

School-Based Physical Fitness and the Link to Student Academic Outcomes and Improved School Climate

Victoria Stuart-Cassel

Children and adolescents need opportunities to regularly engage in fun and age-appropriate physical activities to maintain healthy development and fitness.¹ Schools can offer a safe and supervised environment for promoting children's physical activity to help reduce the risk of obesity and other negative health outcomes. Studies show, however, that children's access to school-based fitness activities, such as physical education (PE) and recess, has declined in the past 15 years.² This trend has been tied to the enactment of federal legislation that raised academic standards and increased pressure on schools to improve school accountability and reduce educational disparities for underperforming students. Schools responded to these new requirements by allocating more time within the school day to core academic subjects, like mathematics and reading, with the belief that increased instructional time would translate into better academic outcomes.³

More recent perspectives reflect a shift in thinking about the value of school physical activity, challenging the notion that efforts to boost student achievement must come at a cost to children's physical health. Notably, in a recent press release, U.S. Secretary of Education Arne Duncan advocated for dedicating more time to fitness-promoting activity in schools, arguing that "helping students become more active physically also helps students become more successful academically."⁴ This statement finds support in a growing body of evidence suggesting that physical activity and physical education, offered within the context of the school day, are not only essential for children's healthy development but also may contribute to children's academic achievement and positively impact school climate and conditions for learning in schools.

This brief will do the following:

- Underscore the importance of physical activity for children's health.
- Identify a role for schools in promoting quality school-based physical activity programs.
- Highlight evidence from the research linking physical activity, fitness, and academic performance.
- Highlight emerging research exploring the relationships between physical activity and school climate.
- Identify resources to help integrate school-based activity programs into the learning environment.

Victoria Stuart-Cassel, MPPA, is the executive director of EMT Associates Inc. and is on staff at the National Center for Safe and Supportive Learning Environments.

The Importance of Physical Activity for Children’s Health

For children and adolescents, regular physical activity contributes to physical fitness and overall health by increasing strength and endurance, building healthy bones and muscles, regulating weight, and promoting mental health and wellness. Physical activity also helps to reduce long-term risks of obesity and chronic illness and establishes a strong foundation for children to remain physically active into adulthood.⁵

Key Terms⁶

- **Physical activity** is bodily movement that is produced by the contraction of skeletal muscles and that substantially increases energy expenditure. Physical activity can be defined in terms of its frequency, duration, and intensity.
- **Physical fitness** is the set of attributes that people have or achieve relating to their ability to perform physical activity.
- **Physical education** is an academic subject that provides opportunities for students to learn the knowledge and skills needed to establish and maintain physically active lifestyles.

The American Academy of Pediatrics (AAP) recommends that every child engage in at least 60 minutes of physical activity each day, including aerobic, muscle strengthening, and bone strengthening activities at least three times per week.⁷ However, the reality is that most children struggle to reach physical activity goals. For example, the 2011–12 National Survey of Children’s Health revealed that only 28 percent of children 6 to 17 years of age engage in a minimum of 20 minutes of vigorous physical activity every day.⁸ Inactivity also is disproportionate among children living at or below poverty level, and among children living in neighborhoods that parents perceived to be unsafe. Importantly, levels of physical activity appear to sharply decline as children transition from childhood to adolescence, with girls being less physically active than boys across the age continuum.

The Role of Schools in Promoting Physical Activity

More than 49 million children are currently enrolled in U.S. public elementary and secondary school systems.⁹ Because children spend most of their time each day in school, schools are uniquely positioned to help children meet daily physical activity and fitness goals. This concept is especially true in more disadvantaged communities, where there are often fewer opportunities for children to safely engage in extracurricular sports and fitness activities outside of the regular school day.¹⁰ Although schools have the potential to help children become more active and physically fit, state mandates for physical activity in schools vary in terms of their comprehensiveness. *The 2012 Shape of the Nation* report noted that 25 percent of states currently require a minimum weekly amount of physical activity time for students at the elementary level, and only 14 percent set minimum requirements for middle schools.¹¹ Nine states require elementary schools to provide students with daily recess. Policy studies examining the influence of state laws on school health practices have shown that mandating minimum standards for physical education and activity can increase the number of minutes that schools allocate to school-based fitness opportunities, although district policies do not appear to have the same effect.¹²

At the school level, studies of staff perceptions on the role of physical activity in schools suggest that teachers and other school staff understand the importance of promoting children’s health and fitness, and they believe that schools should be responsible for helping children become more active. However, school staff also identify a number of barriers that prevent children from engaging in

activity programs, including insufficient time because of competing academic demands; social pressures that discourage activity, most notably for girls; and inadequate space and equipment.¹³

The Centers for Disease Control and Prevention (CDC) and the National Association for Sport and Physical Education have advocated for schools to adopt the Comprehensive School Physical Activity Program (CSPAP) model to help children meet American AAP targets for physical activity. The goals of CSPAP are to do the following:

- Provide a range of school-based physical activity components that can help all students achieve at least 60 minutes of moderate-to-vigorous physical activity each day.
- Provide coordination among model components to create a culture of physical activity that is integrated into the school environment and that builds on knowledge and skills learned in physical education.¹⁴

The CSPAP model provides a practical framework for guiding school implementation of physical activity components that are integrated into the regular school day. As discussed in the next sections, evidence suggests that creating this culture of physical activity in schools not only benefits children’s health but also contributes to the school environment in other positive ways, such as promoting academic achievement and improving the social and behavioral climate in schools.

Comprehensive School Physical Activity Program

- **Physical education** is an academic subject offered during the school day that provides opportunities for students to obtain the knowledge and skills needed to establish and maintain physically active lifestyles. Physical education is the foundation of the CSPAP model.
- **Physical activity during school** includes regular physical activity breaks offered throughout the school day, such as recess, in-class physical activity breaks, or activity and movement that is integrated into academic instruction.
- **Physical activity before and after school** includes physical activities offered before and after school that are organized through schools to occur outside of the regular school day.
- **Staff involvement** includes school employee wellness programs that are designed to improve staff health and increase staff physical activity levels.
- **Family and community engagement** includes opportunities for parents and family members to volunteer or participate in school-based fitness activities or events. Community engagement supports coordination and resource-sharing between schools and youth-serving organizations.

Source: Centers for Disease Control and Prevention. (2013). *Comprehensive school physical activity programs: A guide for schools*. Atlanta, GA: U.S. Department of Health and Human Services.

Physical Activity and Academic Achievement

During the past decade, the volume of research examining the relationship among physical activity, physical fitness, and student achievement has increased.¹⁵ This body of research includes a number of large-scale school-based studies that explored the associations among aerobic fitness, body mass index (BMI), and performance on standardized mathematics and reading tests. The Texas Fitness Study is one seminal study that involved more than 2.4 million public school students. The study found that, after controlling for socioeconomic status, children with higher aerobic fitness levels and lower BMIs earned higher scores on standardized achievement tests, and they had better school attendance and fewer disciplinary concerns than children who were less physically fit.¹⁶ Comparable studies in California and Nebraska found similar results, providing further evidence that children who are healthier and more physically active also perform better on standard measures of academic achievement.^{17, 18}

In 2010, the CDC conducted a comprehensive review and synthesis of the research literature exploring the association among participation in school-based physical activity programs, academic behaviors, and academic performance. The researchers concluded, based on their review of 50 separate studies, that school physical activity was positively associated with academic performance and cognitive functioning, or at least had no detrimental effect. The study findings support the conclusion that maintaining or increasing time children spend engaging in school physical activity does not detract from student achievement, and it may contribute to children's academic success.¹⁹

Other recent studies confirm that participation in physical activity can benefit academic learning and that involvement in as little as one classroom-based session involving activity or movement can be sufficient to boost attention and memory. Studies also have begun to use brain imaging to pinpoint specific brain functions, such as relational and working memory, that are positively impacted by fitness activities and that produce academic benefits. These benefits are most pronounced when programs feature high-intensity, aerobic activity and when programs are scheduled in the early or middle portion of the school day.²⁰

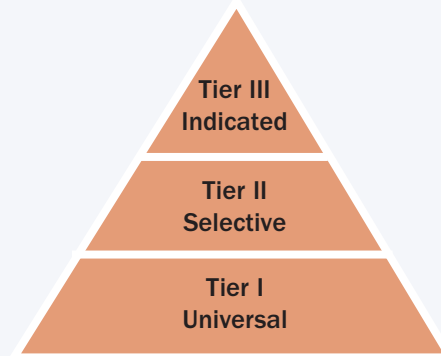
School-Based Physical Activity Components and the Relationship to School Climate

When children engage in quality school-based physical activity components, including recess or activity breaks, there may be positive impacts on the social and behavioral climate in schools. The term school climate refers to the quality of school life and involves the broad dimensions of school engagement, school safety, and the school environment.²¹ Research has linked positive *school climate* to improved academic outcomes for youth in schools.²² Understanding how school-based physical activity programming might intersect with school climate is an emerging area of study that explores not only how opportunities for students to be more physically active can positively influence the school environment but also how students' perceptions of safety and school climate may, in turn, influence how actively they participate in physical education.

Integrating Physical Activity Programming Into Multi-Tiered Systems of Support²³

Multi-tiered systems of support (MTSS) applied in school settings provide a framework for preventing or reducing learning challenges and problem behaviors in schools. The following model illustrates how physical activity programs can be integrated into MTSS as Tier I universal health promotion strategies that benefit the health, achievement, and well-being of all students. Physical activity programs also may offer important benefits for students with special behavioral or academic needs who are identified for Tier II and Tier III supports.

- **Universal (Tier I).** All students receive core or universal academic behavioral supports.
- **Selective (Tier II).** Some students with identified behavioral or academic needs receive supplemental or targeted instruction and intervention.
- **Indicated (Tier III).** Few students with the most serious behavioral or academic needs receive intensive and individualized supports.



Recess and School Climate

The AAP recently published a policy statement emphasizing the importance of recess as a critical aspect of the school day and a necessary element for children’s development.²⁴ Recess provides children with needed breaks from instruction that allow them to rest and refocus their attention. Recess also provides children with some of the few unstructured opportunities to interact with peers, practice social skills, and learn how to resolve conflicts.²⁵ These opportunities for unstructured, child-directed play can help children build resilience and begin to acquire necessary skills to help navigate complex social relationships.

Playground-based recess programs have emerged as a strategy to increase opportunities for school-based physical activity that promotes fitness among children. Some evidence also suggests that recess-based activities may positively impact children’s social development through coaching, positive role modeling, and instruction in conflict resolution techniques. For instance, a recent study of the Playworks high-functioning recess program examined the impact of structured recess on a number of school climate outcomes. Although study results were mixed, teachers in schools that implemented the intervention reported measureable increases in perceptions of student safety and inclusion during recess. Teachers also reported significantly lower rates of bullying exposure, and they perceived fewer challenges with students transitioning from recess to instructional activities after children returned to the classroom.²⁶ Similar studies exploring the relationship between participation in physical activity at recess and measures of the school environment found that engagement in physical activity at recess was positively associated with peer relationships, relatedness to school, and school climate.²⁷

Recess breaks also may contribute to improved behavior in the classroom. For example, one study found that teacher ratings of student behavior were significantly higher in schools where students had at least 15 minutes of recess, compared with schools with no recess break during the school day.²⁸ The same study found that urban, minority children from low-income families were less likely than other children to receive breaks from classroom instruction.²⁹ Other studies have shown that when time

scheduled for recess is postponed during the school day, elementary school children become increasingly inattentive in class. Children also spend more time on-task and are more focused on recess days than on days with no recess breaks. Children who are overactive in the classroom, for example, children with attention deficit hyperactivity disorder, appear to benefit from recess most.³⁰

Despite the known benefits of recess, in many schools, restricting or reducing recess has been used as a punitive disciplinary consequence for children who engage in disruptive behavior.³¹ However, concerns about childhood obesity and acknowledgement of the benefits of physical activity have led to a shift away from denying recess as a disciplinary strategy. For example, data from the 2012 National School Health Policies and Practices Survey suggest that 44 percent of U.S. districts now actively discourage teachers from removing students from recess as part of their approach to discipline.³²

Classroom-Based Activity and Classroom Behavior

Regular physical activity breaks scheduled during classroom instruction and active instruction that integrates movement into academic concepts are other strategies that may increase student engagement in learning and positively impact children's behavior in the classroom.³³ For instance, one study exploring the effects of a classroom-based physical activity program on children's physical activity levels and classroom behavior found moderate improvements in both physical activity and on-task behavior following the activity intervention. Children who were the most disruptive, exhibiting the least on-task behavior prior to the intervention, showed the greatest improvements in behavior.³⁴ Another study found that students in classrooms that incorporated physical activity interventions reported higher levels of learning enjoyment compared with students receiving more traditional forms of instruction. Studies also show that integrating short activity breaks into classroom instruction is one of the most cost-effective prevention approaches for reaching large numbers of students in a school setting. Further, emerging evidence suggests that by interrupting periods of sedentary classroom behavior, these activity breaks may help reduce children's risk of obesity-related illnesses, such as diabetes and heart disease.^{35, 36}

School Climate and Engagement in Physical Activity

Evidence also suggests that social climate and safety in schools may influence how actively students participate in school-based physical activity and physical education. For example, a study exploring the longitudinal relationship among bullying, physical activity, and quality of life found that children of normal weight who experienced bullying in their PE classes were less likely one year later to exercise and be physically active.³⁷ The authors concluded that efforts to limit teasing and improve the social climate in PE could increase children's physical activity levels and their health-related quality of life. A related study found that students who were bullied at school attended fewer days of PE and were less likely to reach their daily targeted physical activity goals than students with no bullying exposure.³⁸

In Summary

Increased pressure on schools to improve accountability and test performance in recent years has led to a reduction or elimination in physical education and recess. However, new and encouraging evidence about the potential benefits physical activity for academic performance has led many schools to rethink their school-based physical activity programs and to increasingly integrate physical activity into the school culture. This brief explored how school efforts to expand physical activity opportunities may not only benefit children's physical health but also increase school achievement and impact the quality of the school environment to promote children's learning and school success.

Resources for Schools

Centers for Disease Control and Prevention, Adolescent and School Health is a federal agency that promotes the health and well-being of children and adolescents, in part, by implementing school- and community-based nutrition and physical activity programs through grants to nongovernmental organizations and states, territories, and tribal governments. The website offers resources, including current research, fact sheets, curriculum analysis tools, toolkits, and program guides. <http://www.cdc.gov/healthyyouth/physicalactivity/facts.htm>

Let's Move! Active Schools is a public-private partnership among the Alliance for a Healthier Generation, the President's Council on Fitness, Sports & Nutrition, and SHAPE America supported by the U.S. Departments of Health and Human Services and Education. Let's Move! Active Schools supports schools in incorporating innovative physical activity and physical education into the school day. The website features online tools and resources to help schools develop comprehensive physical activity programs. <http://www.letsmoveschools.org/resources-grants/>

The President's Council on Fitness, Sports & Nutrition seeks to improve the health and quality of life for Americans of all ages through public and private partnerships. The website provides facts, statistics, research, and reports on physical activity, nutrition, and obesity. <http://www.fitness.gov/resource-center/>

The Partnership for a Healthier America (PHA) is a nonprofit, independent organization that works with national leaders to leverage support for strategies to end childhood obesity. PHA aims to increase access to affordable, healthier choices for families and children across the country. The website includes facts about childhood obesity, recipes, and Designed to Move, a resource that provides a framework for action. <http://ahealthieramerica.org/resources/>

Safe Routes to School National Partnership is a network of organizations, agencies, and professional groups that promotes healthier children and communities through safe walking and bicycling to and from school and in everyday life. The website provides resources on program implementation, advocacy, and policy change, including publications, webinars, news, and research. <http://saferoutespartnership.org/resourcecenter>

References

- ¹ Centers for Disease Control and Prevention. (2013). *Comprehensive school physical activity programs: A guide for schools*. Atlanta, GA: U.S. Department of Health and Human Services.
- ² Bohn-Gettler, C., & Pellegrini, A. (2014). Recess in primary school: The disjuncture between educational policy and scientific research. In B. H. Bornstein & R. L. Wiener (Eds.), *Justice, Conflict and Wellbeing* (pp. 313–336). New York, NY: Springer.
- ³ Ibid.
- ⁴ Yu, D. (2013). *Let's Move! Active Schools campaign hits the school yard*. Retrieved from <http://www.ed.gov/blog/2013/03/lets-move-active-schools-initiative-hits-the-schoolyard/>
- ⁵ Centers for Disease Control and Prevention. (2013). *Comprehensive school physical activity programs: A guide for schools*. Atlanta, GA: U.S. Department of Health and Human Services.
- ⁶ Ibid.
- ⁷ Committee on Sports Medicine and Fitness and Committee on School Health. (2000). Physical fitness and activity in schools. *Pediatrics*, *105*(5), 1156–1157.
- ⁸ National Survey of Children's Health. (2011/12). *Data query from the Child and Adolescent Health Measurement Initiative*. Retrieved from <http://www.childhealthdata.org>
- ⁹ National Center for Education Statistics. (2014). *Selected statistics from the public elementary and secondary education school universe school year 2012–13* (NCES 2014-098). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics Retrieved from <http://nces.ed.gov/pubs2014/2014098.pdf>
- ¹⁰ Active Living Research. (2011). *Do all children have places to be active? Disparities in access to physical activity environments in racial and ethnic minority and low-income communities*. San Diego, CA: Author. Retrieved from http://activelivingresearch.org/sites/default/files/Synthesis_Taylor-Lou_Disparities_Nov2011_O.pdf
- ¹¹ National Associates for Sport and Physical Education & American Heart Association. (2012). *2012 shape of the nation report: Status of physical education in the USA*. Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance. Retrieved from <http://www.shapeamerica.org/advocacy/son/2012/upload/2012-Shape-of-Nation-full-report-web.pdf>
- ¹² Slater, S. J., Nicholson, L., Chriqui, L., Turner, L., & Chaloupka, F. (2012). The impact of state laws and district policies on physical education and recess practices in nationally representative sample of US public elementary schools. *Archives of Pediatric Adolescent Medicine*, *166*(4), 311–316.
- ¹³ Huberty, J., Dinkel, D., Coleman, J., Beighle, A., & Apenteng, B. (2012). The role of schools in children's physical activity participation: Staff perceptions. *Health Education Research*, *27*(6), 986–995.
- ¹⁴ Centers for Disease Control and Prevention. (2013). *Comprehensive school physical activity programs: A guide for schools*. Atlanta, GA: U.S. Department of Health and Human Services.
- ¹⁵ Castelli, D., Glowacki, E., Barcelona, J., Calvert, H., & Hwang, J. (2015). *Active education: Growing evidence on physical activity and academic performance*. Retrieved from http://activelivingresearch.org/sites/default/files/ALR_Brief_ActiveEducation_Jan2015.pdf
- ¹⁶ Welk, G. (2009). *Cardiovascular fitness and body mass index are associated with academic achievement in schools*. Dallas, TX: Cooper Institute.
- ¹⁷ Roberts, C. K., Freed, B., & McCarthy, W.J. (2010). Low aerobic fitness and obesity are associated with lower standardized test scores in children. *Journal of Pediatrics*, *156*(5), 711–718.
- ¹⁸ Rauner, R. R., Walters, R.W., Avery, M., & Wanser, T. J. (2013). Aerobic fitness, more than weight, predicts standardized math and reading scores. *Journal of Pediatrics*, *163*(2), 344–348.
- ¹⁹ Rasberry, C., Lee, S., Robin, L., Laris, B., & Russell, L. (2011). The association between school-based physical activity, including physical education, and academic performance: A systematic review of the literature. *Preventive Medicine*, *52*(Suppl. 1), S10–S20.
- ²⁰ Tomporowski, P.D. (2003). Effects of acute bouts of exercise on cognition. *Acta Psychologica*, *112*(3), 297–324.
- ²¹ MacNeil, A. J., Prater, D. L., & Busch, S. 2009. The effects of school culture and climate on student achievement. *International Journal of Leadership in Education*, *12*(1), 73–84.

- ²² MacNeil, A., Prater, D., & Busch, S. (2009). The effects of school culture and climate on student achievement. *International Journal of Leadership in Education*, 12(1), 73–84.
- ²³ Florida's Positive Behavior Support Project. (2011). *Implementing a multi-tiered system of support for behavior: Recommended practices for school and district leaders*. Tampa: University of South Florida. Retrieved from http://flpbs.fmhi.usf.edu/pdfs/RTIB%20Guide%20101811_final.pdf
- ²⁴ American Academy of Pediatrics. (2013). Policy statement: The crucial role of recess in school. *Pediatrics*, 131(1), 183–188.
- ²⁵ Ibid.
- ²⁶ Mathematica Policy Research and John W. Gardner Center for Youth and Their Communities, Stanford University. (2013). *Impact and implementation findings from an experimental evaluation of Playworks: Effects on school climate, academic learning, student social skills and behavior*. New York, NY: Robert Wood Johnson Foundation. Retrieved from <http://www.rwjf.org/content/dam/farm/reports/evaluations/2013/rwjf405971>
- ²⁷ Haapala, H. L., Hirvensalo, M. H., Laine, K., Laakso, L., Hakonen, H., Kankaanpaa, A., Lintunen, T., & Tammelin, T. H. (2014). Recess, physical activity and school-related social factors in Finnish primary and lower secondary schools: Cross-sectional associations. *BMC Public Health*, 14, 1114–1122.
- ²⁸ Barros, R., Silver, E., & Stein, R. 2009. School recess and group classroom behavior. *Pediatrics*, 123(2), 431–436.
- ²⁹ Ibid.
- ³⁰ Jarrett, O. S., Maxwell, D. M., Dickerson, C., Hoge, P., Davies, G., & Yetley, A. (1998). The impact of recess on classroom behavior: Group effects and individual differences. *Journal of Educational Research*, 92(2), 121–126.
- ³¹ Turner, L., Chriqui, J. F., & Chaloupka, F. J. (2013). Withholding recess from elementary school students: Policies matter. *Journal of School Health*, 83(8), 533–541.
- ³² Centers for Disease Control and Prevention. (2012). *School health policies and practices survey*. Atlanta, GA: U.S. Department of Health and Human Services. Retrieved from http://www.cdc.gov/healthyyouth/shpps/2012/factsheets/pdf/FS_PhysicalActivity_SHPPS2012.pdf
- ³³ Castelli, D., Glowacki, E., Barcelona, J., Calvert, H., & Hwang, J. (2015). *Active education: Growing evidence on physical activity and academic performance*. San Diego, CA: Active Living Research. Retrieved from http://activelivingresearch.org/sites/default/files/ALR_Brief_ActiveEducation_Jan2015.pdf
- ³⁴ Mahar, M., Murphy, S., Rowe, D., Golden, J., Shields, A. T., & Raedeke, T. (2006). Effects of a classroom-based program on physical activity and on-task behavior. *Medicine & Science in Sports and Exercise*, 38(12), 2086–2094.
- ³⁵ Belcher, Berrigan, D., Papachrisotopoulou, A., Brady, S. M., Bernstein, S. B., Brychta, R. J., & Yanovski, J. A. (2015). Effects of interrupting children's sedentary behaviors with activity on metabolic function: A randomized trial. *The Journal of Clinical Endocrinology & Metabolism*. Retrieved from <http://press.endocrine.org/doi/10.1210/jc.2015-2803>
- ³⁶ Babey, S., Wu, S., & Cohen, D. (2014). How can schools help youth increase physical activity? An economic analysis comparing school-based programs. *Preventive Medicine*, 69, S55–S60.
- ³⁷ Jensen, C., Cushing, C., & Elledge, A. (2013). Associations between teasing, quality of life, and physical activity among preadolescent children. *Journal of Pediatric Psychology*, 39(1), 65–73.
- ³⁸ Roman, C. G., & Taylor, C. J. (2013). A multilevel assessment of school climate, bullying victimization, and physical activity. *Journal of School Health*, 83(6), 400–407.



1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000 | TTY: 877.334.3499

www.air.org