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Dec

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## [Exercise and the Brain, the Naperville Experience, Education, and Alzheimer's](#)



Most everyone knows they do not get enough exercise. Most of us are overweight and exercise would certainly help us lose the extra pounds. But – new studies show – exercise does more than just condition the body. Exercise is the most powerful tool we have to increase and optimize our brain function.

The Naperville District 203 in Illinois includes fourteen elementary schools, five junior highs and two high schools and is a case study in exercise and the brain. The District budget is modest but the parents are well - educated. In the 1990s it implemented a physical education program emphasizing fitness over sports. The curriculum is designed to teach kids the principles, practice, and importance of fitness, and begins in fifth

grade. On entering high school the students are given some eighteen fitness choices – from rock climbing to basketball – with suggestions on how to track their improvement, which includes monitoring heart rate, blood pressure and cholesterol levels.

The students of Naperville District was the inspiration for John J. Ratey's book *SPARK, The Revolutionary New Science of Exercise and the Brain* (new edition available in January), in which he discusses the latest research on exercise and brain function.

The TIMSS (Trends in International Mathematics and Science Study) is an international standards test which measures knowledge in math and science. The 1999 version of TIMSS included 230,000 students from thirty-eight countries, 59,000 of whom were from the United States. Naperville District 203 signed up to obtain an international benchmark of its students' performance. Some 97 percent of its eight graders took the test – not merely the best and the brightest. **On the science section of the TIMSS, Naperville's students finished first – number one in the world** – just ahead of Singapore. On the math section, Naperville scored sixth, behind only Singapore, Korea, Taiwan, Hong Kong, and Japan.

There are many other examples of how exercise improves brain function. Of the measureable areas of fitness the two most important for academic performance appear to be body mass index and aerobic fitness, as found by Hillman and Castelli of the University of Illinois.

While controversial, there is evidence that Alzheimer's progression may be slowed by exercise. Carl Cotman, a neuroscientist at the University of California, Irvine, has shown that mice that spent more time running on wheels had lower levels of plaque in their brains than those mice that did not.

Current research includes understanding the science behind how exercise improves brain function. It was already known that exercise increases levels of serotonin, norepinephrine and dopamine – important neurotransmitters that traffic in thoughts and emotions. It has been known that BDNF (brain-derived neurotrophic factor) is needed to make new brain cells. It is now known that exercise increases BDNF. There is evidence that people lose 8% of brain mass every ten years after 40. However, current research shows BDNF can reduce that rate.

One of the important aspects of the Naperville experience is the concept of devising an exercise program which works for you and one in which you can measure the results. Body mass index and aerobic fitness are key parameters. Aerobic fitness can be determined from heart rate and blood pressure. The best and safest goals should be determined in consultation with your doctor. While none of this is easy, which I will certainly confirm, a persistent effort can work.



**2 comments**





1.

*lee hopkins* says:

December 13, 2011 at 11:23 (UTC -7)

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The Naperville experience suggests that Republicans are entirely sedentary.



2.

*Faith Oldman donara* says:

January 28, 2012 at 11:23 (UTC -7)

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After the induction of diabetes, disease progression can only be prevented within a narrow window of opportunity by this treatment.

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