



Increasing Academic Performance While Reducing Obesity Background and Justification

Reducing obesity is a public health priority. Obesity is currently one of the most prevalent, yet controllable, health problems that impact children as well as adults.¹ In the past 20 years, the number of overweight children has practically doubled, and the number of overweight adolescents has nearly tripled.² Three in ten Georgia middle school students (29.7 percent) and one in four high school students (26.7 percent) were at risk for overweight or were actually overweight.³ There has been a sharp rise in hospitalizations of overweight children for the diseases associated with obesity such as diabetes and sleep apnea.⁴ Hospital costs related to childhood obesity have more than tripled over the last 20 years from \$35 million in 1979 to \$127 million in 1999.⁴⁻⁵ Overweight children have a higher level of moderate to severe asthma, higher fasting blood insulin levels (a risk factor for Type II Diabetes), greater likelihood of elevated blood pressure levels, and increased orthopedic conditions than children of normal weight.⁶ In addition, childhood obesity predicts an increased probability of obesity in adulthood.^{1,7,8}

Obese children face both physical and psychological barriers that can reduce academic achievement. Overweight students were four times more likely than healthy students to report "impaired school functioning."⁹ One study of overweight inner city students found that these children were twice as likely to be in special education or other remedial class settings.¹⁰ Another study of 11,192 kindergartners found that overweight students in comparison to students who were not overweight, had significantly lower reading and math scores at the beginning and end of the school year.¹¹ Another study among overweight boys in kindergarten found a negative effect for being overweight that was not explained by factors such as ethnicity or the mother's level of education.¹²

Obesity reduces connectedness to schools – which also reduces the potential for higher academic achievement. There are psychosocial effects that affect overweight and obese youth, such as stigma, lack of self-esteem, and poor body image.^{8,13-15} Studies demonstrate that children rank obese peers as the least preferred friends. This can lead to isolation and limited ability to develop social skills resulting in lower self-esteem.¹⁶ Not feeling connected to school has also been related to lower academic achievement.¹⁷⁻¹⁸

Increased physical activity and improved nutrition is related to a reduction in obesity. A school is an ideal place to influence the health of students, since more than 95 percent of youth in the United States ages 5-17 are enrolled. Children take part in physical education classes and eat one or two meals during the school day. These activities address the two main factors in preventing and treating childhood obesity: diet and exercise.

There is strong evidence that school-based physical education is effective in increasing the levels of physical activity and improving physical fitness.¹⁹ Twelve different studies were reviewed by a CDC panel. Reported behavioral outcomes include increases in energy

expenditure,²⁰⁻²² increases in percentage of class time spent in moderate to vigorous physical activity^{21,23-28i} and increases in self reported type and frequency of physical activities outside of school. Two²⁶⁻²⁷ of three studies showed increase in flexibility as measured through sit-and reach tests. Muscular endurance increased in two studies. These interventions were also associated with an increase in knowledge about exercise,^{25,27} fitness, and nutrition.^{23-24,26}

Providing more opportunity for increased physical activity (by reducing class time) does not lead to a decrease in test scores and can lead to an increase in test scores.^{8,28-29} In one study, 546 primary students in an urban and rural school who received one extra hour per day of physical education were compared to students from the same schools who received the standard physical education program plus one extra hour (13-14%) more instruction per week. Academic performance in French, math, English and science were maintained or even enhanced by an increase in a student's level of physical activity even though it meant a 13-14% reduction in instruction time.

Physical activity is essential to brain function.³⁰ Although the brain only comprises two percent of one's body weight, it uses more than 20 percent of one's available oxygen supply. Blood will pool in the groin area if one is sitting for long periods of time rendering brain function less efficient, hence, one's learning and performance suffer. When students sit for long periods – when reading or listening to a lecture, for example – it becomes increasingly difficult to receive explicit information. The hippocampus, which receives and temporarily stores all explicit information, acts as a surge protector. When it receives too much information, it shuts down. Further learning becomes difficult or impossible.⁸ Brain researcher, Sousa found that 20 minutes was optimal for a learning segment, followed by two to five minutes of movement.^{30,31}

Increased physical activity leads to higher levels of fitness which is associated with higher achievement.³² The California Department of Education found a distinct relationship between the physical fitness of students and their academic achievement. The study matched scores from the 2001 Stanford Achievement Test, Ninth Edition with the results of the mandated physical fitness test (*FITNESSGRAM*), also given in 2001. The study matched reading and mathematics scores with fitness scores of 353,000 fifth graders, 322,000 seventh graders and 279,000 ninth graders. For each grade level, higher achievement was associated with higher levels of fitness. At all three grade levels, the average score for students almost doubled in both reading and mathematics when comparing students who could only pass one fitness test with those students that could pass all six fitness tests.³²

Exercise is associated with improved academic outcomes, maintenance of positive interpersonal relationships, and reduced incidence of depression, anxiety and fatigue. In a review of the literature, Symons et al³³ concluded that there was a strong connection between physical activity and positive academic outcomes. They further noted that participation in vigorous physical activity was linked to a reduction in anxiety, tension and depression that can decrease students' attitudes about self and schooling.

1. Must, A. & Strauss, R.S. (1999). Risks and consequences of childhood and adolescent obesity. International Journal of Obesity, 23 Suppl 2: p.S2-S11.
2. Centers for Disease Control and Prevention (CDC) website, 2003 www.cdc.gov.
3. Kanny D, Bricker SK, Powell KE. *Overweight Among Middle and High School Students, in Georgia, 2001*. Georgia Department of Human Resources, Division of Public Health, Chronic Disease, Injury, and Environmental Epidemiology Section, December 2002. Publication number DPH02.172HW.
4. Neergaard, L. (2002). Agency: Child obesity on the rise. Associate Press (AP), Washington. Wednesday, May 1, 2002.
5. Reuters. (2002). Obese children adding to health costs, study says. Reuters, Chicago. Wednesday, May 1, 2002.
6. American Obesity Association (AOA) website, 2003, www.obesity.org.
7. Stang, J. A., Story, M. & Kalina, B. (1997). School-based weight management services: Perceptions and practices of school nurses and administrators. American Journal of Health Promotion, 11(3), 183-185.
8. Story, M. (1999). School-based approaches for preventing and treating obesity. International Journal of Obesity, 23(Suppl. 2), S43-S51.
9. Schwimmer JB, Burwinkle TM, Varni JW. Health Related Quality of Life of Severely Obese Children and Adolescents. *JAMA*. April 9, 2003; 289 (14):1818.
10. Tershakovec A, Weller S, Gallagher P. Obesity, School Performance, and Behavior of Black, Urban Elementary School Children. *International Journal of Obesity*. 1994;18: 323-327.
11. Data A, Sturm R, Magnabosco JL. Childhood Overweight and Academic Performance: National Study of Kindergartners and First-Graders. *Obesity Research* 2004; 12:58-68.
12. National Institute Health Care Management (NIHCM) Foundation. Obesity in Young Children: Impact and Intervention. Research Brief. August 2004.
13. Illuzi, S. & Cinelli, B. (2000). A coordinated school health program approach to adolescent obesity. The Journal of School Nursing, 16(1), 12-19.
14. World Health Organization. Obesity: Preventing and Managing the Global Epidemic. Report of a WHO Consultation of Obesity, Geneva, 3-5, June 1997. *WHO Technical Report Series*, no. 894,2000.
15. Johnson, M. (2002). BMI – Another “vital” sign? NASN Newsletter, 17(4), 12.
16. American Academy of Pediatrics. Type 2 diabetes in and adolescents children. *Pediatrics* 2000, 105:671-680.
17. Blum RW, Resnick MD, et al. Protecting Adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *JAMA* September 10, 1997, 825-832.
18. Blum RW, et al Improving the Odds: The Untapped Power of Schools to Improve the Health of Teens. University of Minnesota. Minneapolis, Minnesota: Center for Adolescent Health, 2002.

-
19. Shepard RJ, Volle M, Lavallee M, LaBarre R, Jequier JC, Rajic M. Required physical activity and academic grades: A controlled longitudinal study. IN: Limarinen and Valimake, editors. *Children and Sport*. Berlin: Springer Verlag; 1984.58-63.
 20. Shepard, RJ. Curricular physical activity and academic performance. *Pediatric Exercise Science*. 1997; 9:113-126.
 21. Kahn EB, et al. The effectiveness of Interventions to Increase Physical Activity: A Systematic Review. *Am J Prev Med*. 2002;22(4S):73-107.
 22. Donnelly JE, Jacobsen DJ, Watley JE, et al. Nutrition and physical activity program to attenuate obesity and promote physical and metabolic fitness in elementary school children. *Obesity Research*. 1996; 4:229-43.
 23. Simons-Morton BG, Parcel GS, Baranowski T, Forthofer R, O'Hara NM. Promoting physical activity and a healthful diet among children: Results of a school-based intervention study. *Am J Public Health*. 1991;81:986-91.
 24. Luepker RV, Perry CL, McKinlay SM, et al. Outcomes of a field trial to improve children's dietary patterns and physical activity. The Child and Adolescent Trial for Cardiovascular Health. CATCH collaborative group. *JAMA* 1996; 275:768-776.
 25. Sallis JF, Mc Kenzie TI, Alcaraz JE, et al. The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. Sports, Play and Active Recreation for Kids. *Am J Pub Health*. 1997; 87:1328-1334.
 26. Edmunson E, et al. The effects of the Child and Adolescent Trial for Cardiovascular Health upon psychosocial determinants of diet and physical activity behavior. *Prev Med* 1996; 25:442-454.
 27. McKenzie TL, Nader PR, Strikmiller PK, et al. School physical education: Effect of the Child and Adolescent Trail for Cardiovascular Health. *Prev Med* 1996; 25:423-31.
 28. Hopper CA, Gruber MB, Munoz KD, Herb RA. Effect of including parents in a school-based exercise and nutrition program for children. *Res Q Exerc Sport* 1992; 63:315-21.
 29. Manios Y, Moschandreas J, Hatzis C, Kafatos A. Evaluation of a health and nutrition education program in primary school children of Crete over a three-year period. *Prev Med* 1999; 28:149-59.
 30. McCracken Bane. Creating an environment for learning. State Education Standard, The Quarterly Journal of the National Association of State Boards of Education. 2002, Autumn,47-51.
 31. Sousa, David A. *How the Brain Learns*. Thousad Oaks, CA: Corwin Press, 2001.
 32. National Association for Sport and Physical Education. *New Study Proves Physically Fit Kids Perform Better Academically*. December 10, 2002.
 33. Symons CW, Cinelli B, James TC, Groff P. Bridging student health risks and academic achievement through comprehensive school health programs. *Journal of School Health*. 1997; 67(6) 220-227.