

An evidence review into the length of the school day

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Admissions
and Capacity**



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Key findings

- Instruction time is a significant input into a pupil's education. Recent research findings on the effects of providing additional school time, encompassing instruction time and extracurricular activities, are varied but broadly positive. The diversity in these effects is often attributed to variations in the timing, manner, and nature of the activities during these extended hours. A multitude of studies emphasise the critical need to optimise the structure of any additional time, aiming to yield the most significant educational impact.
- The Department for Education (DfE) in England has initiated efforts to encourage certain schools to extend their school days by establishing minimum hours. The closest international comparison could be represented by the 2014 reforms enacted in Denmark, where Bingley et al. (2018) find that the addition of an extra hour was linked to a modest improvement in test scores (0.06 standard deviations).
- The effect of increasing hours varies with the subject being taught. The effect tends to be more pronounced in mathematics than in language-of-instruction lessons. Given the larger learning losses in mathematics compared to language during the pandemic, it could suggest that mathematics skills might be more responsive to practice and exercise than language-of-instruction.
- Extending the school day tends to have a more pronounced impact on the academic outcomes of pupils from lower socio-economic backgrounds (EEF, 2021). This is likely because they often face more challenges in accessing resources for homework assistance within their home environment.
- The effect of extending the school day, especially through tutoring interventions, is typically larger for pupils in earlier grades, especially in the areas of reading and language (Nickow, Oreopoulos and Quan, 2020).
- Additional time is more likely to have a positive effect if the quality of the classroom environment is high, as measured by criteria such as disruptive behaviour during the class and student-teacher relationships. Conversely, the learning loss caused by a more problematic school environment cannot be alleviated by increasing instructional time.
- Additional time on its own does not guarantee an improvement in academic achievement. Most of the programmes that had the best results saw extra time directed primarily towards instructional time, ensuring that the material taught was consistent with the predetermined curriculum.

We have identified five empirically proven common threads that consistently contribute to a more effective delivery of additional time across a wide set of studies:

- **Extending core teaching hours has small effects, especially at the margin.** Increasing the number of teaching hours within existing curricula for all students appears to be an intuitive approach to extending the school day, with studies indicating positive but modest effects. Cross-country comparisons, such as Lavy's (2015) findings in relation to PISA scores, and similar results in Denmark by Bingley et al. (2018), suggest that even substantial increases in instructional time may yield relatively small improvements. For instance, a Dutch programme with a five-hour weekly increase in instruction had no discernible impact on

mathematics or language scores (Meyer and Kleveren, 2013), highlighting the challenges in achieving significant effects through extended school hours.

- **After-school programmes are more effective when they are mandatory.** In-school programmes, taking place before, during, or after the regular school day, have a larger impact than summer schools or weekend tutoring, highlighting the need for integration within the school day.
- **Additional hours have a greater effect on test scores when pupils are instructed by the same teachers who conduct their regular classes.** This emphasises the importance not just of specific training and experience, but also of fostering a well-established connection between students and teachers.
- **Non-academic extracurricular activities can have a positive impact on pupil academic achievements.** Nonetheless, involvement in such activities has the potential to positively augment multiple dimensions of a pupil's comprehensive well-being. Whilst a direct and swift improvement in academic performance might not be immediately evident, participation in activities such as sports clubs may contribute substantially to the holistic development of pupils.
- **One-to-one or small group tuition is most effective, but it is costly.** Tutoring sessions are more likely to have a significant and positive impact on pupil academic outcomes when conducted in a one-on-one setting or in very small groups of two to three participants and a teacher. However, this is often prohibitively costly.

Introduction

In the 2022 white paper 'Opportunity for all: strong schools with great teachers for your child', the government set out an expectation that all state-funded mainstream schools should deliver a minimum length of school week of 32.5 hours, equivalent to 6.5 hours of time in school per day.¹ While the deadline to meet this expectation has now been deferred a year to September 2024, the Department for Education has, in the meantime, issued further non-statutory guidance.²

This expectation follows a 2021 DfE review of time in school, which suggested that extending time in schools could potentially benefit pupils' outcomes contingent on how the time is spent.³ Potential benefits stated included more opportunities for learning, socialisation with peers, and enrichment.

Historically there has not been any systematic collection of data from schools on the length of school days. To help ensure schools deliver the government's expectation, three mechanisms have been put in place. First, Ofsted will start to monitor the length of school days as part of their inspections and, where relevant, require schools to justify not meeting the minimum expectation. Second, the Department for Education has now started collecting data on the total compulsory time pupils spend in school per week through the spring school census.⁴ Finally, schools are also now required to publish their total weekly hours on their websites.

This review explores in further detail how much time pupils typically spend in school in England and what the potential impacts of increasing this amount of time could be, particularly with respect to attainment. We explore previous literature on:

- Theoretical benefits of an extended school day
- Cross-country comparisons
- Policy changes in other countries
- Heterogenous effects by socio-economic status, subject, and phase
- Effective delivery mechanisms
- Responses to the pandemic

In the next phase of this project, our aim is to use the School Census to examine the potential relationship between pupils' academic outcomes, such as test scores, and the length of time they spend in school.

¹ Department for Education (2022) *Opportunity for all: strong schools with great teachers for your child*, CP 650, H.M. Government.

² Department for Education (2023) *Length of the School Week: Non-Statutory Guidance*

³ Department for Education (2021) *Review of time in school and 16 to 19 settings*.

⁴ The spring census takes place in January every year. <https://www.gov.uk/guidance/complete-the-school-census/data-items-2022-to-2023>

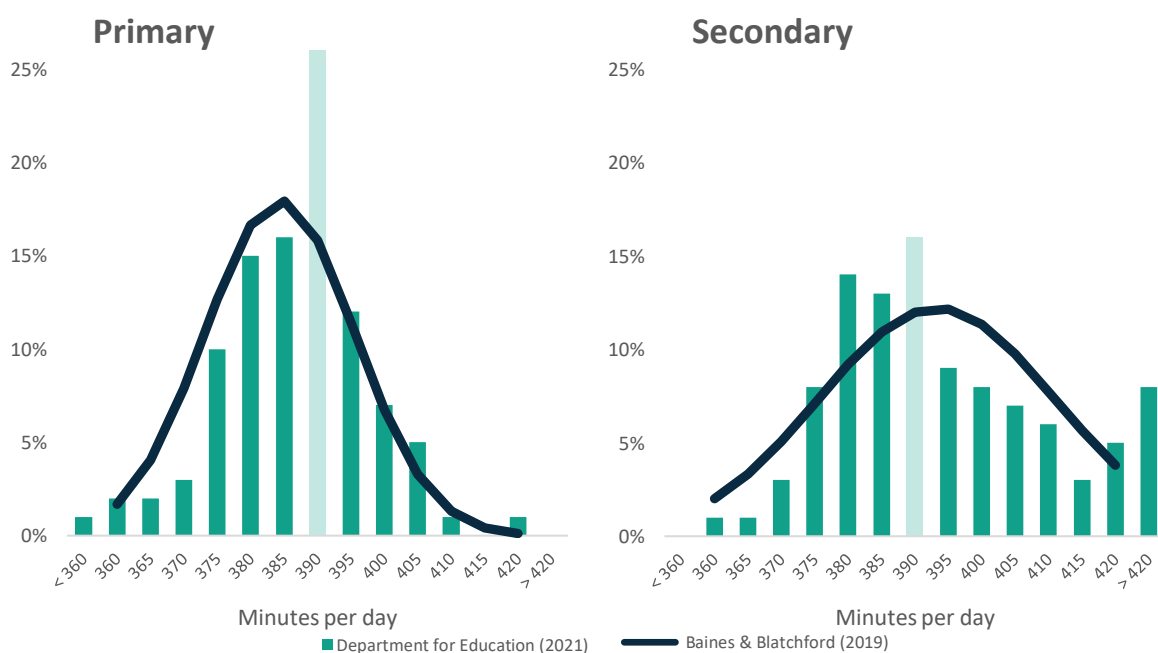
How much time do pupils spend in school in England?

Recent surveys indicate the extent to which the length of the school day in England varies across different schools. Figure 1 illustrates the distributions found in two of these studies: Baines and Blatchford (2019) and Department for Education commissioned work, IFF Research (2021).

Most schools have days that last between 6 and 7 hours (360–420 minutes) and the mean average time in spent in school is around 6.5 hours a day or 32.5 hours a week. Secondary schools appear to have slightly longer days but the difference between the mean average in primary and secondary schools is only around 9 minutes.

In March 2021, a larger fraction of secondary schools (62 per cent) had school weeks that met the governments new expectation (32.5 hours), compared to primary schools (52 per cent). Secondary schools are also more likely to have much longer days than primary schools (13 per cent of secondaries have school days longer than 7 hours, compared to 1 per cent of primaries).

Fig. 1 – Length of the school day in England



Source: Baines and Blatchford (2019); DfE/IFF Research (2021)

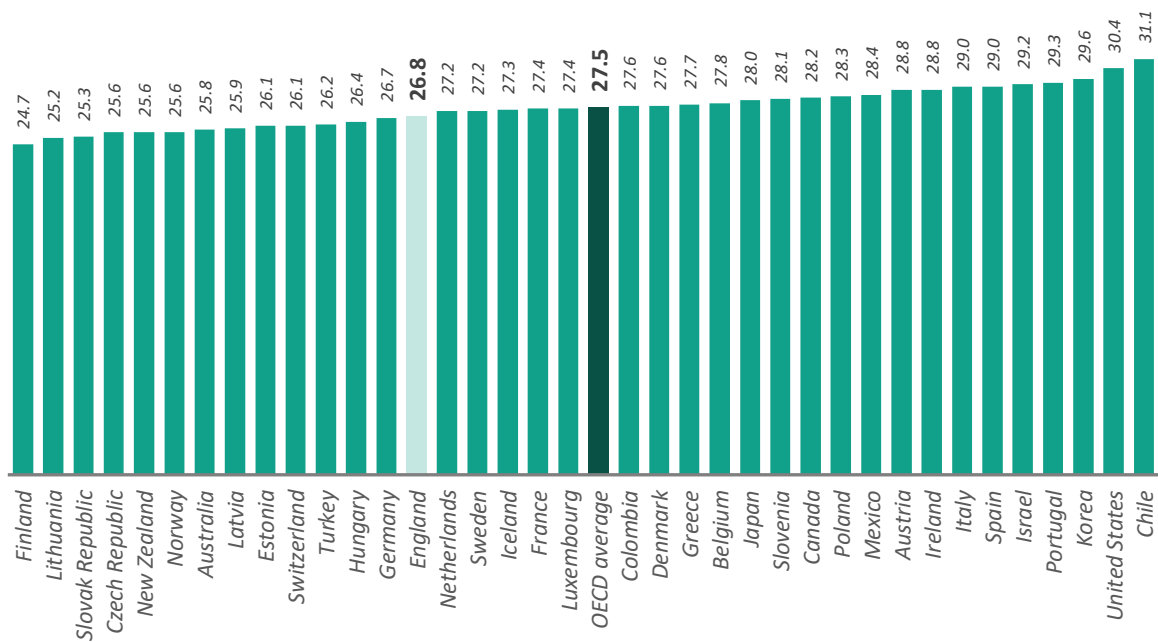
However, it is important to not conflate teaching time with time in school. Whilst teaching is typically the main use of time (79 per cent in primary schools and 84 per cent in secondary schools), time is also spent on lunch breaks, other breaks, and enrichment activities.⁵ The new expectation of 32.5 hours relates to total compulsory time in school, not only teaching time.

The OECD estimate that the average teaching hours for 15-year-olds in England is 26.8 per week.⁶ This is similar to the average number of learning hours in Germany and almost 45 minutes less than the OECD average.

⁵ DfE/IFF Research (2021)

⁶ OECD (2020) *PISA 2018 Results (Volume V) Effective Policies, Successful Schools*

Fig. 2 – Weekly hours of learning time per week in regular lessons



Source: Tables V.B1.6.1 and V.B2.6.1 in OECD (2020) 'PISA 2018 Results (Volume V) Effective Policies, Successful Schools'

The weekly learning time within OECD countries exhibits variations, with an average of 3.7 hours allocated to language-of-instruction and mathematics each, 3.4 hours to science, and 3.6 hours to foreign-language classes. In the United Kingdom, the learning time for English, mathematics, and science slightly surpasses the OECD average, but the learning time in foreign language classes is notably lower at 2 hours per week. This discrepancy becomes more apparent when contrasting it with countries with higher overall learning times, such as Chile (weekly learning time greater than England by 4.3 hours), Portugal (weekly learning time greater than England by 2.5 hours), and Italy (weekly learning time greater than England by 2.2 hours), where foreign-language instruction receives a more substantial commitment of 4 weekly hours.

The Impacts of time on attainment: a theoretical framework

The process of acquiring knowledge and skills can be thought of as a production function with many different inputs and outputs. Abstracting from any functional form or mechanisms, the educational production function is the process of taking inputs (including formal education) and transforming them into skills.

Carroll (1963) highlights instruction time (or 'opportunity to learn') as one of the key inputs to a student's production function. Other inputs likely include aptitude, perseverance, instruction quality, and the ability to process and understand instruction. Hofferth and Sandberg (2001) stress the importance of non-school factors as additional inputs to the education production function, such as family background and the home environment (including family size, parental employment, reading for pleasure) as well as structured sport and social activities.

The output of the education production function is often referred to as human capital, which is typically proxied through cognitive skills, and measured using attainment on tests. Cunha and Heckman (2007) argue that human capital should encapsulate a wider basket of different skills. Increasing inputs to the production function, such as instruction time in school, also has the potential to influence non-cognitive skills. Whilst these outputs are harder to measure, they are nonetheless important outcomes in their own right, as well as a complement to cognitive skill development. In turn, increased human capital is thought to influence long-term outcomes such as earnings, employment, health, and civic participation.

When compared to non-school factors (such as family background), the amount of instruction time allocated and the way that time is used is one of the inputs that can be most easily influenced by policy makers. However, increasing instruction time does not guarantee increases in human capital or academic attainment. There are key differences between the allocated time, time-on-task, and the fraction of time pupils are paying attention. Berliner (1990) highlights that therefore simply increasing instruction time may not have the desired effect. The amount of learning that takes place is the most important underlying driver in achieving greater outcomes. Whilst it can often be hard to increase engagement with learning within instruction time, evidence does consistently suggest increased time in school is likely to improve pupil attainment.

Cross-country comparisons

Pupils in different school systems across countries spend a varied amount of time in school each day. Cross-country comparisons illustrate a positive correlation between the amount of time spent in school and academic attainment on international tests such as PISA.⁷ Whilst instructive, such comparisons are limited as it can be difficult to draw causal inferences.

Lavy (2015) estimates the effect of instructional time on PISA scores using data from over 50 countries. They use fixed-effects regressions to estimate that increasing instructional time by one hour per week is associated with an increase in overall test scores of 0.058 standard deviations, and the association is even larger when considering mathematics and science scores in isolation (0.071). Bingley et al. (2018) posit that an extra weekly hour of instructional time enhances performance in Danish and mathematics examinations at the conclusion of the 9th grade by 0.06 SD. Similarly, Dobbie and Freyer (2013) reveal comparable outcomes as they observe that charter schools in the United States, which augment instructional time by 25 per cent contrasted to traditional public (state-funded) schools, witness an annual improvement of 0.05 SD in their student's mathematics test scores.

More recently, Bietenbeck and Collins (2023) have extended this work by using additional waves of PISA as well as TIMSS cohorts.⁸ They also find a positive association between additional instruction and pupil attainment, but the magnitude is smaller than that suggested by Lavy (2015). An additional hour a week of instruction time is found to be associated with test score improvements of 0.014-0.031 standard deviations, around half as large.

Both these studies find that the association between additional instruction time and attainment is lower in developing countries. This suggests there are complementarities in the education production function; 'higher' classroom quality can enhance the effect of instruction time on pupils' academic outcomes. Other inputs, such as the level of resources per pupil, potentially increase the efficiency of increasing instruction time. Lavy (2015) also finds evidence to suggest the productivity of additional instruction time is higher in school systems where schools are given more autonomy.

Further evidence from Lavy (2015) suggests inputs to the production function may also be substitutes. For instance, the effect of additional instruction for pupils with low parental education is found to be larger— 0.065 standard deviations for an additional hour a week. So additional hours in school can possibly partially make up for lower inputs elsewhere and potentially help address societal inequalities.

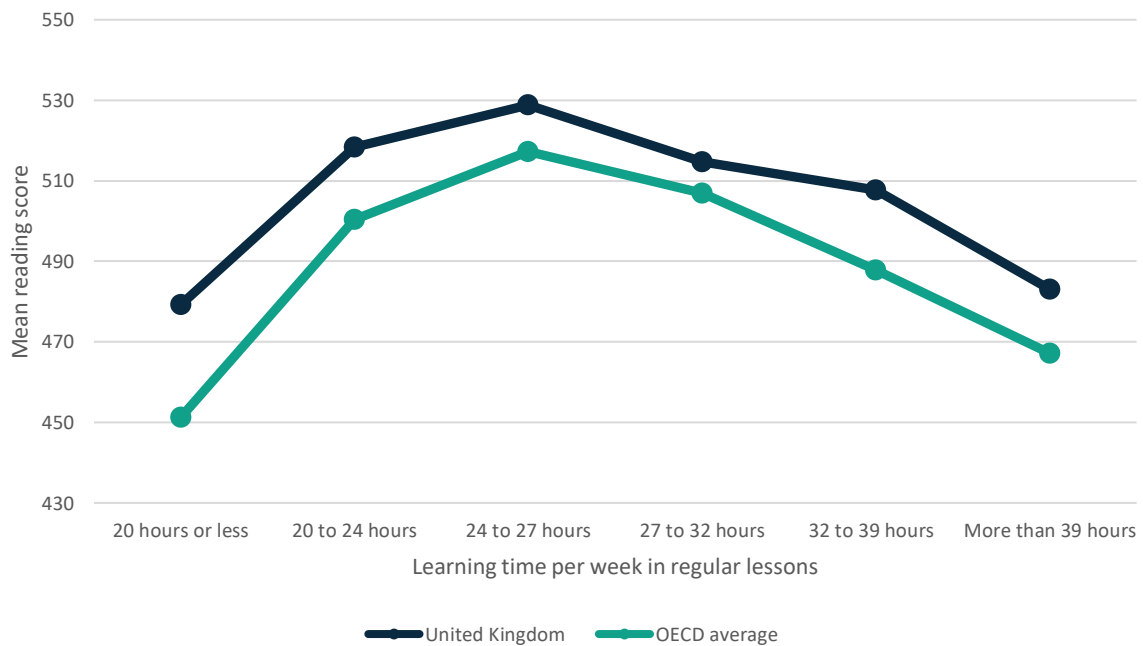
However, this may not always be true. Rivkin and Schiman (2016) show the quality of the class environment is also associated with attainment on PISA tests, as well as that the number of hours spent on instruction. However, they find the negative effects of a poor environment cannot be alleviated by an increase in additional instruction time.

⁷ The Programme for International Student Assessment (PISA) is a worldwide study run every three years by the OECD. It measures 15-year-old school pupils' ability in mathematics, science, and reading.

⁸ Trends in International Mathematics and Science Study (TIMSS) is a series of international assessments of the mathematics and science knowledge of students around the world run by the International Association for the Evaluation of Educational Achievement.

Cross-country comparisons also reveal that the relationship between instruction time and pupil attainment may not be linear. Figure 3 indicates a concave relationship in both the UK and across the OECD as a whole. Initially, increases in the amount of learning time per week are associated with higher average reading scores. Average reading scores are highest for pupils that experience between 24 and 27 learning hours per week, but those who experience further additional hours actually have lower average attainment. In the UK this evidence would suggest that students who spent over 39 hours per week in lessons have similar reading outcomes to students who spent less than 20 hours.

Fig. 3 – PISA reading scores and student reported learning time per week



Source: Table V.B1.6.15 in OECD (2020) 'PISA 2018 Results (Volume V)'

Lavy (2015) uses dummy variables to represent different weekly time allocations for language, mathematics, and sciences classes; less than 2 hours, 2-3 hours, 4 hours or more. Pooling the estimates for the three subjects, the findings reveal a diminishing marginal rate of improvement in PISA scores as the number of additional hours increase.⁹

⁹ The marginal effect is 0.042 at 2-3 hours and 0.248 at 4 hours or more. Given an effect of 0.058 in the continuous case the marginal effect must be even larger for less than 2 hours.

Policy changes in other countries

Instruction time has always been an important education policy lever given its intuitive theoretical link with educational outcomes and skill formation. In England, the number of hours spent in education over a childhood has historically been increased at the extensive margin – the number of years of schooling. For example, the school leaving age was raised to 16 in 1972, and since 2015, all young people must be in education or training until 18.¹⁰ Increasing numbers of other countries have focused on reform at the intensive margin— the number of hours per week. Researchers have been able to identify positive impacts of such policies on pupil attainment.

Studies that use natural and quasi-natural experiments created by reforms to the length of the school day also help to avoid bias in estimates. Cross-country OLS models like those discussed above can often suffer from endogeneity. This typically occurs due to either omitted variable bias, where certain key inputs to the education production function are difficult to observe, such as teacher quality. Or due to measurement error, and whilst studies like PISA provide standard testing across countries, it is not a perfect measure.

Europe

In 2003, Denmark introduced a classroom hour reform (CHR), designed to mitigate the variance in class time across schools. This new piece of legislation made three key changes: (1) replaced a fixed number of school days with a new number of classroom hours per year; (2) introduced cohort-specific classroom hour minima; (3) increased the classroom hour minimum threshold by 4 per cent nationally. Utilising a school fixed effects model to assess the impact of policy-induced additional time on student achievement, Jensen (2013) analyses data from one year before the reforms and a three-year period after the reforms. The findings reveal that, on average, the reforms led to an increase in classroom hours by 2.2-3.3 per cent in both Danish language and mathematics. In turn, this led to small improvements in maths test scores (0.46 per cent of a standard deviation for a 2.2 per cent increase in weekly maths instruction time, which corresponds to 0.21 per cent of an SD increase in test scores for an annual additional hour of maths) and no impact on the academic achievement in Danish language classes.

In Italy, the Quality and Merit Project (PQM) is a programme that was introduced for public lower secondary schools in Southern Italy, with the aim of bridging the gap in educational outcomes between Southern Italy and the rest of the country. The programme involves a series of activities outside the usual school hours led by the participating pupils' main teachers. Battistin and Meroni (2013) assess the impact of this programme using a difference-in-difference strategy, comparing groups from adjacent cohorts, with some receiving additional instruction time and others not receiving it. The results show that the programme had no effect on language but a varying positive effect on maths test scores, with the highest being of 0.25 standard deviations for the schools in the bottom tertile in terms of performance.

¹⁰ Raising of the School Leaving Age Order 1972; Education and Skills Act 2008

Latin America

Since the 1990s, many Latin American countries have undergone various reforms aimed to increase the length of school day – more precisely, transitioning from a 4-hour school day towards a 6–7-hour school day (27 per cent increase of the annual instructional time at the high school level). Bellei (2009) finds positive effects on students' achievement in Chile, as a result of government reforms which lengthened the school day mainly through extending instruction time. The estimated effect of the reforms on language and mathematics scores ranged 0.05–0.07 and 0–0.12 standard deviations, respectively. Effects were found to be larger for rural pupils, pupils attending public school, and pupils who were already higher academic performers. Pires and Urzua (2010) also find the Chilean reforms are associated with improved cognitive scores, as well as improved social outcomes. However, they find these benefits do not translate into better labour market outcomes (employment and earnings) at age 25.

Hincapie (2016) studies a similar type of reform in Colombia and finds similar results. Cohorts that switched to full day learning (6–7-hour school day) obtained test scores around 0.1 standard deviations higher than cohorts attending half-days. Larger effects were found for maths scores than for languages and for 9th graders than for 5th graders. They also found larger positive effects for pupils in rural areas.

Again, a similar reform in Brazil, the 'Programa Mais Educação' (or 'more education' programme) introduced in 2008, saw participating schools lengthen their school day from a half day to a full day. Evidence suggests that participation in the programme was not associated with changes in a range of student outcomes including maths, Portuguese, and IDEB scores. However, Vidigal and Vidigal (2022) do find the programme reduced dropout rates at all phases of education. Oliveira et al. (2022) suggest the failure of the programme is due to its design, highlighting a lack of quality teachers and too frequent use of recreational activities.

United States

The establishment of charter schools in the US from 1991 provides another quasi-experimental setting to estimate the effects of lengthening the school day. Each charter school is able to determine the duration of its school day, which tends to be longer on average than a public-school day – 55 per cent of charter schools have days lasting longer than 8 hours.¹¹ A recent study, Raymond et al. (2023) reveal that pupils in charter schools experience higher attainment outcomes, equivalent to an additional six days of learning in maths and sixteen additional days in reading, compared to pupils in the traditional public school system.

Raymond et al. (2023) also highlight that the impact of charter schools varies widely across demographic characteristics. For example, the positive charter school effect is more pronounced in urban areas, but in rural areas charter school pupils lag behind their peers, having "ten days less of growth". Furthermore, pupils from low-income households that attend charter schools experience stronger growth in outcomes than their peers, but SEN pupils experience slower growth.

Angrist et al. (2013) show the extra time in charter schools is typically allocated to increasing instructional hours in maths and reading. Instruction time can be even longer in 'No Excuses' charter

¹¹ Hoxby and Murarka (2009)

schools, a type of charter school characterised by extensive school days and years, as well as stricter discipline policies. 'No Excuses' charter schools implement other additional policies beyond longer school days, thus making it more difficult to analyse the impact of additional time on pupils' outcomes. Dobbie and Freyer (2013) focus exclusively on the influence of school day length on achievement in 35 charter schools in New York. Their findings suggest that, with all other variables held constant, schools extending the school day by 25 per cent experience a gain of 0.05 standard deviations in mathematics achievement.

Furthermore, Hoxby and Murarka (2009) find the most robust association between charter school policies and attainment is the length of the school year, the number of school days in a year. Whilst this is different from the length of the school day, they show these are often correlated with each other – charter schools that adopt longer days often also adopt longer years. This multicollinearity problem means these should likely be interpreted as one package of policies that increase the total instruction time, and this increase in time is associated with higher attainment, more so than other policies such as smaller class size and additional after school programmes.

Specific programmes have also been implemented in the US to extend the school day. In 2004, Pennsylvania adopted two out-of-school programmes providing academic tutoring, targeted at schools and students scoring below proficiency on statewide tests. Supplemental educational services (SES) and the more intensive Educational Assistance Program (EAP) managed by school districts where students are enrolled into a minimum of 45 hours of tutoring instruction per year per content area. Zimmer, Hamilton, and Christina (2010) found mixed evidence on the effectiveness of these programmes. Students engaged in both programmes were found to benefit from an increase of 0.15 to 0.35 standard deviations in maths scores, however no significant effects were observed in reading scores.

Heterogeneous effects

Though often positive, the effect of an increase in the length of school day is found to be heterogeneous across several factors, in particular the subject that is being evaluated and the socio-economic background of the students.

Socio-economic background

Studies tend to indicate that the effects of extending the school day on attainment are largest for more disadvantaged students. Patai, Cooper and Allen's (2010) systemic review of US programmes designed to increase the school day find that they are most impactful for pupils from a low socio-economic background (SES) and for those who were most at risk of academic failure. Wheeler (1987) also finds that low-SES pupils consistently experience the biggest gains in the aftermath of a school day extension.

In cross-country comparisons Lavy (2015) similarly finds the effects of an additional hour of instruction time are more pronounced for pupils from low socio-economic backgrounds across OECD countries. Pupils with low parental education experience higher effects (0.065 SD) on PISA results than their counterparts with high parental education (0.048 SD). Furthermore, the study estimates that the impact of additional time on second-generation immigrants is 30 per cent higher than for native students. Interestingly, although the impact for first-generation immigrants is 12 per cent higher compared to natives, it remains significantly lower than the impact observed for second-generation immigrants.

In Denmark, Bingley et al. (2018) find one additional hour of instruction time increases the test scores of pupils from low socio-economic backgrounds by 0.09 standard deviations (as opposed to 0.051 for their high-SES peers). Non-western immigrants, especially boys, are also more positively affected by a rise in instruction time. Similarly, Hincapie (2016) only identifies statistically significant effects of switching to a full school day (FSD) in Colombia in the subsample of schools with the lowest socioeconomic status—the effect for 9th graders attending the poorest schools is 0.2 of standard deviation.

Comparably, Battistin and Meroni (2013) use a differences-in-differences design to analyse the effects of additional instruction time in Southern Italy, concluding that the positive effect at a classroom cohort-level on maths achievement is mainly driven by the students who were already among the highest achievers. Cattaneo et al. (2017) replicate Lavy (2015) to analyse the effects of instruction time on pupil test scores at a canton level in Switzerland. Studying the heterogeneous impact of variations in subject-specific instruction time, they find that a one extra hour of schooling for schools with advanced requirements increases PISA scores by 0.07, whereas for schools with basic requirements the increase is only 0.04. A common theme across these two studies is that higher-achieving pupils tend to experience a more positive impact from increased instruction time. This trend aligns with Carroll's student production function, highlighting the relationship between some of the inputs, in this case instruction time and ability. Instruction time might be correlated with but does not have a linear effect on measures of ability (e.g., past performance). Relatedly, in certain instances, pupils with 'higher' ability might self-select into academic programmes that require longer instruction time.

Subject

Another frequently identified heterogeneity in the effect of additional instruction time is both the subject studied and the subject examined. Battistin and Meroni (2013) find the implementation of the Quality and Merit Project (PQM) in Southern Italy, designed to enhance student performance through a series of activities, each spanning 15 hours of additional education, resulted in an increase of 0.25 standard deviations in maths scores but had no significant effect on language scores. Similarly, DeAngelis and Tienken (2016) look at the effects on maths and English attainment in New Jersey high schools and find that an increase in school day length has a positive albeit weak effect on Maths performance, and no significant effect on English scores. In the context of a much larger increase in annual instruction time moving from half to full days in Chile, concluding that the effect on test score in language was around half that in maths (0.05–0.07 standard deviations and 0.12 standard deviations respectively).

In the same study, Battistin and Meroni (2013) find that an increase in instruction time for Italian language had a statistically significant and negative cross effect of -0.31 SD on Maths test scores for pupils attending the highest-performing tertile of schools. Conversely, Lavy (2018) also examines the variance of instructional time for different subjects and concludes that the cross effects are positive yet lacking statistical significance. Expectedly, the most substantial cross impact is that of maths learning time on science academic achievement, amounting to 0.026 SD, though still failing to attain statistical significance.

Sometimes additional instruction time is focused on a particular subject(s). Jensen (2013) investigates the impact of annual 9th grade classroom hours in literacy and maths on performance in the respective subjects. They show that one additional hour of teaching in the given subject per year increases the maths score by 0.0021 of a standard deviation and found no effect on literacy scores.

These findings are consistent with other studies, such as Zimmer et al. (2010) and Sims (2008), which suggest, particularly for secondary aged pupils, it is easier to intervene to improve skills more reliant on practice such as maths than on reading and comprehension skills. This argument that numerical proficiency is more elastic to the influence of schools is further substantiated by the evidence that school closures in the wake of a pandemic had a larger negative impact on pupils' maths test scores. (EEF, 2020; Andrews, 2021)

Phase of education

Skills are accumulated dynamically over time, and studies have emphasised the importance of early skill development. (Carneiro and Heckman, 2003; Heckman, 2006; Cunha, Heckman and Schennach, 2010) Findings suggest early investments in skills improve the return on later investments. This notion of self-productivity, or 'skills-beget-skills', implies the rate of return on investment in skills is higher in the early stages of childhood and decline with age. Earlier investment has been shown to be particularly important for disadvantaged pupils and it is well understood that achievement gaps widen between disadvantaged pupils and their peers throughout childhood. (Currie, 2009; Dietrichson et al., 2017)

Nickow, Oreopoulos and Quan (2020) investigate various tutoring interventions and find that overall effectiveness is more pronounced when tutorials are implemented in lower grades. In first grade, the effect is estimated to be 0.42 standard deviations. However, the effect diminishes with age. For

those in grades 2–5, the effect is 0.29 standard deviations, and for students in grades 6–11, the effect is no longer present. EEF (2021) also finds that, on average, programmes aimed at extending the school day have a larger influence on the academic progress of primary school pupils than on their secondary school counterparts (3 months' worth of academic progress for primary pupils and two for secondary). In contrast, conversely Hincapie (2016) observed stronger positive effects for 9th than 5th grade students (0.138 and 0.082 respectively, for mathematics test scores).

Effective delivery of additional time

Extending the school day is unlikely to have a lasting and significant impact by default. It matters when in the day the time is added, what pupils do in that time, and how the teaching is administered.

1. Extending core teaching hours has small effects, particularly at the margin

Possibly the most intuitive way to extend the school day is to increase the number of teaching hours on existing curricula for all pupils. Whilst studies have revealed positive effects of such increases the magnitudes tend to be modest.

In cross-country comparisons Lavy (2015) finds an additional hour of instruction a week is associated with a 0.058 standard deviation increase in PISA scores. Findings in Denmark are remarkably similar, Bingley et al. (2018) estimate that one extra hour of instruction time per week over nine years leads to a 0.066 standard deviation increase in test scores. Jensen (2013) focuses on a specific Danish reform in the 2000s which mandated an increase in the duration of maths and language classes within core schooling hours and found small effects. A 2.2 per cent increase in maths instruction time resulted in an increase of 0.0046 of a standard deviation in maths test scores and increases in language classes, not have any significant effect on the corresponding test scores. The effect sizes of found in these studies are generally considered small and are much smaller than found in other school-based interventions (EEF, 2021).

Even when the increase in time is much larger, substantial effects are still not found. A programme in the Netherlands that increased the number of weekly instruction hours by 5 (2 hours of language instruction, 2 hours of math instruction, and 1 hour of excursions) was found to have no identifiable effects on math or language scores (Meyer and Kleveren, 2013). In Chile, a move from half to full days, still only led to an improvement in language and mathematics scores was 0.05–0.07 and 0.07 standard deviations, respectively (Bellei, 2009). Whilst using data from charter schools in New York City, Dobbie and Fryer (2013) conclude that a 25 per cent or higher increase in instructional time predicts a 0.05 standard deviation increase in maths scores and 0.044 standard deviation in English scores.

2. After-school and summer school programmes are more effective when they are mandatory

Prolonging the school day has also been achieved by 'attaching' additional instructional time to the end of the school day (in the afternoon, after the usual classes end). This type of policy has been adopted by many countries to varying degrees of success. These after-school type programmes are typically more effective when the programme is mandatory.

Battistin and Meroni (2013) investigate the outcomes of a policy that mandated additional after-school tutoring for low-achieving pupils in Southern Italy and find a 0.25 standard deviation increase in maths scores for the bottom tertile of schools in terms of academic performance. However, Dynarski et al. (2004) finds that the impact on attainment of voluntary after-school programmes in the US to be mostly insignificant. Slavin (2021) suggests the lack of motivation from pupils to take part in non-mandatory programmes while their peers were enjoying their free time is likely one of the main reasons these are often unsuccessful.

In the US, as part of the No Child Left Behind (NCLB) programme, the Supplemental Educational Services afterschool programmes targeted almost only low-performing and low-income pupils. However, the programme was optional, and it has been shown that the lowest achievers were also the least likely to sign up or attend it regularly. Additionally, most of the tasks undertaken during the sessions were not tested or relevant to the main school material (Heinrich et al., 2010; Deke et al., 2014).

EEF (2021) surveys the effects of different summer school-type programmes, most of which are oftentimes designed as remedial sessions. The findings indicate a potential positive influence on pupil's overall academic outcomes, highly contingent upon a range of factors, including the structure and academic rigour of the programme and pupil attendance record. A significant challenge in implementing effective summer school programmes is represented by the fact that disadvantaged pupils have more impediments in attending them, such as additional transport and food costs.

3. Extra-curricular activities could be effective in increasing attainment, in addition to having other benefits

When secondary schools in England were asked how they would use extra time, the most common response (44 per cent) was 'a mixture of both enrichment activities and teaching broader curriculum content'.¹²

'Teaching broader curriculum content' can be accomplished through a range of channels, from small-group teaching to after-school activities or extending class time. A considerable body of literature has studied the effects of school-based extracurricular activities not only on pupils' academic achievements but also on their behavioural outcomes. Meta-analysis has revealed however that whilst there is a positive correlation between extracurricular activities and academic achievement, no causality can be established between the two (Shulruf, 2010).

Booth et al. (2013) study the relationship between 'free-living' physical activity and academic attainment, with their model predicting that, at GCSE-level, a 1 SD increase in the time a pupil spends doing moderate to vigorous physical activities (MVPA) correspond with a modest 0.16 SD GCSE scores increase. However, a systematic review conducted by Donnelly et al. (2016) conclude, that while the evaluated cross-sectional and longitudinal studies yielded a positive correlation between physical activity (PA) and academic attainment, the examined randomised-controlled trials did not find a significant impact of PA on test scores.

Lipscomb (2007) uses a fixed effects model to assess the long-term impact that participation in school-sponsored clubs and sports have on pupil's attainment in secondary school. The results show that club participation is correlated with a 2 per cent increase in math scores and an overall 5 per cent increase in undergraduate degree attainment expectations. Shulruf et al. (2008) also prove that students in athletic clubs tend to have higher literacy scores. After controlling for grade level and prior levels of outcome variables, Metsäpelto and Pulkkinen (2014) observe that for pupils aged 9-10, participation in arts and crafts leads to higher attainment in reading, writing, and arithmetic, more adaptive behaviour, and diminished levels of internalising personal issues.

¹² DfE/IFF Research (2021)

However, test scores are not the only desirable outcome. For instance, participation in extra-curricular activities (ECA) can be important in developing socio-emotional skills, relationships and networks. Fredricks and Eccles (2008) find that pupils who took part in 8th grade school clubs and teams incurred a larger increase in psychological resiliency. Additionally, the same study predicts that pupils from more disadvantaged backgrounds who took part in any type of school club reported a higher number of supportive peers than their non-participating counterparts.

According to the EEF (2021), non-academic extracurricular activities, like sports clubs, can contribute positively to student outcomes, yielding approximately one month's worth of progress in academic achievement, in addition to other improvements in non-cognitive skills. Nevertheless, extracurricular activities centred around sports or arts, which maintain a rigorous structure and include short reading and math sessions as part of the programme, are more likely to enhance students' academic accomplishments.

Robinson (2024) demonstrates a positive relationship between involvement in sports clubs and a specific outcome in the labour market, the probability of being in employment or education during early adulthood. The results indicate that, after controlling for other pupil characteristics, attendance to a sports club is associated with a 42 per cent rise in the odds of a pupil being employed or in education at ages 21/22 as compared to those who did not attend sports clubs. Additionally, pupils who engaged in arts or music clubs exhibited a 56 per cent rise in the odds of being in higher education at age 21/22 compared to their non-participating counterparts.

Both EEF (2021) and Robinson (2024) discovered that students with low socioeconomic status (SES) are less inclined to join sports clubs, with one contributing factor being their difficulty in acquiring the required equipment.

Universal free meal clubs could also be considered a type of non-academic ECA. In the UK, the implementation of the 'Magic Breakfast' project, extended the school day by providing several schools with the resource necessary to organise a before-school free and universal breakfast club (IFS, 2019). Evaluation results indicate a positive correlation between academic performance and program participation amongst Year 2 pupils, with participants demonstrating two months of additional progress. However, this effect was not found amongst older Year 6 pupils. The programme also had a large impact on teacher-perceived pupil behaviour, reportedly increasing teacher-perceived pupil behaviour by 48 per cent of a standard deviation. This is likely due to the positive correlation between breakfast clubs and concentration during class. Breakfast clubs are also shown to generate spillover effects, as the pupils who did not attend were still positively affected and studying in a less disruptive environment.

4. Additional hours have a greater effect on test scores when pupils are instructed by the same teachers who conduct their regular classes.

Across programmes it is notable that those that have been deemed more successful were often led by the pupils' main teachers. Kidron and Lindsey (2014) review a range of studies on out-of-school programmes and emphasised that the effects were positive and statistically significant when activities were conducted by certified teachers, who had a thorough understanding of the school

curriculum and could teach in a way that enhanced the pupils' grasp of the material taught during regular class time.

Nickow, Oreopoulos, and Quan (2020) examine a number of studies on the effects of tutoring programmes and conclude that tutorials held by teachers positively impact test scores by 0.5 standard deviations compared to 0.4 when held by paraprofessionals and 0.21 when held by non-professionals. Besides the familiarity with the curriculum and classroom content that teachers have, they might also be more likely to forge mentorship relationships which may in turn extend towards a positive attitude towards educational content. However, Kraft (2015) still finds a positive effect of 0.15-0.25 SD per year on 10th grade achievement through quasi-experiments on daily individualised tutorials held not by teachers, but by recent college graduates.

The failure of other reforms to the school day has been attributed externally contracted teachers (Meyer and Kleveren, 2013) and a lack of quality teachers (Oliveira et al., 2022). Furthermore, Jun, Ramirez, and Cumming (2014) highlight the importance of providing tutored students with detailed feedback, which could also be traced back to the importance of there being a connection for pupils with the teaching staff leading the aforementioned programmes.

5. One-on-one or small group tuition is most effective, but it is costly

Existing literature reveals that one-on-one tutoring is a notably effective form of improving academic performance. Lauer et al. (2006) survey a slate of studies centred around after-school programmes and find that one-on-one tutoring had the highest effect size of 0.5. This is almost ten times larger than the effects of increasing instruction time by one hour per week (Lavy, 2015; Bingley et al., 2018). Similarly, Slavin et al. (2009) show that one-on-one tuition is the most effective method of improving reading performance for children ages 5-10, also outlining the fact that tuition is most effective when the instructors are teachers rather than paraprofessionals or volunteers. EEF (2018) also reports that one to one tuition over a period of ten weeks had very positive results, with primary and secondary school students achieving six- and four-months' worth of progress, respectively.

However, there are many impediments in implementing one-on-one tutoring programmes. Bloom (1984) explores these drawbacks, with the main counterarguments being its high costs especially compared to small-group teaching and the potential issues with the supply of teachers willing to do extra-work, though the supply issue is present to some degree in almost any type of policy aiming to extend the school day.

Responses to the pandemic

In response to the learning loss amongst pupils resulting from school closures amid the pandemic, countries implemented a diverse array of remedial strategies. These typically involved adding additional time for instruction, either tutoring sessions integrated into the regular school week or conducted during weekends, or the establishment of summer schools.

In England, the pandemic induced learning loss in the region of two months. The National Tutoring Programme (NTP) was introduced during the 2020/21 academic year to provide tutoring for pupils and help them catch up with these losses. Subsequently, pupils have made some progress in rectifying previous losses, however, the role of the NTP in this is unclear. Lord, Poet and Styles (2022a, b) analyse an element of the programme where schools could use external tutors to provide small group tuition in core subjects. They find participation in the programme was not linked with better test scores in English or maths in both primary and secondary settings.

These findings align with outcomes observed in programmes implemented in other countries. In Spain, a tutoring scheme was introduced at the end of 2021. Young teachers led tutoring sessions for an 8-week period to groups of two pupils aged 12-15 from disadvantaged backgrounds. Again though, no significant effects on attainment were detected (Mineá-Pic, 2023).

In the US, summer learning was more commonly used as a post-pandemic recovery strategy. Callen et al. (2023) analyse the impact of summer school attendance in 2022, concluding that the gains were very small, with the designated programmes managing to close only around 3 per cent of learning loss in maths and none in reading. Lynch et al. (2023) extrapolates from these findings that in order to return to pre-pandemic scores in maths, students would need to attend summer schools over two to three years. They also find that the potential impacts are higher for primary aged pupils than secondary.

Conclusion

The effects of extending the school day, although generally small, are relatively robust. Significant effects on attainment are found in both cross-country comparisons as well as evaluation of country specific reforms.

Effects on attainment are, however, heterogeneous. Pupils from more disadvantaged backgrounds have been shown to benefit more than their peers from an extended school day. The literature also indicates that extra time spent on tuition in maths rather than languages or reading is more effective at increasing test scores. In many cases the studies are unable to establish effects on language and reading scores.

Improving attainment outcomes should not be the sole focus of extending school days. Additional time spent on extra-curricular activities have been shown to improve a range of other socio-economic outcomes. However, additional time used for such activities do not appear to improve exam performance.

Significant effects on attainment are contingent on how the additional time is utilised within a specific context. To enhance the efficacy of programmes seeking to prolong the school day, it is essential to underscore the significance of a well-trained teaching staff, who preferably already possess a familiarity with the pupils they are teaching. Equally important is ensuring alignment between the content taught during additional instruction time and the class curriculum. Additionally, the most successful programmes are integrated into the school day and are mandatory. Extending time in school through weekend classes or summer schools is less effective.

Extending school time imposes a diverse set of costs, encompassing both tangible expenditures and opportunity costs. The most effective use of extra instruction time is in one-on-one tutoring sessions, but this is also the costliest. Nevertheless, even in the cases where the extension of time spent at school is more incremental and integrated in the mandatory school day, costs can still be considerable. For instance, Silva (2007) shows that a 30 per cent extension of school time in Massachusetts prompted a 20 per cent increase in funding.

Paper	Set-up	Research design	Findings and interpretations
By country			
Battistin and Meroni (2013)	A programme that provides additional instructional time (mainly in the form of tutoring) to pupils in Southern Italy.	Differences-in-differences methodology comparing cohorts of sixth grades in participating schools with those in non-participating schools before and after the implementation of the programme.	<p>No statistically significant effect of the programme on Italian language.</p> <p>For the bottom tertile of schools performance-wise there was a significant effect of the programme on maths tests scores – 0.25 SD (more specifically driven by an improvement in quantitative reasoning).</p> <p>There was also a negative cross-effect, meaning that additional time spent on Italian language has a negative effect (-0.31 SD) on maths.</p>
Bellei (2009)	The Chilean school reforms that increased school day from 4 hours (half day) to 6-7 hours (full day).	<p>Differences-in-Differences for examining whether studying by a full school day programme as opposed to a half day one influenced Chilean pupils' academic outcomes.</p> <p>Data from the Chilean testing system capturing test scores obtained by pupils at the end of 10th grade in two years: 2001 (pre-reform) and 2003 (post-reform).</p>	<p>Students who went to school under the full day regime obtained generally higher scores than their counterparts.</p> <p>The estimation of the effect that the programme had on language test scores is between 0.05 and 0.07 SD. The effect for maths is more sensitive to historical trends and specifications of control groups, so ranges more widely between 0.00 and 0.12, with 0.07 remaining the most convincing estimate.</p>
Bingley et al (2018)	Analyses the relationship between test scores at the end of compulsory schooling (9th grade, pupils aged 15) in Danish, Maths, and English.		A one extra hour of weekly instruction time improves test scores at the end of 9th grade by approx. 0.06 SD (very similar to Lavy). For low-SES students, the increase is of 0.09 SD; for their counterparts the increase is lower (0.05 SD).

			The effect is contingent on the phase of education – girls benefit more from instruction time in grades 1-3 and 7-9 whereas boys benefit from more instruction time in grades 4-6.
DeAngelis and Tienken (2016)	The effect of school day length on pupil aggregate performance in New Jersey comprehensive high schools (performance measured through the High School 2011 Mathematics and Language Arts examinations).	Non-experimental study Correlation research and hierarchical regression analysis to measure the relationship between length of school day and Grade 11 High School Proficiency Assessment scores in 2011.	Length of school day does not have any significant effect on language test scores but corresponds to 1.8 per cent of the variance in Maths test scores at a high school level.
Dobbie and Freyer (2013)	Data collected from 39 charter schools in the US.		Pupils attending schools that increase instructional time by 25 per cent have annual gains on standardised maths tests of 0.05 SD (standard instructional time for traditional NYC public schools is 6.75 hours – the baseline from which the percentage changes are calculated) and ELA gains of 0.03 SD.
Jensen (2013)	Danish reforms which implemented an increase in instruction time between 2.2-3.3 per cent in Danish language and maths in primary school (classes 1 through 9 in Denmark). The paper investigates the effects of the increase in instructional time after the reforms on 9th graders (age 16).	Natural experiment School fixed-effects model (similar to difference in difference). 'Treated' group represented by the schools that had to increase classroom hours after the reform passed 'Control' group – the schools that remained unaffected by the reform. Pre-reform data: one year before the reform, Post-reform data: three years after the reform.	Only statistically significant effect was for maths. Maths instructional time increased on average by only 2.63 annual hours, which corresponded to a 0.46 per cent of a standard deviation increase in maths test scores. Breaking it down further, one additional annual hour of maths increases test scores by 0.21 per cent of a standard deviation. The explanation given for the difference in significance between maths and Danish language is that training in literacy also takes place in

			a home environment more than maths and is, henceforth, less elastic to classroom hour changes.
Nickow, Oreopoulos, and Quan (2020)	<p>Systematic review of pre-K-12 tutoring programmes in the US.</p> <p>The tutoring programmes under examination in this meta-analysis supplemented classroom education and most of them were geared towards helping more disadvantaged pupils.</p>		<p>The overall pooled effect of participating in tutoring programmes on standardised test scores is 0.37 SD.</p> <p>Tutorials implemented in earlier grades are found to be more effective. In first grade, the effect for participating in a tutoring programme is of 0.42 SD. The effect diminishes with age. Those in grades 2–5, the effect is 0.29 SD, and no effect for students in grades 6–11.</p> <p>The effect for intervention lasting 20 weeks or fewer is 0.39 SD whereas the effect of programmes longer than 20 weeks is 0.29 SD.</p> <p>The tutor type is also important. The effect of a tutoring programme taught by a classroom teacher is 0.5 SD, then 0.4 SD if a paraprofessional teaches it and 0.21 SD for a non-paraprofessional.</p> <p>The effect is also larger when the tutorials are held by classroom teachers.</p>
Cross-country studies			
Bietenbeck and Collins (2023)	Investigates how instruction time influences pupil performance on international tests – PISA and Trends in International Mathematics and Science Study (TIMSS)	Use Lavy (2015)'s fixed-effects model to investigate the causal effect of instructional time on individual-level data.	Using PISA test scores, they find that an additional weekly hour of instruction time is found to be associated with test score

			<p>improvements of 0.014-0.031 SD.</p> <p>Using TIMSS cohorts, the estimates for an increase of an hour in instructional times range from 0.015 SD to 0.037SD, with the average being 0.025 SD.</p>
Lavy (2015)	<p>Investigates the international gaps in pupils' academic achievement as measured by the relationship between national instructional time and national average PISA 2006 test scores</p>	<p>PISA 2006 data from OECD countries.</p> <p>Within-students estimates of the effect of instructional time on individual academic achievement.</p>	<p>A weekly extra hour of classroom instruction time in the fixed-effects regression corresponds to a 0.058 SD increase in PISA test scores.</p> <p>There is a nonlinear relationship between instruction time and test scores and the marginal effect of an additional hour starts to diminish, as illustrated by the fact that the positive effect on test scores is higher in the first two hours.</p>

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