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## Fit Kids Learn Better

**Summary:** As schools seek to improve learning, many are moving towards sophisticated and high-stakes testing regimes. What isn't tested doesn't matter. To sharpen the focus on the competencies demanded by tests, schools are devoting an ever-greater share of resources to a few, basic subject areas, while reducing – even eliminating – time spent on subjects not tested. A casualty among these has been physical education. This brief summarizes the evidence against this trend. It presents concrete evidence that school-based sports and physical activity during the school day can improve learning and test scores. There is a positive association between mental and physical fitness. Although evidence is drawn from the United States, the conclusions can be adapted more universally. To date, there are no rigorous studies on the impact of sports and physical activity on learning in Latin America and the Caribbean.

## Mismatched: High Stakes Testing and Preparing Kids for Life

There is a raging debate in countries across the globe about how best to raise education standards, and what a world-class education should include. At present, the debate is being won by those who insist that schools should focus on the basics – the three “Rs”, of reading, writing and arithmetic – as student proficiencies in these areas determine success in school and life. Testing is at the heart of this view: high scores indicate quality education. From a policy standpoint, serious consequences follow. Quality brings resources in terms of better qualified teachers and more technology; low performance runs the risk of school closure or reorganization. Schools have responded accordingly, often abandoning social studies, art, music, physical education and other subjects in pursuit of high scores in tested areas. This trend is likely producing one the gravest errors of present-day education policy. An excessive focus on a few subjects carries a risk of compromising the very skills, competencies and pedagogies that help kids learn and achieve the high test scores schools so desperately seek. Kids must dominate the basics. About this there is no debate. The basics lay the foundation for higher-order learning and thinking. However, as new research finds, how well a kid adapts to new situations and applies knowledge to real world challenges can predict math and reading competence throughout school better than other factors,



including IQ. Such skills bear a close association to teamwork, creativity, experimentation and asking good questions, persistence and perseverance, and are honed and strengthened through precisely those curricular areas most likely to be abandoned in pursuit of high test scores. The remainder of this brief focusses on one of these areas: physical education and school-based sports, and its impact on learning.

## As Curricula Narrow, Learning Suffers

**With the advent of high-stakes testing in the United States, patterns of time allocation across subjects in schools has undergone considerable change.** In a nationally representative sample, 62% of elementary schools increased almost doubled the amount of time allocated to language, and increased by more than a third time allocated to math. Time allocated to other subjects, including physical education, declined accordingly (McMurrer, 2007). Other research documents changes in pedagogy that accompanied these trends, including a move towards more teacher-centered teaching and an increased use of test-like problem styles and formats, as opposed to child-centered approaches that put a premium on experimentation, teamwork and inquiry (Au, 2007; Hamilton et al., 2007).

There are few compelling data to link these changes to improvements in learning. A nearly decade-long study of test-based incentive systems, including the “adequate yearly progress” measures under the No Child Left Behind Act, high school exit exams, teacher merit-pay programs, and other testing-and-accountability initiatives, undertaken by the National Research Council’s Committee on Incentives and Test-Based Accountability in Public Education (Hout and Elliott, 2011) finds no strong evidence in favor of improved student achievement and, in some cases, negative results. Among its strongest conclusions is that high school exit exams have decreased the rate of graduation without increasing achievement.

## The Academic Advantage from Athletics

**There are compelling data that suggest a positive impact of sports on educational outcomes and aspirations. Numerous studies find a positive association between participation in sports and academic achievement.** For example, a longitudinal study of 22,696 high school students in 1,052 schools found that athletes had higher grades, higher educational aspirations, and fewer school-related discipline problems than non-athletes (Fejgin, 1994). Stevenson (2010), controlling for a number of factors related to the student (e.g., age, race, levels of cognition), the family (socioeconomic status, urban versus rural) and the school (% of teachers with master’s degrees, attendance and dropout rates) similarly reports that participation in school-based, high school sports is associated with more schooling and has positive effects on future wages. Taking the analysis further with a quasi-experimental design offered by the implementation of Title IX of the Educational Amendments to the 1964 Civil Rights Act<sup>1</sup>, she finds the effect to be causal and significant for girls (boys were excluded from this part of the study): an estimated 20% increase education attainment and a 40% increase in employment among women who, as girls, participated in high school sports. This is a treatment effect, that is, an effect caused by participation, not a selection effect, or an effect associated with the type of kid who chooses to participate in athletics. Studies of more current cohorts

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<sup>1</sup>This was a watershed piece of legislation passed in 1972. It mandated that no person, on the basis of sex, could be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance. The biggest impact of this change was on high school athletics, an area where explicitly discriminatory policies existed. Prior to Title IX, just about the only physical activities school offered girls were cheerleading and square-dancing. Only 1 in 27 girls played high school sports. Title IX required schools to increase female participation rates in athletics to near equity with boys’ participation rates. Six years after its enactment, at the point at which compliance was required, a quarter of all girls participated in some form of organized sports at school. Boys’ participation held constant over this time (50%).

(e.g., Women's Sports Foundation, 2009) find that female high school athletes of all races and ethnicities tend to have higher grades and standardized test scores, and significantly higher graduation rates than non-athletes. Female athletes in grades 9 through 12 are less than half as likely to get pregnant as their non-athlete peers, and they tend to have higher self-esteem and more positive body images; about half of teen moms drop out of school before they become pregnant. The positive effects of sports on grades are especially pronounced among Latinas, the ethnic group with the highest teen birth rate. Participating in sports also decreases the chance that all kids will abuse drugs and alcohol, both of which have serious consequences for educational attainment and life prospects.

## Exercise and Brain Functioning. Effects that Can Last a Lifetime

New research focuses on the important of executive functions for learning, and the role that sports play in enhancing these functions. Executive functions are what allow people to concentrate, stay focused and think, rather than act on impulse. They are higher order processes which regulate goal-directed behavior. Core executive functions include inhibition (self-control and self-regulation), working memory (ability to temporarily store and manage information to meet mental challenges), and cognitive control and flexibility (ability to restructure knowledge and information based on changing situational demands). Executive functions underlie creativity and discipline, and are necessary to perform well in school and life. Research finds that, after controlling for socioeconomic, gender and IQ, children with less persistence, more impulsivity, and poorer attention regulation at ages 3 to 11 tend to have worse health, earn less, and commit more crimes 30 years later than children with better self control measured at the same time (Diamond and Lee, 2011). Executive functioning tends to be more important for school readiness than IQ, and can predict math and reading competence throughout school.

As children mature into adults, their executive functioning matures as well. Yet experiences early-on in life can have lasting consequences, with failure in school being key among these. Work undertaken by the neurocognitive Kinesiology Laboratory at the University of Illinois at Urbana-Champaign, an innovative initiative which studies the relationship between physical activity and cognitive health across the lifespan, is interesting in this regard. Their results and reported findings indicate that physical activity and aerobic fitness are critical for maximizing the underlying brain functioning necessary for school success from an early age onward (Chaddock, et al., 2011a; Chaddock, et al., 2011b). Aerobically fit children are more able to use executive control, inhibitory control and relational memory processes. Inhibition and working memory bear a positive relationship with achievement of math and reading, two beacons of standardized testing. Poorer aerobic fitness is associated with failures in attentional processes, which may relate to academic achievement. These effects appear to hold across the lifespan. Exercise improves memory and skilled task performance in aging adults. Although no long-term panel data exist, certain relationships between fitness levels and brain functioning have been observed in both children and adults. For example, the association between poorer aerobic fitness in children and decreased response accuracy when performing specific tasks and its corollary, of higher fit children being able to maintain a high level of performance across specific, variable task demands. The same has been observed in adults.

## An Extra Academic Premium from Endurance Sports

In addition, there appears to be an “extra academic premium” to some types of physical activity. Running, more so than standard physical education, improves cognitive flexibility and creativity in kids aged 8 to 12 (Ibid.). Endurance activities (e.g., running or constant movement over a period of 50 minutes versus new drills combining movement and listening) boosts attention span and sharpens

concentration in the classroom (Gallotta et al., 2011). More intensive aerobic exercise (e.g., 40 versus 20 minutes of running, jumping rope, soccer) leads to improvement in math and difficult executive functioning tasks (Diamond and Lee, 2011). These results seem counterintuitive at first. Rather than leaving kids exhausted, endurance activities leave kids more focused and attentive in class. Indeed, neuroscientists have shown many times over that attention is the sine qua non of learning and thus of boosting intelligence.

## Concluding Remarks and Perspectives

**Fit kids learn better. The data are clear in this regard. Although there is a need to replicate the studies cited here in contexts other than the United States, several universal principles emerge. As kids progress through school, their levels of physical activity tend to decline.** Kids become increasingly sedentary, even obese. This, in turn, influences physical and cognitive health, including brain functioning. Physical education and school-based sports not only increase academic performance and test scores, but lay the foundation for healthy life-styles and positive life outcomes. It is in this sense that physical activity is an integral component of quality education, from the earliest years onward. Attempts to reduce or otherwise remove it from the curriculum are misplaced, even detrimental to producing the type of outcomes societies expect from schools.

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