

INTRODUCTION

It is recommended that children and adolescents get at least 60 minutes of daily physical activity (HHS, 2008), and the physical and emotional health benefits of daily physical activity are well acknowledged. Physical activity improves strength and endurance, helps build healthy bones and muscles, helps control weight, reduces anxiety and stress, increases self-esteem, and may improve blood pressure and cholesterol levels (HHS, 2008). Although the more physical activity the better, even moderate amounts of physical activity can have health benefits. A recent study found that just 20 minutes a day of physical activity at school may be enough to prevent diabetes in children (Katz, 2010).

*“If the body is feeble,
the mind will not be strong.”*

— Thomas Jefferson

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While the physical and emotional health benefits of physical activity are well known, the academic benefits of physical activity are just as impactful, yet less commonly acknowledged. Studies *consistently* demonstrate that physical activity is associated with improved academic achievement, academic behaviors, and cognitive skills (Singh et al. 2012; Fedewa and Ahn, 2011; CDC, 2009; Shepard, 1997; Symons et al. 1997; Tremblay et al., 2000).

Despite this growing body of evidence, physical activity levels are declining in youth across the U.S. both at home and also at school. In 2011 only 29% of high school students had engaged in at least 60 minutes of physical activity on each of the seven days before the survey (CDC, 2012). It is estimated that physical activity levels for U.S. children drop by 75% between ages 9 and 15 (Nader, et al., 2008). Designed to Move (www.designedtomove.org), a report prepared by Nike and presented at the 8th Annual Clinton Global Initiative, states that physical inactivity causes 9% of all deaths worldwide; that’s 5.3 million of 57 million deaths (Lee et al., 2012). U.S. public schools are under increasing pressure to perform well on state standardized tests, and as a result, time allocated for physical education and recess is shrinking to make time for tested subjects like Math, English, and Science (Wilkins et al., 2003). Only 4% of elementary schools and 6% of middle schools provide students with opportunities for daily physical education (Lee, 2007). Physical activity and the core subjects need not be rivals for time within the school day, when in fact the body and brain are biologically determined to work together (www.sparkinglife.org).

“Exercise is the single most powerful tool you have to optimize your brain function”

(SparkingLife.org)

A SOLUTION

HealthTeacher, Inc. believes that schools remain the most consistent venue for children to engage in physical activity. The challenge is to overcome the “all or nothing” mindset that the 60 minutes of daily physical activity must happen all at once. As Katz (2010) suggests, even incremental levels of physical activity can yield tremendous benefits in children’s lives.

In response to this challenge, HealthTeacher, Inc. launched an innovative new product called GoNoodle. GoNoodle is a suite of K-5 interactive brain breaks that improve student engagement and classroom culture with brief bouts of desk-side movement. Each of the brain breaks take 3 to 5 minutes of class-time; just enough time for teachers to get their students’ blood flowing and minds re-engaged, but without taking away from valuable instruction time. According to John Ratey, movement stimulates brain activity, “What’s happening in the body is [students’] heart rates increasing and blood flow is changing, and they’re actually activating the brain differently than when they’re sitting down.”

The use of physical activity brain breaks is gaining momentum in the elementary school setting, and there is increasing evidence of their association with improved classroom behaviors (Mahar, 2011), cognition, and academic achievement (Kibbe, et al., 2011; Donnelly & Lambourne, 2011).

First let’s examine the evidence supporting brain breaks for improved classroom engagement. HealthTeacher, Inc. found the use of their deep abdominal breathing app, for just 2 minutes every day for 4 weeks with elementary students, resulted in a 37% decrease in classroom disciplinary events; overall classroom engagement improved significantly as well, as observed by teachers. Maeda and Randall (2003) found that just 5 minutes of moderate to vigorous activity not only significantly improved math fluency, but also classroom concentration. Another innovative study combined exercise with relaxation activities for 5 to 10 minute breaks (Norlander et al., 2005). This study saw significant gains in students’ concentration levels. Mahar and colleagues (2006) examined the effects of 10 minute “Energizers” on elementary students’ on-task behavior during academic instruction. After 12 weeks of daily 10 minute “Energizers,” students’ on-task behavior significantly improved. In fact, the effects of brain breaks have no geographic boundaries. The Class Moves! was implemented in the United Kingdom, and 10 to 15 minute exercises, once a day, throughout the school year resulted in significantly improved classroom behaviors, including concentration, attention, self-expression, and calmness (Lowden et al., 2001).

Next, let’s shift focus to academic gains that can be achieved through physical activity brain breaks where mathematics and reading have been the primary research focus. A two-year, school-based obesity intervention was piloted

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(Hollar et al., 2010)

among 1,197 elementary students in Florida (Hollar et al., 2010). The goal was to examine the effects of nutrition curricula and additional physical activity on body mass index (BMI) and academics. The physical activity component included 10 to 15 minutes of desk-side activities that were matched with core academic subjects such as spelling and math. Over the two-year period, intervention students were significantly more likely to have higher FCAT (Florida Comprehensive Achievement Test) math scores than students in the control group; although not statistically significant, the FCAT reading scores were higher among the intervention students than the control. An earlier study by Molloy (1989) also found that aerobic exercise for 5 to 10 minutes improved arithmetic performance among elementary students.

A three-year study in Kansas (Donnelly et al., 2009) examined the effects of 10-minute physically active academic lessons on academic indicators in elementary students. From baseline to year three, significant improvements were seen in math, reading, and spelling scores among students in the intervention schools, compared to the control schools.

Similarly, a program called PASS & CATCH was implemented and evaluated among 930+ 3rd and 4th graders in Austin, Texas (Murray et al., 2008). The goal was to improve academic achievement by adding 60 minutes of daily physical activity through structured recess and 10-minute classroom physical activities. Math scores on standardized achievement assessments improved significantly among PASS & CATCH students, compared to students in the control group. Reading scores improved significantly among PASS & CATCH students who were not adapting well to school, compared to the control group.

“Evaluation of this program found that participating students nearly doubled their reading scores and their math scores increased 20-fold.”

(Wright & Segall, 2010)

Finally, Dr. John Ratey has received a significant amount of media attention with his book, [Spark: The Revolutionary New Science of Exercise and the Brain](#) (2008). In his book, Dr. Ratey presents data from Naperville Central High School in Illinois where students were encouraged to take brain breaks throughout the day, as part of a larger effort to weave physical activity into the school day. Classrooms were equipped with exercise bikes and balls that were readily available in classrooms that students used to refresh and to get their blood flowing. Evaluation of this program found that participating students nearly doubled their reading scores and their math scores increased 20-fold. One math teacher at Naperville gives students a burst of physical activity, or a brain break, when his students start to “zone out.” (Wright & Segall, 2010)

Despite the shrinking amount of time allocated for physical education in schools, there is increasing evidence for the feasibility and impact of brief, physical activity “brain breaks” in the classroom. HealthTeacher, Inc.’s new product, GoNoodle, is an innovative suite of brain break games, informed by current research and adapted into a practical, web-based delivery model accessible by most elementary teachers across the United States.

CITATIONS

- CDC. Youth Risk Behavior Surveillance—United States (2011). *MMWR* 2012;61(SS-4).
- Donnelly, J, Greene, J, et al. (2009). Physical Activity Across the Curriculum (PAAC): a randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children. *Preventive Medicine*, 49(4), 336-41.
- Donnelly, JE., & Lambourne, K. (2011). Classroom-based physical activity, cognition, and academic achievement. *Preventive Medicine*, 52 (S1), S36-42.
- Fedewa, A., & Ahn, S. (2011). The Effects of Physical Activity and Physical Fitness on Children's Achievement and Cognitive Outcomes: A Meta-Analysis. *Research Quarterly for Exercise and Sport*, Vol. 82, No. 3, pp. 521-535
- Hollar, D., Messiah, S., et al. (2010). Effect of a two-year obesity prevention intervention on percentile changes in body mass index and academic performance in low-income elementary school children. *American Journal of Public Health*, 100(4), 646-53.
- Katz, D., Cushman, D., Reynolds, J., Mjike, V., Treu, J., Walker, J., Smith, E., and Katz, C.(2010). Putting physical activity where it fits in the school day: preliminary results of the ABC (activity bursts in the classroom) for fitness program. *Preventing Chronic Disease: Public Health Research, Practice, and Policy*, 7(4): A82.
- Kibbe, D., Hackett, J. (2011). Ten years of TAKE 10!: Integrating physical activity with academic concepts in elementary classrooms. *Preventive Medicine*, 52, S43-S50.
- Lee, I., Shiroma, E., Lobelo, F., Puska, P., Blair, S., and Katzmarzyk, P. (2012). Effect of physical activity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *The Lancet*, 380(9838), 219-229, July.
- Lee, S., Burgeson, C., Fulton, J., Spain, C. (2007). Physical education and physical activity: results from the School Health Policies and Programs Study 2006. *Journal of School Health*, 77(8), 435-463.
- Lowden, K., Powney, J., Davidson, J. and James, C. (2001). The Class Moves! Pilot in Scotland and Wales: an evaluation. *Edinburgh: Scottish Council for Research in Education*, Jan Report No: 100.
- Maeda, J., Randall, L. (2003). Can academic success come from five minutes of physical activity? *Brock Education Journal*, 13(1), 14-22.
- Mahar, M., Murphy, S., Rowe, D., Golden, J., Shields, A., and Raedeke, T. (2006). Effects of a classroom-based program on physical activity and on-task behavior. *Medicine and Science in Sports and Exercise*, 38(12): 2086-2094.
- Mahar, MT. (2011). Impact of short bouts of physical activity on attention-to-task in elementary school children. *Preventive Medicine*, 52(S1), S60-4.
- Molloy, G.N. (1989). Chemicals, exercise, and hyperactivity: a short report. *International Journal of Disability, Development, and Education*, 36(1), 57-61.

Murray, N., Garza, J., Diamond, P., Hoelscher, D., Kelder, S., Ward, J. (2008). Fitness and academic achievement among 3rd and 4th grade student in Texas. *Medicine and Science in Sports and Exercise*, 40(5), S96.

Nader, P., Bradley, R., Houts, R., McRitchie, S., and O'Brien, M. (2008). Moderate-to-vigorous physical activity from ages 9 to 15 years. *JAMA*, 300(3), 295-305.

Norlander, T., Moas, L., Archer, T., (2005). Noise and stress in primary and secondary school children: noise reduction and increased concentration ability through a short but regular exercise and relaxation program. *School Effectiveness and School Improvement*, 16(1), 91-99.

Singh, A., Uijtendwilligen, L., Jos W. R. Twisk, J., van Mechelen, W., Chinapaw, M. (2012). A Systematic Review of the Literature Including a Methodological Quality Assessment. *Archives of Pediatric Medicine*, 166(1), 49-55.

Symons, C., Cinelli, B., James, T., Groff, P. (1997). Bridging student health risks and academic achievement through comprehensive school health programs. *Journal of School Health*, 67(6):220-227.

U.S. Department of Health and Human Services (HHS). [2008 Physical Activity Guidelines for Americans](#). Washington, DC: U.S. Department of Health and Human Services; 2008.

Wilkins, J., Graham, G., Parker, S., Westfall, S., Fraser, R.G., Tembo, M. (2003). Time in the arts and physical education and school achievement. *Journal of Curriculum Studies*, 35(6), 721-734.

Wright and Segall (2010).

<http://abcnews.go.com/WN/exercise-school-leads-learning/story?id=10371315#.UHMXu3NGxDI>. Accessed October 9, 2012.