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The Association Between School-Based Physical Activity, Including Physical Education, and Academic Performance



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http://www.cdc.gov/HealthyYouth/health_and_academics/index.htm

Executive Summary

When children and adolescents participate in the recommended level of physical activity—at least 60 minutes daily—multiple health benefits accrue. Most youth, however, are not engaging in recommended levels of physical activity. Schools provide a unique venue for youth to meet the activity recommendations, as they serve nearly 56 million youth. At the same time, schools face increasing challenges in allocating time for physical education and physical activity during the school day.

There is a growing body of research focused on the association between school-based physical activity, including physical education, and academic performance among school-aged youth. To better understand these connections, this review includes studies from a range of physical activity contexts, including school-based physical education, recess, classroom-based physical activity (outside of physical education and recess), and extracurricular physical activity. The purpose of this report is to synthesize the scientific literature that has examined the association between school-based physical activity, including physical education, and academic performance, including indicators of cognitive skills and attitudes, academic behaviors, and academic achievement.

Methods

For this review, relevant research articles and reports were identified through a search of nine electronic databases using both physical activity and academic-related search terms. The search yielded a total of 406 articles that were examined to determine their match with the inclusion criteria. Forty-three articles (reporting a total of 50 unique studies) met the inclusion criteria and were read, abstracted, and coded for this synthesis.

Coded data from the articles were used to categorize and organize studies first by their physical activity context (physical education, recess, classroom-based physical activity, and extracurricular physical activities), and then by type of academic performance outcome. Academic performance outcomes have been grouped

into three categories: 1) academic achievement (e.g., grades, test scores); 2) academic behavior (e.g., on-task behavior, attendance); and 3) cognitive skills and attitudes (e.g., attention/concentration, memory, mood). Findings of the 43 articles that explored the relationship between indicators of physical activity and academic performance were then summarized.

Results

Across all 50 studies (reported in 43 articles), there were a total of 251 associations between physical activity and academic performance, representing measures of academic achievement, academic behavior, and cognitive skills and attitudes. Measures of cognitive skills and attitudes were used most frequently (112 of the 251 associations tested). Of all the associations examined, slightly more than half (50.5%) were positive, 48% were not significant, and only 1.5% were negative. Examination of the findings by each physical activity context provides insights regarding specific relationships.

1) School-Based Physical Education Studies

School-based physical education as a context category encompassed 14 studies (reported in 14 articles) that examined physical education courses or physical activity conducted in physical education class. Typically, these studies examined the impact of increasing the amount of time students spent in physical education class or manipulating the activities during physical education class. Overall, increased time in physical education appears to have a positive relationship or no relationship with academic achievement. Increased time in physical education does not appear to have a negative relationship with academic achievement. Eleven of the 14 studies found one or more positive associations between school-based physical education and indicators of academic performance; the remaining three studies found no significant associations.

2) Recess Studies

Eight recess studies (reported in six articles) explored the relationship between academic performance and recess during the school day in elementary schools. Six studies tested an intervention to examine how

recess impacts indicators of academic performance; the other two studies explored the relationships between recess and school adjustment or classroom behavior. Time spent in recess appears to have a positive relationship with, or no relationship with, children's attention, concentration, and/or on-task classroom behavior. All eight studies found one or more positive associations between recess and indicators of cognitive skills, attitudes, and academic behavior; none of the studies found negative associations.

3) Classroom Physical Activity Studies

Nine studies (reported in nine articles) explored physical activity that occurred in classrooms apart from physical education classes and recess. In general, these studies explored short physical activity breaks (5–20 minutes) or ways to introduce physical activity into learning activities that were either designed to promote learning through physical activity or provide students with a pure physical activity break. These studies examined how the introduction of brief physical activities in a classroom setting affected cognitive skills (aptitude, attention, memory) and attitudes (mood); academic behaviors (on-task behavior, concentration); and academic achievement (standardized test scores, reading literacy scores, or math fluency scores). Eight of the nine studies found positive associations between classroom-based physical activity and indicators of cognitive skills and attitudes, academic behavior, and academic achievement; none of the studies found negative associations.

4) Extracurricular Physical Activity Studies

Nineteen studies (reported in 14 articles) focused specifically on the relationship between academic performance and activities organized through school that occur outside of the regular school day. These activities included participation in school sports (interscholastic sports and other team or individual sports) as well as other after-school physical activity programs. All 19 studies examining the relationships between participation in extracurricular physical activities and academic performance found one or more positive associations.

Strengths and Limitations

This review has a number of strengths. It involved a systematic process for locating, reviewing, and coding the studies. Studies were obtained using an extensive array of search terms and international databases and were reviewed by multiple trained coders. The studies cover a broad array of contexts in which youth participate in school-based physical activities and span a period of 23 years. Furthermore, a majority (64%) of studies included in the review were intervention studies, and a majority (76%) were longitudinal.

The breadth of the review, however, is a limitation. All studies meeting the established review criteria were included and treated equally, regardless of the study characteristics (e.g., design, sample size). The studies were not ranked, weighted, or grouped according to their strengths and limitations. The breadth of the review, while revealing a variety of study designs, measures, and populations, often made comparisons and summaries difficult. As a result, conclusions are intentionally broad.

Implications for Policy

There are a number of policy implications stemming from this review:

- There is substantial evidence that physical activity can help improve academic achievement (including grades and standardized test scores).
- The articles in this review suggest that physical activity can have an impact on cognitive skills and attitudes and academic behavior, all of which are important components of improved academic performance. These include enhanced concentration and attention as well as improved classroom behavior.
- Increasing or maintaining time dedicated to physical education may help, and does not appear to adversely impact, academic performance.

Implications for Schools

The results of this review support several strategies that schools can use to help students meet national physical activity recommendations without detracting from academic performance:

- **School-based physical education:** To maximize the potential benefits of student participation in physical education class, schools and physical education teachers can consider increasing the amount of time students spend in physical education or adding components to increase the quality of physical education class. Articles in the review examined increased physical education time (achieved by increasing the number of days physical education was provided each week or lengthening class time) and/or improved quality of physical education (achieved through strategies such as using trained instructors and increasing the amount of active time during physical education class).
- **Recess:** School boards, superintendents, principals, and teachers can feel confident that providing recess to students on a regular basis may benefit academic behaviors, while also facilitating social development and contributing to overall physical activity and its associated health benefits. There was no evidence that time spent in recess had a negative association with cognitive skills, attitudes, or academic behavior.
- **Classroom-based physical activity:** Classroom teachers can incorporate movement activities and physical activity breaks into the classroom setting that may improve student performance and the classroom environment. Most interventions reviewed here used short breaks (5–20 minutes) that required little or no teacher preparation, special equipment or resources.
- **Extracurricular physical activities:** The evidence suggests that superintendents, principals, and athletic directors can develop or continue school-based sports programs without concern that these activities have a detrimental impact on students' academic performance. School administrators and teachers also can encourage after-school organizations, clubs, student groups, and parent groups to incorporate physical activities into their programs and events.