

Active Living Research

Building Evidence to Prevent Childhood Obesity and Support Active Communities
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Do Short Physical Activity Breaks in Classrooms Work?

Introduction

Childhood obesity has reached epidemic proportions in the United States. Almost 17 percent of children and teens—more than 12 million young people—are obese.^{1, 2} Physical activity can help children and teens maintain a healthy weight, but national studies show low levels of physical activity among children and teens.³⁻⁶ School-aged children spend more than half of their waking hours at school,⁷ making schools a prime location to increase physical activity among children. There are several evidence-based strategies for increasing physical activity at school.⁸

Creating activity breaks at school, such as moving and stepping for up to 20 minutes at a time in the classroom during the school day, is a relatively new and innovative method for increasing physical activity among children. Several activity break programs already are available for teachers to use with children at different ages, and many of them have been evaluated. This brief summarizes

the research on how programs that provide classroom physical activity breaks impact physical activity, on-task behavior, health, and related factors in children. This brief focuses on activity breaks conducted in the classroom, and does not cover physical education classes, recess, or physical activity breaks outside of schools.

Program Definitions

Instant Recess[®] uses culturally salient music and moves to encourage physical activity in 10-minute bouts throughout the school day. Materials for this program are available at: www.journeyworks.com/Nutrition-Physical-Activity/products/206/.

TAKE 10! incorporates grade-specific activities linked to core curriculum objectives for mathematics, science, language arts, social studies, and character education in 10-minute segments.⁹ Materials for this program are available at: www.take10.net.

The Energizers program, based on TAKE 10!, allows students to stand and move in 10-minute intervals during classroom instruction using grade-appropriate, teacher-led activities.¹⁰ Materials for this program are available at: www.ecu.edu/cs-hhp/exss/upload/Energizers_for_Grades_K_2.pdf.

Happy 10, also based on TAKE 10!, encourages classroom-based, teacher-led physical activity for 10 minutes at least once per school day.¹¹

The **Promoting Lifestyle Activity for Youth (PLAY)** program focuses on teaching children in grades 4 through 6 active lifestyle habits and encourages accumulation of 30 to 60 minutes of moderate-to-vigorous physical activity daily.¹² PLAY includes a 15-minute break for physical activity during the school day.

Physical Activity Across the Curriculum (PAAC), somewhat similar to TAKE 10!, promotes 90 minutes per week of active academic lessons through moderate-to-vigorous physical activity in a study of 24 elementary schools in Kansas.¹³

Texas I-CAN incorporates movement into regular classroom lessons (e.g., math, language arts, science, social studies, and health), in 10–15 minute bouts, to achieve academic curricular goals.¹⁴ Teachers are provided with a full day of training at the beginning of the program, and a half-day refresher in the middle of the school year.

The **Making the Grade with Diet and Exercise** program for elementary school students includes participation in 10–20 minutes of teacher-led physical activity at the beginning of each school day.

Activity Bursts in the Classroom for Fitness (ABC for Fitness) encourages structured physical activity during the time teachers would ordinarily spend settling students down or getting students back on task. Activity bursts, spread throughout the day, include a warm-up, a core strength or aerobic activity, and a cool-down. The length and number of activities varies.

Key Research Results

Providing short physical activity breaks during the school day increases physical activity in students

- Instant Recess[®] was evaluated by direct observation in 3rd, 4th and 5th grade classrooms in eight elementary schools in Winston-Salem, N.C.¹⁵ Teachers were trained in a half-day workshop and acted as “champions” to encourage use by other teachers. After implementing Instant Recess,[®] intervention schools showed significant increases in light- (51%) and moderate-intensity (16%) classroom-based physical activity. Control schools did not show significant increases in classroom physical activity intensity until after they began implementing Instant Recess.[®] There was a direct correlation between teacher self-reported enthusiasm and minutes of classroom time spent in Instant Recess.[®]
- A separate evaluation of Instant Recess[®] in six elementary schools in Los Angeles showed an increase of 1,841–1,910 steps per school day, compared with students who did not have the physical activity breaks.¹⁶
- Following a two-hour training session for teachers, an evaluation of TAKE 10! was conducted in three classrooms in a suburban school in Georgia. During a five-day evaluation the students, from grades 1, 3, and 5, spent an average of 86.1 minutes in TAKE 10! sessions, averaging 644–1,376 steps per 10-minute session.
- An evaluation of Energizers among 243 students from kindergarten through 4th grade used pedometers to measure daily steps during the school day. Participation in Energizers raised physical activity levels by 782 steps per school day, compared to control classrooms that did not have similar physical activity breaks.
- The Happy 10 program was implemented by teachers in grades 1 through 5 in Beijing, China.¹¹ Fourteen classrooms with 328 students were in the intervention school and 12 classrooms with 425 students were in the control school. Questionnaires were used to assess physical activity. Before and after tests showed a significant increase in hours per day spent in reported physical activity in intervention schools (from 2.8 to 3.3 hours/day) and a significant decrease in control schools (from 4.4 to 2.9 hours/day). The difference between intervention and control schools also was statistically significant, though the surprisingly large effects may be due to the self-report measures.
- Thirty-five schools in Arizona participated in an evaluation of PLAY, comparing it with no treatment, standard physical education (PE) only, and PLAY plus PE. Compared to the control group, the study showed a significant increase in the steps taken by children who participated in the PLAY program only (+1,418 steps); and by those who participated in the PLAY plus PE program (+1,583). Girls experienced even larger improvements. Girls in the PLAY plus PE group took 2,277 more steps per day than those in the control group.

- One evaluation of PAAC found that children in schools implementing the program were roughly 12 percent more physically active during the school day than those in schools that did not take part in PAAC. The program also had a positive impact on weekend physical activity among participating students: They were 17 percent more active than peers in non-participating schools. Students were more physically active in classrooms with more physically active teachers.

Providing short physical activity breaks during the school day can help improve on-task behavior

- In Texas I-CAN, on-task behavior was measured by direct observation. Third grade classrooms compared time on-task before and after students participated in an active lesson and an inactive lesson. Students had small, but not statistically significant, increases in time on-task after an active lesson. However, there was a significant decrease in time on task after students participated in an inactive lesson. The authors concluded that participation in active school lessons can prevent declines in on-task behavior among students.
- The evaluation of the Energizers program described above showed a 20 percent improvement in on-task behavior among the least on-task students.¹⁰ Overall on-task behavior among all students improved by 8 percent.
- Instant Recess® resulted in a significant, 11 percent increase in the percentage of time students devoted to on-task behavior.¹⁵
- Children participating in the PAAC evaluation referenced above experienced greater improvements in composite, reading, math, and spelling scores compared to children in control schools.¹³
- An evaluation of Making the Grade with Diet and Exercise found that the number of discipline referrals was 58 percent lower following the implementation of the program than it was before the program.¹⁷

Providing short physical activity breaks during the school day improves some measures of health

- ABC for Fitness was studied over one school year among 1,216 students in grades 2 through 4 in five schools in Missouri.¹⁸ The program was evaluated using objective data on student aerobic capacity and body composition, as well as muscle strength, endurance, and flexibility. Students in participating schools had greater improvements in strength and flexibility than students in control schools. They also saw a 7 percent decrease in use of ADHD medication and a 5 percent decrease in use of asthma medication. However, students in control schools had significantly smaller increases in their body mass indices (BMIs) and weights compared to students in intervention schools. No differences between groups were observed for classroom behavior, academic performance, or attitudes toward physical activity.
- The Making the Grade with Diet and Exercise program showed a 67 percent decline in school nurse visits.¹⁷

- In the PAAC study, increases in BMI over the three-year evaluation period were significantly smaller in schools that conducted more than 75 minutes of active lessons per week than in schools that conducted less than 75 minutes.¹³ However, there were no differences in other risk indicators such as cardiorespiratory fitness and blood lipids.

Providing short physical activity breaks during the school day may not improve all measures of physical activity or health outcomes

- While the PLAY curriculum increased daily steps among girls who participated in the program, PLAY did not appear to be effective in boys.¹²
- Over three years in the PAAC study, students who participated in activity breaks did not have statistically different BMIs than those who did not participate.¹³ However, schools that conducted at least 75 minutes per week of activity breaks did slow down excess weight gain among students.

Providing short physical activity breaks during the school day may compete with other school priorities and be perceived negatively by teachers

- In the PAAC study, participating teachers reported needing more time to incorporate physical activity into lesson plans and needing to develop more lessons appropriate for students in 4th and 5th grades because students perceived breaks as too 'babyish.' To conduct 90 minutes of active academic lessons per week, teachers said they needed more lessons that could be taught within a small classroom, and wanted a forum to share ideas on what lessons work well in the classroom.
- PE2GO trained teachers to provide PE lessons in their classrooms, targeting 4th and 5th grade classrooms whose PE classes and other physical activity opportunities had been reduced or eliminated.¹⁹ When asked about the barriers to implementation, teachers noted indoor space constraints, inadequate training, and safety.
- Action School! BC is an active school model that included, but was not limited to, classroom activity breaks as a means to increase physical activity throughout the school day.²⁰ Negative comments about the program from teacher focus groups included competing curriculum demands, needing more preparation time, needing a supportive school environment, and lack of appropriate footwear and clothing for children. Negative comments from school facilitators included teacher overload, limited teacher time to familiarize themselves with the resources provided, lack of teacher belief in the priority of physical activity, lack of communication among teachers, and limited space.

Conclusions and Considerations

- Short physical activity breaks during the school day may increase physical activity, improve student behavior and on-task behavior, and improve some measures of health. However, this brief is not an exhaustive review of the literature. Several literature reviews have been published that thoroughly investigate the association between physical activity breaks and outcomes among a variety of populations, including children, and in a variety of settings. Relevant reviews are listed at the end of this brief.
- While classroom physical activity breaks have been shown to increase physical activity, there is limited evidence to suggest that they can impact other measures of health related to chronic disease (e.g., BMI, blood pressure, waist circumference). It is possible that the level of physical activity achieved during classroom activity breaks may not be sufficient to impact chronic disease risk factors among children. However, given the evidence suggesting that classroom activity breaks can impact overall daily physical activity, classroom activity breaks may encourage students to be active on their own outside of class, which could help students meet the recommended 60 minutes per day of moderate-to-vigorous physical activity.²¹ In addition, given the recent evidence of the dangers of sedentary behavior,^{22, 23} classroom activity breaks may provide an opportunity to reduce long bouts of sitting which could, in turn, reduce chronic disease risk.
- Classroom physical activity breaks can help increase physical activity among children during the school day and potentially complement daily physical education programs (i.e., the PLAY program). In an era of tight budgets that may prevent schools from providing daily high-quality P.E., classroom physical activity breaks may act as a low-burden alternative.
- Classroom physical activity breaks can be integrated into academic lessons, allowing teachers to teach academic content (e.g., math) through physical activity. Physically active lessons can increase, or prevent declines in, the amount of time students spend on task, which may improve academic performance. A report from the Centers for Disease Control and Prevention summarizes research on the link between physical education, physical activity, and academic performance.²⁴ A brief from Active Living Research also summarizes evidence on the link between physical education, physical activity, and academic performance.²⁵
- Teachers may need training to incorporate activity breaks into existing classroom activities. Most programs described above provided just two to eight hours of training for teachers. Providing continuing education credit for teachers who participate in activity break training may be a strategy for increasing teacher enthusiasm for the training.¹⁵
- It may be important to involve teachers in the planning, development and/or selection of classroom activity break materials and procedures, in order to reduce potential resistance to implementation of classroom activity breaks.

- Under-resourced schools that are at risk for cutting funding for PE may benefit most from classroom activity breaks. However, several studies noted indoor space constraints as a limitation for implementing classroom activity breaks. If under-resourced schools are also less likely to have adequate classroom space in which to implement activity breaks, this could pose an additional barrier to implementing activity breaks in classrooms.
- Limited data are available on the impact of classroom activity breaks among middle school and high school students, which is when the largest decreases in daily physical activity and largest increases in sedentary behavior and BMI tend to occur.⁵ Additional research is needed to understand methods for incorporating classroom physical activity breaks among older children and adolescents, or how to engage older students in school day physical activity through different types of programs. The PAAC study suggested that different approaches for older students may need to begin as early as 4th or 5th grade.
- Additional research is needed to understand how to assist teachers with adapting classroom activity break materials to make them most effective for children with physical, cognitive, and emotional disabilities.

Policy Implications

- Twelve states have school physical activity requirements, which set standards for how schools augment PE to increase physical activity levels.²⁶ Classroom physical activity breaks may help meet state requirements for daily school-based physical activity.
- School officials can support classroom physical activity breaks by incorporating them into daily physical activity requirements outside physical education classes and by enforcing local and statewide mandates for daily physical activity in school.
- Schools may need to include language in dress code policies that supports implementation of classroom physical activity breaks by encouraging students to wear clothing conducive to physical activity during the school day.

Relevant Literature Reviews

Below are several literature reviews for those interested in reviewing more research on physical activity breaks. Studies on physical activity breaks in classrooms that are included in the citations below have been included in this brief.

Barr-Anderson, D.J., et al., *Integration of short bouts of physical activity into organizational routine a systematic review of the literature*. Am J Prev Med, 2011. **40**(1): p. 76-93.²⁷

Bartholomew, J.B. and E.M. Jowers, *Physically active academic lessons in elementary children*. Prev Med, 2011. **52 Suppl 1**: p. S51-4.²⁸

Centers for Disease Control and Prevention, *The association between school based physical activity, including physical education, and academic performance*. 2010, U.S. Department of Health and Human Services: Atlanta, GA.²⁴

Donnelly, J.E. and K. Lambourne, *Classroom-based physical activity, cognition, and academic achievement*. Prev Med, 2011. **52 Suppl 1**: p. S36-42.²⁹

Kibbe, D.L., et al., *Ten Years of TAKE 10![®]: Integrating physical activity with academic concepts in elementary school classrooms*. Prev Med, 2011. **52 Suppl 1**: p. S43-50.³⁰

Mahar, M.T., *Impact of short bouts of physical activity on attention-to-task in elementary school children*. Prev Med, 2011. **52 Suppl 1**: p. S60-4.³¹

Rasberry, C.N., et al., *The association between school-based physical activity, including physical education, and academic performance: a systematic review of the literature*. Prev Med, 2011. **52 Suppl 1**: p. S10-20.³²

This brief was prepared by Melicia C. Whitt-Glover, Ph.D., and Amber T. Porter, BS, both of Gramercy Research Group, LLC, as well as Toni (Antronette) K. Yancey, MD, MPH of the UCLA School of Public Health. Ramine C. Alexander, Gramercy Research Group and Virginia Polytechnic Institute and State University, Jeskell M. Creecy, Gramercy Research Group and Winston-Salem State University, and Active Living Research staff, contributed as well. Peer review was provided by Joseph E. Donnelly, Ed.D, Center for Physical Activity and Weight Management, University of Kansas; and NiCole R. Keith, Ph.D., FACSM, Indiana University-Purdue University, Indianapolis.

Disclosures

Dr. Toni Yancey's company Imhotep Publishing Inc. dba Instant Recess owns the Instant Recess[®] trademark and receives a licensing fee for the use of the trademark and royalties on sales of Instant Recess[®] materials. Royalties for Instant Recess[®] DVDs and CDs featuring professional sports organizations and religious institutions are donated to non-profits to promote the active living mission. Dr. Yancey also receives a royalty from the University of California Press on sales of her book *Instant Recess: Building a Fit Nation 10 Minutes at a Time*. Drs. Melicia C. Whitt-Glover and Toni Yancey have received federal and foundation funding to develop and evaluate Instant Recess[®] materials.

For updates and a Web-based version of this brief, visit www.activelivingresearch.org.

Active Living Research, a national program of the Robert Wood Johnson Foundation, stimulates and supports research to identify environmental factors and policies that influence physical activity for children and families to inform effective childhood obesity prevention strategies, particularly in low-income and racial/ethnic communities at highest risk. Active Living Research wants solid research to be part of the public debate about active living.

Active Living Research

University of California, San Diego
3900 Fifth Avenue, Suite 310
San Diego, CA 92103-3138
www.activelivingresearch.org

Endnotes

- 1 CDC grand rounds: childhood obesity in the United States. *MMWR Morb Mortal Wkly Rep*, 2011. **60**(2): p. 42–6.
- 2 Ogden, C.L., et al., *Prevalence of high body mass index in US children and adolescents, 2007–2008*. *JAMA*, 2010. **303**(3): p. 242–9.
- 3 Troiano, R.P., et al., *Physical activity in the United States measured by accelerometer*. *Med Sci Sports Exerc*, 2008. **40**(1): p. 181–8.
- 4 Belcher, B.R., et al., *Physical activity in US youth: effect of race/ethnicity, age, gender, and weight status*. *Med Sci Sports Exerc*. **42**(12): p. 2211–21.
- 5 Whitt-Glover, M.C., et al., *Disparities in physical activity and sedentary behaviors among US children and adolescents: prevalence, correlates, and intervention implications*. *J Public Health Policy*, 2009. **30 Suppl 1**: p. S309–34.
- 6 Gortmaker, S.L., et al., *Disparities in Youth Physical Activity in the United States: 2003–2006*. *Med Sci Sports Exerc*.
- 7 Guinhouya, B.C., et al., *How school time physical activity is the “big one” for daily activity among schoolchildren: a semi-experimental approach*. *J Phys Act Health*, 2009. **6**(4): p. 510–9.
- 8 Ward, D.S., *School policies on physical education and physical activity: A research synthesis*. 2011, Active Living Research, a National Program of the Robert Wood Johnson Foundation: Princeton, NJ.
- 9 Stewart, J.A., et al., *Exercise level and energy expenditure in the TAKE 10! in-class physical activity program*. *J Sch Health*, 2004. **74**(10): p. 397–400.
- 10 Mahar, M.T., et al., *Effects of a classroom-based program on physical activity and on-task behavior*. *Med Sci Sports Exerc*, 2006. **38**(12): p. 2086–94.
- 11 Liu, A.L., et al., *Report on childhood obesity in China (6) evaluation of a classroom-based physical activity promotion program*. *Biomed Environ Sci*, 2007. **20**(1): p. 19–23.
- 12 Pangrazi, R.P., et al., *Impact of Promoting Lifestyle Activity for Youth (PLAY) on children’s physical activity*. *J Sch Health*, 2003. **73**(8): p. 317–21.
- 13 Donnelly, J.E., et al., *Physical Activity Across the Curriculum (PAAC): a randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children*. *Prev Med*, 2009. **49**(4): p. 336–41.
- 14 Grieco, L.A., E.M. Jowers, and J.B. Bartholomew, *Physically active academic lessons and time on task: the moderating effect of body mass index*. *Med Sci Sports Exerc*, 2009. **41**(10): p. 1921–6.
- 15 Whitt-Glover, M.C., S.A. Ham, and A.K. Yancey, *Instant Recess: A Practical Tool for Increasing Physical Activity During the School Day*. *Prog Community Health Partnersh*, 2011. **5**(3): p. 289–97.
- 16 Woods, C.D., *Evaluation of Instant Recess exercise breaks as a means for implementing LAUSD physical activity policy in elementary schools*, 2011, University of California Los Angeles. p. 76.
- 17 Sibley, B.A., et al., *Making the grade with diet and exercise*. *AASA Journal of Scholarship and Practice*, 2008. **5**(2): p. 38–45.
- 18 Katz, D.L., et al., *Putting physical activity where it fits in the school day: preliminary results of the ABC (Activity Bursts in the Classroom) for fitness program*. *Prev Chronic Dis*, 2010. **7**(4): p. A82.
- 19 Martin, M.W., S. Martin, and P. Rosengard, *PE2GO: program evaluation of a physical activity program in elementary schools*. *J Phys Act Health*, 2010. **7**(5): p. 677–84.
- 20 Naylor, P.J., et al., *Lessons learned from Action Schools! BC—an ‘active school’ model to promote physical activity in elementary schools*. *J Sci Med Sport*, 2006. **9**(5): p. 413–23.
- 21 U.S. Department of Health and Human Services, *2008 physical activity guidelines for Americans*, 2008.
- 22 Tremblay, M.S., et al., *Systematic review of sedentary behaviour and health indicators in school-aged children and youth*. *Int J Behav Nutr Phys Act*, 2011. **8**: p. 98.
- 23 Bankoski, A., et al., *Sedentary activity associated with metabolic syndrome independent of physical activity*. *Diabetes Care*, 2011. **34**(2): p. 497–503.
- 24 Centers for Disease Control and Prevention, *The association between school based physical activity, including physical education, and academic performance*, 2010, U.S. Department of Health and Human Services: Atlanta, GA.
- 25 Active Living Research, *Physically active and fit children perform better in school fact sheet*, 2012: Princeton, NJ.
- 26 Trust for America’s Health and The Robert Wood Johnson Foundation, *F as in Fat: How obesity threatens America’s future*, 2012, T.f.A.s. Health, Editor 2012: Washington, DC.
- 27 Barr-Anderson, D.J., et al., *Integration of short bouts of physical activity into organizational routine a systematic review of the literature*. *Am J Prev Med*, 2011. **40**(1): p. 76–93.
- 28 Bartholomew, J.B. and E.M. Jowers, *Physically active academic lessons in elementary children*. *Prev Med*, 2011. **52 Suppl 1**: p. S51–4.
- 29 Donnelly, J.E. and K. Lambourne, *Classroom-based physical activity, cognition, and academic achievement*. *Prev Med*, 2011. **52 Suppl 1**: p. S36–42.
- 30 Kibbe, D.L., et al., *Ten Years of TAKE 10!®: Integrating physical activity with academic concepts in elementary school classrooms*. *Prev Med*, 2011. **52 Suppl 1**: p. S43–50.
- 31 Mahar, M.T., *Impact of short bouts of physical activity on attention-to-task in elementary school children*. *Prev Med*, 2011. **52 Suppl 1**: p. S60–4.
- 32 Rasberry, C.N., et al., *The association between school-based physical activity, including physical education, and academic performance: a systematic review of the literature*. *Prev Med*, 2011. **52 Suppl 1**: p. S10–20.