (4) 0.26 (0.07 to 0.45) for composite scores; and (5) 0.77 (0.22 to 1.32) for time in on-task behaviors. LIMITATIONS: Limitations included the variety of tools used to measure academic achievement and the limited number of studies that reported the effect of after-school PA interventions. CONCLUSIONS: PA, especially physical education, improves classroom behaviors and benefits several aspects of academic achievement, especially

mathematics-related skills, reading, and composite scores in youth.