

**Evidence Topic:**

Does Physical Education improve academic performance in school aged children?

**Primary Reviewer**

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**Evidence Question:**

P: School Aged Children

I: Physical Education

C: No Treatment

O: Academic Performance

**Question Background:**

Research concerning effects of specified exercise on academic performance has shown mixed results. This evidence review sought to answer whether simple physical activity itself has an impact on academic performance.

**Parameters of the Search:**

Peer reviewed journal articles from 1999-2009

**Evidence Table****Key to Level of Evidence**

*(Level of evidence may be adjusted downward by EBPX team if study has poor rigor.)*

Level	1	2	3	4	5
Type of Evidence	Systematic Reviews and meta-analyses	Randomized Control Trials (RCT)	Quasi-experimental and Comparative studies	Correlation and Non-experimental studies	Descriptive studies & Expert Opinion articles

Citation	Type of Evidence & Access	Description of Evidence/ Type of study	Level of Evidence	Description of Population	Description of Intervention	Outcome/ Findings
Sallis, J.F.; McKenzie, T.J.; Kolody, B.; Lewis, M.; Marshall, S.; & Rosengard, P. (1999). Effects of health-related physical education on academic achievement: project spark. <i>Research Quarterly for Exercise and Sport</i> , 70(2), 127-134	Accessed using ProQuest Nursing and Allied Health Source	Experimental study determining the effects of a school physical education program on academic achievement.	Level 1	Elementary grade students in Southern California.	The SPARK program is a comprehensive curriculum and professional development program designed to promote physical activity in and out of school. Students were assessed for physical activity, physical fitness, and psychosocial variables.	Cohort 1: There were no effects of the SPARK intervention on the basic battery or math scores. Cohort 2: Significant intervention effects were found on three of the four scores. The primary finding is that spending more time in physical education did not have harmful effects on academic achievement based on the Metropolitan Achievement Tests. Authors conclude that physical activity confers physical and mental health benefits.
Sibley, B.A. & Ethnier, J.L. (2003). The relationship between physical activity and cognition in children: a meta-analysis. <i>Pediatric Exercise Science</i> , 15, 243-256.	Accessed using CINAHL	Review study that primarily looked at the relationship between physical activity and cognition.	Level 1		Gain effect sizes were analyzed. Experimental (.52) was greater than control (.12). Insufficient data to analyze posttest to posttest effect sizes but 10/15 studies showed a benefit. Effect sizes found for all cognitive measures in the studies except memory. Smallest was verbal and math tests.	The overall effect resulted in 0.32 indicating that physical activity and cognition are associated, and might have a causal connection. It is equally beneficial for typical and atypical children to have physical activity, and it doesn't seem to matter what type of physical activity the child is engaged in.

<p>Coe, D.P., Malina, R.M., Pivarnik, J.M., Reeves, M.J., &amp; Womack, C.J. (2006). Effect of physical education and activity levels on academic achievement in children. <i>Medicine &amp; Science in Sports &amp; Exercise</i>. 38(8), 1515-1519.</p>	<p>Accessed using SPORTdiscus</p>	<p>Randomly assigned study determining the effect of physical education class enrollment and physical activity on academic achievement in middle school</p>	<p>Level 3</p>	<p>214 sixth-grade students randomly assigned to physical education either first or second semester</p>	<p>Physical education class either first or second semester. Moderate and vigorous activity outside of school assessed using the 3-d physical activity recall. These scores converted to ordinal data with a 1-3 likert scale. Academic achievement was assessed using grades from four core classes and standardized test scores.</p>	<p>Grades were similar regardless of which semester they were enrolled in physical education. Students who performed some or met Healthy People 2010 guidelines for vigorous activity had significantly higher grades. Therefore, a little activity neither hurts nor helps academics, but vigorous physical activity meeting Healthy People 2010 standards is associated with higher achievement.</p>
<p>Castelli, D.M., Hillman, C.H., Buck, S.M., &amp; Erwin, H.E. (2007). Physical fitness and academic achievement in third and fifth grade students. <i>Journal of Sport and Exercise Psychology</i>, 29, 239-252.</p>	<p>Comparison study - Accessed using SPORTdiscus with full text</p>	<p>Correlational study</p>	<p>Level 4</p>	<p>259 students in public school in grades 3 -5 who passed the Fitnessgram test</p>	<p>Performance on the subtests of the Fitnessgram compared with performance on ISAT</p>	<p>Results indicated that children who are physically fit are more likely to perform better on standardized academic tests</p>

<p>Dwyer, T., Sallis, J., Blizzard, L., Lazarus, R., &amp; Dean, K. (2001). Relation of academic performance to physical activity and fitness in children. <i>Pediatric Exercise Science, 13</i>(3), 225-237.</p>	<p>Accessed using SPORTDiscus</p>	<p>Exploratory study examining the association of scholastic performance with physical activity and fitness in children</p>	<p>Level 4</p>	<p>7961 Australian school-aged children between the ages of 7 and 15, conducted in 1985</p>	<p>Data obtained from Australian Schools Health and Fitness Survey (conducted in 1985; <i>cardiorespiratory endurance</i>- physical work capacity, 1.5km run, <i>muscular force and power</i>-50-meter run, sit-ups, standing long jump, <i>physical activity</i>- lunchtime and weekly exercise) and a questionnaire looking at the scholastic ability of each subject as rated by a school representative and through self assessment</p>	<p>Significant associations between school rating of scholastic ability and the measures of physical activity and performance were found. However, there were no significant associations for physical capacity (as measured by cardiorespiratory endurance). Children with higher scholastic ability were more active. Body mass index was negatively associated with scholastic rating. Endurance, force, power and physical activity were all related to scholastic ability but the correlations were all weak.</p>
<p>Tremblay, M.S., Inman, J.W., &amp; Willms, J.D. (2000). The relationship between physical activity, self-esteem, and academic achievement in 12-year-old children. <i>Pediatric Exercise Science, 12</i>(3), 312-323.</p>	<p>Accessed using SPORTDiscus</p>	<p>Exploratory study examining the relationship between children's reported level of physical activity, body-mass index, self-esteem, and reading and mathematics scores.</p>	<p>Level 4</p>	<p>6923 children in 6<sup>th</sup> grade in New Brunswick, Canada conducted in 1996</p>	<p>Data obtained from the Questionnaire of Elementary School Climate Study.</p>	<p>Increased levels of physical activity were associated with slightly lower body mass index scores. High physical activity correlated with increased self esteem. There is a weak relationship between physical activity and academic achievement in both mathematics and reading.</p>

Bailey,R. (2006). Physical education and sport in schools: A review of benefits and outcomes. <i>Journal of School Health.</i> 76(8), 397-401.	Accessed using SPORTdiscus	Review, correlational study	Level 5	Students, all ages	A review of 3 large-scale studies	Giving extra PE time does not impede academic performance and in many instances is associated with improved academic performance.
Carlson, S.A., Fulton, J.E., Lee, S.M., Maynard, L. M., Brown, D.R., Kohl, H.W. & Dietz, W. H. (2008). Physical education and academic achievement in elementary school: Data from the early childhood longitudinal study. <i>American Journal of Public Health,</i> 98(4), 721-727.	Accessed using MEDLINE	Exploratory study that looked at the data from the early childhood longitudinal study to determine if there is a link between amount of physical education and academic performance.	Level 5	5316 Kindergarten students from 1280 schools across the United States studied until they reached 5 <sup>th</sup> grade	Amount of time spent in physical education classes was compared with academic performance	Girls who had increased P.E. time may see academic benefit. There did not appear to be a difference for boys. A negative link between additional P.E. and academic performance was not found.

### **EBPX Summary**

Time shifted from academics to physical activity does not impede academic performance. Although there is strong evidence that better academic performance is associated with physical activity, evidence is only suggestive that physical activity may improve academic performance. Meta-analysis indicates that the form of the physical activity has no influence on these potential effects. There is no recent evidence that perceptual motor programs improve academic performance, however, such programs do involve physical activity. Therapists would do well to consider these programs in light of the degree of physical activity these programs afford as well as potential social and behavioral benefits involvement in such programs may confer. It is unlikely that the specific motor patterns practiced in these programs have any effect on learning readiness or academic performance.

### **EBPX Strength and Impact Summary**

There is suggestive evidence that this intervention may be effective. Therapists are cautioned to carefully measure individual outcomes when selecting this intervention