Measuring the outcomes of disadvantaged pupils using Star Assessments 2022/23

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EDUCATION POLICY INSTITUTE

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About the author

Jon Andrews is Head of Analysis and Director for School System and Performance at EPI. He has published a wide range of studies including: 'The performance of multi-academy trusts and local authorities', 'School revenue balances in England', 'Access to special schools in England', and 'Grammar schools and social mobility'. He worked in the Department for Education from 2003 to 2016 as a statistician.

About the Education Policy Institute

The Education Policy Institute is an independent, impartial, and evidence-based research institute that promotes high quality education outcomes, regardless of social background. We achieve this through data-led analysis, innovative research and high-profile events.

Education can have a transformative effect on the life chances of young people, enabling them to fulfil their potential, have successful careers, and grasp opportunities. As well as having a positive impact on the individual, good quality education and child wellbeing also promotes economic productivity and a cohesive society.

Through our research, we provide insight, commentary, and a constructive critique of education policy in England – shedding light on what is working and where further progress needs to be made. Our research and analysis spans a young person's journey from the early years through to entry to the labour market.

Our core research areas include:

- Benchmarking English Education
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- Accountability, Assessment, and Inspection
- Curriculum and Qualifications
- Teacher Supply and Quality
- Education Funding
- Higher Education, Further Education, and Skills

Our experienced and dedicated team works closely with academics, think tanks, and other research foundations and charities to shape the policy agenda.

About Renaissance

Renaissance is a leading provider of assessment and practice solutions that put learning analytics to work for teachers, saving hours of preparation time while making truly personalised learning possible.

Since 1986, our mission has remained the same: To accelerate learning for all children and adults of all ability levels and ethnic and social backgrounds, worldwide.

Today, schools and school groups rely on Renaissance solutions for data and insights to equitably move learning forward. Our assessments, which also now include GL Assessment, offer the ideal starting point to help schools understand their students' strengths, pinpoint areas of need, and put targeted measures in place. Our teaching and learning programmes then provide effective next steps to drive better student outcomes.

This research, an extension of the work we started in 2020 on behalf of the Department for Education, is testament to our commitment to our mission – providing unique insights into student performance since the pandemic for educators and policymakers alike.

Thanks to the millions of Renaissance Star Assessments administered every year, we can provide the data for this analysis without increasing teacher workload or asking students to take additional tests.

Together, Renaissance Star Reading and Renaissance Star Maths streamline the assessment process with valid, reliable data to deliver the right teaching instruction, at the right time, for the right reason. They provide a complete view of student progress, including achievement and growth measures:

- **Purposeful:** Star provides the data and insight needed to inform teaching decisions.
- **Proven:** Star data is valid and reliable, backed by research, validity studies, and millions of data points.
- **Powerful:** Star utilises learning science, data analytics, and test design to deliver maximum impact in minimal time.
- **Predictive:** Star is highly predictive of performance on Key Stage 2 assessments and other high-stakes tests thanks to statistical linking.

Star Assessments are aligned to the national curriculum, and in addition to this research we have made available Focus Skills Teacher Workbooks that help educators identify the skills a student should prioritise and master to progress. These are available from the Renaissance website.

Acknowledgements

Contents

Executive summary

This analysis is the second in a series of reports produced by the Education Policy Institute, working in partnership with Renaissance. The purpose of this research programme is to ensure that policy makers and schools have access to robust data on the performance of different pupil groups, so that support is targeted effectively to those who need it most as we continue to recover from the pandemic.

The purpose of this report is to explore the outcomes of pupils from low-income backgrounds in Renaissance's Star Reading and Star Maths assessments. We know from previous analysis that pupils from low-income backgrounds suffered disproportionately from the effects of the pandemic and experienced a greater degree of lost learning. This has been confirmed by measures from statutory assessments in primary schools and GCSE and equivalent qualifications in secondary schools which have shown that the disadvantage gap increased to its widest level in a decade.

In this report we examine pupil outcomes in Star Reading and Star Maths on a consistent basis covering pre-, during, and post-pandemic periods. In order to be consistent over time we have needed to adapt our method for quantifying lost learning[1] and this inevitably means that some results differ from what we have published before, but the conclusions are unaffected by these changes.

When we compare the outcomes of disadvantaged pupils with their non-disadvantaged peers we find:

- In primary reading, attainment is slightly higher than before the pandemic but there is a widening disadvantage gap (increasing from 10.8 to 12.7 months).
- In secondary reading, results are slightly down on average compared to before the pandemic. This is driven by falling attainment for disadvantaged pupils and a widening disadvantage gap (from 18.8 months to 21.2 months).
- In primary mathematics, results are down for both disadvantaged and non-disadvantaged pupils since the start of the pandemic. The disadvantaged gap has widened from 6.9 months to 8.7 months).
- In secondary mathematics, results are down for both disadvantaged and non-disadvantaged pupils since the start of the pandemic. But results for disadvantaged pupils increased in 2022/23 meaning the disadvantage gap has narrowed slightly (from 17.7 months to 15.9 months).
- Pupils who have been persistently eligible for free school meals during their time in school typically have far lower outcomes than those eligible for shorter periods. In fact, the gap in outcomes between low and high levels of disadvantage is of a similar magnitude to that between low levels of persistence and pupils who are reported as non-disadvantaged.
- The pattern of results by level of disadvantage is complicated by shifting levels of disadvantage and an increasing proportion of pupils reported as persistently disadvantaged. The widening gaps are at least in part driven by an increase in persistent disadvantage.

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[1] For example, in our earliest studies working in partnership with the Department for Education we used prior attainment data to develop estimates of expected progress. Unfortunately, for current cohorts that prior attainment is itself affected by the pandemic.

- Overall, Star Assessment data appears to provide a good measure of the changing disadvantage gap at the end of Key Stage 2 as measured by the Department for Education. It shows that the gap widened substantially during the pandemic but has narrowed slightly from its highest point. However, the attainment gap remains substantially larger than before the pandemic.

The data used in this report

Background

The data analysed in this report is drawn from assessment data from Renaissance's Star Reading and Star Maths. These provide criterion-based scores that run on a singular scale from year 1 to year 13. Star Assessments are computer-adaptive in nature and adapt to the individual, providing an assessment that identifies gaps in learning from the entirety of the curriculum independent of their current year group. Star Assessments also include a standardised measure which takes account of the pupil's age in years and months.

The Star Reading assessment measures pupils' performance in key reading skills via a brief standards-based test of general reading achievement, administering 34 questions that students complete, on average, in less than 20 minutes. The Star Maths assessment similarly comprises a brief assessment of 24 questions that students complete, on average, in less than 15 minutes. The assessments draw on banks of just over 4,000 items in each of reading and mathematics.[2]

Over the course of 2023, Renaissance provided the Education Policy Institute and the Department for Education (DfE) with data comprising assessments undertaken in England between the start of the 2017/18 academic year and the end of the summer term of 2022/23.[3] The Department for Education then carried out a matching exercise to link this data with that in the National Pupil Database which contains a wealth of data on pupil characteristics and assessment outcomes. The Education Policy Institute then used this linked data as the basis for this report.

Data volumes

Renaissance assessments cover all national curriculum year groups; however, the vast majority of tests are completed in year 3 to year 9, and older pupils tend to be atypical of the pupil population as a whole. Therefore, as with previous reports, our analysis focusses on this age range and we group pupils into primary (years 3 to 6) and secondary (years 7 to 9) year groups. In this report, we restrict analysis to those pupils for whom we have been able to match with a record in the National Pupil Database.

Figures 1 to 4 show the number of pupils in each phase who took at least one assessment in reading or mathematics in each academic year. We group three years of pre-pandemic data together such that the Baseline category includes all pupils from 2017/18 up to and including the autumn term of 2019/20.

As discussed in previous reports, the number of pupils with assessments in mathematics is much lower than that in reading. In this report we also introduce a third measure combining attainment in reading and mathematics for those pupils who have a result in both. These numbers are slightly

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[2] A more detailed discussion of Star Assessments is available in *'Research Foundation for Star Adaptive Assessments – Science of Star'*, Renaissance White Paper, September 2020.

[3] The data provided for this analysis was restricted to those institutions who instructed Renaissance to conduct the analysis.

lower than mathematics alone, and we do not present results for secondary aged pupils on this measure as the numbers are too low.

Figure 1: Number of pupils included in analysis by disadvantaged status – primary reading

Figure 2: Number of pupils included in analysis by disadvantaged status – primary maths

Figure 3: Number of pupils included in analysis by disadvantaged status – secondary reading
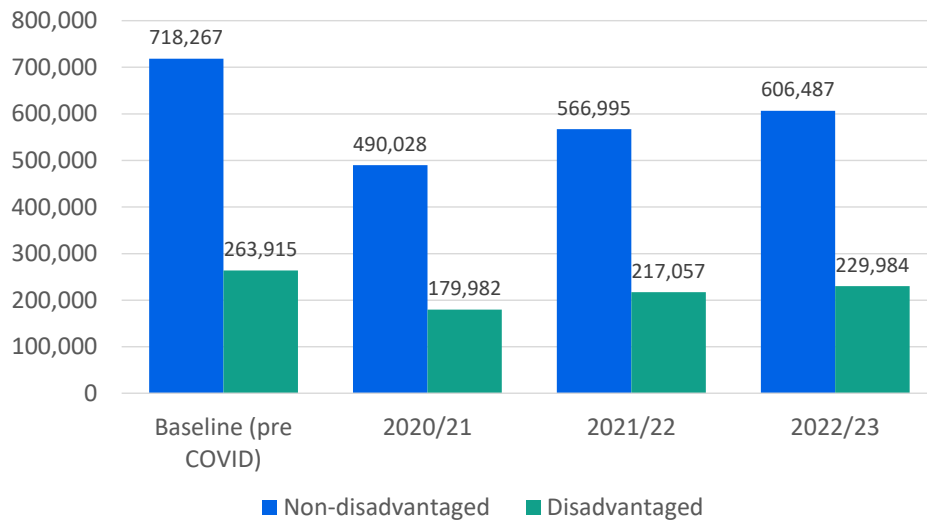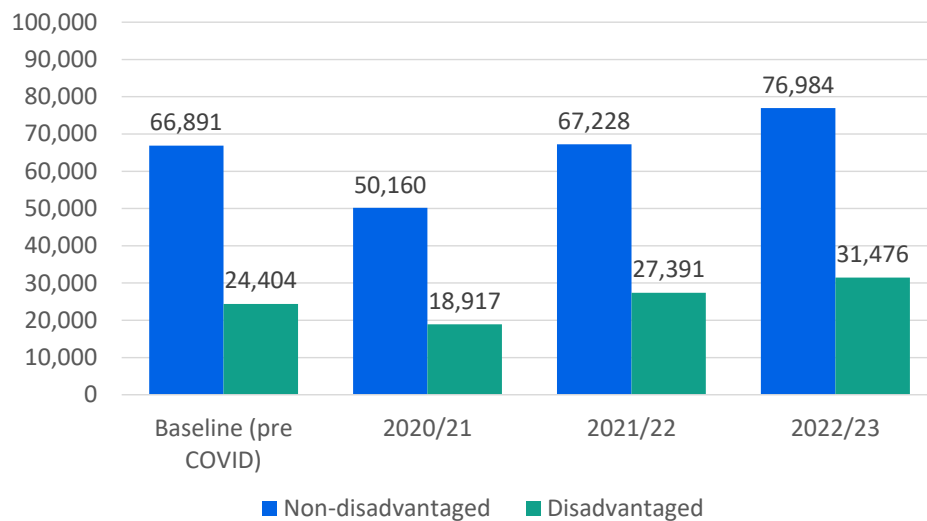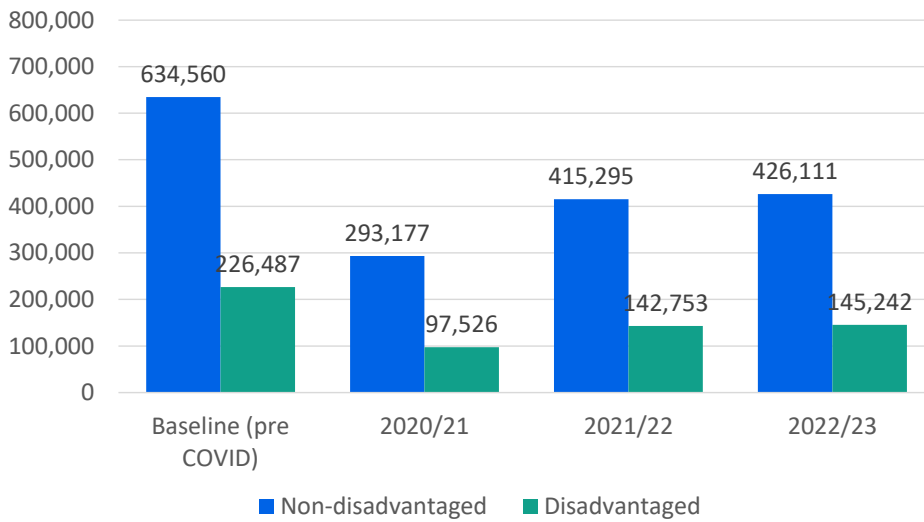

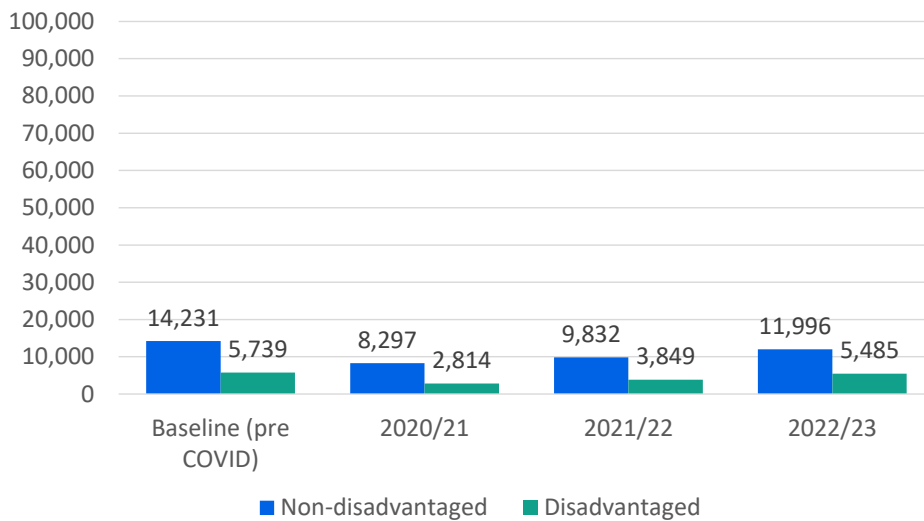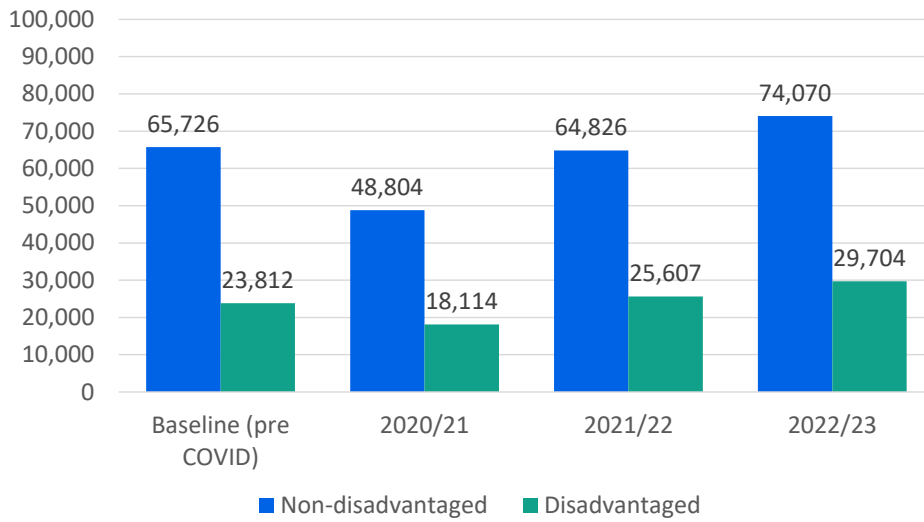**Figure 4: Number of pupils included in analysis by disadvantaged status – secondary maths**

Figure 5: Number of pupils included in analysis by disadvantaged status – disadvantage gap index measure (pupils with results in reading and maths)

Disadvantage in the pupil population

Definition of disadvantage

In this report we consider the attainment of economically disadvantaged pupils, comparing their attainment to their non-disadvantaged peers. We define disadvantage for individual pupils in two related ways:

- **Disadvantaged:** pupils who have been known to be eligible for free school meals at any point in the previous six years; and of this group
- **Duration of disadvantage:** the proportion of time in school that a disadvantaged pupil has been known to be eligible for free school meals (in bands of 20 per cent).

We also consider the rate of disadvantage within schools. For this we measure the percentage of pupils in a school who are reported as disadvantaged.

Prevalence of disadvantage

Figure 6 and Figure 7 show the proportion of pupils in the Renaissance dataset who were recorded as disadvantaged broken down by the duration of disadvantage in primary and secondary schools.[4]

Amongst primary aged pupils:

- In 2022/23, 27.7 per cent of pupils were reported as disadvantaged. This varied little over the four time periods in the analysis.
- This rate of disadvantage is slightly below the average for all Key Stage 2 pupils in Department for Education data (30 per cent).[5]
- While the overall rate of disadvantage is unchanged, there has been a noticeable increase in the proportion of pupils who were recorded as disadvantaged for at least 80 per cent of their time in school – a group that we term persistently disadvantaged. This has increased from 8.9 per cent prior to the pandemic to 13.3 per cent in 2022/23.

Amongst secondary aged pupils:

- In 2022/23, 25.6 per cent of pupils were reported as disadvantaged. This varied little over the four time periods in the analysis.
- This rate of disadvantage is broadly the same as the average for all Key Stage 4 pupils in Department for Education data (26 per cent).[6]
- While the overall rate of disadvantage is unchanged, there has been a small increase in the proportion of pupils who had been recorded as disadvantaged for at least 80 per cent of

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[4] Note that in this analysis the figures are based on the total assessments across the academic year. This means that pupils can actually appear up to three times in the analysis for an academic year. We do this as in later analysis we also combine terms together to boost sample sizes. We use the term "proportion of pupils" for brevity.

[5] https://explore-education-statistics.service.gov.uk/find-statistics/key-stage-2-attainment. Note that official statistics for disadvantaged children also include children looked after by a local authority or have left local authority care in England and Wales through adoption, a special guardianship order, a residence order or a child arrangements order.

[6] https://explore-education-statistics.service.gov.uk/find-statistics/key-stage-4-performance-revised/2022-23 See note about definition of disadvantage in official statistics above.

their time in school. This has increased from 9.1 per cent prior to the pandemic to 10.6 per cent in 2022/23.

The change in the persistently disadvantaged group does not necessarily reflect changes in economic circumstances. Universal Credit (UC) is a social security benefit which was introduced in April 2013 to replace six existing means-tested benefits, aimed at ensuring people are better-off in work. Prior to April 2018, UC claimants with school-aged children were eligible to claim FSM. From April 2018, an income threshold was introduced so that new UC claimants were only eligible if they earned less than £7,400 per year. To ease this transition, the government put in place protections during the period of UC rollout. This meant that any pupil eligible for FSM (and subsequently eligible) would retain free school meals until at least March 2025 – even if their family income increased above the threshold during that time.

This means that since 2018, there has been an increasing number of pupils who are eligible for FSM due to transitional protections rather than their financial circumstances.

Figure 6: Percentage of pupils who were reported as being disadvantaged by the proportion of their time in school that they have been reported as being disadvantaged – primary
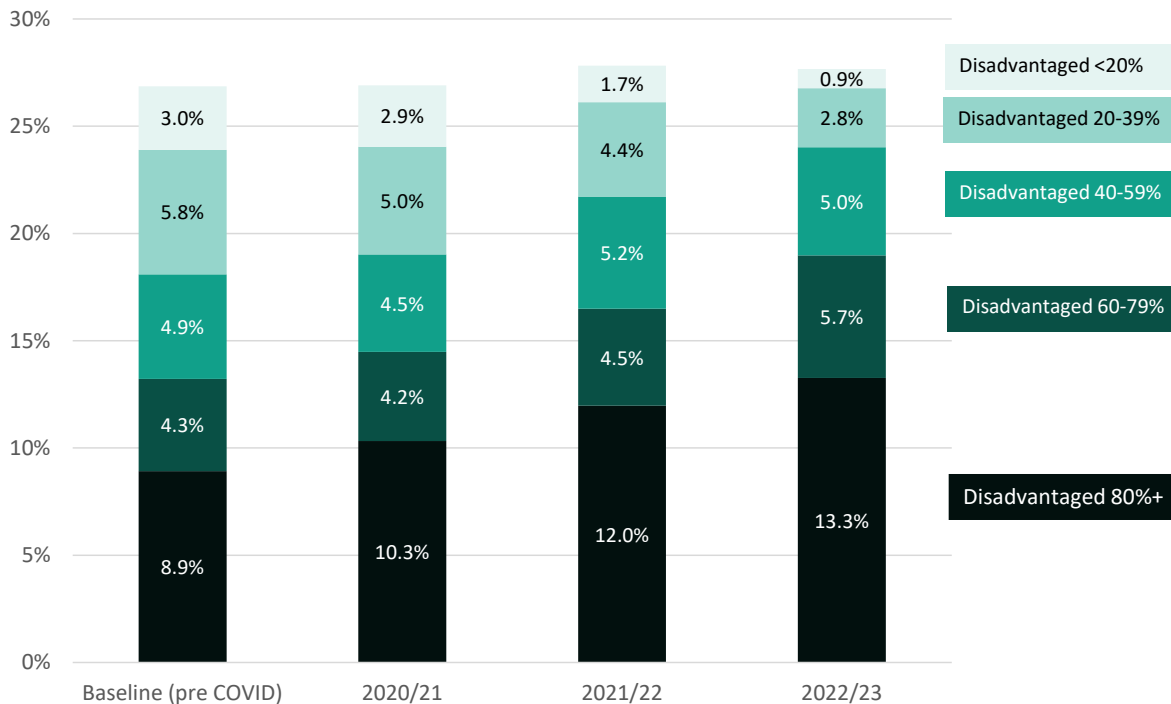
Figure 7: Percentage of pupils who were reported as being disadvantaged by the proportion of their time in school that they have been reported as being disadvantaged – secondary
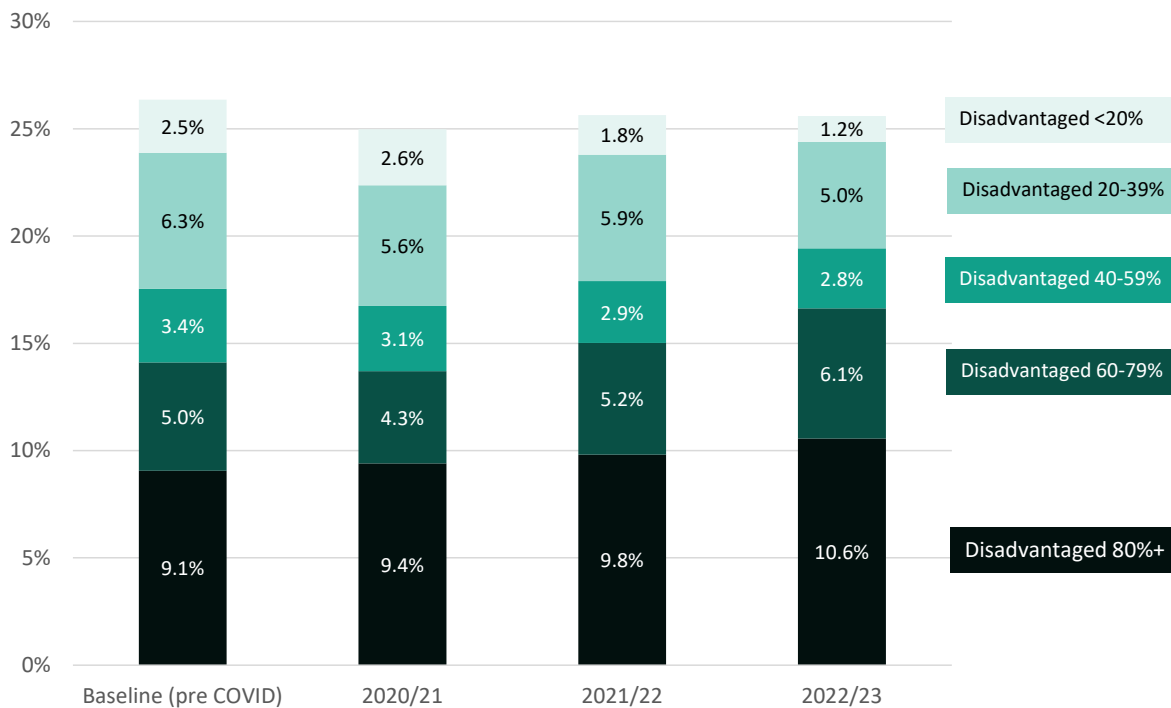
Prevalence of disadvantage at school level

In Figure 8 and Figure 9 we group pupils by the level of disadvantage in their school (the percentage of pupils who are recorded as being disadvantaged). We group schools into four bands of disadvantage. Disadvantaged pupils are not evenly distributed between schools and, by definition, pupils from disadvantaged backgrounds are disproportionately found in schools with high levels of disadvantage. But this also means that there are pupils who appear to be from non-disadvantaged backgrounds in highly disadvantaged schools, and these pupils are likely to be less affluent than non-disadvantaged pupils elsewhere.

Amongst primary aged pupils we find that:

- Disadvantaged pupils are not evenly distributed between schools and, by definition, pupils from disadvantaged backgrounds are disproportionately found in schools with high levels of disadvantage.
- But 11 per cent of all pupils from disadvantaged backgrounds were in the least disadvantaged schools overall and 15 per cent of all pupils from non-disadvantaged backgrounds were in schools were in highly disadvantaged schools overall.
- Around half of pupils in the most disadvantaged schools were not themselves recorded as disadvantaged, but they are likely to be less affluent than non-disadvantaged pupils in the least disadvantaged schools.

Amongst secondary aged pupils we find that:

- 14 per cent of all pupils from disadvantaged backgrounds were in the least disadvantaged schools overall and 15 per cent of all pupils from non-disadvantaged backgrounds were in schools were in highly disadvantaged schools overall.

- Around half of pupils in the most disadvantaged schools were not themselves recorded as disadvantaged, but they are likely to be less affluent than non-disadvantaged pupils in the least disadvantaged schools.

Figure 8: Percentage of pupils by pupil and school level disadvantage – primary

Legend: 0 - 15% | 15 - 25% | 25 - 35% | 35%+

	0 - 15%	15 - 25%	25 - 35%	35%+
Disadvantaged	11%	22%	27%	39%
Non-disadvantaged	33%	30%	21%	15%
All pupils	27%	28%	23%	22%
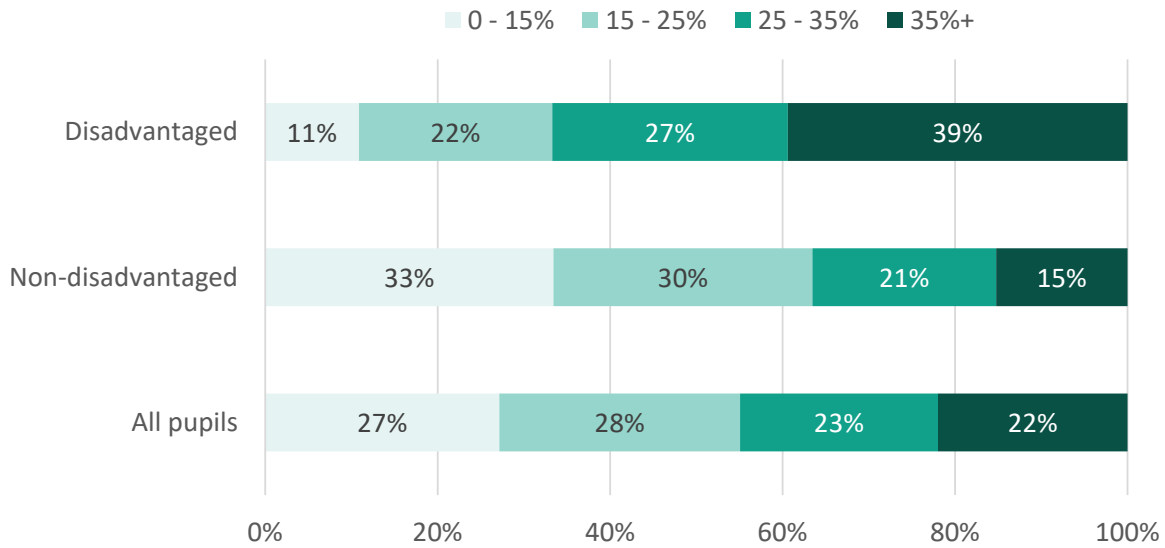
Figure 9: Percentage of pupils by pupil and school level disadvantage – secondary

Legend: 0 - 15% | 15 - 25% | 25 - 35% | 35%+

	0 - 15%	15 - 25%	25 - 35%	35%+
Disadvantaged	14%	23%	27%	36%
Non-disadvantaged	35%	29%	21%	15%
All pupils	29%	28%	23%	21%
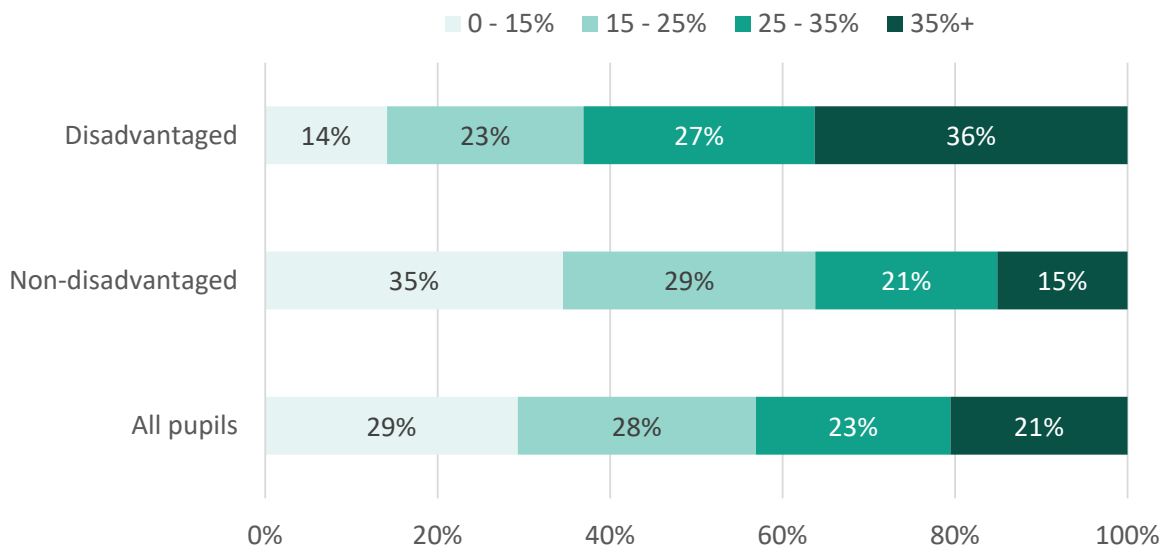
Outcomes for pupils from disadvantaged backgrounds

We now consider the outcomes in Star Assessments in reading and mathematics for pupils over time to track how outcomes have changed in comparison with pre-pandemic norms for disadvantaged and non-disadvantaged pupils.

To ensure sufficient sample sizes we have grouped year groups together into primary and secondary year groups and terms together into scores for the complete academic year. To group scores together in this way it has been necessary to "standardise" scores. We do this relative to performance in a "baseline" period – the years prior to the pandemic. For a pupil's result we do this as follows:

- We take their score and subtract the mean score in that subject, in the equivalent term, in the pupil's year group, in our baseline data.
- We then divide that by the standard deviation of scores in that subject, in the equivalent term, in the pupil's year group, in our baseline data.

This means that scores in our baseline data have a mean of zero and a standard deviation of one. All of the averages presented in this analysis are then in fractions of a standard deviation relative to pre-pandemic averages for all pupils. 0.1 standard deviations can be broadly interpreted as:

Figure 10: Approximate interpretations of a change of 0.1 standard deviations in attainment[7]

	Months of learning	Unified scale score points
Primary reading	2.4	7
Primary maths	1.7	7
Secondary reading	4.0	7
Secondary maths	3.0	8

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[7] These are derived from the typical rates of progress and standard deviations included in our Star Assessments Benchmarking Report.

We present results on a series of charts below that show how attainment for each group has changed over time, and what that has meant for the gap between the groups. They should be read as:
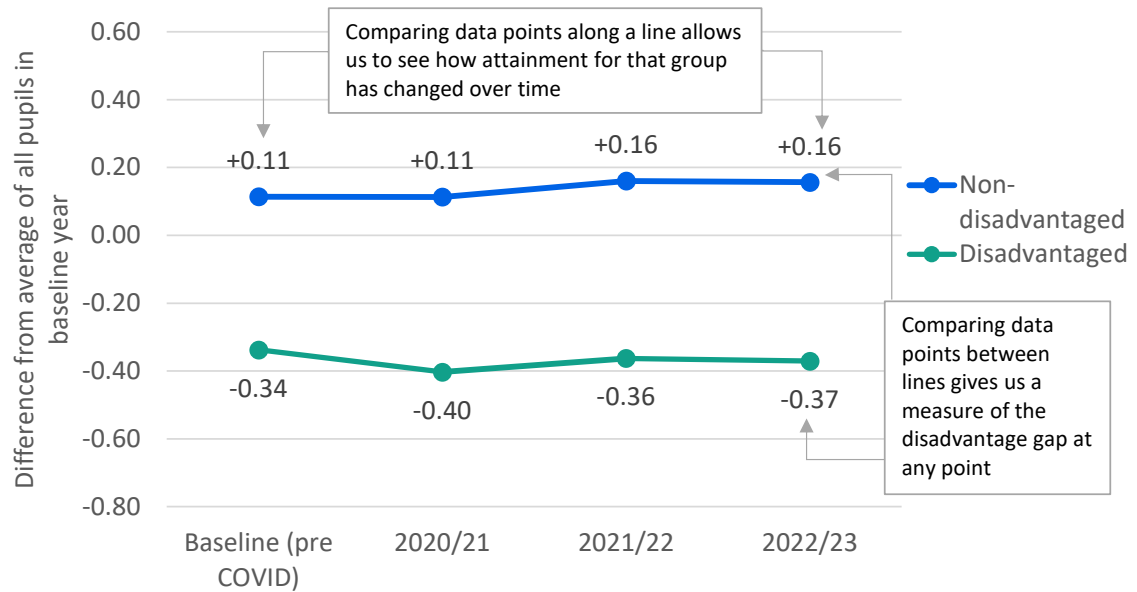
In primary reading, overall attainment is slightly higher than before the pandemic. But this is driven by attainment for non-disadvantaged pupils and the disadvantage gap has widened

- Since the start of the pandemic, attainment in reading for primary aged pupils from non-disadvantaged backgrounds has increased by 0.05 standard deviations. This is equivalent to additional learning of around 1.2 months.
- Over the same period, attainment for pupils from disadvantaged backgrounds has fallen by 0.03 standard deviations. This is equivalent to lost learning of around 0.7 months.
- In other words, on this measure, the disadvantage gap is 1.9 months wider than it was before the pandemic (an increase from 10.8 months to 12.7 months).
- Results for pupils from disadvantaged backgrounds have recovered slightly from their lowest point in the pandemic. In the 2020/21 academic year, attainment was 0.06 standard deviations lower than prior to the pandemic. This is equivalent to lost learning of 1.4 months, in comparison with 0.7 months by 2022/23.

Figure 11: Standardised score relative to pre-pandemic average in reading – primary
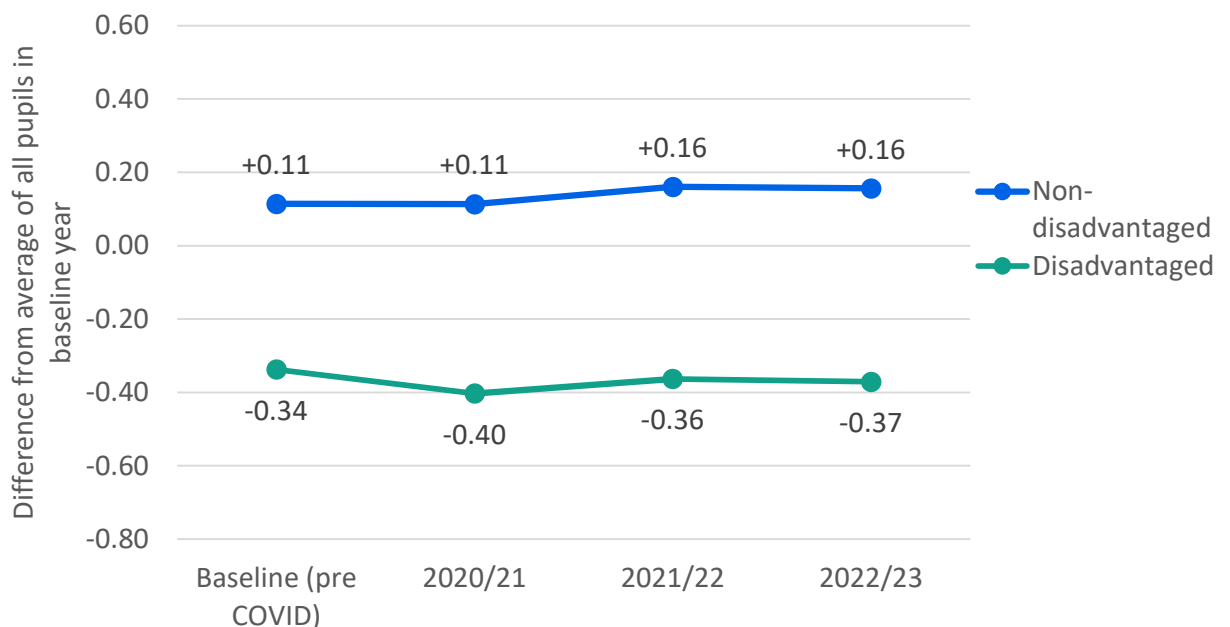
In secondary reading, results are down slightly on average, driven by falling attainment for disadvantaged pupils and a widening disadvantage gap

- Since the start of the pandemic, attainment in reading for secondary aged pupils from non-disadvantaged backgrounds has remained largely unchanged.
- Over the same period, attainment for pupils from disadvantaged backgrounds has fallen by 0.06 standard deviations. This is equivalent to lost learning of around 2.4 months.
- In other words, on this measure, the disadvantage gap is 2.4 months wider than it was before the pandemic (an increase from 18.8 months to 21.2 months).
- Results for pupils from disadvantaged backgrounds have not recovered from the pandemic. In the 2020/21 academic year, attainment was 0.05 standard deviations lower than prior to the pandemic and in 2022/23 they were 0.06 standard deviations lower than prior to the pandemic. This is equivalent to lost learning of 2.0 to 2.4 months.

Figure 12: Standardised score relative to pre-pandemic average in reading – secondary
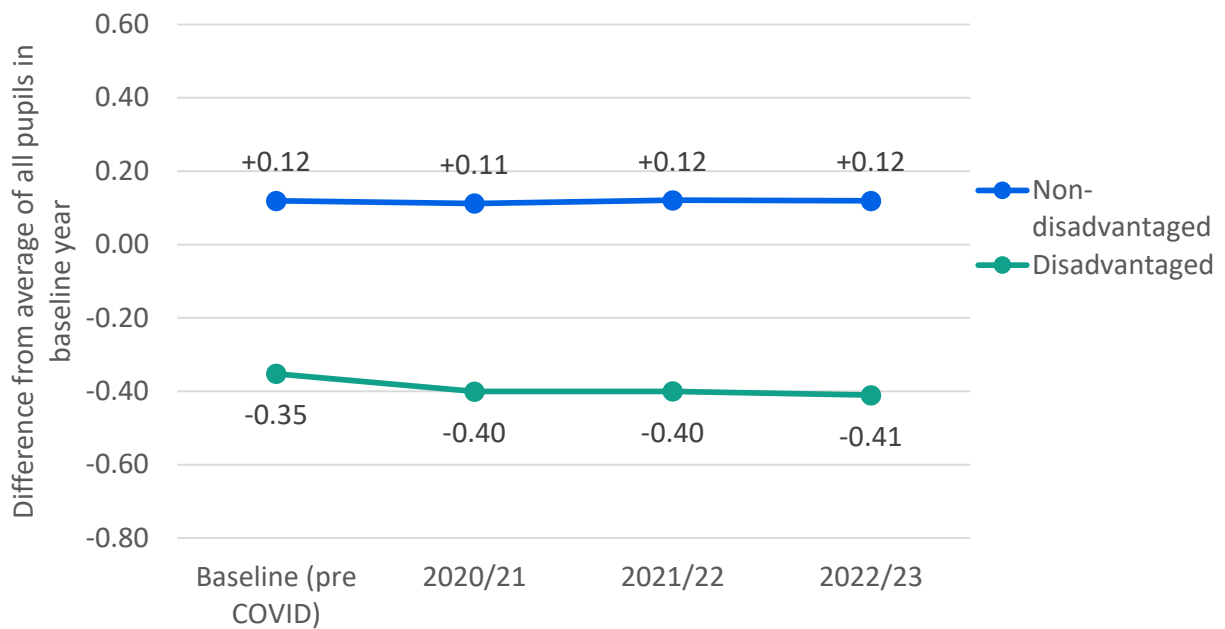
In primary mathematics, results are down overall and results for disadvantaged pupils have fallen further leading to a widening disadvantage gap

- Since the start of the pandemic, attainment in mathematics for primary aged pupils from non-disadvantaged backgrounds has decreased by 0.07 standard deviations. This is equivalent to lost learning of around 1.2 months.
- Over the same period, attainment for pupils from disadvantaged backgrounds has fallen by 0.18 standard deviations. This is equivalent to lost learning of around 3.1 months.
- On this measure, the disadvantage gap is 1.8 months wider than it was before the pandemic (an increase from 6.9 months to 8.7 months).
- Results for pupils from disadvantaged backgrounds have recovered slightly from their lowest point in the pandemic. In the 2020/21 academic year, attainment was 0.25 standard deviations lower than prior to the pandemic. This is equivalent to lost learning of 4.3 months, in comparison with 3.1 months by 2022/23.

Figure 13: Standardised score relative to pre-pandemic average in mathematics – primary
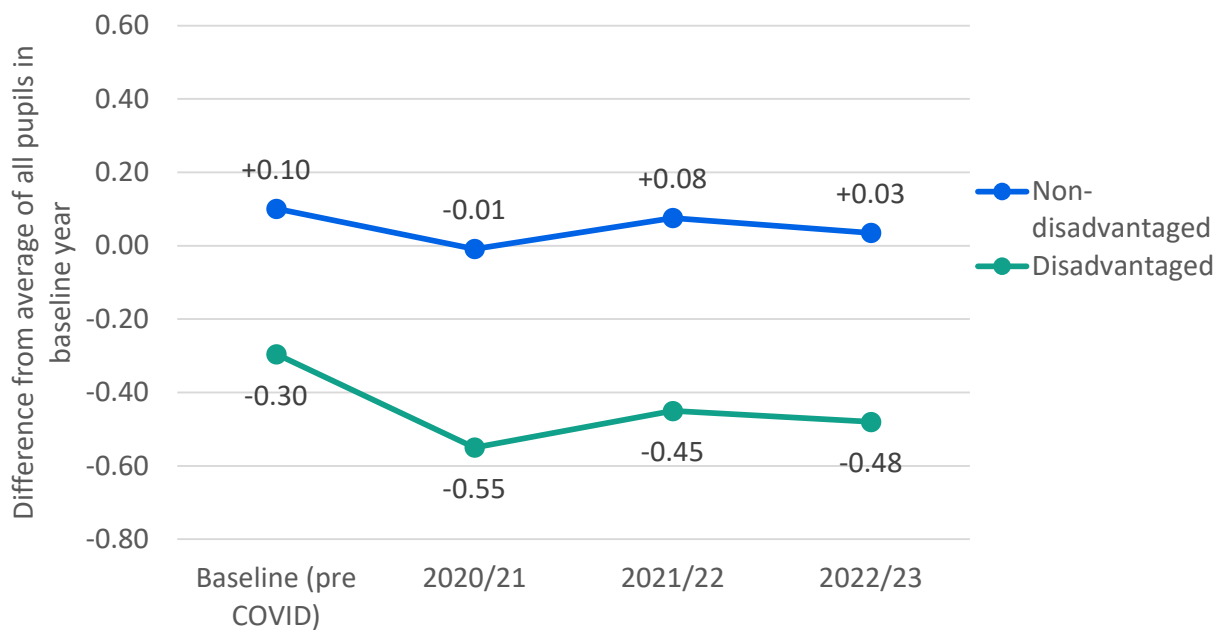
In secondary mathematics, results are down overall. But in our data, results for disadvantaged pupils in 2022/23 increased, meaning the disadvantage gap narrowed

- Since the start of the pandemic, attainment in mathematics for secondary aged pupils from non-disadvantaged backgrounds has decreased by 0.16 standard deviations. This is equivalent to lost learning of around 4.8 months.
- Over the same period, attainment for pupils from disadvantaged backgrounds has fallen by 0.1 standard deviations. This is equivalent to lost learning of around 3.0 months.
- On this measure, the disadvantage gap is 1.8 months narrower than it was before the pandemic (a decrease from 17.7 months to 15.9 months).
- Results for pupils from disadvantaged backgrounds have partially recovered from their lowest point in the pandemic. In the 2020/21 academic year, attainment was 0.17 standard deviations lower than prior to the pandemic. This is equivalent to lost learning of 5.1 months, in comparison with 3.0 months by 2022/23.
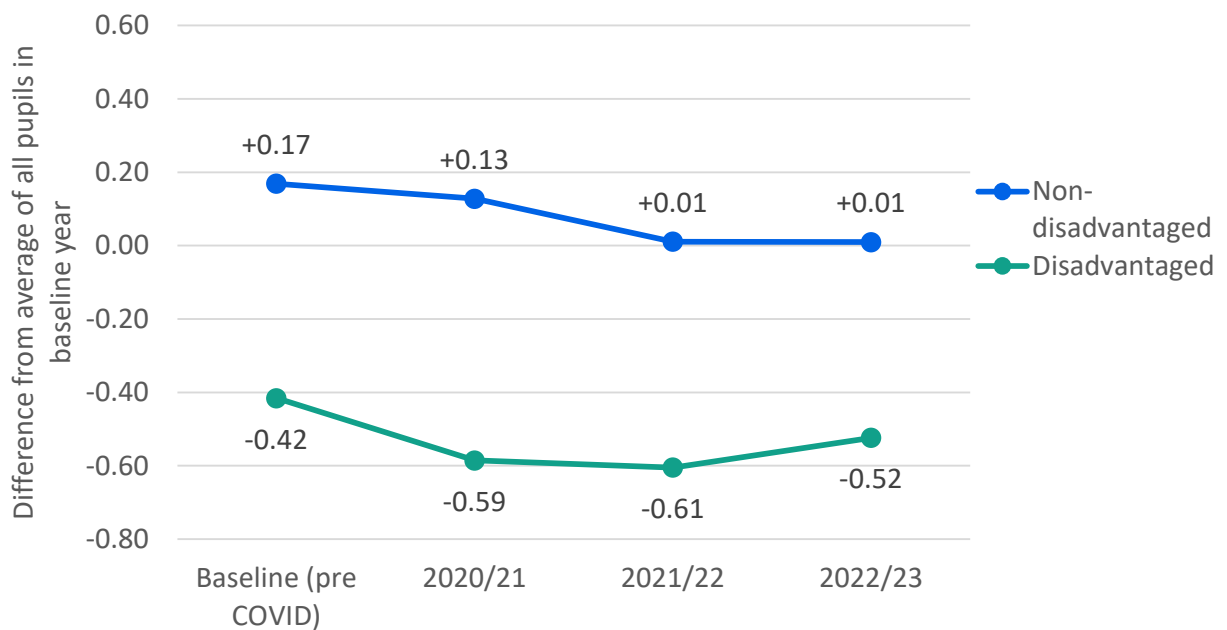
Figure 14: Standardised score relative to pre-pandemic average in mathematics – secondary

Outcomes by persistence of disadvantage

In this section we consider the attainment of pupils broken down by the persistence of disadvantage. We previously considered the attainment of pupils from disadvantaged backgrounds, by which we mean whether they have been eligible for free school meals in the last six years. As in Figure 6 and Figure 7, we break this group down further by looking at the percentage of their time in school that they have been eligible for free school meals. We include attainment outcomes for all of these groups, but in the analysis that follows we particularly focus on:

- Non-disadvantaged pupils (those who have not been eligible for free school meals in any of the previous six years.
- Disadvantaged but eligible for free school meals for less than 20 per cent of their time in school (low persistence disadvantaged).
- Disadvantaged and eligible for free school meals for at least 80 per cent of their time in school (persistently disadvantaged).

Pupils who have been persistently eligible for free school meals typically have far lower outcomes than those eligible for shorter periods

- Prior to the pandemic, primary aged pupils with low persistence of disadvantage were typically 0.27 standard deviations behind non-disadvantaged pupils in reading. Pupils from persistently disadvantaged backgrounds were typically 0.59 standard deviations behind non-disadvantaged pupils. In other words, the gap between pupils with low and high persistence of disadvantage was of a similar magnitude to the difference between low persistence disadvantage and non-disadvantaged pupils.
- Prior to the pandemic, primary aged pupils with low persistence of disadvantage were typically 0.21 standard deviations behind non-disadvantaged pupils in mathematics. Pupils from persistently disadvantaged backgrounds were typically 0.54 standard deviations behind non-disadvantaged pupils. In other words, the gap between pupils with low and high persistence of disadvantage was greater than the difference between pupils in low persistence disadvantage and non-disadvantaged pupils.
- Prior to the pandemic, secondary aged pupils with low persistence of disadvantage were typically 0.26 standard deviations behind non-disadvantaged pupils in reading. Pupils from persistently disadvantaged backgrounds were typically 0.63 standard deviations behind non-disadvantaged pupils. In other words, the gap between pupils with low and high persistence of disadvantage was of a similar magnitude to the difference between low persistence disadvantage and non-disadvantaged pupils.

In primary reading, overall attainment is at or above pre-pandemic levels in all but one of the groups. But overall, attainment for disadvantaged pupils is down slightly

- Average attainment for non-disadvantaged pupils remained at a similar level through the first year of the pandemic (at 0.11 standard deviations above the pre-pandemic average for all pupils) and by 2021/22 this increased by 0.05 standard deviations. This is equivalent to an additional 1.2 months of learning.
- All of the disadvantaged groups saw falls during the pandemic. In 2020/21, average attainment for pupils from low persistence disadvantaged backgrounds fell by 0.08 standard deviations, equivalent to around 1.9 months of learning. Results for pupils from persistently disadvantaged backgrounds fell by 0.04 standard deviations, equivalent to just under a month of learning.
- In 2022/23 average attainment for pupils from low persistence disadvantaged backgrounds was still 0.03 standard deviations below pre-pandemic averages, equivalent to around 0.7 months of learning. However, among the persistently disadvantaged group results were 0.02 standard deviations above pre-pandemic averages (equivalent to around half a month).

Figure 15: Standardised score relative to pre-pandemic average in reading by level of disadvantage – primary
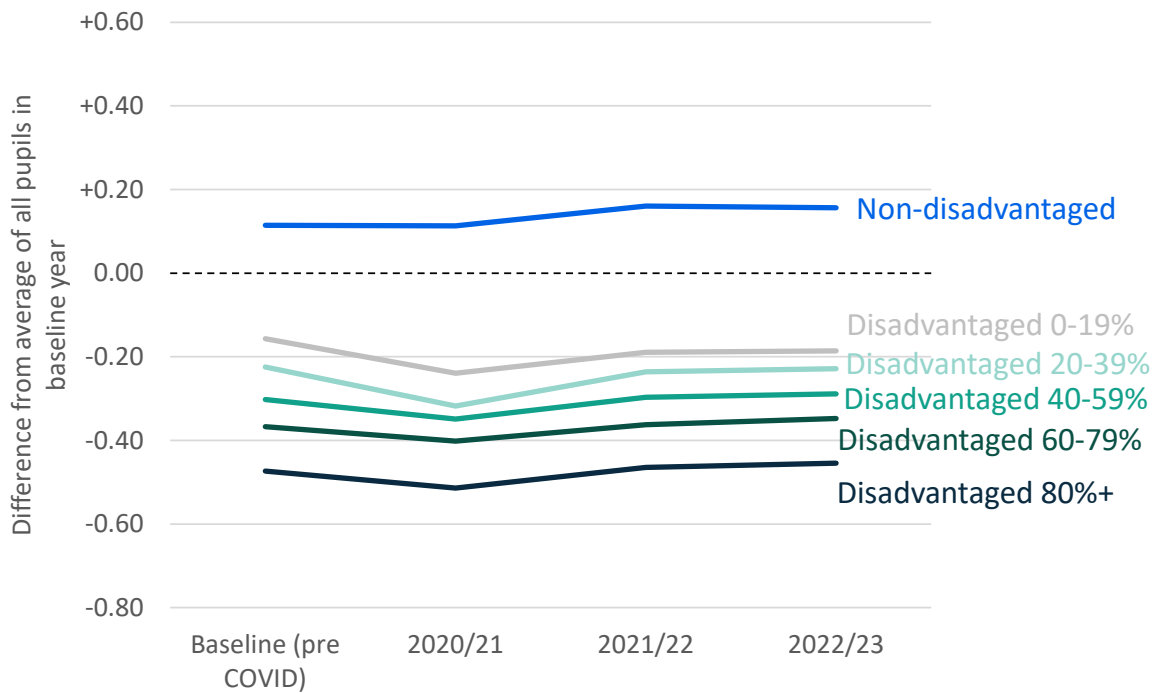
The patterns of all of these results are complicated by the shifting levels of disadvantage, with an increasing proportion of pupils reported as persistently disadvantaged

While most disadvantage groups have seen results go up slightly since before the pandemic, we saw in the previous section that overall, results for disadvantaged pupils were actually lower than prior to the pandemic.

These apparent contradictions are likely to be caused by the fact that an increasing proportion of disadvantaged pupils are falling within the higher disadvantaged categories (in part due to the protections in Universal Credit set out previously). As demonstrated above, these groups typically

have much lower attainment overall (so the overall average falls). At the same time, because of the protections, pupils moving into the higher disadvantage group are likely to be similar to pupils in the lower groups in the past (and hence have slightly higher attainment on average), so the attainment in the sub-group increases.

In secondary reading, overall attainment has fallen in each disadvantage group, but the degree to which it has fallen has varied

- Since the start of the pandemic, attainment in reading for secondary aged pupils from non-disadvantaged backgrounds has remained largely unchanged.
- All of the disadvantaged groups saw falls during the pandemic. In 2020/21, average attainment for pupils from low persistence disadvantaged backgrounds fell by 0.06 standard deviations, equivalent to around 2.4 months of learning. Results for pupils from persistently disadvantaged backgrounds fell by 0.04 standard deviations, equivalent to 1.6 months of learning.
- By 2022/23, average attainment for pupils from low persistence disadvantaged backgrounds was 0.10 standard deviations below pre-pandemic averages, equivalent to around 4 months of learning. Among the persistently disadvantaged group results had recovered very slightly – 0.03 standard deviations below pre-pandemic averages (equivalent to 1.2 months of learning).

Figure 16: Standardised score relative to pre-pandemic average in reading by level of disadvantage - secondary
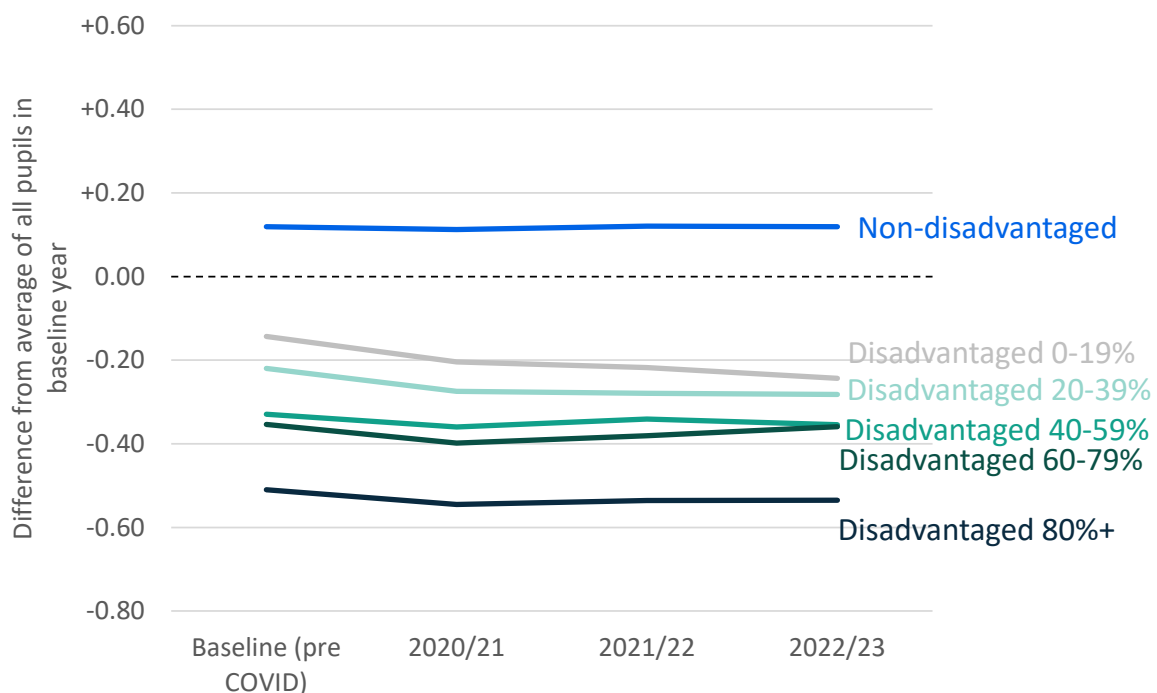
In primary mathematics, overall attainment has fallen in every group, but again, the degree to which it has fallen varies and is well below pre-pandemic averages

- Since the start of the pandemic, attainment in mathematics for primary aged pupils from non-disadvantaged backgrounds has decreased by 0.07 standard deviations. This is equivalent to lost learning of around 1.2 months.
- All of the disadvantaged groups saw falls during the pandemic. In 2020/21, average attainment for pupils from low persistence disadvantaged backgrounds fell by 0.29 standard deviations, equivalent to over 5 months of learning. Results for pupils from persistently disadvantaged backgrounds fell by 0.23 standard deviations, equivalent to just under 4 months of learning.
- By 2022/23 average attainment for pupils had seen some recovery but was still below pre-pandemic norms. Attainment for pupils from low persistence disadvantaged backgrounds was 0.17 standard deviations below pre-pandemic averages, equivalent to just under 3 months of learning. Attainment for pupils from persistently disadvantaged backgrounds was 0.12 standard deviations below pre-pandemic averages, equivalent to just over 2 months of learning.

Figure 17: Standardised score relative to pre-pandemic average in mathematics by level of disadvantage - primary
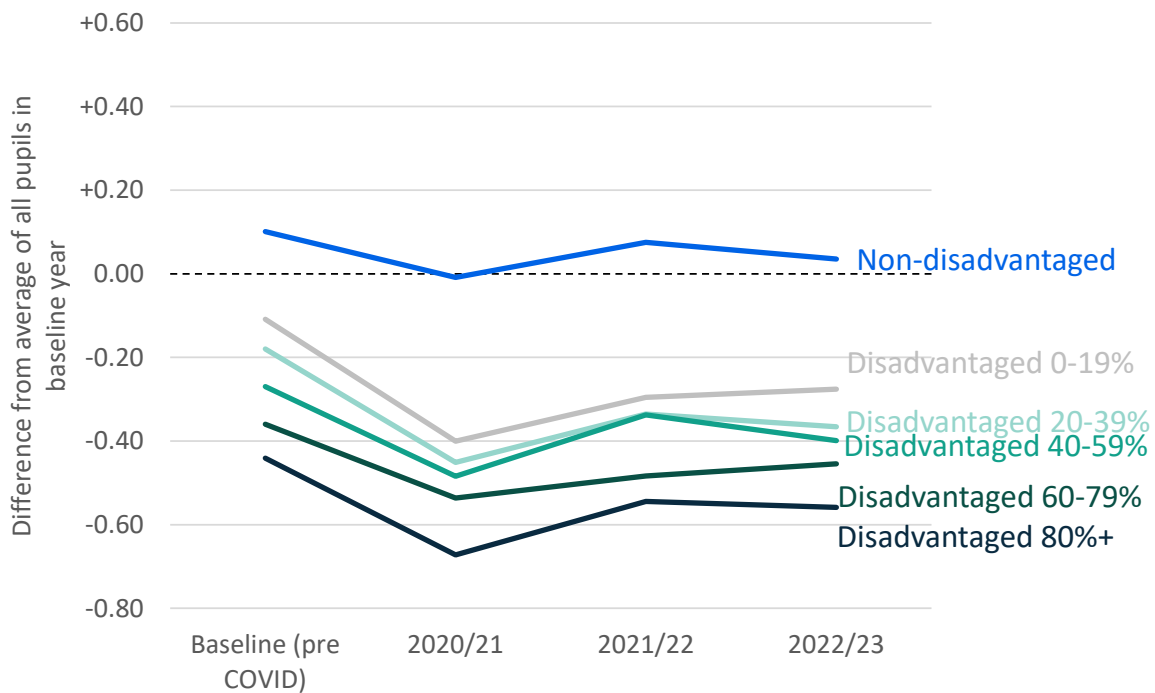
Using Star Assessments to measure the disadvantage gap

The Department for Education and the Education Policy Institute produce a measure of the disadvantage gap – the difference in attainment between pupils from disadvantaged backgrounds and their peers. Both are based on a "mean rank difference" approach where all pupils scores are ordered so every pupil is given a rank and then the mean rank of disadvantaged pupils is subtracted from the mean rank of non-disadvantaged pupils. The DfE measure is then scaled to run between - 10 and 10, while the EPI measure is typically presented in months of progress.

The advantage of using mean ranks over simply comparing average scores is that it means different phases of education can be compared directly, and the measure is more robust to changes in assessment.

Key Stage 2 measures of the disadvantage gap typically use outcomes in reading and mathematics and so it is possible for us to construct a similar measure using Star Assessments. We include pupils who have an assessment in Star Reading and in Star Maths at any point in the academic year (the two assessments must have been taken in the same term) and for all primary year groups – due to the smaller number of pupils we cannot construct robust measures for secondary pupils.

In Figure 18 we present a disadvantage gap measure for Star Reading and Star Maths in primary schools pre-, during, and post-pandemic. We put this on the same scale as the DfE disadvantage gap index.

It shows that:

- Prior to the pandemic, Star Assessments for primary aged pupils yielded a disadvantage gap measure of 2.47.[8] This is slightly lower than the DfE measure, though this is not unexpected as the Star Assessments data includes pupils in year 3 to year 6, not just pupils in year 6, and we know that the gap grows during a pupil's time in school (see for example, on the same chart, the measure for Key Stage 4 – typically aged 16).
- During the pandemic there were no key stage assessments, but it is clear from the Star Assessment data that the gap grew substantially to 3.15.
- In 2021/22, Star Assessment data suggests that the gap narrowed slightly to 3.10. This was the first year of key stage 2 assessments post the start of the pandemic, results from those assessments showed that the gap had widened since the start of the pandemic but could tell us nothing about the intervening years.
- In 2022/23, Star Assessment data suggest again a slight narrowing of the gap to 3.05 and the gap on key stage 2 assessments also narrowed slightly (from 3.23 to 3.20).

Overall, Star Assessment data appears to provide a good measure of the changing disadvantage gap at the end of key stage 2. Note however that Star Assessments implied a widening of the gap of around a quarter rather than the 10 per cent seen in the official measure. This may be partly

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[8] Note that data from 2017/18 to 2019/20 has been pooled together in this analysis and this is why we show the same result in each year. It should not be interpreted as meaning that no progress in closing the gap was being made, though this is implied by the DfE data.

explained by differential changes for younger pupils (for example, EPI estimate that the gap for pupils aged 5 increased by 14 per cent between 2019 and 2022).

Figure 18: the disadvantage gap index using the Department for Education's measure for key stage 2 and key stage 4 and Star Assessments for primary aged pupils.
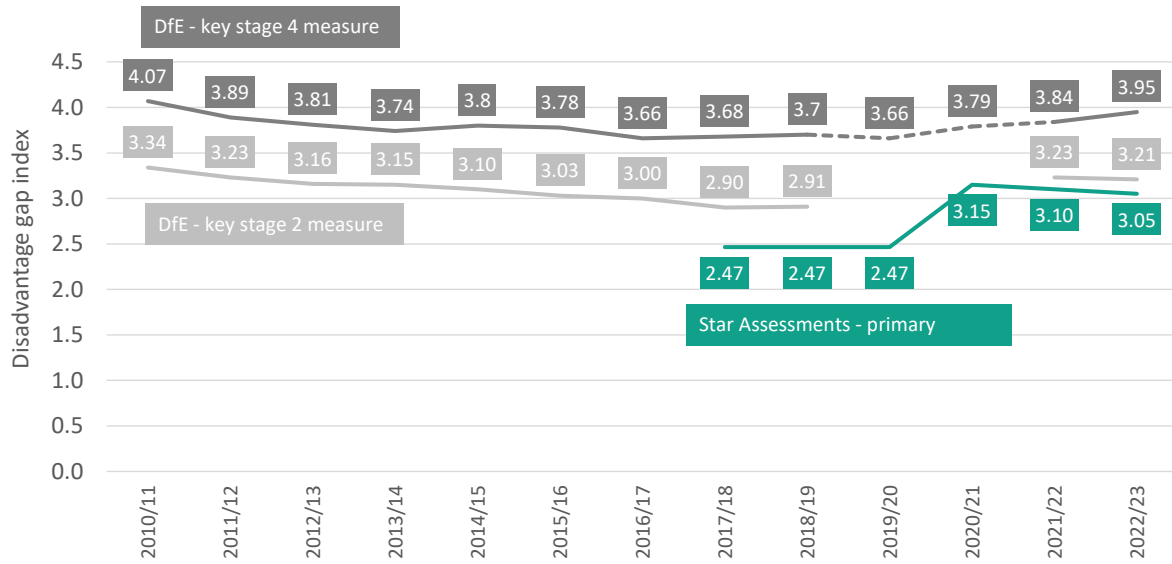
Annex – tables of results

Figure A.1 Standardised scores by phase, subject, year, and disadvantaged status

			Baseline (pre COVID)	2020/21	2021/22	2022/23
Primary						
Reading	Non-disadvantaged	Number of pupils	718,267	490,028	566,995	606,487
		Mean score	+0.11	+0.11	+0.16	+0.16
		Standard deviation	0.965	0.979	0.986	0.995
	Disadvantaged	Number of pupils	263,915	179,982	217,057	229,984
		Mean score	-0.34	-0.40	-0.36	-0.37
		Standard deviation	1.013	1.037	1.061	1.076
Mathematics	Non-disadvantaged	Number of pupils	66,891	50,160	67,228	76,984
		Mean score	+0.10	-0.01	+0.08	+0.03
		Standard deviation	0.961	0.975	0.965	0.992
	Disadvantaged	Number of pupils	24,404	18,917	27,391	31,476
		Mean score	-0.30	-0.55	-0.45	-0.48
		Standard deviation	1.034	1.031	1.048	1.064
Secondary						
Reading	Non-disadvantaged	Number of pupils	634,560	293,177	415,295	426,111
		Mean score	+0.12	+0.11	+0.12	+0.12
		Standard deviation	0.956	0.982	0.989	1.005
	Disadvantaged	Number of pupils	226,487	097,526	142,753	145,242
		Mean score	-0.35	-0.40	-0.40	-0.41
		Standard deviation	1.034	1.068	1.076	1.095
Mathematics	Non-disadvantaged	Number of pupils	14,231	08,297	09,832	11,996
		Mean score	+0.17	+0.13	+0.01	+0.01
		Standard deviation	0.935	0.986	1.067	1.040
	Disadvantaged	Number of pupils	05,739	02,814	03,849	05,485
		Mean score	-0.42	-0.59	-0.61	-0.52
		Standard deviation	1.014	1.124	1.095	1.086

Figure A.2 Standardised scores by phase, year, and degree of disadvantage – primary reading

		Baseline (pre COVID)	2020/21	2021/22	2022/23
Non-disadvantaged	Number of pupils	718,267	490,028	566,995	606,487
	Mean score	+0.11	+0.11	+0.16	+0.16
	Standard deviation	0.965	0.979	0.986	0.995
Disadvantaged 0-19%	Number of pupils	28,487	19,066	13,272	07,407
	Mean score	-0.16	-0.24	-0.19	-0.19
	Standard deviation	0.956	0.964	0.995	1.001
Disadvantaged 20-39%	Number of pupils	56,789	33,703	34,330	22,979
	Mean score	-0.22	-0.32	-0.24	-0.23
	Standard deviation	0.980	1.010	1.007	1.024
Disadvantaged 40-59%	Number of pupils	48,112	30,517	41,170	41,957
	Mean score	-0.30	-0.35	-0.30	-0.29
	Standard deviation	1.001	1.021	1.044	1.048
Disadvantaged 60-79%	Number of pupils	42,526	27,776	35,275	47,513
	Mean score	-0.37	-0.40	-0.36	-0.35
	Standard deviation	1.001	1.038	1.061	1.067
Disadvantaged 80%+	Number of pupils	88,001	68,920	93,010	110,128
	Mean score	-0.47	-0.51	-0.46	-0.45
	Standard deviation	1.043	1.065	1.085	1.099

Figure A.3 Standardised scores by phase, year, and degree of disadvantage – primary mathematics

		Baseline (pre COVID)	2020/21	2021/22	2022/23
Non-disadvantaged	Number of pupils	66,891	50,160	67,228	76,984
	Mean score	+0.10	-0.01	+0.08	+0.03
	Standard deviation	0.961	0.975	0.965	0.992
Disadvantaged 0-19%	Number of pupils	3,233	2,134	1,669	1,046
	Mean score	-0.11	-0.40	-0.30	-0.28
	Standard deviation	0.948	0.987	0.992	1.047
Disadvantaged 20-39%	Number of pupils	5,576	3,426	4,284	3,098
	Mean score	-0.18	-0.45	-0.34	-0.37
	Standard deviation	1.012	1.008	1.021	1.019
Disadvantaged 40-59%	Number of pupils	4,156	3,053	4,794	5,614
	Mean score	-0.27	-0.48	-0.34	-0.40
	Standard deviation	1.033	1.013	1.027	1.056
Disadvantaged 60-79%	Number of pupils	3,722	2,906	4,435	6,536
	Mean score	-0.36	-0.54	-0.48	-0.45
	Standard deviation	1.056	1.018	1.054	1.061
Disadvantaged 80%+	Number of pupils	7,717	7,398	12,209	15,182
	Mean score	-0.44	-0.67	-0.54	-0.56
	Standard deviation	1.050	1.053	1.060	1.071

Figure A.4 Standardised scores by phase, year, and degree of disadvantage – secondary reading

		Baseline (pre COVID)	2020/21	2021/22	2022/23
Non-disadvantaged	Number of pupils	634,560	293,177	415,295	426,111
	Mean score	+0.12	+0.11	+0.12	+0.12
	Standard deviation	0.956	0.982	0.989	1.005
Disadvantaged 0-19%	Number of pupils	21,246	10,174	10,286	06,842
	Mean score	-0.14	-0.20	-0.22	-0.24
	Standard deviation	0.966	0.992	1.025	1.047
Disadvantaged 20-39%	Number of pupils	54,511	22,034	32,853	28,209
	Mean score	-0.22	-0.27	-0.28	-0.28
	Standard deviation	0.989	1.028	1.033	1.042
Disadvantaged 40-59%	Number of pupils	29,484	11,884	16,075	15,918
	Mean score	-0.33	-0.36	-0.34	-0.35
	Standard deviation	1.026	1.066	1.057	1.086
Disadvantaged 60-79%	Number of pupils	43,396	16,788	29,012	34,403
	Mean score	-0.35	-0.40	-0.38	-0.36
	Standard deviation	1.010	1.055	1.056	1.073
Disadvantaged 80%+	Number of pupils	77,850	36,646	54,527	59,870
	Mean score	-0.51	-0.55	-0.54	-0.54
	Standard deviation	1.074	1.098	1.111	1.125