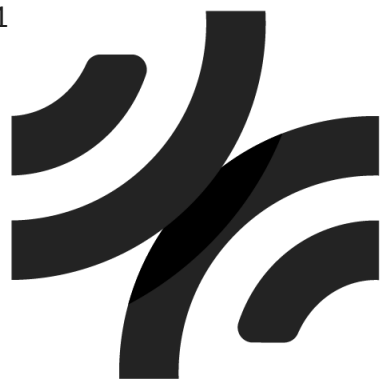


# Youth Sport Trust

The social value of free physical activity in schools: pioneering new study and discussion paper.



## Headline findings at a glance

- This is the first study to investigate the relationship between Physical Activity (PA) in and out of school (primary and secondary) and personal wellbeing.
- We find that already being motivated and enjoying sport and activity accounts for at least half the wellbeing benefits at secondary school age: thus, generating and creating that motivation and enjoyment at primary school age is of vital, lifelong benefit.
- Those more active out of school are from higher socioeconomic backgrounds, likely because such activity tends to have significant costs (clubs, kit, lessons, travel etc.)
- Those doing less than 30 minutes of PA a week are more likely to be eligible for Free School Meals (FSM).
- The wellbeing impact of free PA at school is almost double for those children who are disabled and/or receiving FSM than for those who aren't.
- Using the new, Treasury recommended measure of wellbeing - the WELLBY, the economic value of providing PA in primary schools is at least £4bn, and likely to be more than double this figure.

## **Executive Summary: key findings and limitations**

The objective of this work was to enable The Youth Sport Trust to estimate the economic value of Physical Activity (PA) provision in schools using the new HM Treasury recommended value for wellbeing, the WELLBY, to then try as far as possible to attribute this wellbeing value of activity in schools to the £300m school sports funding, and finally - to produce a high-level cost-benefit analysis to understand if the investment in school physical activity was good value for money.

The key research question is: **What is the wellbeing impact and value of activity in young people?**

The Chief Medical Officers' recommendation is for an 'hour a day' of activity for children and with half an hour of this provided at school. So, what is the impact and value of half an hour a day of this being in school (150 minutes per week)?

For this work we analysed a large UK data set run by Sport England, called the Active Lives Children and Young People Survey. This enables a strong, credible level of analysis (full OLS regression analysis<sup>1</sup>) to evidence the impact of activity in school on the wellbeing of young people. We can be confident in these findings.

### **Rapid evidence review, methodology and analysis of UK open data (Active Lives)**

- Appendix 1 details a rapid review of the many studies that discuss the benefits of play, physical activity and sport at school. These studies show the link between doing sport at school and academic achievement (grades), as well as self-esteem. However, a meta-review has found that many of these studies are of variable quality, and no existing study has investigated the relationship between sport at school and personal wellbeing / life satisfaction.

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<sup>1</sup> This link is a State of Life short explanation of regression analysis.  
<https://docs.google.com/document/d/1eMw6EXcXwvGl56nL8Zhs1pVwMYJQjj6fTvNLpKbTY/edit>

- This report addresses this absence, hypothesising that provision of sport in state schools is likely the most effective way to capture the benefits of PA for the greatest number of children.
- The UK has world leading data sets, and we use Sport England's Active Lives Children and Young People data. This data allows us to factor in other drivers of wellbeing such as affluence and socioeconomic status. This enables us, as far as possible, to isolate the impact of physical activity in school and out of school on personal wellbeing.
- We have looked at the minutes of activity in dosage blocks of 30 minutes.
- Those doing less than 30 minutes of activity a week at school are more likely to be eligible for Free School Meals.

## **Findings on the benefits, impact and value of Physical Activity (PA) overall**

- The value of a school-age child being active for an hour a day (regardless of where the activity takes place) looks to be the most impactful (+0.6 life satisfaction/happiness on a 0-10 scale). This is worth £7,800 per child, per year.
- Even being active for half an hour a day has a +0.3 effect on happiness for year 3-6 children (£3,900) and a +0.5 effect on life satisfaction for year 7-11 young people (£6,500).
- However, the uplift is significantly reduced when we allow for motivation and wealth factors i.e. those children who are more active in and out of school already enjoy and are motivated to do sport. These children also tend to come from higher socioeconomic backgrounds.

## **PA in school - younger children seem to benefit more; motivation matters**

- Being active for half an hour a day in primary school has a +0.084 effect on happiness for year 3-6 children (£1,100) and a +0.149 effect on life satisfaction for year 7-11 young people (£1,900) per year.
- The effect of PA in school on the wellbeing of primary school children is increasing with the amount of PA performed - going up to +0.216 for 300 minutes of PA per week (an hour each school day) or more.

- The opposite applies for secondary school children - the peak effect is +0.3 at 90-119 minutes/week. After this the benefits diminish, except for those that already enjoy sport.

### **Children who are disadvantaged experience double the benefit**

- One of the key aims of early years provision of sport and activity in primary schools is to create enjoyment and motivation for activity and to lay down the foundations of lifelong habits.
- Sport outside of school often has significant costs (clubs, kit, lessons, travel). This is a serious barrier, and one that is growing as the cost of living crisis bites. Conversely, PA and sport provided at school is free and available to all.
- Crucially, the impact of PA at school on wellbeing is almost double for those children who are disabled and/or receiving Free School Meals (FSM) than for those who are not.
- We can reasonably conclude that the benefit is greater for those kids who most need access to free school sports provision. To repeat Tim Hollingsworth, *“For too long, people with the most to gain from being active have been the least able to take part”*.
- We find the economic value of free provision of PA in schools (using the new, Treasury recommended measure of wellbeing - the WELLBY) is at least £4.5bn and likely to be double this.

## 1. Introduction

The Youth Sport Trust wishes to estimate the value of Physical Activity (PA) provision in schools. The objective was to evidence, as far as possible, the impact at two levels:

1. The Chief Medical Officers' recommendation of an 'hour a day' of activity for children - with half an hour of this provided at school
2. The impact and value of half an hour a day of this being in school (150 minutes per week)

The Green Book is the UK Government and Treasury's guidance on how to measure and evaluate the efficacy of policy. 2018 and 2020 updates have a significant shift in the emphasis and objectives of policy, with Page 5 stating:

*"The appraisal of social value, also known as public value, is based on the principles and ideas of welfare economics and concerns overall social welfare efficiency, not simply economic market efficiency. Social or public value therefore includes all significant costs and benefits that affect the welfare and wellbeing of the population, not just market effects".*

The Youth Sport Trust in their PE and School Sport report 2022<sup>2</sup> cite many of the studies and benefits of physical activity in children. The UK has some of the world's leading data on wellbeing and lifestyles and the evidence for health and wellbeing benefits from physical activity in adults are starting to be well evidenced and recognised.

With decades of work in campaigning for the provision of children's sport, the Youth Sport Trust felt it was vital to contribute to this growing understanding in the value of childhood intervention in line with the latest 2020 Green Book guidance on public spending and the new WELLBY measure of economic value recommended by HM Treasury<sup>3</sup>.

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<sup>2</sup> <https://www.youthsporttrust.org/news-insight/research/pe-school-sport-the-annual-report-2022>

<sup>3</sup> <https://www.gov.uk/government/publications/green-book-supplementary-guidance-wellbeing>

Activity in schools is free, habit-forming, and likely to be beneficial for learning and wellbeing. This paper is a first look at the UK open data evidence on the impact and value of physical activity in and out of school.

## **Literature review summary**

Existing studies show a link between doing sport at school, academic achievement (grades), and improved self-esteem. However, a meta-review has found that many of the studies are of variable quality and fail to factor in the socio-economic background of the children. It is also known that children from lower socioeconomic backgrounds do less sport and physical activity, owing to cost of access and more pressing basic needs.

Furthermore, while there are many studies that look at the benefit of sport and activity levels in general and the positive impacts on health and wellbeing, none has isolated and interrogated the relationship between personal wellbeing / life satisfaction and sport in and out of school, while factoring in socioeconomics and motivation alongside. A more detailed literature review, with references to the source studies, is in Appendix 1.

Clearly there is a gap in the literature on the relationship between doing sport in as well as out of school and life satisfaction. We aim to close this gap by interrogating one of the UK's largest data sets on sport and physical activity, Sport England's Active Lives data set. The hypothesis for our review is that the provision of sport in state schools may be the only large-scale option to capture these potential benefits.

## **2. The Active Lives data set**

Active Lives is a very large England-wide survey run by Sport England. It aims to collect detailed information about engagement in all kinds of sport and physical activity levels among the population. There is an Active Lives adult survey which receives responses from 175,000 people aged 16 and above every year, and an Active Lives Children and Young People survey for those aged 5 to 16, with up to 100,000 respondents every year.

We use the Active Lives Children and Young People data to investigate the relationship between doing physical activity in school, out of school, and personal wellbeing. We have focused only on years 1 and 2 of the data, corresponding to the academic years 2017/18 and 2018/19, respectively.

We exclude year 3, which corresponds to the academic year 2019/20, the onset of the COVID pandemic. At this time, teaching moved online and measures of physical activity in school were reclassified to ‘physical activity during school hours’. Incidentally, there is a considerable body of work from the Sport for Development Coalition and Sport England showing that during COVID levels of inactivity increased for those already inactive and from lower socioeconomic groups<sup>4</sup>. The full dataset from the 2022 survey was not yet available at time of analysis.

### 3. Methodology

As the main **explanatory variable(s)** of interest we take the total number of minutes of physical activity performed per week as reported by the respondents, split by where it took place: in school, outside school, or both (everywhere). To allow for a more flexible relationship between the amount (minutes) of physical activity and outcomes, we recode the minutes into categories or dosage of 30-minute blocks.

Our model examines together physical activity in and outside school. This allows us, as far as possible, to isolate the benefits of one location versus the other. In another version of the model, we include only physical activity ‘everywhere’.

The main **outcome variables** we consider are two of the ONS4 standard questions for personal wellbeing, both on a scale of 0 to 10:

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<sup>4</sup><https://sportfordevelopmentcoalition.org/sites/default/files/user/Impact%20of%20Covid%2019%20on%20the%20Sport%20for%20Development%20Sector.pdf>



- Life Satisfaction (“Overall, how satisfied are you with your life nowadays?”) for secondary school students (school years 7-11<sup>5</sup>)
- Happiness (“Overall, how happy did you feel yesterday?”) for primary school age children (school years 3-6)

Moving beyond simple cross-tabulation, we also use multiple linear regression analysis to investigate the relationship between physical activity (in and out of school) and these outcomes, which allows us to control for some demographic and socioeconomic factors which may be responsible for some of the differences in wellbeing across respondents.

We use the following **control variables**, all categorical:

- School year (year 7 to year 11 for life satisfaction and year 3 to year 6 for happiness)
- Gender (female, male, other, missing)
- Broad ethnicity (White British, White Other, Asian, Black, Mixed, Other, missing)
- Disability, special need or illness (Yes/no/missing)
- School term (Autumn, Spring, Summer)
- Family Affluence Score (low 0-6, medium 7-10, high 11-13, missing)
- Free School Meals recipient (Yes/no/missing)
- Region of England
- Rural/Urban
- Local area deprivation based on the IMD decile (high 1-3, medium 4-7, low 8-10, missing)

In some models (see regression results appendix), we also included school control variables<sup>6</sup>:

- Single-sex vs. coeducational
- Selective vs. non-selective
- Religious Christian, other faith, non-religious
- Maintained / academy / independent
- Number of pupils, grouped into categories
- Percentage of pupils receiving Free School Meals
- Percentage of pupils having English as a non-native language

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<sup>5</sup> Life satisfaction is only available for respondents from school years 7-11 in the Active Lives Children data set.

<sup>6</sup> This made almost no change to the results compared to the base model, and therefore we do not report on the results of the models with school-level control variables in any further detail.

- Pupil-teacher ratio
- Ofsted rating

## **Motivation matters: considering the COM-B model**

Individual motivation/desire to engage in sport and physical activity is evidenced by the answer to the question “I enjoy taking part in exercise and sports: Strongly Disagree / Disagree / Agree / Strongly Agree”. This question is part of the COM-B (Capability, Opportunity, Motivation -> Behaviour) model developed by Sport England, which is now standard for measuring physical activity and engagement.

We run two model specifications in the analysis - one which controls for existing motivation and one that does not. There are sound arguments in favour of each option.

We found in all previous analysis of the benefits of physical activity that motivation and enjoyment is a very significant predictor of personal wellbeing in relation to participation in physical activity. This means significant differences in wellbeing associated with physical activity are due to intrinsic enjoyment and motivation to do sport, rather than provision or availability of facilities.

Not controlling for motivation would cause the estimated relationship between wellbeing and physical activity to be biased (contaminated) by these personality traits; controlling for motivation singles these effects out.

Theoretically, motivation and enjoyment of sport is likely to be a channel for the wellbeing benefits of school sport provision; after all, children who have more opportunity to do sport or physical activity in school are also more likely to start enjoying it, which then contributes to the total wellbeing benefit of school sport provision.

Therefore, in our final figures we use those that do not control for motivation - precisely because creating this enjoyment is the objective of the free provision in primary schools.

## **Applying the WELLBY to our findings**

The WELLBY is a new standardised measure of wellbeing impacts, introduced in the 2021 HM Treasury Green Book Supplementary guidance on wellbeing<sup>7</sup>. It is also the first time that the Treasury has explicitly recommended an economic value for wellbeing and as such is a

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<sup>7</sup> <https://www.gov.uk/government/publications/green-book-supplementary-guidance-wellbeing>

significant and important step forward in how we can put monetary value on things that can be seen, to a large extent, as preventative health.

The WELLBY is based on improvements in Life Satisfaction. As such, we should apply the value of £13,000 per WELLBY to the estimates based on life satisfaction of secondary school children in years 7-11 rather than happiness observed in primary school children at years 3-6. However, we also analyse happiness in primary school children and find that the effects of physical activity on these two outcomes are broadly similar. Therefore, we believe we can base our valuation result both on estimated effects on life satisfaction for secondary school children as well as estimated effects on happiness for primary school children. Additional reasons are provided further in this report.

## 4. Findings

### Activity and descriptive statistics

We start with a simple illustration of how life satisfaction and happiness varies across the groups split by Physical Activity (PA) in school and ‘everywhere’ (in and out of school).

First, we look at the full sample and then we narrow down to those who do not do any physical activity out of school, so that there are more grounds to associate the variation in PA in school with school sport provision.

As mentioned, PE & school sport premium funding is only destined for primary school children (up to and including age 11, or year 6 of schooling). Therefore, we included extra columns where we look at this target population group in particular. However, Life satisfaction is only measured in the Active Lives Children data starting from school year 7. We therefore look at happiness, an alternative ONS4 wellbeing measure which is collected in Active Lives Children starting from school year 3.

**Table 1. Mean life satisfaction / happiness by physical activity everywhere**

<b>Minutes per week of sport/PA EVERYWHERE</b>	<b>LS - Year 7-11</b>	<b>Happiness - Year 3-6</b>
Total PA Less than 30 minutes	5.77	7.29
Total PA 30-59 minutes	6.04	7.34
Total PA 60-89 minutes	6.24	7.63
Total PA 90-119 minutes	6.25	7.62
Total PA 120-149 minutes	6.39	7.63
Total PA 150-179 minutes	6.43	7.68
Total PA 180-209 minutes	6.46	7.76
Total PA 210-239 minutes	6.53	7.76
Total PA 240-269 minutes	6.47	7.72
Total PA 270-299 minutes	6.56	7.73
Total PA 300-329 minutes	6.65	7.74
Total PA 330-359 minutes	6.47	7.79
Total PA 360-389 minutes	6.64	7.61
Total PA 390-419 minutes	6.56	7.95
Total PA 420 minutes or more	6.77	7.93

**Table 2. Mean life satisfaction / happiness by physical activity in school**

<b>Minutes per week of sport/PA in school</b>	<b>LS - Year 7-11</b>	<b>Happiness - Year 3-6</b>
In school Less than 30 minutes	6.00	7.47
In school 30-59 minutes	6.37	7.66
In school 60-89 minutes	6.56	7.77
In school 90-119 minutes	6.66	7.76
In school 120-149 minutes	6.70	7.75
In school 150-179 minutes	6.51	7.85
In school 180-209 minutes	6.58	7.87
In school 210-239 minutes	6.68	7.91
In school 240-269 minutes	6.72	7.90
In school 270-299 minutes	6.69	7.97
In school 300 minutes or more	6.78	8.00

Table 1 and table 2 reveal a clear pattern: children with more physical activity, both at school and ‘everywhere’ (in and out of school) do show higher life satisfaction and happiness scores (which is increasing in physical activity with minor exceptions).

However, physical activity in school and outside school are correlated ( $\rho = 0.63$ ), which means that those who are active in school also tend to be active outside school and vice versa. A majority of those who don’t do physical activity outside school also don’t do physical activity at school. This makes it likely that any changes associated with physical activity in school may be explained by existing motivation and preference rather than availability.

Therefore, we must look closer at how pre-existing motivation and enjoyment of sport and physical activity is linked to the experience of the health and wellbeing benefits.

### Socioeconomics

The data also suggests that children and young people who do less physical activity in school tend to be from slightly lower socioeconomic backgrounds. Those doing less than 30 minutes of activity a week at school are more likely to be eligible for Free School Meals - 19.5% vs. 16% for those who do 90-119 minutes and 120-149 minutes or 15.6% for 60-89 minutes.

The fact that lower socioeconomic groups tend to be less physically active is a common finding in the analysis of many different types of physical activity across all ages and demographics. As page 8 of the Youth Sport Trust PE and School Sport Report<sup>8</sup> makes clear:

*“Deep-rooted and growing inequality as a result of lived experience, geography or characteristics is leading to poorer health and educational outcomes for many young people. Children from poorer backgrounds face more barriers to accessing opportunities to be active, missing out on the associated benefits as a result”.*

And as Tim Hollingsworth CEO of Sport England states at the start of the ‘Uniting the Movement’ strategy paper:

*“For too long, people with the most to gain from being active have been the least able to take part.”*

The full descriptive statistics from the Active Lives Children and Young People data set are annexed to this report and can be accessed by clicking on the following links:

- [AL Youth results.xlsx](#) - full split (30-minute bins)
- [AL Youth results 3cat.xlsx](#)- reduced, 3-category split of physical activity

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<sup>8</sup> [https://drive.google.com/file/d/1W287LEid5I\\_8pOr4OQ5kBMjAR4HN11\\_Q](https://drive.google.com/file/d/1W287LEid5I_8pOr4OQ5kBMjAR4HN11_Q)

## Factoring in the socioeconomics and intrinsic motivation for sport/PA

As noted, those from higher socioeconomic strata are also more active - so to report that more active people are healthy (as many reports do) is likely to show the value and impact of being wealthy rather than being active.

Regression analysis allows us to better isolate the effect of physical activity from demographic and socioeconomic background. It is thus essential if we are to accurately report and value provision of physical activity in and out of school.

### Activity everywhere - in and out of school combined

Table 1 showed activity in general, everywhere (in and out of school) for the age groups under consideration. This is to investigate the impact of the Chief Medical Officers' guidelines for activity in children of an 'hour a day' (so 420 minutes per week). Table 3 below introduces the motivation variable.

**Table 3. Key regression coefficients - physical activity everywhere**

Minutes per week of sport/PA	L.S., yr 7-11, no motiv.	L.S., yr 7-11, with motiv. control <sup>9</sup>	Ha., yr 3-6, no motiv.	Ha., yr 3-6, with motiv. control
Total PA Less than 30 minutes (ref.)	0.000	0.000	0.000	0.000
Total PA 30-59 minutes	0.243***	0.181***	0.066	0.089
Total PA 60-89 minutes	0.313***	0.189***	0.235***	0.170***
Total PA 90-119 minutes	0.349***	0.149***	0.204***	0.174***
Total PA 120-149 minutes	0.447***	0.190***	0.283***	0.236***
Total PA 150-179 minutes	0.484***	0.187***	0.314***	0.247***
Total PA 180-209 minutes	0.526***	0.196***	0.353***	0.261***
Total PA 210-239 minutes	0.509***	0.159***	0.320***	0.233***
Total PA 240-269 minutes	0.541***	0.166***	0.397***	0.273***
Total PA 270-299 minutes	0.554***	0.148***	0.391***	0.247***

<sup>9</sup> The answer to the following question is included as a categorical control variable in the regression model: How much do you agree or disagree with the following statement? - I enjoy taking part in exercise and sports. Answer options are: - Strongly agree; - Agree; - Disagree; - Strongly disagree; - Can't say;



Total PA 300-329 minutes	0.579***	0.191***	0.380***	0.244***
Total PA 330-359 minutes	0.546***	0.131**	0.439***	0.290***
Total PA 360-389 minutes	<b>0.671***</b>	<b>0.241***</b>	0.345***	0.183***
Total PA 390-419 minutes	0.514***	0.104*	0.537***	<b>0.374***</b>
Total PA 420 minutes or more	<b>0.627***</b>	0.079**	<b>0.592***</b>	0.358***

Stars denote statistical significance: \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. Dependent variable indicated in the top cell of the same column. Other control variables included but not shown here (see full details).

### Key Findings from Table 3

- In columns 1 and 3 we can see that where we don't control for pre-existing enjoyment of sport and activity, the relationship is more activity = more impact on wellbeing. This is logical and obvious - the more you do something you enjoy, the better you feel.
- However, these benefits plateau at around half an hour a day (row 6 and 7) and don't increase noticeably until we get close to 420 minutes per week. This is consistent with the principles of diminishing marginal utility.
- In the final row of table 3 we can see that the value of the Chief Medical Officers' target of 'an hour a day' of activity (420 minutes per week) for a child in primary and secondary school is around 0.6 (on a scale of 0-10). This is compared to being inactive at under 30 minutes per week. And the finding is consistent across both age groups.
- Columns three and five give us the results with the 'motivation control,' where we factor in the pre-existing, intrinsic enjoyment of activity and sport. Here we see a very clear pattern and difference in the two age groups:
  - Years 7 -11 (secondary school) - two hours a week is beneficial but beyond that only if you already enjoy sport. If you don't already enjoy sport at secondary school, over two hours a week has no real benefit.
  - At primary year levels the effect rises until around the 150 minutes a week mark and then plateaus a little, to pick up again only around 420 minutes a week (an hour a day).

### Activity in and out of school considered separately

With a better understanding of the impact of activity in and out of school, we now try to isolate and evidence the impact and value of provision in school - the 'half hour a day' or 'two hours a week' that are funded and enabled by the PE & school sport premium.

Table 4 shows levels of activity in and out of school and four columns that show the effect (regression coefficient) for secondary school years 7-11 and primary school years 3-6, with and without controlling for the pre-existing, intrinsic motivation of the children.

**Table 4. Key regression coefficients - physical activity in school and outside school**

Minutes per week of sport/PA	L.S., yr 7-11, no motiv.	L.S., yr 7-11, with motiv. control <sup>10</sup>	Ha., yr 3-6, no motiv.	Ha., yr 3-6, with motiv. control
<b>In school</b> Less than 30 minutes (ref.)	0.000	0.000	0.000	0.000
In school 30-59 minutes	0.203***	0.134***	0.044	0.039
In school 60-89 minutes	0.266***	0.180***	0.085**	0.083**
In school 90-119 minutes	<b>0.301***</b>	<b>0.180***</b>	0.051	0.020
In school 120-149 minutes	0.258***	0.126***	0.063	0.024
<b>In school 150-179 minutes</b>	<b>0.149***</b>	0.114***	<b>0.084**</b>	0.046
In school 180-209 minutes	0.121***	0.058	0.145***	0.096**
In school 210-239 minutes	0.144***	0.093**	0.175***	0.126**
In school 240-269 minutes	0.216***	0.135***	0.145***	0.085
In school 270-299 minutes	0.108**	0.017	0.190***	0.110*
In school 300 minutes or more	0.135***	0.004	<b>0.216***</b>	<b>0.129***</b>
<b>Outside school</b> Less than 30 minutes (ref.)	0.000	0.000	0.000	0.000
Outside school 30-59 minutes	0.114***	0.046	0.202***	0.153***
Outside school 60-89 minutes	0.220***	0.069*	0.203***	0.157***
Outside school 90-119 minutes	0.205***	0.019	0.263***	0.207***
Outside school 120-149 minutes	0.382***	<b>0.127***</b>	0.255***	0.173***
Outside school 150-179 minutes	0.263***	0.023	<b>0.349***</b>	0.255***
Outside school 180-209 minutes	0.387***	0.069	0.255***	0.124**
Outside school 210-239 minutes	0.352***	0.041	0.367***	0.287***
Outside school 240-269 minutes	0.394***	0.073	0.323***	0.194***
Outside school 270-299 minutes	0.411***	0.060	0.400***	0.245***
Outside school 300-329 minutes	0.471***	0.115**	0.315***	0.182***

<sup>10</sup> The answer to the following question is included as a categorical control variable in the regression model: How much do you agree or disagree with the following statement? - I enjoy taking part in exercise and sports. Answer options are: - Strongly agree; - Agree; - Disagree; - Strongly disagree; - Can't say;

Outside school 330-359 minutes	0.325***	-0.054	0.291***	0.140**
Outside school 360-389 minutes	0.470***	0.080	0.398***	0.232***
Outside school 390-419 minutes	<b>0.528***</b>	0.096*	0.357***	0.207***
Outside school 420 minutes or more	<b>0.465***</b>	-0.003	<b>0.476***</b>	<b>0.281***</b>

Stars denote statistical significance: \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. Dependent variable indicated in the top cell of the same column. Other control variables included but not shown here (see full details).

## Key Findings from Table 4

### 1. Out of school

- Out of school the ‘more is more’ pattern seems to apply if we do not account for motivation - more activity leads to more wellbeing impacts.
- Once again, the impact of an hour a week (420 minutes/week) outside school is consistent across the two age groups at nearly 0.5 (final row, columns 1 and 3).
- Consistent with Table 3 on activity ‘everywhere,’ this is largely because the kids who are more active out of school already enjoy it.
- For years 7 - 11, we again see that the benefits of activity are close to 0 with a few exceptions when we control for motivation. So, more is more, but only if you enjoy it already. This is why it’s so important to continue to ensure that PA and PE is enjoyable in school.
- However, in primary school (years 3-6) the wellbeing benefits of physical activity outside school seem to remain even after controlling for motivation, although the effect size is reduced by around 50%. Furthermore, the peak effect is achieved at around 150 minutes/week and does not consistently increase for higher activity levels.

### 2. In school

- We can see, once again, the difference between primary and secondary school. In secondary school the impact peaks at 60 - 120 minutes of activity and after that it goes down, even to 0 for the highest activity levels when you control for pre-existing motivation.
- For primary level we see that more activity in school, up to 300 minutes per week or more, has increasing impacts - quite literally more is more (columns 4 and 5).

- The difference between being inactive (less than 30 minutes per week) and ‘half hour a day’ (150 minutes per week) is 0.084 for in school vs 0.349 out of school (column 3, row 6 in bold) for primary school children. For secondary school students, it is 0.149 in school vs. 0.263 out of school.

## **How important is motivation and enjoyment as a factor?**

### **Secondary school - years 7 to 11**

Compared to the effect size of physical activity in the model which does not control for motivation, the effect sizes when controlling for motivation drop almost to 0. This is true when we consider activity outside school or activity everywhere. If we consider activity in school, then the effect size drops by around 30-60% but remains positive and largely significant.

This suggests that in secondary school enjoyment and motivation for activity account for around 30% to 100% of the wellbeing benefits.

### **Primary school - years 3 to 6**

The pattern here is interesting - more activity seems to lead to more happiness. But when you factor in the pre-existing enjoyment, the effect broadly starts to reduce to 30-50% less. This is similar to the above estimate for secondary school children, but for secondary school years 7-11 this reduction holds for both activity in school, outside school and everywhere.

On balance, when considering primary school level provision of PA we have decided to use the coefficients from the model that does not control for motivation. We use this result as an input for wellbeing impact estimation and valuation using the WELLBY. It is a key objective of the free provision of activity in schools to create, generate and build the intrinsic enjoyment and motivation to be active. After all, children who have more opportunity to do sport or physical activity in school are also more likely to start enjoying it and become more motivated to be physically active as they get older, which would contribute to the total wellbeing benefit of school sport provision. Controlling for motivation in the main results would remove this crucial indirect effect component.

## Does the impact of PA in schools increase for disadvantaged groups?

To answer this question, we perform split-sample regressions - separate regressions for males and females, white and BAME, disabled and non-disabled respondents, and those receiving and not receiving free school meals. This will allow us to see if the relationship between life satisfaction and physical activity at school is stronger or weaker for any particular subgroup.

**Table 5. Split sample regression coefficients - life satisfaction for year 7-11 pupils**

Subgroup	<30 min.	30-59 min.	60-89 min.	90-119 min.	120-299 min.	300+ min.
Everyone	0 (ref.)	0.203***	0.265***	0.300***	0.173***	0.144***
Female	0	0.183***	0.229***	0.259***	0.091**	0.041
Male	0	0.150***	0.223***	0.246***	0.208***	0.192***
White	0	0.193***	0.261***	0.288***	0.161***	0.142***
BAME	0	0.185**	0.232***	0.334***	0.223***	0.158**
Disabled	0	0.547***	0.350***	0.528***	0.374***	0.249**
Not disabled	0	0.136***	0.228***	0.255***	0.135***	0.118***
FSM	0	0.257***	0.391***	0.543***	0.296***	0.328***
No FSM	0	0.189***	0.232***	0.275***	0.155***	0.101**

Note: Y = life satisfaction on a scale of 0 to 10. Motivation not included as a control variable - the result for 'everyone' coincides with the main model. Stars denote statistical significance: \*p<0.1, \*\*p<0.05, \*\*\*p<0.01.

The key takeaway from Table 5 is that **the relationship between wellbeing and doing physical activity at school is considerably larger, almost double, for those children who are disabled or receiving Free School Meals (FSM) than for those who are not.**

This holds for all intensity categories of physical activity at school - for the category of 90-119 minutes the effect size is about twice as large. It is important to note that the same finding holds if we include motivation as a control variable (not shown here but can be seen in [AL Youth regression results.xlsx](#)).

We were unable to check whether this also holds for year 3-6 children, because unfortunately FSM data is only collected for school years 7-11 in the data. However, for year 3-6 children, we can see that those from ethnically diverse communities experience a somewhat stronger relationship with happiness, as well as those living in high deprivation areas and those with lower family affluence scores (FAS) - see the link in the previous paragraph. Nonetheless, we have seen in the main findings that the results for primary school children are broadly in line with the results for secondary school respondents. **Therefore, we believe that we have produced good evidence in favour of the argument that sport in school provides greater benefits for those in need.**

## 5. Key findings and interpretation

The next step is to choose key metrics and impacts from the foregoing analysis in order to estimate the wellbeing impact of sport and PA provision in school using the new WELLBY measure, and to then put a monetary value on it.

As stated in the methodology section, the WELLBY is a new standardised measure of wellbeing impact that was introduced in the 2021 HM Treasury Wellbeing guidance and is based on the life satisfaction effect that we have been discussing in the previous sections<sup>11</sup>.

Key impact estimates are as follows (expressed as a wellbeing coefficient on a scale of 1 to 10):

- Table 3 shows that the value of the Chief Medical Officers' target of an 'hour a day' of activity (420 minutes per week) for a child in primary and secondary school is close to

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<sup>11</sup> <https://www.gov.uk/government/publications/green-book-supplementary-guidance-wellbeing>

**0.6 (bottom row, highlighted)** compared to inactivity at under 30 minutes per week. **This has a WELLBY value of around £7,800 per year, per child.**

- If 0.6 impact is for an hour a day in general (everywhere), then row 6 of Table 4 (highlighted) reports that ‘half an hour a day’ of activity at school gives between 0.15 at secondary and 0.084 at primary school. Taking the average of these two estimates, this gives a value of about **£1,500 per year, per child for the ‘half an hour a day’ at school.**
- The pre-existing, intrinsic enjoyment of sport is a big factor in these benefits, with a contribution of 30%-60%, and even more so for activity outside school at secondary level (70-100%).

We also find that those who are least active are more likely to be from lower socio-economic groups. These groups (such as pupils receiving Free School Meals) need this free provision of activity most, being unable to afford the fees for sports club memberships and lessons. The impact for these groups is nearly double from the provision of free school PE for two hours a week (e.g. 0.54 vs 0.3 for 90-119 minutes per week of PA at school).

### **Is the WELLBY valuation result applicable to primary school children?**

The Treasury economic measure of wellbeing impact, the WELLBY, is based on life satisfaction rather than happiness. But life satisfaction is only measured for years 7-11, whereas the PE & school sport premium only applies to primary schools. For younger children from years 3-6, happiness is the only available wellbeing measure in the Active Lives Children data set.

But are the benefits the same for older children as for younger children? We feel the answer is almost certainly yes.

#### **1. The pattern of activity and benefit is similar.**

The pattern of improvements in happiness for primary school activity mirrors that of life satisfaction for secondary schools. As we can see in Tables 3 and 4, the pattern of the effect size of minutes/week of physical activity on life satisfaction and happiness is similar.

2. There is a case that wellbeing impacts for younger children are more valuable.

Wellbeing and welfare economic theory presents a strong argument that an increase in wellbeing for a young child is more valuable to society than an equal-sized increase in wellbeing for an adult.

First, personal wellbeing later in life is significantly affected by personal wellbeing in childhood and youth. Second, a young child has more years to live, and therefore has more years which will be improved by a positive wellbeing change (in our case, doing sport and physical activity.)

Indeed, the Department of Education is now carrying out research on the 'life course' value of wellbeing and the relatively higher value of early-stage interventions.



## 6. Valuation

The WELLBY is a new standardised measure of wellbeing impact that is introduced in the 2021 HM Treasury Wellbeing guidance<sup>12</sup>. It is the first time that HM Treasury has explicitly endorsed and recommended a measure for wellbeing impacts and a way to convert it into an economic (monetary) value.

For physical activity of one hour a day everywhere, our key result of a 0.6 wellbeing increase corresponds to a monetary value of £7,800 per person per year. However, this reduces to a coefficient of 0.079 when we factor in the motivation of these children. So, we are left with a value of £1,000.

### Primary vs secondary school

When we factor in the motivation and socioeconomics of more activity, the coefficient never rises above the 0.3 in life satisfaction observed for secondary school children for in school provision (Table 4). And the half an hour a day in school - that is, 150 minutes/week in school (since there are 5 school days), corresponds to a wellbeing estimate of 0.149 (£1,900 in value) for year 7-11 children and 0.084 (£1,100 in value) at primary school level.

Points to consider when choosing a measure:

1. The PE & school sport premium available to fund activity at primary school, so the 0.084 figure would apply
2. As explained in the introduction the WELLBY measures life satisfaction, which is only measured at secondary school, so the 0.149 variable applies for 30 minutes/day.

We have used this measure in order to maintain the integrity of the WELLBY methodology. As noted, there is also a very strong case that interventions at primary school level are more valuable than when applied to adults.

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<sup>12</sup> <https://www.gov.uk/government/publications/green-book-supplementary-guidance-wellbeing>

Thus, applying the valuation rate from the 2021 Wellbeing Guidance of HM Treasury (£13,000 / WELLBY), the estimated social benefit in monetary terms from getting one extra child at secondary school who was previously inactive to do half an hour a day of physical activity at school could be around **£1,900 for every year that the provision lasts for secondary school children and £1,100 respectively for primary school children.**

## **A VERY rough and ready UK-wide cost-benefit analysis (CBA) of sport in school**

The total population of school children in the UK was over 9 million in the academic year 2021/22<sup>13</sup>. We consulted the breakdown by age to conclude that about half of these (ca. 4.5 million) are aged 5 to 11, which corresponds to primary school age. The remaining equally-sized group of 4.5 million then corresponds to secondary school age.

In Table 6 below we can see the estimated hypothetical benefit of doing different levels of physical activity by all 4.5 million primary/secondary school children. Keep in mind that these are purely hypothetical values, as not all children and young people do the same level of physical activity.

**Table 6. Hypothetical estimates of the benefits of physical activity to children / young people**

Category	Age group	Controlling for motivation	Coefficient	Wellbeing value per person per year	Total wellbeing value per year
Total PA 420 minutes or more (1 hour / day)	year 7-11	NO	0.627	£ 8,151	£ 36,679,500,000
Total PA 420 minutes or more (1 hour / day)	year 3-6	NO	0.592	£ 7,696	£ 34,632,000,000
Total PA 210-239 minutes (0.5 hours / day)	year 7-11	NO	0.526	£ 6,838	£ 30,771,000,000
Total PA 210-239 minutes (0.5 hours / day)	year 3-6	NO	0.353	£ 4,589	£ 20,650,500,000
<b>In school 150-179 minutes (0.5 hours / school day)</b>	<b>year 7-11</b>	<b>NO</b>	<b>0.149</b>	<b>£ 1,937</b>	<b>£ 8,716,500,000</b>
In school 150-179 minutes (0.5 hours / school day)	year 3-6	NO	0.084	£ 1,092	£ 4,914,000,000

<sup>13</sup> <https://explore-education-statistics.service.gov.uk/find-statistics/school-pupils-and-their-characteristics>

In school 150-179 minutes	year 3-6	YES	0.046	£ 598	£ 2,691,000,000
In school 90-119 minutes	year 7-11	NO	0.301	£ 3,913	£ 17,608,500,000
In school 90-119 minutes	year 7-11	YES	0.180	£ 2,340	£ 10,530,000,000

This is supplemented by a more comprehensive model, which considers the different wellbeing impacts of different levels of PA, as well as the proportion of children and young people at those levels of PA and adds them up together.

The calculations behind both Table 6 and the more comprehensive model for a crude Cost Benefit Analysis (CBA) are available here: [Crude CBA.xlsx](#). The bottom line of the comprehensive model and the simpler model presented in Table 6 is that the current level of **school sport provision for primary school children (ages 5 to 11) across the UK is worth between £2.7 and £8.7 billion annually<sup>14</sup>.**

On the cost side, beyond the £300m of PE & school sport premium that is spent on equipment, coaching and bought in services, there are also the costs of facilities and PE teachers that are part of the school, which in the absence of hard DfE statistics, we might estimate at £200 million.

This would give a cost of school sport provision for primary schools at ca. £500 million, and the Benefit-Cost Ratio of 17.4 to 19.4. If we apply a more conservative 50% deadweight to account for the fact that PE & school sport premium funding is not responsible for all physical activity in school<sup>15</sup>, the resulting net social benefit will be £4.4 to £4.9 billion and the Benefit-Cost Ratio will be 9 to 10 (8.7 to 9.7).

Given the approximate nature of working at this scale and the uncertainties surrounding it, we report the headline net social benefit as £9 billion without including deadweight and £4.5 billion including the 50% deadweight, and we report the headline Benefit-Cost Ratio as 9 to 1.

This means that for every £1 spent on provision of physical activity for primary school children there is wellbeing and social value of between £3 and £9 returned. But we would

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<sup>14</sup> This would drop down to just over £5 million if we use the alternative model which controls for motivation.

<sup>15</sup> A recent survey from the Youth Sport Trust found that teachers felt that the PE & school sport premium, if removed, would risk approximately 50% of PA in schools: [Link](#)

urge caution in using this figure with certainty and would suggest that more work be done in the area of understanding both the value and the costs of free provision of PE in schools.

What we can say with certainty is that there is significant value of free PE to the wellbeing of children in schools.

## Appendix 1. Literature review

A meta-study by [Owen et al. \(2022\)](#) found a positive effect on academic performance of sport participation, based on a systematic review which identified 115 eligible studies in the subject matter. Sports participation during school hours was more beneficial for academic performance compared with sport participation outside school hours. Sports participation was most beneficial for academic performance when it was at a moderate dose (i.e., 1–2 hours/week), compared with no sport or a high dose of sport (3+ hours/week). However, the authors noted that the quality of most studies was low and better studies are necessary if this were to inform policy.

[Wretman \(2017\)](#) used Structural Equation Modelling on a sample of over 3,000 school children from North Carolina and found that school sports participation was significantly associated with academic achievement, positive body-image perceptions, and self-esteem (including the Rosenberg Self-Esteem measures ‘I have a number of good qualities’ etc., which are also found in USoc youth questionnaires).

A longitudinal observational analysis of 11,957 students in grades 7 to 12 — one of the largest samples to date — found that increases in self-reported daily physical activity were significantly positively associated with increases in global self-esteem ([Nelson & Gordon-Larsen, 2006](#)).

The Youth Sport Trust’s 2022 Annual Report states that children from poorer backgrounds are the least confident being active and that children from Black and South Asian communities are less active than the overall average. 51% of 11-to-16-year-olds in the D and E socio-economic groups rate themselves as confident taking part in physical activity, compared to 75% of 11-to-16-year-olds in the A and B socio-economic groups.

Furthermore, a [2021 Sported report](#) on girls aged 13-16 showed that low socioeconomic status (SES) and diverse ethnic communities tend to do more PE in school and active transport (i.e. walk/cycle to school), whereas activities outside of school tend to be accessed more by those from areas of higher SES.

Lower-SES and high-minority block groups had reduced access to facilities, which in turn was associated with decreased PA and increased overweight. Inequality in availability of PA facilities may contribute to ethnic and SES disparities in PA and overweight patterns. ([Nelson et al. 2006](#))

The most recent addition to this pool of literature is [this study](#) by Kitty McCarthy (Queen Mary University London) based on the analysis of the dataset of the BeeWell survey, which targets school children in Greater Manchester. At the moment, the results of the study are only presented informally as a blog article. The study attempts to estimate a correlation between school children engaging in sports / physical activity and their life satisfaction, and place a crude monetary value on this correlation based on the value per WELLBY recommended by the 2021 HMT Wellbeing Guidance for Appraisal. How this correlation was estimated is not explained in sufficient detail.

While there are multiple papers which investigate the relationship between sport / physical activity and life satisfaction, none of the papers we have reviewed look directly at the effect of school sport participation. The actual topics include:

- The relationship between sport (not necessarily in school; including extracurricular activities) and life satisfaction in people aged 13-16 ([Gomez-Baya et al. 2018](#)) or the general adult population ([Mutz et al. 2020](#))
- That playing team sports, and being satisfied with one's team, correlate positively with life satisfaction among school athletes ([Chen et. al 2017](#))
- Correlations between life satisfaction and the level of sport engagement among students of a sport university ([Inan and Koç 2021](#), small sample size)
- The relationship between sport participation and life satisfaction (with motivation and self-efficacy as mediators) among urban residents of Shanghai ([Yu and Song 2022](#))

## Appendix 2: results tables

For full details, see the spreadsheets in

[https://drive.google.com/drive/u/1/folders/1KwiJl2cZaluhZEh6quQEzGQqdVW\\_P93](https://drive.google.com/drive/u/1/folders/1KwiJl2cZaluhZEh6quQEzGQqdVW_P93)

Table 1. Mean life satisfaction / happiness by physical activity **in school**

Minutes per week of sport/PA in school	LS - Year 7-11	Happiness - Year 3-6
In school Less than 30 minutes	6.00	7.47
In school 30-59 minutes	6.37	7.66
In school 60-89 minutes	6.56	7.77
In school 90-119 minutes	6.66	7.76
In school 120-149 minutes	6.70	7.75
In school 150-179 minutes	6.51	7.85
In school 180-209 minutes	6.58	7.87
In school 210-239 minutes	6.68	7.91
In school 240-269 minutes	6.72	7.90
In school 270-299 minutes	6.69	7.97
In school 300 minutes or more	6.78	8.00

Table 2. Mean life satisfaction / happiness by physical activity **everywhere**

Minutes per week of sport/PA EVERYWHERE	LS - Year 7-11	Happiness - Year 3-6
Total PA Less than 30 minutes	5.77	7.29
Total PA 30-59 minutes	6.04	7.34
Total PA 60-89 minutes	6.24	7.63
Total PA 90-119 minutes	6.25	7.62
Total PA 120-149 minutes	6.39	7.63
Total PA 150-179 minutes	6.43	7.68
Total PA 180-209 minutes	6.46	7.76
Total PA 210-239 minutes	6.53	7.76
Total PA 240-269 minutes	6.47	7.72
Total PA 270-299 minutes	6.56	7.73
Total PA 300-329 minutes	6.65	7.74
Total PA 330-359 minutes	6.47	7.79
Total PA 360-389 minutes	6.64	7.61
Total PA 390-419 minutes	6.56	7.95
Total PA 420 minutes or more	6.77	7.93

Table 3. Key regression coefficients - physical activity in school and outside school

Minutes per week of sport/PA	L.S., yr 7-11, no motiv.	L.S., yr 7-11, with motiv. <sup>16</sup>	Ha., yr 3-6, no motiv.	Ha., yr 3-6, with motiv.
In school Less than 30 minutes (ref.)	0.000	0.000	0.000	0.000
In school 30-59 minutes	0.203***	0.134***	0.044	0.039
In school 60-89 minutes	0.266***	0.180***	0.085**	0.083**
In school 90-119 minutes	0.301***	0.180***	0.051	0.020
In school 120-149 minutes	0.258***	0.126***	0.063	0.024
In school 150-179 minutes	0.149***	0.114***	0.084**	0.046
In school 180-209 minutes	0.121***	0.058	0.145***	0.096**
In school 210-239 minutes	0.144***	0.093**	0.175***	0.126**
In school 240-269 minutes	0.216***	0.135***	0.145***	0.085
In school 270-299 minutes	0.108**	0.017	0.190***	0.110*
In school 300 minutes or more	0.135***	0.004	0.216***	0.129***
Outside school Less than 30 minutes (ref.)	0.000	0.000	0.000	0.000
Outside school 30-59 minutes	0.114***	0.046	0.202***	0.153***
Outside school 60-89 minutes	0.220***	0.069*	0.203***	0.157***
Outside school 90-119 minutes	0.205***	0.019	0.263***	0.207***
Outside school 120-149 minutes	0.382***	0.127***	0.255***	0.173***
Outside school 150-179 minutes	0.263***	0.023	0.349***	0.255***
Outside school 180-209 minutes	0.387***	0.069	0.255***	0.124**
Outside school 210-239 minutes	0.352***	0.041	0.367***	0.287***
Outside school 240-269 minutes	0.394***	0.073	0.323***	0.194***
Outside school 270-299 minutes	0.411***	0.060	0.400***	0.245***
Outside school 300-329 minutes	0.471***	0.115**	0.315***	0.182***
Outside school 330-359 minutes	0.325***	-0.054	0.291***	0.140**
Outside school 360-389 minutes	0.470***	0.080	0.398***	0.232***
Outside school 390-419 minutes	0.528***	0.096*	0.357***	0.207***
Outside school 420 minutes or more	0.465***	-0.003	0.476***	0.281***

Stars denote statistical significance: \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. Dependent variable indicated in the top cell of the same column. Other control variables included but not shown here (see full details).

<sup>16</sup> The answer to the following question is included as a categorical control variable in the regression model: How much do you agree or disagree with the following statement? - I enjoy taking part in exercise and sports. Answer options are: - Strongly agree; - Agree; - Disagree; - Strongly disagree; - Can't say;



Table 4. Key regression coefficients - physical activity everywhere

Minutes per week of sport/PA	L.S., yr 7-11, no motiv.	L.S., yr 7-11, with motiv. <sup>17</sup>	Ha., yr 3-6, no motiv.	Ha., yr 3-6, with motiv.
Total PA Less than 30 minutes (ref.)	0.000	0.000	0.000	0.000
Total PA 30-59 minutes	0.243***	0.181***	0.066	0.089
Total PA 60-89 minutes	0.313***	0.189***	0.235***	0.170***
Total PA 90-119 minutes	0.349***	0.149***	0.204***	0.174***
Total PA 120-149 minutes	0.447***	0.190***	0.283***	0.236***
Total PA 150-179 minutes	0.484***	0.187***	0.314***	0.247***
Total PA 180-209 minutes	0.526***	0.196***	0.353***	0.261***
Total PA 210-239 minutes	0.509***	0.159***	0.320***	0.233***
Total PA 240-269 minutes	0.541***	0.166***	0.397***	0.273***
Total PA 270-299 minutes	0.554***	0.148***	0.391***	0.247***
Total PA 300-329 minutes	0.579***	0.191***	0.380***	0.244***
Total PA 330-359 minutes	0.546***	0.131**	0.439***	0.290***
Total PA 360-389 minutes	0.671***	0.241***	0.345***	0.183***
Total PA 390-419 minutes	0.514***	0.104*	0.537***	0.374***
Total PA 420 minutes or more	0.627***	0.079**	0.592***	0.358***

Stars denote statistical significance: \*p<0.1, \*\*p<0.05, \*\*\*p<0.01. Dependent variable indicated in the top cell of the same column. Other control variables included but not shown here (see full details).

**The broad patterns are:**

- Activity outside school and activity in general - the pattern for the effect on wellbeing seems to be 'the more, the merrier' (increasing wellbeing with minutes of activity) both for older and younger children.
- Activity in school - for older children there seems to be a peak around 60-150 minutes, and then it starts dropping off. This is not the case for the younger ones though (year 3-6), where the pattern still seems to be 'the more, the merrier'!
- Controlling for motivation - all coefficients drop generally, but the ones for the older group (years 7-11) drop considerably more when motivation is introduced as a control

<sup>17</sup> The answer to the following question is included as a categorical control variable in the regression model: How much do you agree or disagree with the following statement? - I enjoy taking part in exercise and sports. Answer options are: - Strongly agree; - Agree; - Disagree; - Strongly disagree; - Can't say;

variable. In fact, the coefficients for physical activity outside school are almost annihilated for years 7-11.