



Insight driving innovation and impact

# **Evidence Paper – The Link Between Physical Activity and Attainment in Children and Young People**

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# Executive Summary

This paper has been compiled by the Youth Sport Trust's (YST) Research and Insight Team in January 2022. The paper reviews secondary evidence to explore the link between physical activity and attainment among children and young people.

## Background

**Young people are not taking part in enough physical activity**<sup>1</sup> and alongside this, schools in England have seen **significant cuts to the amount of PE** on the school timetable<sup>2</sup>. Young people are also affected by the **attainment gap**<sup>i</sup>, and the current slow progress in narrowing the gap means it will persist for decades<sup>3</sup>.

## Key Findings

The headline findings from this evidence review are summarised below:

- 1. Physically active children achieve higher levels of academic attainment than their less physically active peers.**
- 2. Physical activity means that children are better able to concentrate, which can enhance learning.**
- 3. Physical activity supports better health and wellbeing among young people, which in turn means they are more likely to achieve better academically.**
- 4. Physical activity can enhance the cognitive health of young people to support effective learning.**
- 5. Physical literacy can support school readiness.**
- 6. Organised sports and after-school clubs are associated with higher levels of attainment.**

## Conclusions

The evidence presented in this paper highlights the important role that high quality physical activity and Physical Education (PE) can play in supporting a child's progress at school. **Available evidence shows that whilst there is still a need for further high-quality research in this area**<sup>ii</sup>, there is a growing body of research, both in the UK and internationally, to suggest a positive association between participation in physical activity and academic performance in young people<sup>4,5,6,7,8</sup>.

This evidence paper provides **a sound rationale for investment in physical activity and Physical Education (PE) for children and young people**. What is more, it emphasises that **school environments provide a unique opportunity** as they represent a critical intervention point to influence young people's motivations and can also ensure that children have access to opportunities for physical activity<sup>9</sup>.

Based on the evidence presented in this paper, the YST continues to work hard to ensure that every child has access to high quality sport and physical activity and PE so that every child can reach their potential.

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<sup>i</sup> The attainment gap refers to the difference in academic attainment between learners from different social backgrounds.

<sup>ii</sup> More research is needed due to the complexities of inter-relationships between outcomes, changes in wider variables, small sample sizes, and the wide range of educational assessments applied.

## Introduction

This paper has been compiled by the Youth Sport Trust's (YST) Research and Insight Team in January 2022. The paper reviews secondary evidence (all published from 2011 onwards) to explore whether there is a link between physical activity and attainment among children and young people.

## Background

**Young people are not taking part in enough physical activity**; only 44.6% are meeting the Chief Medical Officer guidelines of taking part in sport and physical activity for an average of 60 minutes or more every day<sup>10</sup>. What is more, less than half of all children and young people strongly agree that they enjoy taking part in sport and physical activity, this means that 55% are not likely to receive the full benefits of doing so<sup>11</sup>. Alongside this, schools in England have seen **significant cuts to the amount of PE** on the school timetable; 42,285 hours of PE have been lost from state-funded secondary schools between 2011/12 and 2020/21<sup>12</sup>.

Young people are also affected by the **attainment gap**<sup>iii</sup>, which according to the Education Endowment Fund (EEF) is largest for children and young people eligible for free school meals and those with special educational needs. The EEF highlights that the gap is already evident when children begin school and then widens at every stage of education; it more than doubles to 9.5 months by the end of primary school, and then more than doubles again, to 19.3 months, by the end of secondary school. The current slow progress in narrowing the gap, coupled with the impact of Covid-19, means it will persist for decades<sup>13</sup>.

## Link Between Physical Activity and Attainment

### 1. Physically active children achieve higher levels of academic attainment than their less physically active peers.

The Chief Medical Officers for the UK state that in children and young people, regular physical activity is associated with improved learning and attainment<sup>14</sup>.

Supporting this, a number of studies have concluded that there is an association between physical activity levels and academic attainment<sup>15</sup>. One UK study involving 86 primary school children showed that **children who were more active performed significantly better in writing and mathematics than children who were less active**; the study concluded that there does appear to be an association between physical activity and academic attainment in primary school children. However, it is important to note that the study also acknowledges that a range of other unaccounted socio-economic factors could also account for these differences<sup>16</sup>.

Another UK study which focused on secondary school pupils concluded that findings suggested **a long-term positive impact of moderate to vigorous physical activity (MVPA) on academic attainment in adolescents**. The study found that the amount of

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<sup>iii</sup> The attainment gap refers to the difference in academic attainment between learners from different social backgrounds.

MVPA engaged with at age 11 had an effect on academic performance across English, Maths and Science at age 11, 13 and final GCSE exam results for both males and females. The study found that the higher MVPA at 11 was associated with higher subsequent attainment. In addition, robust longitudinal associations were observed for attainment in English for males and females and in addition, in Science for females<sup>17</sup>.

A research project conducted with 24 elementary schools in the United States showed that **adding sessions of physical activity to a school curriculum could have long-term benefits**, including improved academic performance. When comparing improvement in standardized test scores over three years, schools that were stratified and randomly assigned to receive physically active lessons did 6 percent better than their peers who had received the same lessons in a seated, inactive manner<sup>18</sup>.

Quality-based PE interventions have also been found to favour an increase in academic performance, particularly mathematics-related skills and through teaching strategy interventions. Research found that **improving the quality of PE can result in small increases in students' cognition, mainly in primary education, and academic performance**, particularly in relation to Maths<sup>19</sup>.

The type of physical activity and its influence on academic achievement has not been studied extensively<sup>20</sup>. However, one review of studies suggests that the **greatest effects were seen when children engaged in aerobic physical activity**, like jogging in place, rather than resistance activities, like push-ups or sit-ups. It also found that that **children who were physically active in small groups (10 to 30 children) showed greater improvements** than those in large groups (30 or more children) or very small groups (1 to 2 children)<sup>21</sup>.

Between 2003 and 2017, the YST delivered the Sky Sports Living for Sport Programme, which used a team of Athlete Mentors to inspire young people and encourage them to achieve their personal best. An independent evaluation of the programme found that 72% of teachers agreed that students who participated in the programme had demonstrated improvements in attainment at school<sup>22</sup>.

Many schools implement active learning – whereby they incorporate the use of physical activity into their academic lessons to enhance learning. A number of reviews suggest that this approach is beneficial for cognitive performance and academic achievement<sup>23 24 25</sup>. This may be a particularly attractive option for schools who are concerned about incorporating physical activity within the curriculum at the expense of the time spent on other 'academic' subjects. In response to Covid-19, the YST supported schools with Active Recovery Curriculums (ARC); the prioritisation of physical activity to support outcomes for young people following the pandemic. An independent evaluation across a sample of ten schools found that 75% of teachers noted an increase in academic progress among pupils since implementing an ARC. In addition, the evaluation found that 74% of pupils agreed that 'doing exercise and sports at school helps me learn'<sup>26</sup>. Supporting this, results from the YST's National PE, School Sport and Physical Activity Survey found that 87% of schools considered that sport makes a positive contribution to achievement, and 65% to attainment<sup>27</sup>.

## **2. Physical activity means that children are better able to concentrate, which can enhance learning.**

Children's attention problems have been shown consistently to predict lower academic achievement at all ages<sup>28</sup>. Supporting this, **pupils with better attention skills make more progress across the four key stages of schooling in England**; for example, children with no attention problems have an average value-added score which is 2.08 points higher at Key Stage 2 and 2.10 points higher at Key Stage 3 (i.e. representing one term of academic progress), and a total value-added score which is 63.38 points higher at Key Stage 4 (i.e., equivalent to more than one extra GCSE at grade A\*) compared to children with a lot of attention problems<sup>29</sup>. Research has found that higher levels of MVPA has a beneficial association with attention in adolescents, in particular for males, which will help them when learning in school<sup>30,31</sup>.

Research from the United States found that almost **immediately after engaging in physical activity, children were better able to stay focused and concentrate on classroom tasks**, thus enhancing their learning experience<sup>32</sup>. This was supported by a review of studies assessing the effects of physically active lessons on educational outcomes; the research concluded that learning and attention may be improved following bouts of educational physically active lessons<sup>33</sup>. Further research also found that a single PE programme of 30 minutes duration led to an improvement in the maintenance of on-task attention in the face of distraction<sup>34</sup>.

Research also found that **physical activity positively predicted academic achievement through emotional regulation** for 7-year-olds and behavioural regulation in 11-year-olds, when controlling for prior achievement and cognitive ability at age five. The impact of this relationship was more pronounced when controlling for socio-economic status. This suggests that early interventions might focus on attention rather than behaviour<sup>35</sup>.

## **3. Physical activity supports better health and wellbeing among young people, which in turn means they are more likely to achieve better academically.**

Public Health England found that a positive association exists between academic attainment and physical activity levels of pupils. It highlights that the positive impact of school sport and physical activity on young people's wellbeing played a significant part in this, concluding that **pupils with better health and wellbeing are likely to achieve better academically**. Importantly, it highlighted that the culture, ethos and environment of a school influences the health and wellbeing of pupils and their readiness to learn<sup>36</sup>.

## **4. Physical activity can enhance the cognitive health of young people to support effective learning.**

A physically active lifestyle during childhood is positively associated with brain and cognitive health. Research found that **children who are more aerobically fit have improved brain function, higher academic achievement scores and superior cognitive performance than less fit children**, and vice versa<sup>37,38,39,40,41,42,43</sup> (evident in both primary<sup>44</sup> and secondary school children<sup>45 46</sup>). What is more, a study emphasised that repetitive engagement in physical activity levels leads to higher fitness, which has been positively related to better academic behaviours<sup>47</sup>; this highlights the need for regular engagement in physical activity.

Research with pre-adolescent children found that **higher cardiorespiratory fitness was associated with improvements in the cognitive control of working memory**<sup>48,49</sup>. A systematic review of evidence supported these findings and concluded that quality-based PE interventions enhanced cognition, primarily core executive functions, and mainly in primary education settings<sup>50</sup>.

Building on this, research states that the component skills that form the construct of self-regulation are crucial for developing the habits and behaviours that enable children to be successful academically<sup>51</sup>. Research showed that **children who do more physical activity are likely to have stronger 'self-regulation'** (the ability to 'keep themselves in check'), and in turn, young people's academic achievement is associated to their self-regulation skills<sup>52</sup>. More intensive physical activity has also been associated with boosting self-regulation across childhood<sup>53</sup>. Among early years children, research found that it is possible that active play may have a positive indirect effect on academic achievement; it showed that higher levels of active play positively predicted self-regulation scores and early maths and literacy scores<sup>54</sup>.

Emerging evidence also suggests that **cognitively challenging physical activities (e.g. dance and martial arts) produce larger and more sustainable improvements in executive functions** than physical activity involving low cognitive demand<sup>55 56</sup>. Similarly, physical activity which requires some form of decision making (i.e. cognitive engagement) may be particularly beneficial for subsequent cognitive function. For example, playing both basketball and football, as well as a circuit of exercises that were designed to be cognitively engaging, have been shown to have positive effects on cognitive function in young people<sup>57 58</sup>.

A substantial body of evidence demonstrates that **when a young person completes some physical activity, their cognitive function is improved for approximately one hour following the activity**<sup>59 60 61</sup>. Specifically, it has been shown that cognitive function (across the important domains of attention, memory and executive function) is enhanced following moderate intensity running, high intensity intermittent sprinting, and team games such as basketball in adolescent boys and girls. These effects last for approximately one hour, which highlights the importance of regular opportunities for physical activity to be included within the school day. This was supported by a review of literature which found that across nearly all studies included, offering physical activity breaks during standard classroom time may have favourable associations with some indicators of cognitive functioning, academic behaviours and/or academic achievement<sup>62</sup>.

## 5. Physical literacy can support school readiness.

The early years are a critical period for promoting physical activity. What is more, physical activity at this stage of a child's life is vital for healthy development. A systematic review of evidence examined the **relationship between physical activity and cognitive development during early childhood** (birth to 5 years). The review found preliminary evidence to suggest that MVPA may have beneficial effects on cognitive development (particularly in relation to the domains of executive function domain and language) and motor development, during early childhood<sup>63</sup>. The YST delivers Healthy Movers, which is a programme for early years children that aims to develop their physical literacy skills to support their wellbeing and school readiness. An evaluation of the Healthy Movers



programme in Cornwall found that children taking part in the programme demonstrated positive progress against key early learning goals, including speaking, and listening and attention<sup>64</sup>.

## 6. Organised sports and after-school clubs are associated with higher levels of attainment.

Research conducted by NatCen Social Research and Newcastle University analysed data from the Millennium Cohort Study, which followed thousands of children from birth, and has been linked to key stage 1 and key stage 2 attainment scores. The results showed that participation in some formal out of school activities for primary school children was associated with attainment, and in particular, the researchers highlighted that sports or physical activities as well as after school clubs stood out as particularly important<sup>iv</sup>.

**Participation in sports clubs was positively associated with attainment outcomes** at age 11; children who started a sports club from age 7 onwards, and were taking part at age 11, and children who took part in such organised physical activities at ages 5, 7 and 11, were more likely to achieve a Level 5 in maths, compared with children who had never taken part in such activities. Being active informally (for example playing active games with friends) several times a week (but not as much as every day), at age 7 was also associated with higher attainment at age 11. Among economically disadvantaged children, after school clubs emerged as the only organised activity linked to positive outcomes, including higher key stage 2 attainment<sup>65</sup>.

## Conclusions

The evidence presented in this paper highlights the important role that high quality physical activity and PE can play in supporting a child's progress at school. **Available evidence shows that whilst there is still a need for further high-quality research in this area<sup>v</sup>, there is a growing body of research, both in the UK and internationally, to suggest a positive association between participation in physical activity and academic performance in young people<sup>66,67,68,69,70</sup>**. What is more, research suggests that any increased time spent in PE is not likely to detract from academic performance, even when there is less time devoted to subjects other than PE<sup>71,72</sup>.

This evidence paper provides **a sound rationale for investment in physical activity and PE for children and young people**. As stated in a report by Nike, 'children who participate in a variety of sports and physically active play and have access to high-quality PE as an integral part of their school experience will realise a level of benefits that sets them up to thrive for life'. Their report highlights how this stage of life is especially important because reaching children before their brains are fully developed represents a critical intervention point for influencing their motivations. What is more, it also emphasises that **school environments provide a unique opportunity** to ensure that all children can access opportunities for physical activity<sup>73</sup>. Supporting this, a systematic review of evidence highlighted that schools are ideal settings for the promotion of healthy lifestyles and that PE is the primary vehicle to achieve these objectives. The study

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<sup>iv</sup> The study looked at breakfast clubs, after school clubs, informal childcare, formal childcare, sports clubs, religious activity / lessons, extra tuition, and music lessons or tuition.

<sup>v</sup> More research is needed due to the complexities of inter-relationships between outcomes, changes in wider variables, small sample sizes, and the wide range of educational assessments applied.



concluded by stating the importance of having access to quality PE for children and adolescents, as recommended by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and that: **'schools should place more emphasis on PE to not only improve students' health but also to raise their cognition and academic performance'**<sup>74</sup>.

Based on the evidence presented in this paper, the YST continues to work hard to ensure that every child has access to high quality sport and physical activity and PE so that every child can reach their potential.

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