

A young girl with long, wavy red hair is seen from behind, wearing a light green t-shirt and blue jeans. She is holding a piece of white chalk and writing on a dark chalkboard. The chalkboard has three lines of text written in white chalk.

I wont skip fysical edjucation.
I wont skip fysical edjucation.
I wont skip fisio

Active kids are fit to learn.

Active Kids are Fit to Learn

In an effort to increase students' academic performance, many schools are choosing to reduce physical education (PE) requirements and even the time allocated for recess. However, **no empirical evidence** has suggested that academic performance is hindered in any way by regular participation in PE and physical activity. In fact, the majority of empirical evidence suggests the opposite is true – **that academic performance is improved by engagement in regular physical activity.**

Possible mechanisms by which physical activity improves academic performance

- Improvements in cognitive function (memory, concentration etc.)
- Neurogenesis
- Improved cerebral blood flow
- Enhanced neurotransmitter release and function
- Increased self-esteem, self-confidence & self-image
- Increased attention span via increased adrenalin
- Reduced misconduct behaviours at school
- Production of substances that protect delicate neurons from free radicals and oxidants
- Increased feelings of school connectedness
- Increased ability to relax

Several mechanisms by which physical activity affects academic performance

A thorough review of the potential mechanisms by which physical activity and exercise improve academic performance is beyond the scope of the Report Card. Essentially, the association is mediated through improvements in cognitive or behavioural function. In animal models, physical activity enhances memory and learning, promotes the generation of new nerve cells in the brain (neurogenesis) and protects the nervous system from injury and disease. In clinical studies, exercise increases brain volume in areas implicated in executive processing, improves cognition in children with cerebral palsy and enhances phonemic skills in children with reading difficulties.² It is also possible that the link between physical activity and academic performance is indirect and via improvements in self-esteem³ and/or classroom behaviour and attention span.^{4,5}

Re-allocating time from academic subjects to physical education does not harm grades

A thorough review of this topic area led a group of Canadian researchers to conclude that school-based physical activity, (PE instruction, free play or school sport) could “become a consistent component of physical activity to meet current guidelines for children and adolescents without impairing academic performance, even if curricular time for so-called academic subjects is curtailed.”⁶ Such findings are not new in Canada. A study completed in Quebec in the 1970s found that students provided with 5 hours of PE per week had a higher academic performance than their control counterparts who received only 40 minutes per week.⁷ Recently, researchers in British Columbia observed that the academic scores of students receiving more physical activity instruction per week, and therefore less academic time, remain unchanged.

In fact, these data demonstrated a trend toward enhanced academic performance in the intervention group despite a reduction in academic subject curricular time.⁸ In Ontario, an examination of the effect of a comprehensive school health model on academic performance showed that increased focus on students’ health in schools led to positive changes in their academic performance, as measured by Education Quality and Accountability Office (EQAO) test scores.⁹

Research studies from around the world are observing the same trends. In California, a group of students in grades 5 and 6 were taught PE either by staff trained in PE, a trained homeroom teacher or a regular classroom teacher. Those taught by the staff trained in PE spent more time being active, had greater improvements in fitness and had smaller declines in academic performance compared to the other two groups who spent more time in academic instruction.¹⁰ Similarly, when 1.25 hours per day of endurance fitness training was added to the daily curriculum of a group of young Australian students, math and reading scores were not adversely affected by a substantial reallocation of curricular time in favour of PE.¹¹ A follow-up study in the same population two years later revealed that the academic benefits persisted.¹² Finally, an American study observed that Grade 6 students who received 55 minutes more of daily PE performed equally well in math, science and English when compared to a group that spent those 55 minutes in academic classrooms.¹³ The U.S. National Longitudinal Study of Adolescent Health showed that adolescents who were active in school were more likely to have high grades, even after adjustment for socio-economic status.¹⁴ A gender difference emerged in younger children (kindergarten to Grade 5) whereby higher amounts of PE were associated with academic benefit in girls; no such trend emerged in boys.¹⁵

Physical activity and fitness are positively associated with academic performance

In addition to the findings on PE and academic performance, there is research to suggest that physical activity and fitness are also positively related to academic performance.^{16,17} For example, one study found that adolescents who reported higher levels of daily exercise also reported having higher grades.¹⁷ Academic performance has also been positively related to directly measured physical fitness scores in children.^{18,19} In addition, a meta-analysis has found a positive relation between physical activity and cognitive performance (e.g., perceptual skills, intelligence quotient, achievement, verbal tests, mathematics, developmental level/academic readiness) in school-aged children.²⁰

Being sedentary is associated with low academic performance in children

Sedentary time spent in front of screens is increasingly pervasive in the lives of children and youth. A comprehensive analysis of the media's impact on children's health, completed in November 2008, provides some critical insights into how being inactive might be impacting academic performance.²¹ Thirty-one studies evaluated media and academic performance, and 65% reported a significant association between increased media exposure and poor academic outcomes. Of the 26 studies that examined the effect of watching TV, 62% reported a strong link between greater media exposure and lower academic performance. Interestingly, the likelihood of earning a bachelor's degree (or higher) by age 26 decreased as the mean hours of TV per weekday increased between the ages of 5 and 15 years²² (**Figure 1**).

Conclusions

- There is now a substantial evidence base from Canada and around the world to show that participation in PE and physical activity at school does not hinder academic performance. By contrast, there is reason to suggest that physical activity can lead to improvements in academic performance.

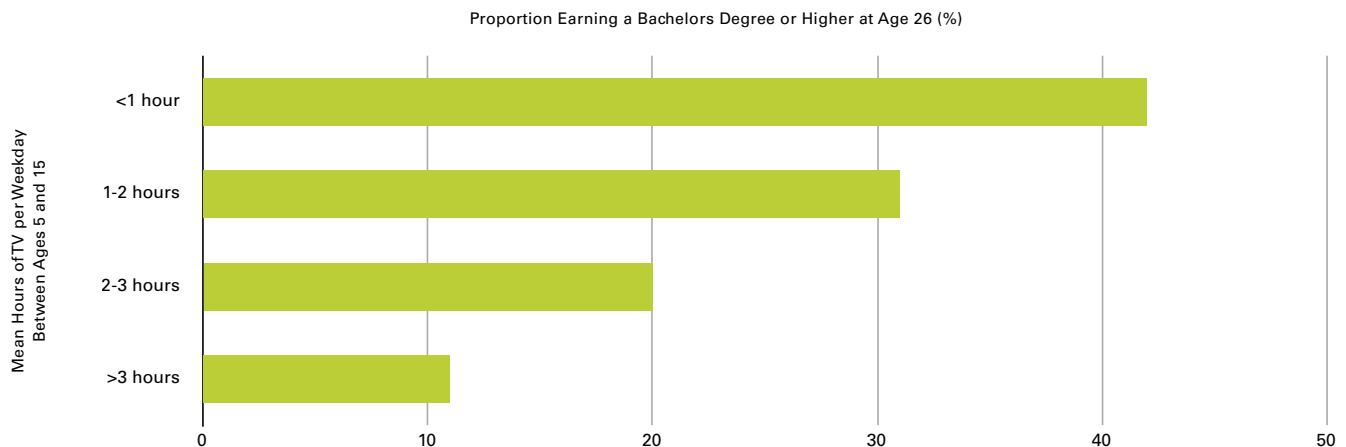


Figure 1: The impact of watching TV during childhood and adolescence on the likelihood of earning a bachelor's degree or higher by age 26.²²

This summary of current knowledge on the link between physical activity and academic performance should negate any rationale proposed to limit PE

and physical activity programs in an attempt to improve academic outcomes. Parents, teachers and policy-makers concerned about decreases in study time may be “better advised to question the time their children spend on watching TV and playing computer games rather than the time that they devote to PE, physical activity or sports in school.”⁶

adolescents who reported higher levels of daily exercise also reported having higher grades.



Healthy body weight

The prevalence of pediatric obesity has increased in Canada to such an extent in the past 10 to 15 years that it now represents the most common lifestyle-related disease affecting children and youth.²³ Statistics Canada estimates that 26% of our children and youth aged 2 to 17 are overweight or obese.²⁴ Aside from the physiological, psychological and sociological issues, the rising childhood obesity rate is likely to overwhelm even well-resourced healthcare systems, given that these children are at increased risk of developing obesity-related diseases in adulthood.

Modifying physical activity is an integral component of achieving and maintaining a healthy body weight. However, the benefits of physical activity are too often presented solely in the context of body weight regulation. Children and youth should be engaging in physical activity because it is intrinsically fun, feels good, is part of normal growth and development, prevents disease and promotes health. It is important that we stress to children and youth that there are many benefits to being physically active beyond just a healthy body weight.

Physical health and chronic disease prevention

Childhood obesity is associated with an increased risk for metabolic, cardiovascular, respiratory, gastrointestinal, orthopedic and psychological co-morbidities.²⁵ Chronic diseases such as type 2 diabetes (T2D) and cardiovascular disease (CVD) have traditionally been viewed as adult diseases. However, it is now clear that the risk factors for these diseases (e.g. high blood pressure, low HDL-cholesterol, high triglycerides and insulin resistance) can also develop early on in life.²⁶⁻²⁸ Specifically, there is now evidence that childhood obesity is an independent risk factor for the development of CVD and premature mortality in the adult years.

Physical inactivity in children and youth has been directly linked to hypertension, metabolic syndrome, blood pressure, T2D and CVD risk factors.²⁹⁻³⁵ Using data on youth aged 8 to 17 years collected from the National Health and Nutrition Examination Survey (NHANES), researchers were able to demonstrate that increases in directly measured total physical activity and moderate to vigorous physical activity (MVPA) were associated with decreases in blood pressure (**Figure 2**).²⁹ On a similar positive note, researchers in Europe found that even small increases in physical activity can have dramatic effects on the health of children. A European study found that an increase in daily moderate-intensity physical activity of only 10-20% was associated with a 33% lower risk of being categorized with metabolic syndrome.³⁴

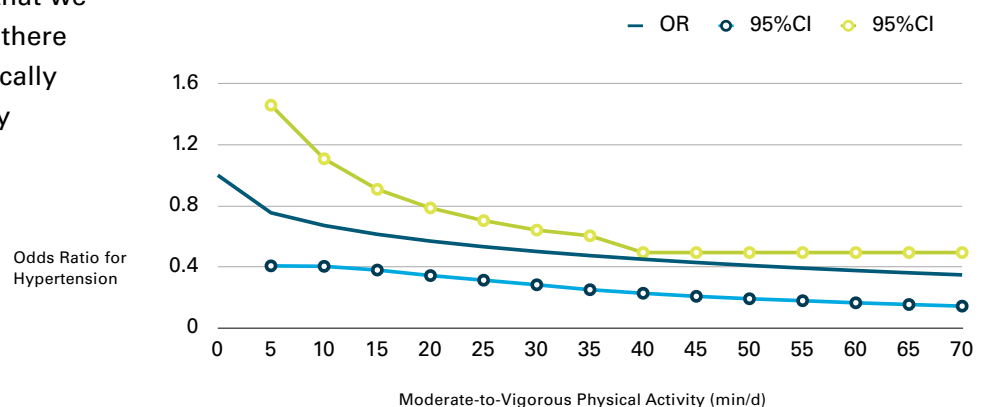


Figure 2: Odds ratio for hypertension according to minutes of MVPA per day (Adapted from Mark and Janssen, 2008²⁹).

26

percent of our children & youth aged 2 to 17 are overweight or obese

What is the metabolic syndrome?

The metabolic syndrome is a cluster of risk factors for metabolic disease (cardiovascular disease and type 2 diabetes),³⁷ including:

- abdominal obesity
- high triglycerides
- high LDL cholesterol
- glucose intolerance
- high blood pressure

Why is Physical Activity Important?

Screen time, a proxy indicator of overall inactivity and sedentary behaviour, has been associated with reductions in physical health. Canadian researchers found that independent of physical activity level, higher daily screen time hours was associated with an increased likelihood of having metabolic syndrome.³⁶ More notably, the negative impacts of screen time go beyond metabolic syndrome. A systematic review was recently published on the effects of all types of media, from television to magazines and music, on different health outcomes including childhood obesity, tobacco use and sexual behaviour, and it showed startling results. Out of the 173 studies reviewed, the researchers found very few studies that demonstrated a positive association between consumption of media and health, **with 80% of the studies concluding that an increase in media exposure is associated with negative health outcomes.**²¹

Outcomes of Physical Activity Participation

Academic Performance	<ul style="list-style-type: none"> • Time allocated for physical education does not negatively affect academic achievement, even when the time is taken away from other subjects.^{6,9} • Physical fitness and active living have positive effects on academic performance, including achievement in math tests and reading, academic grades, perceptual skills, intelligence quotient and academic readiness.¹⁶⁻²⁰ • In animal models, physical activity has been found to enhance memory and learning, cause new brain cell growth and release chemicals involved in learning.² • Physical activity may help academic achievement by improving self-esteem, attention span and classroom behaviour.^{3,4}
Healthy Body Weight	<ul style="list-style-type: none"> • Compared to 40 other developed countries, Canada ranks 5th highest in the prevalence of overweight and obesity in youth (<i>HBSC 2005-2006</i>). • Our most recent national surveillance data indicate that 26% of Canadian children and adolescents are overweight or obese.²⁴ <p>Urban versus rural</p> <ul style="list-style-type: none"> • The prevalence of overweight and obesity in Canadian adolescents is higher in rural areas.⁴⁴ <p>Socio-economic status</p> <ul style="list-style-type: none"> • In low-income communities in Ontario, there is a high prevalence of overweight in young children (junior kindergarten), which persists into childhood (Grade 3).⁴⁵ <p>Aboriginal</p> <ul style="list-style-type: none"> • The prevalence of obesity is higher among Canadian Aboriginal children and youth.⁴⁶ <p>Disabilities</p> <ul style="list-style-type: none"> • The prevalence of obesity is higher in individuals with intellectual disabilities.⁴⁷⁻⁵² • Research suggests that deaf Canadians are at a higher risk of becoming obese and being physically inactive.⁵³
Physical Health	<ul style="list-style-type: none"> • The likelihood of developing hypertension in children decreases with increasing amounts of moderate to vigorous physical activity.²⁹ • Small increases in daily moderate-intensity physical activity can lower the risk of metabolic syndrome.³⁴ • Physical activity plays a role in the prevention and risk management for type 2 diabetes, cardiovascular disease and metabolic syndrome in children and youth.^{30-33,35,54} • Screen time is associated with an increased likelihood of metabolic syndrome independent of physical activity for children and youth.³⁶ • Media exposure is associated with numerous negative health outcomes.²¹ <p>Aboriginal</p> <ul style="list-style-type: none"> • A study of Cree children found that more than half of the sample had central adiposity, a component of metabolic syndrome, and that physical activity was negatively correlated with central adiposity.⁵⁵ <p>Disabilities</p> <ul style="list-style-type: none"> • Canadian children with intellectual disabilities have lower cardiovascular fitness than Canadian children with typical development.^{51,56} • Canadian children with activity-limiting conditions visit health professionals more often.⁵⁷
Mental Health	<ul style="list-style-type: none"> • Mental fitness is higher in students engaged in physical activity at school (<i>SHAPES</i>). • Mental fitness is lower in students who accumulate higher levels of screen time (<i>SHAPES</i>). • Childhood participation in organized sports is associated with positive psychosocial outcomes.⁵⁸ • Sport participation is associated with decreased anxiety in shy children.⁵⁸ • Physical activity is associated with decreased susceptibility to smoking among youth.⁴³ • Active living is positively associated with self-esteem, whereas sedentary behaviour is negatively associated with self-esteem.⁴⁰ • Physical inactivity is associated with emotional and behavioural problems in adolescents.³⁹

Mental health

The benefits of physical activity in the prevention of chronic disease are becoming increasingly well known, yet several important emotional and psychosocial benefits of regular physical activity have received less attention. Shockingly, recent evidence found that obese children and adolescents, who we know tend to have lower levels of physical activity, report having a health-related quality of life comparable to children and adolescents who have been diagnosed with cancer and are undergoing chemotherapy treatment.³⁸

Physical activity impacts upon numerous mental health outcomes including anxiety, depression and rule-breaking behaviour.³⁹ Data on children in Alberta, British Columbia and Ontario suggest that physical activity improves mental fitness, whereas screen time has a negative effect (**Figures 3 & 4**) (*SHAPES*). Mental fitness is defined as the personal state of psychological wellness that reflects an individual’s self-perceptions regarding the satisfaction of three basic psychological needs: relatedness, competency and autonomy (*SHAPES*).

“Self-esteem is the value we place on ourself,”³⁹ and is important for children and youth. It is postulated that high self-esteem may actually protect children and youth against mental health issues while contributing to personality, social and cognitive development.^{40,41} The majority of findings from a recent systematic review indicate that exercise improves self-esteem in children and youth.⁴² Similarly, Canadian researchers found that sedentary behaviour was negatively associated with self-esteem, whereas active living had positive associations.⁴⁰ Finally, risk-taking behaviour (e.g. susceptibility to smoking) has also been linked to both low physical activity participation and high levels of screen time.⁴³

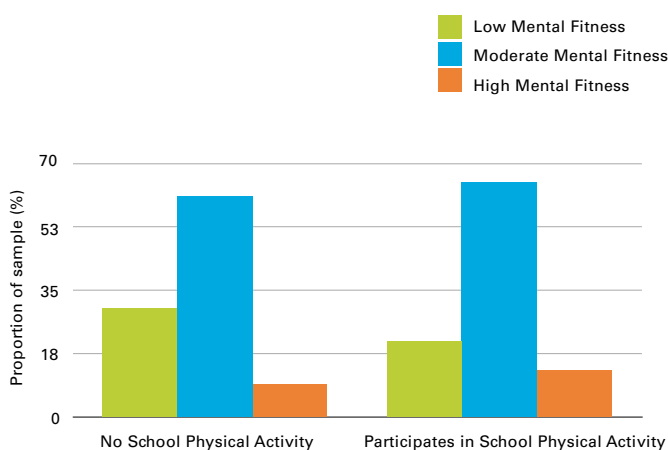


Figure 3: Mental fitness of children who participate in school physical activity presented by proportion of sample (%) demonstrating low, moderate or high mental fitness (Source: SHAPES).

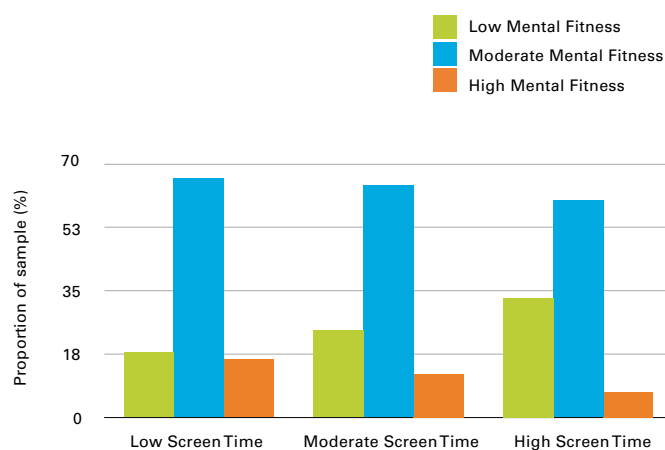


Figure 4: A comparison of the mental fitness of children based on screen time use (high, medium, low) by proportion of sample (%) demonstrating low, moderate or high mental fitness (Source: SHAPES).

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