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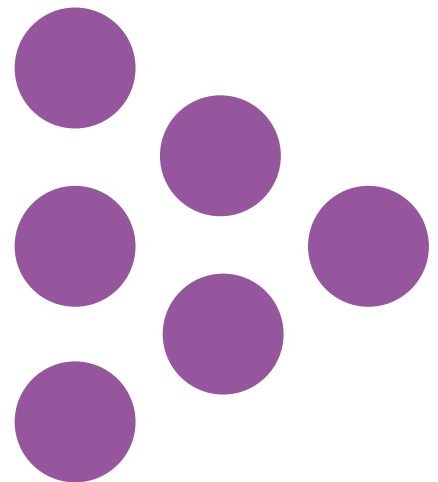## National Foundation for Educational Research

Report

National Reference Test 2021: Factors Affecting Attainment

Research into student and school level characteristics associated with changes in performance during Covid-19 disruption

National Foundation for Educational Research (NFER)

National Reference Test 2021: Factors Affecting Attainment

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Minor changes have been made to *National Reference Test 2021: Factors Affecting Attainment* report due to some updated analyses. The overall conclusions have not changed.

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Executive Summary

Since 2017, the National Reference Test (NRT) has been reporting annually on the percentage of eligible year 11 students achieving at an ability level equivalent to three key GCSE grade boundaries in English and mathematics. The NRT is therefore uniquely placed, as an independent measure of attainment at Key Stage 4 with outcomes not impacted by GCSE grading decisions, to contribute to the evidence on the impact of disruption due to the Covid-19 pandemic. The 2020 NRT administration was largely unaffected by the pandemic, as the testing window ended before schools were closed to the majority of students for the first national lockdown, and the same test instruments were used in 2020 and 2021. We can assume, therefore, that the outcomes on the NRT up to, and including, 2020 provide a relatively precise and stable measure of performance of the population over time. This allowed us to identify if there were significant changes in performance between 2020 and 2021, which could be attributed to the disruption to education due to the pandemic.

There was, as we might have anticipated given the disruption to education in the preceding year, an overall drop in performance on mathematics in 2021. For English, perhaps more surprisingly, performance was very similar between 2020 and 2021.

The NRT went ahead in 2021 to provide evidence of the impact of the pandemic on student outcomes and did so by comparing the 2021 results with those from the 2020 NRT. Some limitations must be borne in mind relating to the administration of the NRT in 2021. First, the NRT took place approximately two months later than would usually be the case due to the closure of schools during the spring term of 2021. Further, the achieved sample size was smaller compared with previous years. However, statistical analysis indicates that the sample achieved was still representative of key stratifiers (e.g., historical school performance). There is also no evidence to suggest that schools which were unable to administer the test due to the pandemic were systematically different from those which took part.

The NRT returned to its more usual administration window in the second half of the spring term in 2022. Performance in mathematics appeared to recover slightly but was still significantly below 2020 levels. Performance in English appeared to have declined slightly but this was not statistically significant. This paper focuses on the comparison of performance in 2020 and 2021 as the two administrations of the NRT either side of the main disruption in learning due to the pandemic.

In the first instance, the research looked at whether the gaps in performance between students and schools, based on a range of demographic and attainment variables, had changed significantly between 2020 and 2021. For example, the gap between advantaged and disadvantaged students was compared to see if the relationship had changed. The variables were all then included in a series of logistic regression models to predict the likelihood of attainment at or above the three key grade boundaries[1] in the NRT. Interaction terms were included in the regression models to

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[1] The NRT provides information about performance at the grade 4 boundary (the minimum score needed to achieve a grade 4 rather than a grade 3), the grade 5 boundary (the minimum score needed to achieve a grade 5 rather than a grade 4) and the grade 7 boundary (the minimum score needed to achieve a grade 7 rather than a grade 6).

establish whether the relationship between those variables and student performance had changed between 2020 and 2021 once other factors were taken account of.

It is reasonable to hypothesise that specific groups of students and schools may have been more adversely impacted by the disruption attributed to the Covid-19 pandemic, resulting in worse performance on the NRT in 2021 compared with other groups. Two key themes explored as part of this research were: socio-economic factors and prior performance. Additionally, the analysis included a range of other demographic factors at both student-level and school-level that could potentially play a role in explaining how the impact of disruption due to the pandemic may vary across the population. The findings are presented below.

Socio-economic factors

For both English and mathematics, there was no significant change in the relationship between the socio-economic status of the student, as measured by ever having been eligible for free school meals or current free school meal status, and performance on the NRT between 2020 and 2021. There was one significant change when socio-economic status was measured using scores on the Income Deprivation Affecting Children Index (IDACI): the gap between students in the highest and lowest quintiles for IDACI in the likelihood of achieving grade 5 or above in mathematics increased.

There was a statistically significant impact related to being in a school with greater levels of deprivation. For mathematics, students in schools with higher proportions of students eligible for free school meals experienced a greater decline in performance at grades 5 and 7.

Prior attainment and historical performance

School historical performance, in terms of GCSE outcomes in 2019, and student prior attainment, in terms of performance in national curriculum tests at the end of Key Stage 2, were included in the model to test the hypothesis that high performing schools or students may have coped better with the disruption caused by the pandemic. There was no evidence that this was the case: the relationships between NRT performance and previous school and student performance did not change significantly across the two years.

Student characteristics

A range of additional student-level and school-level characteristics were also included in the analysis as potential indicators of differential impacts of the pandemic. Students with English as an additional language (EAL) saw a statistically significantly greater decline in performance in mathematics than students with English as a first language. This decline appears to have had a greater impact at the higher end of the ability scale: the likelihood of meeting the threshold for grade 7 in the NRT in 2021 was reduced for students with EAL relative to those without, compared to the difference in likelihood between those groups in 2020. This finding was not replicated in English.

The relationships between gender, ethnicity and students with special educational needs and disabilities (SEND), and performance on the NRT were not found to have changed significantly between the two years. This result was arguably surprising for SEND, given it might have been expected that students with SEND would have been more likely to be adversely affected by school closures.

School characteristics

A range of additional school-level characteristics were also included in the analysis as potential indicators of differential impacts of the pandemic. The type of school (for example, academies, free schools and Local Authority maintained schools), being defined as urban versus rural, and school size were not significant predictors of performance on the NRT, and nor did the relationship between these variables and performance change significantly across the years. It should be noted that the data used in this study does not enable us to compare the effect of the pandemic between independent schools and state schools, given the very small numbers of independent schools taking part in the NRT in 2020 (and none taking part in 2021).

Regional differences

The pattern of changes in performance across different regions of England is difficult to unpick, particularly as confidence intervals are quite wide once the sample is broken down into the nine regional groups. There is evidence however, to suggest that the proportion of students achieving grade 4 and above in mathematics in the NRT dropped significantly more in the North West compared to the reference region of the East Midlands.

Student absence rates

Data on average rates of absence in the autumn term prior to taking the NRT was obtained for each school, with the intention that for the 2021 sample, this may be useful as a proxy for the level of Covid-19 disruption encountered during the autumn term of 2020. This was a time when schools were open but suffering varied levels of disruption due to Covid-19 cases and student 'bubbles' being required to isolate.

Although for both years, without taking into account other factors, students in schools with greater rates of absence were less likely to achieve each of the three grades in the NRT in either subject, once other factors were accounted for in the model this relationship was only statistically significant for the grade 4 boundary in English (and not at all for mathematics). The relationship at grade 4 in English then significantly weakened in 2021. This could be due to the fact that the nature of student absence changed in 2021, with a large proportion of absences due to Covid-19, rather than other school-level factors related to absence which have a greater impact on student performance. School-level absence did not have a significant impact on the likelihood of achieving any of the grades in mathematics, and nor did the relationship appear to have changed significantly in 2021.

1   Background

The NRT is uniquely placed, as an independent measure of attainment at Key Stage 4 with outcomes not impacted by GCSE grading decisions, to contribute to evidence on the impact of disruption to education due to the Covid-19 pandemic. As an independent measure of performance of a nationally representative sample at GCSE level, the NRT outcomes in 2021 have the potential to provide useful insights.

The NRT was designed to routinely report outcomes each year in terms of the proportions of students achieving at or above three key GCSE grades, defined as being equivalent to the ability required to achieve those grades in 2017 (the baseline year). The 2020 NRT administration was largely unaffected by the pandemic, as the testing window ended before schools were closed to the majority of students for the first national lockdown. We can assume, therefore, that the outcomes up to, and including, 2020 for the NRT provide a relatively precise and stable measure of performance of the population over time. This allows us to identify if there were significant changes in performance between 2020 and 2021, which could be attributable to the impact of the pandemic. The eight test booklets that make up the NRT had the same content each year up until 2021 which means that direct comparisons between the performances of the two representative samples are possible.

We might have expected that the performance of the 2021 sample would be lower than for the previous years given the possible loss of learning due to Covid-19 pandemic. While the term 'learning loss' has attracted some criticism for its negative focus, it has been commonly used in education research and policy literature over the last 18 months and a shared understanding has developed. We use it in this report to refer specifically to a reduction in the overall level of attainment that a student achieves, which is attributable to both direct and indirect impacts from the pandemic. This definition is consistent with that used by Ofqual in its review of literature on learning during the pandemic, published last year.

There was an overall drop in performance in mathematics in 2021 relative to 2020. For English, the outcomes were perhaps more surprising: performance was very similar, on average, in 2021 and 2020, with no significant differences at any of the three grade boundaries.

The purpose of this study was to identify factors affecting the impact of the disruption due to Covid-19 by comparing performance in 2020 (the last pre-Covid-19 assessment for the NRT) with that in 2021. When interpreting the findings of this research, it is important to consider the performance of the NRT 2021 cohort in light of the disruption they experienced as a result of the Covid-19 pandemic during the two years they were studying for their GCSEs. Figure 1 below provides a timeline of key events from September 2019 to the administration of the NRT in April/May 2021.

Figure 1   Timeline of key events impacting the NRT 2021 cohort during Covid-19 pandemic

- **September 2019**: Academic year begins as normal

- **February 2020**: NRT 2020 administration

- **March 2020**: First lockdown – school buildings shut to most students

- **June 2020**: Partial reopening of schools – some students return (including Year 10)

- **September 2020**: School buildings reopen to all students

- **January 2021**: Second lockdown – school buildings shut to most students

- **March 2021**: School buildings reopen to most students

- **April/May 2021**: NRT 2021 administration

As shown in Figure 1 for the NRT 2021 cohort, both years of Key Stage 4 have been defined by high levels of disruption, including long periods of physical school closures during the two national lockdowns, as well as periods where Covid-19 cases in 'bubbles' or schools may have resulted in additional periods of time away from the classroom. However, it should be recognised that from the start of the Covid-19 pandemic, this cohort had extended periods of time in school participating in face-to-face lessons. As an 'exam' year they were one of the priority year groups to return to school at the end of the first national lockdown in June 2020. Although this meant that these students may have had an additional six weeks of face-to-face teaching compared with other year groups, provision of lessons and student attendance may not have been consistent across the cohort. The 2020/21 academic year began relatively normally with all students returning to school at the start of the autumn 2020 term. This normality was short-lived in some regions however, with many students experiencing further disruption during this period with 'bubble' and year group closures as well as time away from schools for self-isolation due to high Covid-19 rates. The second national lockdown, which began in January 2021, saw most students experiencing another long period of remote learning and, for the NRT 2021 cohort, the announcement that formal GCSE examinations would not take place that summer. The vast majority of students returned to school in March 2021 and therefore, the NRT students spent four weeks participating in face-to-face lessons before the NRT 2021 was administered. However, the cancellation of formal GCSE exams may have meant that these students were working in a different way or completing different sorts of assignments (for example, internal assessments) in the weeks preceding the NRT administration. In some respects, these students may, therefore, have been more 'test ready' compared with the students who participated in the NRT in 2020; however, they may also have been less motivated as they were not preparing for formal examinations, which would normally have been the case. This, as well as the two-month delay to the administration of the NRT 2021, may have impacted student performance.

It is not possible to say definitively how students' learning experiences during this period may help to explain the findings from this additional analysis. However, Ofqual has undertaken further analysis of the contextual information collected from schools and students during the administration of the NRT. The findings from Ofqual's analysis may provide some useful context in the interpretation of the findings from this study.

> **Interpreting the data**
>
> The following points should be borne in mind when comparing student performance on the NRT in 2020 and 2021 and interpreting how these differences reflect Covid-19 disruption:
>
> The administration of the NRT in 2021 took place approximately two months later than would usually be the case, due to the closure of schools to most students in the spring term of 2021.
>
> The administration period was relatively soon after the return to school for most students, so some students may still have been adjusting to being back in school.
>
> GCSE examinations had been cancelled prior to the administration of the NRT in 2021; this was not the case for the 2020 administration, even though they were later cancelled. This may have impacted on student motivation.

2   Research questions

The purpose of this study is to investigate which student-level and school-level factors are related to any changes in performance on the NRT between 2020 and 2021. When the study was conceived, it was anticipated that performance may have dropped in both subjects. Although this is not the case in terms of the overall outcomes, investigation of the English data is still just as important as that of the mathematics data to understand if performance shifts have occurred for some groups of students relative to others.

To test the hypothesis that performance on the NRT in 2021 was impacted differentially for *students* with different characteristics, the following variables were included in the analysis:

- socio-economic status measured by:
    - current free school meal eligibility status (FSM)
    - eligibility for free school meals ever (FSM-Ever)
    - IDACI quintile by pupil postcode
- prior attainment (based on KS2 performance)[2]
- gender
- English as an additional language (EAL) (derived from language group)
- ethnicity (based on major ethnic group)
- special educational needs and disability (SEND).

To test the hypothesis that performance on the NRT in 2021 was impacted differentially for students at *schools* with different characteristics, over and above the effects related to student characteristics themselves, the following school-level variables were included in the analysis:

- proportion of students eligible for free school meals
- historical GCSE performance in English language and mathematics
- urban or rural
- school size
- school type (academies, free schools, Local Authority maintained and independents)
- geographical region
- student absence rate during the autumn term prior to taking the NRT.

In summary, there are two linked research questions covered within this study:

1. Which student-level factors are associated with changes in performance between 2020 and 2021?

2. Which school-level factors are associated with changes in performance between 2020 and 2021?

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[2] The 2021 NRT cohort took KS2 National Curriculum Tests in 2016, which was the first year of the tests of the new National Curriculum. Prior attainment is therefore not directly comparable across 2020 and 2021. Quintiles of performance were therefore used for this analysis.

3   Data and methodology

3.1   Data

The achieved sample sizes for the NRT (the sample available for this study), are shown in Table 1. Fewer schools took part in the NRT in 2021 than in other years following the postponement of the administration period to the summer term.

Table 1   School and student achieved samples NRT 2020 and 2021

Achieved samples	2020	2021
English achieved sample: Number of Schools	332	214
English achieved sample: Number of Students	6,639	4,030
Mathematics achieved sample: Number of Schools	333	216
Mathematics achieved sample: Number of Students	6,756	4,143

A bias analysis was carried out at school level to check that the reduced sample was still representative in terms of the stratifier used to select the NRT school sample: GCSE performance at school level in 2019. A number of other school-level factors which could have affected performance due to the impact of the pandemic were also investigated. Therefore, the sample has been broken down further by the proportion of students eligible for free school meals (FSM), geographical region and absence rates in the autumn term prior to the NRT taking place. While the data shows that the NRT samples do not perfectly represent schools in terms of the proportion of students with FSM and geographical region, it does indicate that there has not been a major change compared with 2020. Analysis of the absence rates during the autumn term 2020 found that there were no significant differences in the absence rates during this term between those schools that participated in NRT 2021 and those schools which were invited but were unable to participate due to the pandemic. Therefore, the evidence suggests that despite the smaller sample size, comparing performance in 2020 and 2021 can still be considered valid. However, when interpreting the findings of this study, it should be borne in mind that there is no direct measure available of how individual schools coped with the impact of the pandemic, and therefore we cannot rule out the possibility that the schools that struggled more with the impact may have been less likely to participate in the NRT.

The student-level variables used in the study are available in the National Pupil Database (NPD). Ofqual matched NRT sample data for both 2020 and 2021 to the data from the NPD and provided matched files back to NFER for the purpose of this project. Gender information is collected operationally as part of the NRT, and this data was therefore already directly available.

Aside from student absence rate, the school-level variables listed in Section 2 are publicly available data published as the result of the annual school census, which was then matched to the NRT sample schools. School attainment data was average GCSE points score for English and mathematics at school-level, as provided by Ofqual each year for sample selection for the NRT in the following year. School-level absence data was provided by Ofqual. For each school participating in 2020 or 2021, an absence rate was provided for the autumn term in 2019 or 2020 respectively, calculated by averaging the absence rates for all students in the school at GCSE target age.

Several variables had some missing values. Overall, the percentages of missing data for the English 2020, English 2021, mathematics 2020, and mathematics 2021 datasets were 3.31, 3.44, 3.45, and 3.50, respectively. Where data was missing, multivariate imputation by chained equations was used to generate ten datasets with imputed variables using the R-package known as *mice* (van Buuren and Groothuis-Oudshoorn, 2011). For each iteration of multiple imputation with chained equations, each specified variable was imputed using a model that took into account the other variables in the dataset. Appendix A contains further details of all the student- and school-level variables included in the analysis, including the levels of missing data for each variable.

3.2   Methodology

The NRT is a type of matrix sampling assessment. This means that the students selected in the sample do not all take the same test paper: each student takes one of eight test booklets, which have overlapping content. The purpose of this is to allow a broader range of the curriculum content to be assessed. Since students do not take the same test, raw total scores on the test booklets are not necessarily appropriate for comparison as the test booklets are likely to differ slightly in terms of difficulty. An approach called Item Response Theory (IRT) is used to enable all students and test questions to be calibrated onto the same ability scale derived from student responses to test questions in the booklet that they take. Because the approach creates one scale, the performance of samples of students can then be directly compared. This same technique is used to link the NRT from one year to the next, even if not all of the test content is the same, meaning students who took the NRT in different years can be directly compared based on the same ability scale.

In this kind of assessment, the primary goal is to produce valid and reliable estimates of the performance of the population; individual measurement of students is not the focus. For this reason, rather than each student being awarded a single mark or grade, plausible values are generated. Plausible values are random draws from the probability distribution around the estimate of the student's ability. They are designed to encapsulate the measurement error associated with the fact that performance on a test is not perfectly reliable and that each student takes a sample of the assessment content. In the NRT, ten plausible values (estimates of ability) are generated for each student. Specialist methodology must be used to ensure that the plausible values are treated appropriately in any subsequent analysis. Each analysis is repeated ten times - once for each plausible value involved - and then combined following specific rules. Applying these rules results in valid regression estimates and valid associated confidence levels around those estimates when the ten results are combined as a whole.

Since the NRT is taken by a sample of schools and students rather than the whole population, sampling error must also be estimated. A two-step procedure is used for sampling whereby

schools are first selected and then students are selected from those schools in a complex procedure. Analyses need to be executed with the help of the balanced repeated replication (BRR) weighting method. Briefly, this method entails splitting the achieved sample into groups of similar schools, taking many subsamples from each of these groups and then combining the results.

The estimates of measuring and sampling error are used to determine accurate confidence intervals around the NRT outcomes, which will be broader than would be the case if a test score were treated as a perfect measure.

For both subjects, three logistic regression models were run to estimate the relationship between each student- and school-level variable and the likelihood of achieving at or above a level of ability equivalent to grades 4, 5 and 7 at GCSE. For all of the regression models, each student-level and school-level variable was entered into the model as a main effect. For the main models presented in this study, ever having been eligible for free school meals and the proportion of students in the school eligible for free school meals were included in the model. IDACI measures were also collected for this study but were not included in the same model, given their strong relationship with FSM eligibility. Separate models were run with IDACI included in place of FSM status to check what impact this would have. These are not reported in full in the paper, but reference will be made to them as appropriate throughout discussion of the results. FSM-Ever was used in place of current FSM status as a more stable indicator of deprivation than status at a particular point in time.

Interaction terms were included to investigate the interaction between the year of the study (2020 or 2021) and the relevant student-level or school-level variable. The statistical significance of the interaction terms with year were the main focus of this study: these would reveal whether there has been a change in the relationship between a particular variable and performance on the NRT between 2020 and 2021, once all other factors were taken into account. For example, if the interaction term between year and FSM-Ever was significant then this would indicate that the disadvantage gap based on FSM-Ever status changed between 2020 and 2021.

Several tests of statistical significance are reported here, both for individual comparisons between groups and for each coefficient in the regression outputs. When reporting the main outcomes of the NRT, a Bonferroni adjustment is made to adjust for the fact that, when making multiple statistical comparisons, some results may be statistically significant purely due to chance. A statistically significant finding at the 5% level of significance, by definition, means that we would expect 5% of comparisons to be significant purely by chance. This is referred to as *type 1 error* and means that there is a greater risk of incorrectly considering a finding to be statistically significant. The purpose of the outcomes of the NRT are sufficiently important that it is considered crucial to guard against type 1 errors. However, this study is based on an exploratory analysis of patterns in performance among sub-groups and, for this reason, it is less important to prevent the type 1 error rate being inflated. It is important to bear in mind in interpreting results that such an adjustment has not been made.

4   Results

The results are presented in six sub-sections, each exploring the data in relation to a different theme:

- socio-economic factors, at both student-level and school-level
- prior attainment, at both student-level and school-level
- student characteristics
- school characteristics
- geographical region
- absence rates at school-level.

Each sub-section includes charts showing the proportion of students performing on the NRT at a level equivalent to grades 4, 5 and 7 and above at GCSE, broken down by each of the relevant variables. Tables of the statistics are also provided, including the gap between groups of students (for example, boys and girls) and the change in that gap from 2020 to 2021. All statistics are provided with 95% confidence intervals estimated as described in Section 3.2, designed to encapsulate both sampling and measurement error.

After the comparison of each individual variable, the regression outputs are provided for the variables relevant to that sub-section. Note, however, that although all variables from all the themes were put into the regression models together, they are presented separately for clarity.

4.1   Socio-economic factors

Results for both subjects were broken down by three variables indicating socio-economic status at student level: eligibility for free school meals (FSM) at the time of data collection, ever having been eligible for FSM (FSM-Ever), and IDACI index split into quintiles. At school-level, the percentage of students in the school eligible for free school meals was used.

It is worth noting that the proportion of students eligible for free school meals increased nationally between 2020 and 2021, largely precipitated by the Covid-19 pandemic and an arrangement related to the roll-out of Universal Credit (Julius and Ghosh, 2022). This increase was also reflected in the NRT samples, with the proportion of pupils eligible for FSM increasing from 13 per cent to 17 per cent, and the proportion of pupils with FSM-Ever status increasing from 28 per cent to 33 per cent. The FSM eligibility of the students in the 2021 sample was compared against the eligibility of the same students in spring 2020, finding that approximately one per cent of the students in the 2021 sample became eligible for FSM for the first time between spring 2020 and spring 2021. These students may have different characteristics from students who had been eligible for FSM prior to the pandemic, but, since they also have different circumstances from students who continued to have never been eligible for FSM by spring 2021, there is no definitive case for placing them in either group. For all of the 2021 sample, the analysis was based on their FSM (and FSM-Ever) status in spring 2021. Additional analysis has been undertaken to confirm that the results reported in this paper would not have differed in terms of statistical significance if their FSM status in 2020 had been used instead.

4.1.1 English

Figures 2 to 4 show the percentage of students in the 2020 and 2021 samples estimated to have demonstrated a level of ability in English equivalent to achieving grade 4 and above, grade 5 and above or grade 7 and above at GCSE, broken down by student socio-economic status. The values are also provided in Table 2, along with estimates of the gaps between advantaged and disadvantaged students, the change in that gap between 2020 and 2021, and all associated confidence intervals.

In line with the overall NRT results for English, the charts illustrate that there was very little change in performance from 2020 to 2021.

Figure 2 shows that students eligible for free school meals (FSM) are less likely to achieve at or above each of the three grade points in both years. This gap in achievement has not changed significantly between the years, despite increasing slightly by 1.2 percentage points at grades 4 and 5 and above and 1.8 percentage points at grade 7 and above.

Figure 2   Proportion of students at each grade in the NRT each year by FSM - English
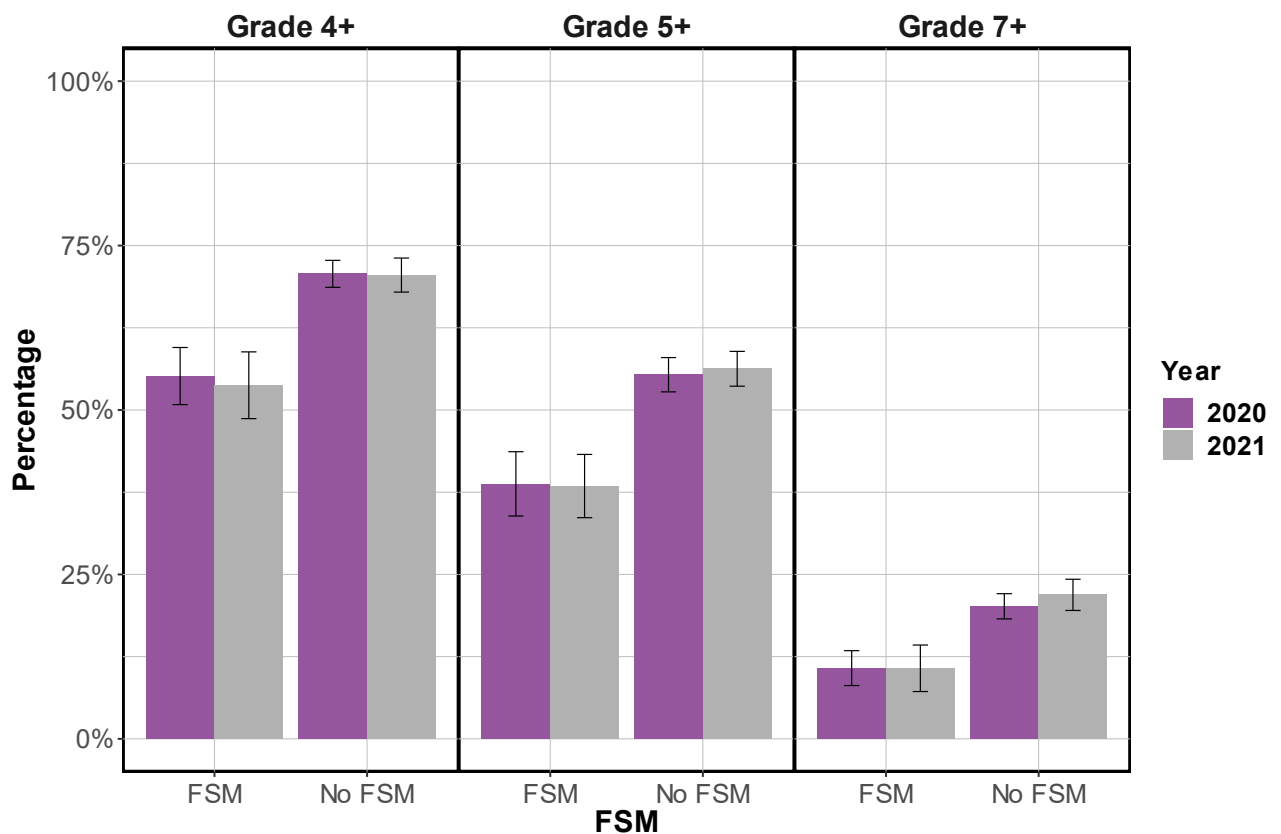
Figure 3 shows that there is still a visible disadvantage gap when comparing students who have ever been eligible for FSM (that is students categorised as FSM-Ever) against those who have *never* been eligible for FSM. The gap did not change significantly, however, between years despite appearing to reduce slightly at grades 4 and 5 and above and increase slightly at grade 7 and above.

Figure 3   Proportion of students at each grade in the NRT each year by FSM-Ever - English
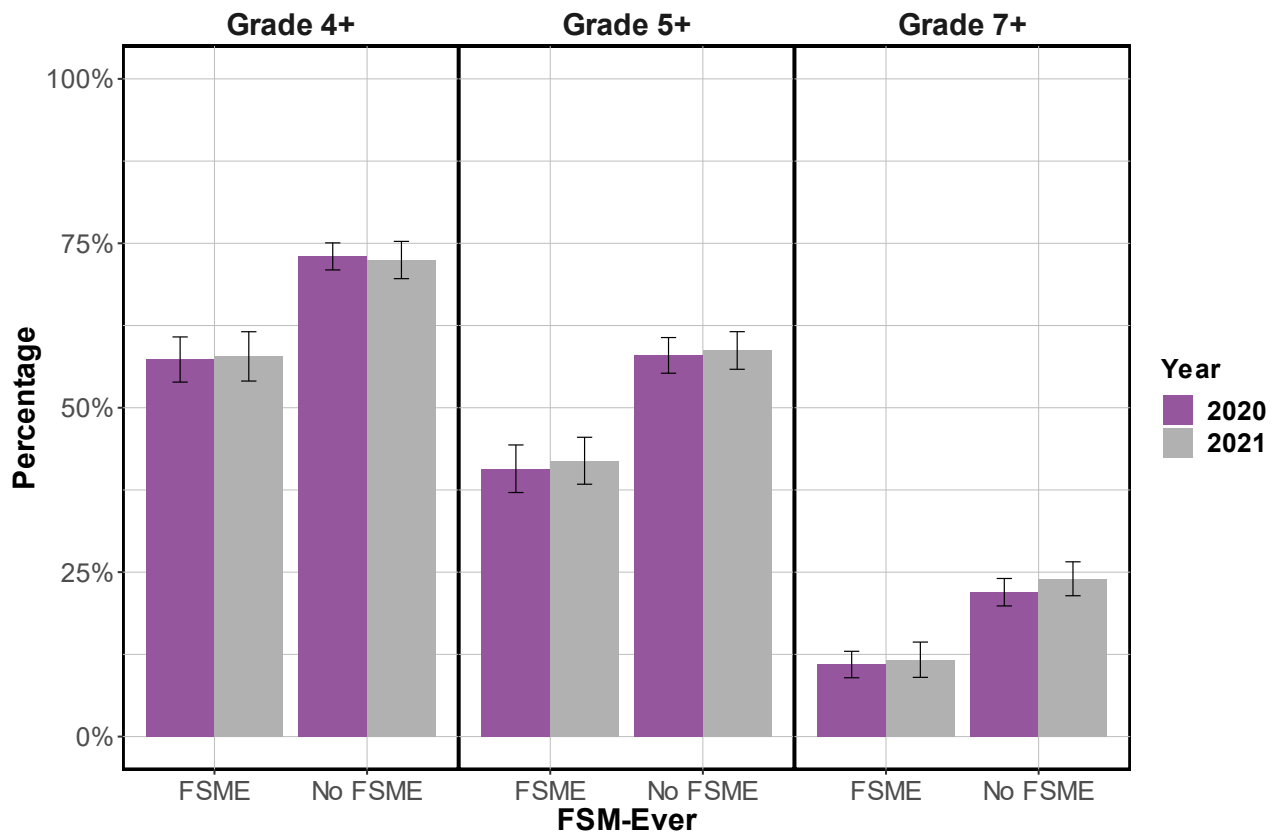
Students were grouped into five bands, or quintiles, on the basis of their scores on the IDACI index, with band 1 representing students with the lowest 20 per cent of IDACI scores and band 5 representing the 20 per cent of students with the highest scores. Figure 4 shows that, in both years, the likelihood of achieving each grade reduces with increased IDACI scores. Some small changes in this disadvantage gap are suggested in the plot – in the lowest two IDACI bands (i.e. students living in the least deprived areas), performance appears to have improved slightly in 2021 at grades 5 and 7 and above (and remained the same at grade 4 and above). The reverse is true for students in the highest three bands. Although the gap in attainment between the band with the lowest IDACI scores and the band with the highest increased by 1.1, 2.2 and 3.3 percentage points respectively from 2020 to 2021, these changes are not statistically significant.

Figure 4   Proportion of students at each grade in the NRT each year by IDACI quintile - English
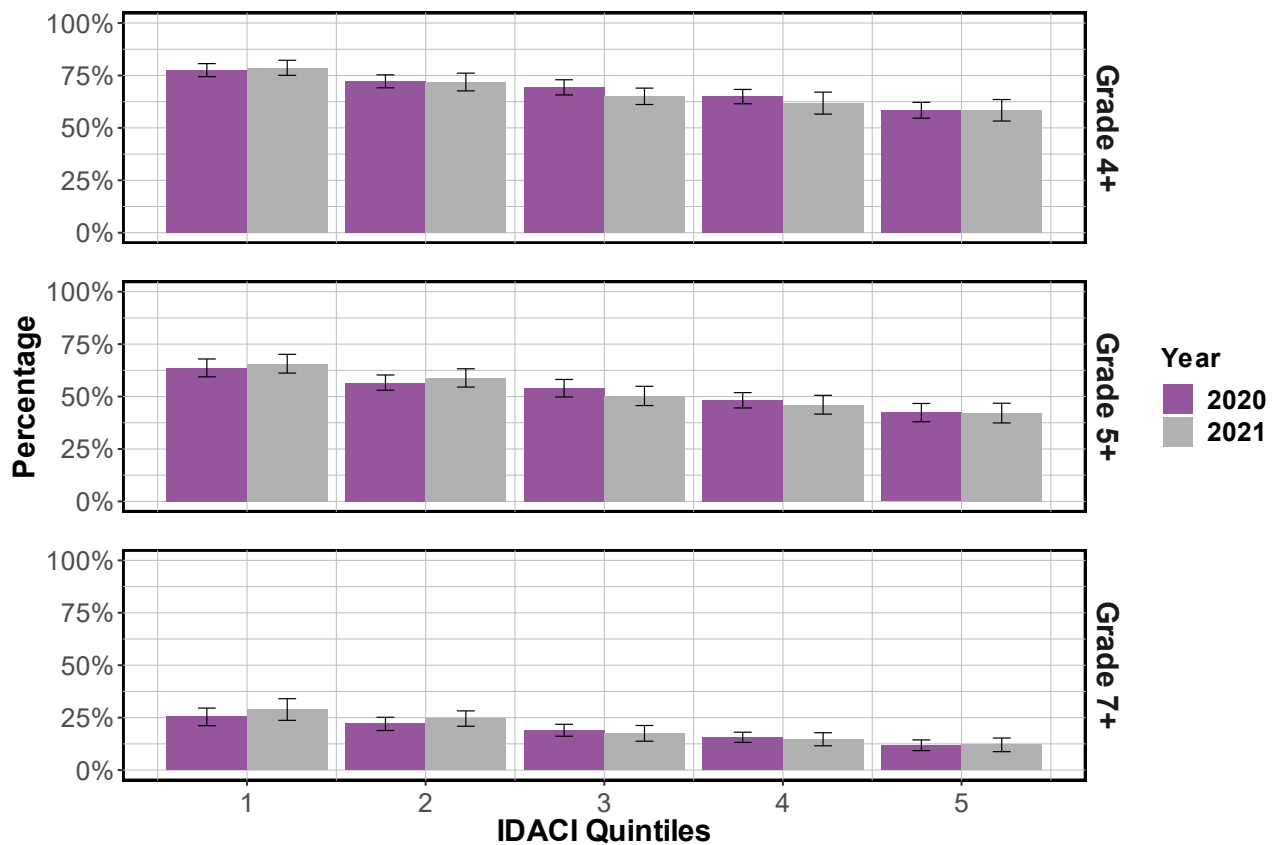
Table 2 **Proportion of students at each grade in the NRT each year by socio-economic status – English**

Socio-economic status	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
FSM eligibility No FSM	2020	70.7 (68.7 to 72.8)	55.4 (52.8 to 58.0)	20.2 (18.2 to 22.1)
FSM eligibility No FSM	2021	70.5 (67.9 to 73.1)	56.3 (53.6 to 58.9)	21.9 (19.5 to 24.3)
FSM eligibility FSM	2020	55.2 (50.8 to 59.5)	38.8 (33.9 to 43.7)	10.8 (8.1 to 13.4)
FSM eligibility FSM	2021	53.8 (48.7 to 58.8)	38.4 (33.6 to 43.2)	10.7 (7.2 to 14.3)
FSM gap (No FSM – FSM)	2020	15.5 (10.7 to 20.3)	16.6 (11.1 to 22.1)	9.4 (6.1 to 12.7)
FSM gap (No FSM – FSM)	2021	16.8 (11.1 to 22.4)	17.8 (12.3 to 23.3)	11.2 (6.9 to 15.4)
Change in FSM gap	Change	1.2 (-6.2 to 8.7)	1.2 (-6.6 to 9.0)	1.8 (-3.6 to 7.1)
FSM-Ever No FSME	2020	73.0 (71.0 to 75.1)	58.0 (55.2 to 60.7)	22.0 (19.9 to 24.0)
FSM-Ever No FSME	2021	72.5 (69.6 to 75.3)	58.7 (55.8 to 61.6)	24.0 (21.4 to 26.6)
FSM-Ever FSME	2020	57.3 (53.9 to 60.8)	40.7 (37.1 to 44.3)	11.0 (8.9 to 13.0)
FSM-Ever FSME	2021	57.8 (54.1 to 61.6)	41.9 (38.4 to 45.5)	11.7 (9.0 to 14.4)
FSME gap (No FSME – FSME)	2020	15.7 (11.7 to 19.7)	17.2 (12.7 to 21.8)	11.0 (8.1 to 13.9)
FSME gap (No FSME – FSME)	2021	14.7 (10.0 to 19.4)	16.8 (12.2 to 21.3)	12.3 (8.6 to 16.0)
Change in FSME gap	Change	-1.0 (-7.2 to 5.1)	-0.5 (-6.9 to 6.0)	1.3 (-3.4 to 6.0)

Socio-economic status	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
IDACI quintiles Band 1	2020	77.5 (74.4 to 80.6)	63.7 (59.4 to 67.9)	25.4 (21.2 to 29.6)
IDACI quintiles Band 1	2021	78.7 (75.1 to 82.2)	65.7 (61.2 to 70.1)	28.9 (23.7 to 34.0)
IDACI quintiles Band 2	2020	72.2 (69.1 to 75.3)	56.7 (53.0 to 60.3)	22.0 (18.9 to 25.2)
IDACI quintiles Band 2	2021	71.9 (67.7 to 76.1)	58.9 (54.5 to 63.3)	24.6 (20.9 to 28.2)
IDACI quintiles Band 3	2020	69.3 (65.7 to 73.0)	54.0 (49.8 to 58.2)	19.0 (16.1 to 21.8)
IDACI quintiles Band 3	2021	65.1 (61.1 to 69.0)	50.3 (45.7 to 54.9)	17.5 (13.8 to 21.3)
IDACI quintiles Band 4	2020	64.9 (61.5 to 68.3)	48.2 (44.6 to 51.9)	15.6 (13.2 to 18.1)
IDACI quintiles Band 4	2021	61.8 (56.6 to 67.0)	46.1 (41.6 to 50.6)	14.7 (11.6 to 17.8)
IDACI quintiles Band 5	2020	58.4 (54.6 to 62.2)	42.3 (38.0 to 46.7)	11.8 (9.3 to 14.4)
IDACI quintiles Band 5	2021	58.4 (53.3 to 63.5)	42.1 (37.4 to 46.8)	12.0 (8.8 to 15.3)
IDACI gap (Band 1 – Band 5)	2020	19.1 (14.2 to 24.0)	21.3 (15.2 to 27.4)	13.5 (8.6 to 18.4)
IDACI gap (Band 1 – Band 5)	2021	20.3 (14.0 to 26.5)	23.5 (17.1 to 30.0)	16.9 (10.8 to 23.0)
Change in IDACI gap	Change	1.1 (-6.8 to 9.1)	2.2 (-6.7 to 11.1)	3.3 (-4.5 to 11.2)

The socio-economic indicators discussed so far have been based on student-level data. Performance was also compared at school-level, based on the proportion of students in the school eligible for free school meals. The schools were grouped into quintiles with band 5 representing those with the highest proportion of students eligible for FSM, and band 1 representing those with the lowest. Figure 5 shows the percentage of students at schools in each of the five bands achieving grades 4, 5 and 7 and above in 2020 and 2021.

Figure 5   Proportion of students at each grade in the NRT each year by school level FSM quintile - English
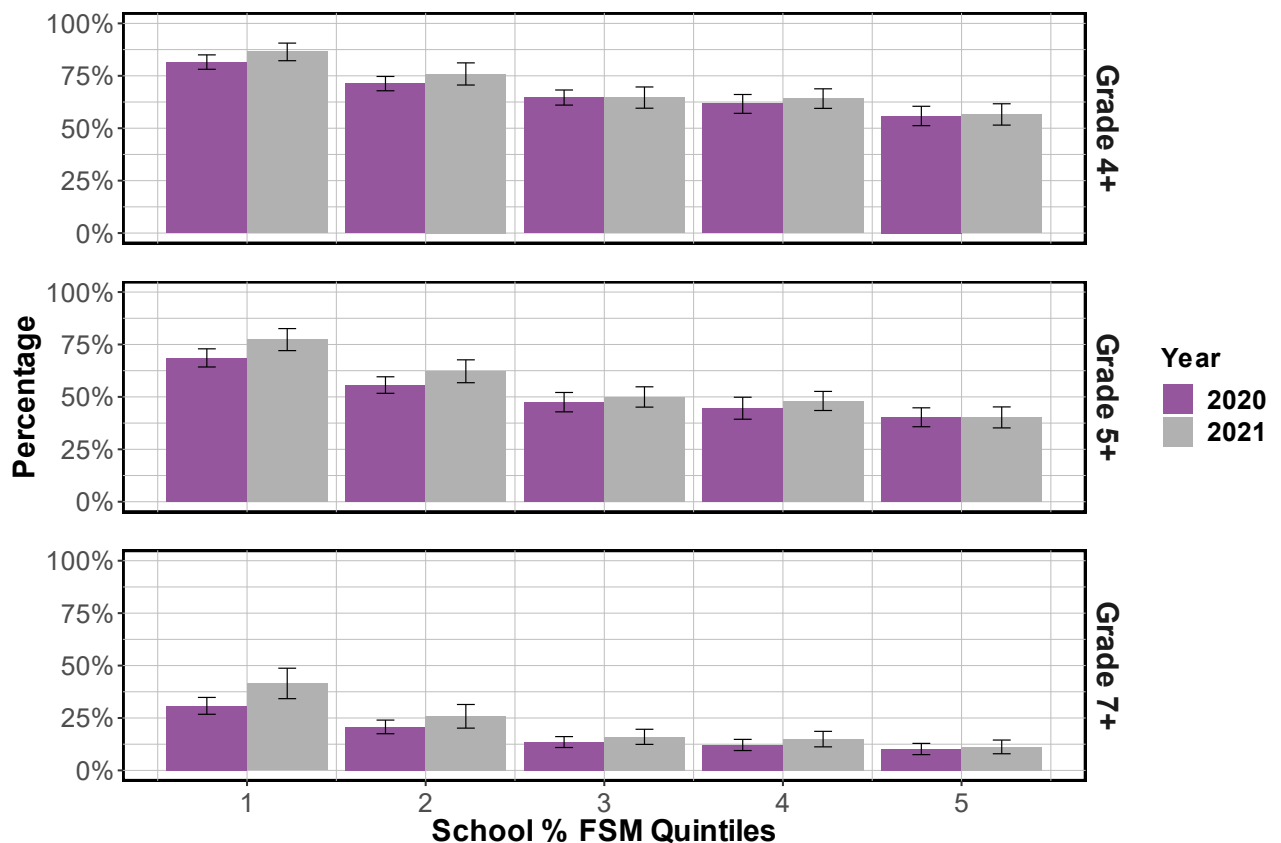
The gap in performance of students in schools with the highest and lowest levels of deprivation increased significantly at grade 7, but not at grades 4 and 5.

The chart suggests that performance improved from 2020 to 2021 for the lowest two FSM bands, while the picture was more mixed for schools with higher levels of FSM, with performance being more similar across the two years. The gap between the students in schools with the highest and lowest levels of deprivation appeared to have increased at the grade 4 and 5 boundaries but these were not statistically significant. Table 3 confirms, for grade 7, a statistically significant increase of 9.7 percentage points in the gap between bands 1 and 5. In 2020, 30.8 per cent of students in schools in band 1 achieved grade 7 or above, increasing to 41.5 per cent in 2021, while the percentage of students in band 5 achieving the same level increased minimally from 10.2 per cent to 11.2 per cent.

Table 3   Proportion of students at each grade in the NRT each year by school level FSM – English

Bands of school level FSM	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	81.5 (78.1 to 85.0)	68.6 (64.3 to 72.9)	30.8 (26.8 to 34.8)
Band 1	2021	86.4 (82.2 to 90.6)	77.3 (72.1 to 82.6)	41.5 (34.2 to 48.7)
Band 2	2020	71.3 (67.9 to 74.7)	55.6 (51.7 to 59.6)	20.7 (17.5 to 24.0)
Band 2	2021	75.9 (70.6 to 81.2)	62.2 (56.8 to 67.7)	25.8 (20.2 to 31.4)
Band 3	2020	64.6 (61.0 to 68.2)	47.5 (42.9 to 52.1)	13.5 (10.9 to 16.1)
Band 3	2021	64.6 (59.5 to 69.7)	50.0 (45.1 to 54.8)	16.0 (12.4 to 19.6)
Band 4	2020	61.6 (57.1 to 66.1)	44.6 (39.4 to 49.8)	12.1 (9.5 to 14.8)
Band 4	2021	64.1 (59.5 to 68.8)	48.1 (43.5 to 52.6)	14.9 (11.2 to 18.6)
Band 5	2020	55.8 (51.2 to 60.5)	40.3 (35.8 to 44.8)	10.2 (7.5 to 12.9)
Band 5	2021	56.6 (51.5 to 61.7)	40.2 (35.2 to 45.2)	11.2 (7.9 to 14.5)
School level FSM gap (Band 1 – Band 5)	2020	25.7 (19.9 to 31.5)	28.3 (22.1 to 34.6)	20.6 (15.7 to 25.4)
School level FSM gap (Band 1 – Band 5)	2021	29.8 (23.2 to 36.4)	37.1 (29.9 to 44.4)	30.3 (22.3 to 38.2)
Change in FSM gap	Change	4.1 (-4.6 to 12.9)	8.8 (-0.8 to 18.4)	9.7 (0.4 to 19.0)

4.1.2   Mathematics

Figures 6 to 8 show the percentage of students in the 2020 and 2021 samples estimated to have demonstrated a level of ability in mathematics equivalent to achieving grade 4 and above, grade 5 and above or grade 7 and above at GCSE, broken down by student socio-economic status. The values are also provided in Table 4, along with estimates of the gaps between advantaged and disadvantaged students, the change in that gap between 2020 and 2021, and all associated confidence intervals.

In line with the overall NRT results for mathematics, the charts illustrate that there was a decline in performance from 2020 to 2021 for all groups.

Figure 6 shows that students eligible for free school meals (FSM) were significantly less likely to achieve at or above each of the three grade points in both years. Although this gap in achievement at and above grades 4, 5 and 7 appears to have increased slightly, the differences were not statistically significant.

Figure 6   Proportion of students at each grade in the NRT each year by FSM – mathematics
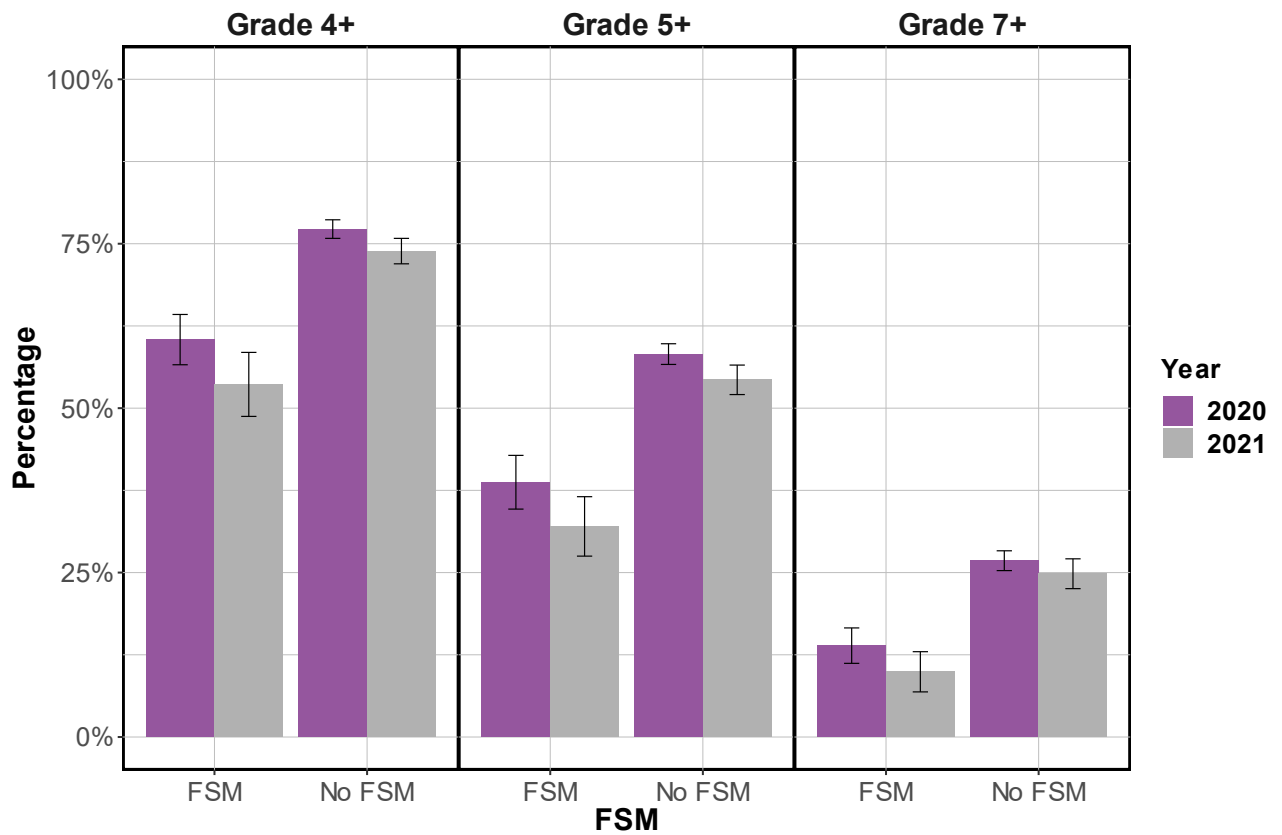
The gap between students who have ever been eligible for FSM (FSM-Ever) and those who have not, remained consistent from 2020 to 2021, as illustrated in Figure 7.

Figure 7   Proportion of students at each grade in the NRT each year by FSM-Ever – mathematics
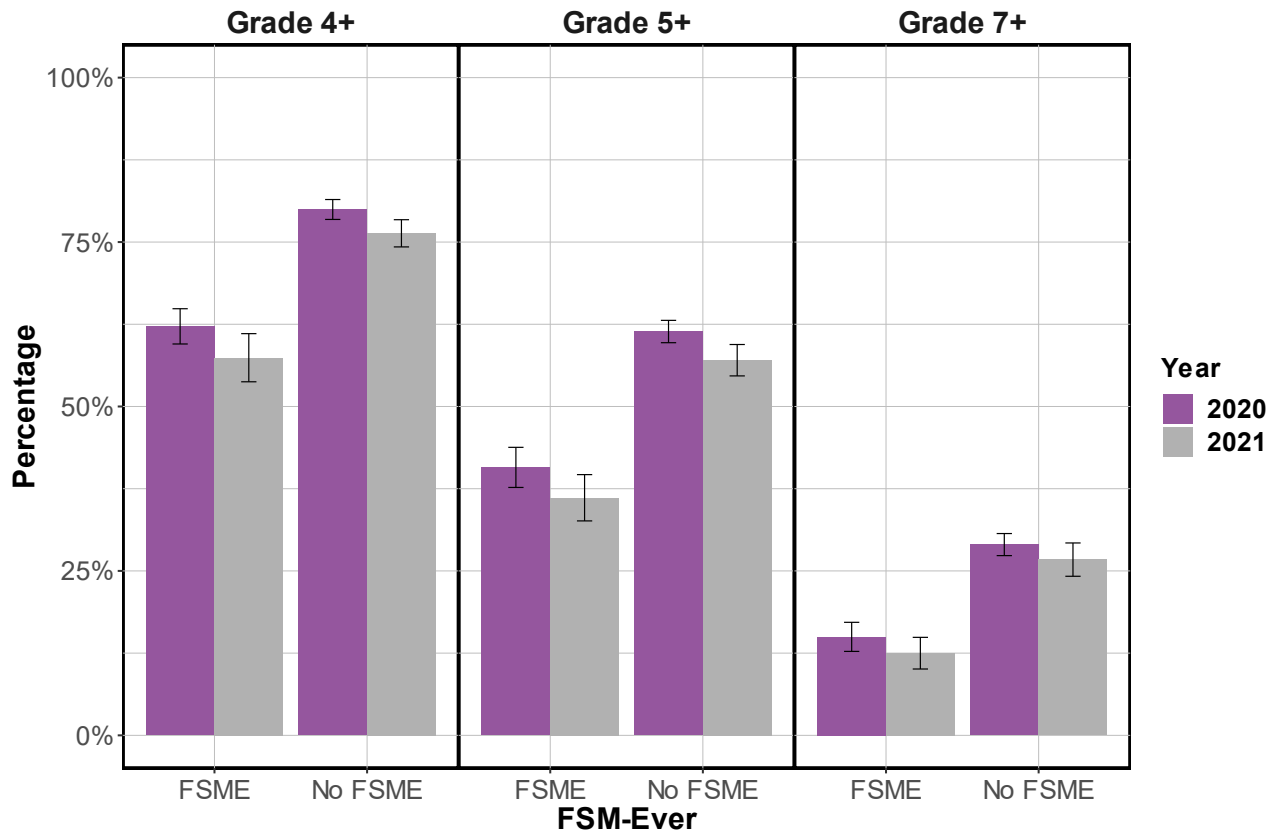
Figure 8 suggests that the likelihood of achieving each grade declines with increased levels of deprivation, based on IDACI scores, for both years. Performance for all five bands dropped in 2021, although many of the drops within IDACI bands were not statistically significant because of the wider confidence intervals when taking sub-groups of the sample. Broadly speaking, the plot appears to indicate slightly bigger drops for students in the higher IDACI bands. The change in the difference between the highest and lowest IDACI bands was statistically significant at the grade 5 boundary.

Figure 8   Proportion of students at each grade in the NRT each year by IDACI quintile – mathematics
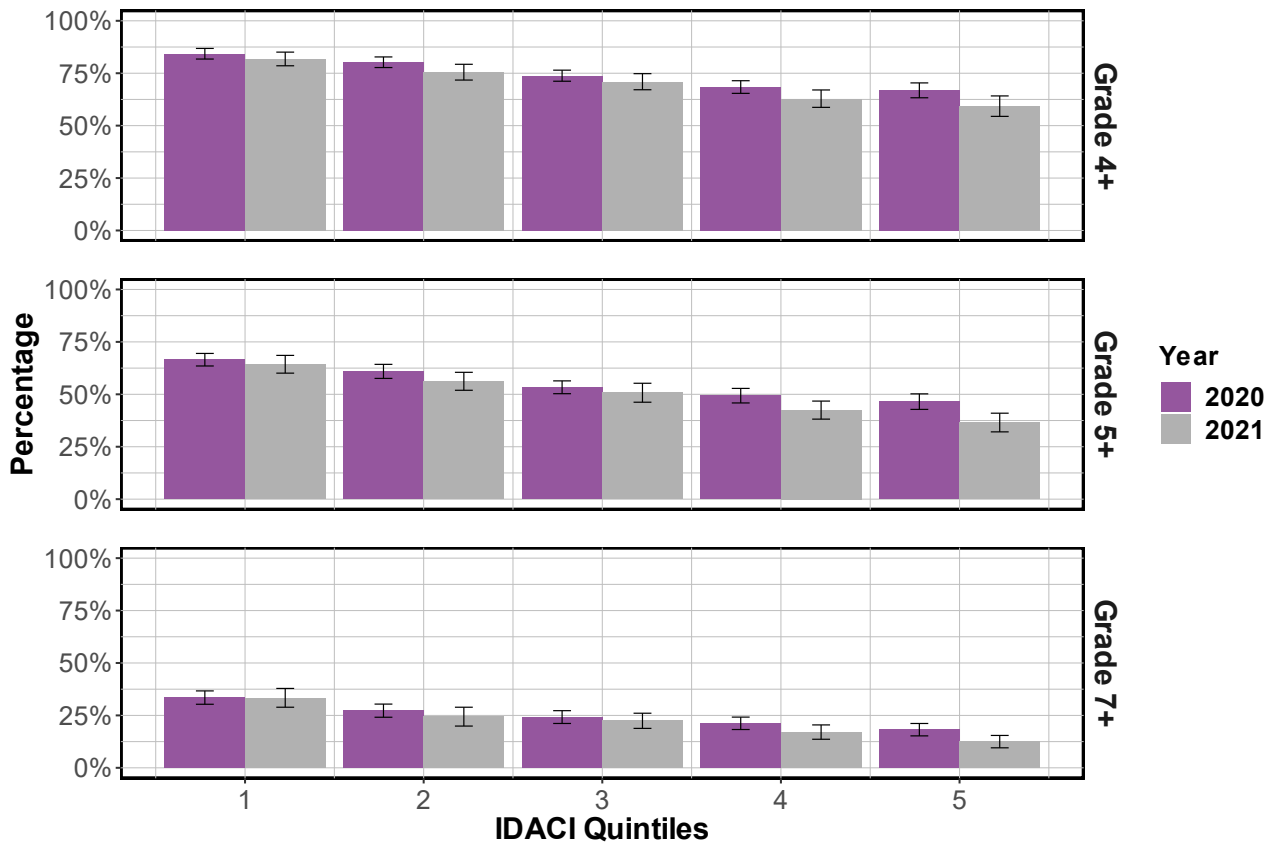
Table 4   Proportion of students at each grade in the NRT each year by socio-economic status – mathematics

Socio-economic status	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
FSM eligibility FSM	2020	77.2 (75.8 to 78.6)	58.2 (56.6 to 59.8)	26.8 (25.3 to 28.3)
FSM eligibility FSM	2021	73.9 (71.9 to 75.8)	54.3 (52.1 to 56.6)	24.8 (22.6 to 27.1)
FSM eligibility No FSM	2020	60.4 (56.6 to 64.2)	38.7 (34.7 to 42.8)	13.9 (11.2 to 16.6)
FSM eligibility No FSM	2021	53.6 (48.7 to 58.5)	32.0 (27.5 to 36.5)	9.9 (6.9 to 13.0)
FSM gap (No FSM – FSM)	2020	16.8 (12.7 to 20.9)	19.5 (15.1 to 23.9)	12.9 (9.8 to 16.0)
FSM gap (No FSM – FSM)	2021	20.3 (15.0 to 25.5)	22.3 (17.2 to 27.3)	14.9 (11.1 to 18.7)
Change in FSM gap	Change	3.5 (-3.2 to 10.1)	2.8 (-3.9 to 9.5)	2.0 (-2.9 to 6.9)
FSM-Ever FSME	2020	80.0 (78.4 to 81.5)	61.4 (59.7 to 63.1)	29.0 (27.3 to 30.7)
FSM-Ever FSME	2021	76.3 (74.3 to 78.4)	57.0 (54.7 to 59.4)	26.7 (24.2 to 29.3)
FSM-Ever No FSME	2020	62.2 (59.5 to 64.9)	40.7 (37.7 to 43.8)	15.0 (12.8 to 17.2)
FSM-Ever No FSME	2021	57.4 (53.8 to 61.1)	36.1 (32.6 to 39.6)	12.5 (10.1 to 14.9)
FSME gap (No FSME – FSME)	2020	17.8 (14.7 to 20.8)	20.7 (17.2 to 24.1)	14.0 (11.3 to 16.8)
FSME gap (No FSME – FSME)	2021	18.9 (14.7 to 23.1)	20.9 (16.7 to 25.2)	14.2 (10.7 to 17.7)
Change in FSME gap	Change	1.1 (-4.1 to 6.4)	0.3 (-5.2 to 5.8)	0.2 (-4.3 to 4.7)

Socio-economic status	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
IDACI quintiles Band 1	2020	84.3 (81.8 to 86.8)	66.5 (63.5 to 69.5)	33.5 (30.3 to 36.7)
IDACI quintiles Band 1	2021	81.8 (78.6 to 85.1)	64.3 (60.1 to 68.6)	33.4 (28.9 to 37.9)
IDACI quintiles Band 2	2020	80.2 (77.7 to 82.8)	60.9 (57.6 to 64.3)	27.3 (24.1 to 30.4)
IDACI quintiles Band 2	2021	75.5 (71.7 to 79.3)	56.2 (51.9 to 60.5)	24.4 (19.9 to 28.9)
IDACI quintiles Band 3	2020	73.8 (71.2 to 76.5)	53.4 (50.3 to 56.4)	24.2 (21.2 to 27.2)
IDACI quintiles Band 3	2021	71.0 (67.1 to 74.8)	50.8 (46.2 to 55.3)	22.4 (18.8 to 26.0)
IDACI quintiles Band 4	2020	68.4 (65.4 to 71.4)	49.3 (45.9 to 52.8)	21.2 (18.3 to 24.2)
IDACI quintiles Band 4	2021	62.9 (58.7 to 67.0)	42.5 (38.2 to 46.8)	17.0 (13.6 to 20.5)
IDACI quintiles Band 5	2020	66.8 (63.3 to 70.4)	46.5 (42.8 to 50.2)	18.2 (15.2 to 21.1)
IDACI quintiles Band 5	2021	59.3 (54.4 to 64.2)	36.5 (32.1 to 41.0)	12.5 (9.5 to 15.4)
IDACI gap (Band 1 – Band 5)	2020	17.5 (13.1 to 21.8)	20.0 (15.2 to 24.8)	15.3 (11.0 to 19.6)
IDACI gap (Band 1 – Band 5)	2021	22.5 (16.6 to 28.4)	27.8 (21.6 to 33.9)	20.9 (15.5 to 26.3)
Change in IDACI gap	Change	5.1 (-2.3 to 12.4)	7.8 (0.0 to 15.6)	5.6 (-1.3 to 12.5)

Performance was compared at school-level based on the proportion of students in the school eligible for free school meals, again grouped into quintiles with band 5 representing schools with the highest proportion of students eligible for FSM, and band 1 representing schools with the lowest. Figure 9 shows the percentage of students at schools in each of the five bands achieving grades 4, 5 and 7 and above in 2020 and 2021. For the lowest FSM band, there is a significant improvement in performance from 2020 to 2021 at all three grade boundaries. For students in schools with higher levels of FSM, the chart suggests a reduction in the proportion of students achieving at or above each grade, which was statistically significant only in the case of band 4 at grades 5 and 7.

Figure 9   Proportion of students at each grade in the NRT each year by school level FSM quintile – mathematics
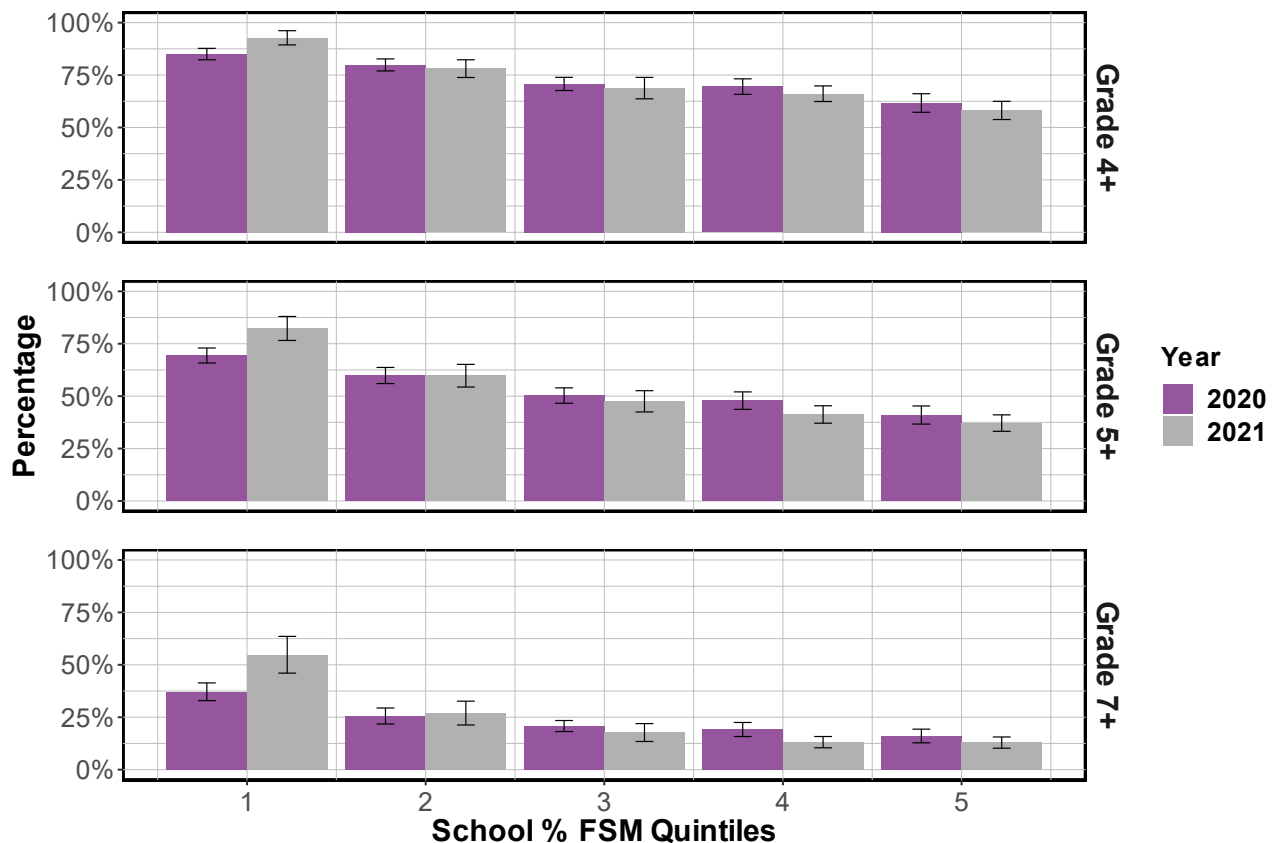
As shown in Table 5, the gap between the students in schools with the highest and lowest levels of deprivation significantly increased, by 11.3, 16.7 and 20.8 percentage points at grades 4, 5 and 7 respectively. The percentage of students achieving grade 7 and above, for example, increased from 37.1 per cent to 54.8 per cent in schools in the lowest FSM band, while decreasing from 16.0 per cent to 12.9 per cent in schools in the highest FSM band.

Table 5   Proportion of students at each grade in the NRT each year by school level FSM – mathematics

Bands of school level FSM	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	85.0 (82.3 to 87.7)	69.4 (65.8 to 73.0)	37.1 (32.9 to 41.4)
Band 1	2021	92.8 (89.4 to 96.2)	82.3 (76.6 to 88.0)	54.8 (46.0 to 63.6)
Band 2	2020	79.8 (77.0 to 82.7)	59.8 (56.0 to 63.7)	25.6 (21.8 to 29.4)
Band 2	2021	78.1 (73.8 to 82.3)	59.7 (54.3 to 65.1)	27.0 (21.3 to 32.7)
Band 3	2020	70.8 (67.6 to 73.9)	50.3 (46.6 to 54.0)	20.8 (18.2 to 23.4)
Band 3	2021	68.8 (63.7 to 73.9)	47.5 (42.5 to 52.6)	17.7 (13.4 to 22.0)
Band 4	2020	69.5 (65.8 to 73.2)	47.9 (43.7 to 52.0)	19.1 (15.8 to 22.5)
Band 4	2021	66.1 (62.4 to 69.8)	41.3 (37.1 to 45.4)	13.1 (10.4 to 15.8)
Band 5	2020	61.7 (57.2 to 66.1)	41.0 (36.7 to 45.3)	16.0 (12.8 to 19.3)
Band 5	2021	58.1 (53.8 to 62.5)	37.1 (33.2 to 41.1)	12.9 (10.2 to 15.6)
School level FSM gap (Band 1 – Band 5)	2020	23.3 (18.1 to 28.5)	28.4 (22.8 to 34.0)	21.1 (15.8 to 26.4)
School level FSM gap (Band 1 – Band 5)	2021	34.6 (29.1 to 40.1)	45.1 (38.2 to 52.1)	41.9 (32.7 to 51.1)
Change in FSM gap	Change	11.3 (3.7 to 18.9)	16.7 (7.8 to 25.7)	20.8 (10.2 to 31.4)

4.1.3   Regression outputs

Three logistic regression models were run for each subject to predict the likelihood of sub-groups of students achieving at or above a level of performance equivalent to grades 4, 5 and 7. All of the student-level and school-level variables described in Section 2 and Appendix 1 were included in the model, as were interaction terms to investigate the interaction between the year of the NRT and the relevant student- or school-level variable. The purpose of these models was to test for any significant impacts once other factors had been taken into account.

For the disadvantage variables, FSM-Ever (an indicator of whether a student has ever been eligible for free school meals) was included to represent student level-disadvantage, and FSM status and IDACI were excluded from the model, given the similarity between these three measures. Separate models were carried out with IDACI in place of FSM-Ever to verify that this did not impact the model in a meaningful way (regression parameters for these models are provided in Appendices D and E). The percentage of students in the school eligible for FSM was adjusted by dividing the value by ten to make interpretation of the regression coefficients simpler (note that this did not impact the significance or otherwise of the variables).

Figures 10 and 11 show the estimates of the coefficients of the disadvantage variables in the logistic regression models. The error bars represent 95% confidence intervals for the estimates of the coefficients. If the confidence interval is entirely above or below zero (i.e. it does not cross the x axis), this indicates that the variable has a significant effect on performance on the NRT. If the coefficient is negative (i.e. the confidence interval is entirely below the line), this indicates that increasing values of the variable in question are related to reduced performance in the NRT, whereas if the value is positive (i.e. the confidence interval is entirely above the line), it indicates that the variable in question is related to higher performance. The interaction terms are interpreted in a similar way. A positive interaction variable indicates that the effect of the variable increases the likelihood of achieving the grade in 2021 relative to 2020, whereas a negative interaction variable indicates that the effect of the variable reduces the likelihood of achieving the grade in 2021 relative to 2020. Tables of the regression coefficients for all variables are provided in Appendices B and C.

Figure 10 shows that being categorised as FSM-Ever and the proportion of students in the school eligible for FSM were not significant predictors of performance in English (i.e. likelihood of achieving a grade) once other variables were accounted for in the model, and nor did the interaction variables indicate a significant change in the relationship between these disadvantage variables and performance from 2020 to 2021. This is in contrast to the finding in Section 4.1.1 when comparing directly the gap between the most and least deprived groups of schools, which found a significant difference at the grade 7 boundary.

Figure 10   Regression coefficients for disadvantage variables – English
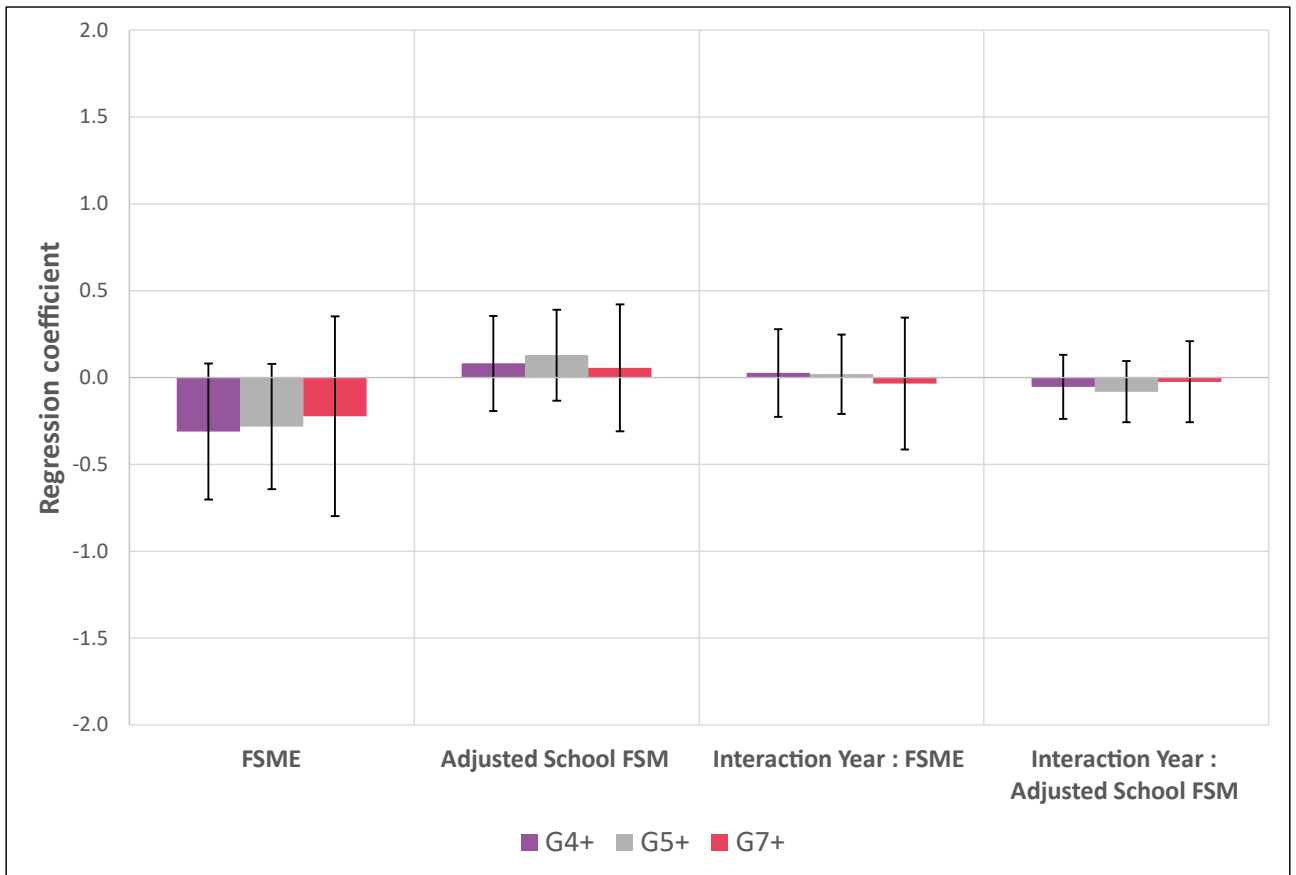
Figure 11 shows that being categorised as FSM-Ever was not a significant predictor of performance in mathematics once other factors were taken into account, and the relationship did not change significantly between the years. On the other hand, the proportion of students in the school eligible for FSM did have a significant impact on the likelihood of achieving grade 5 and above and grade 7 and above, and this relationship changed significantly between the two years at those same two grades boundaries. Note that the coefficients for school levels of FSM as a main effect are positive, indicating that being in a school with higher levels of deprivation is linked to *better* performance once other factors are taken into account. This is a complex finding, given it is counterintuitive and also contrary to what was shown in Figure 9, but it is important to remember that the regression coefficient indicates the direction of the relationship once all other factors are accounted for, including student prior attainment, historical school GCSE performance and student-level deprivation. The coefficient for the interaction term is negative, confirming the pattern seen in the analysis of individual variables in Section 4.1.2, that students in schools with higher levels of deprivation experienced a greater drop in performance in 2021.

Figure 11   Regression coefficients for disadvantage variables – mathematics
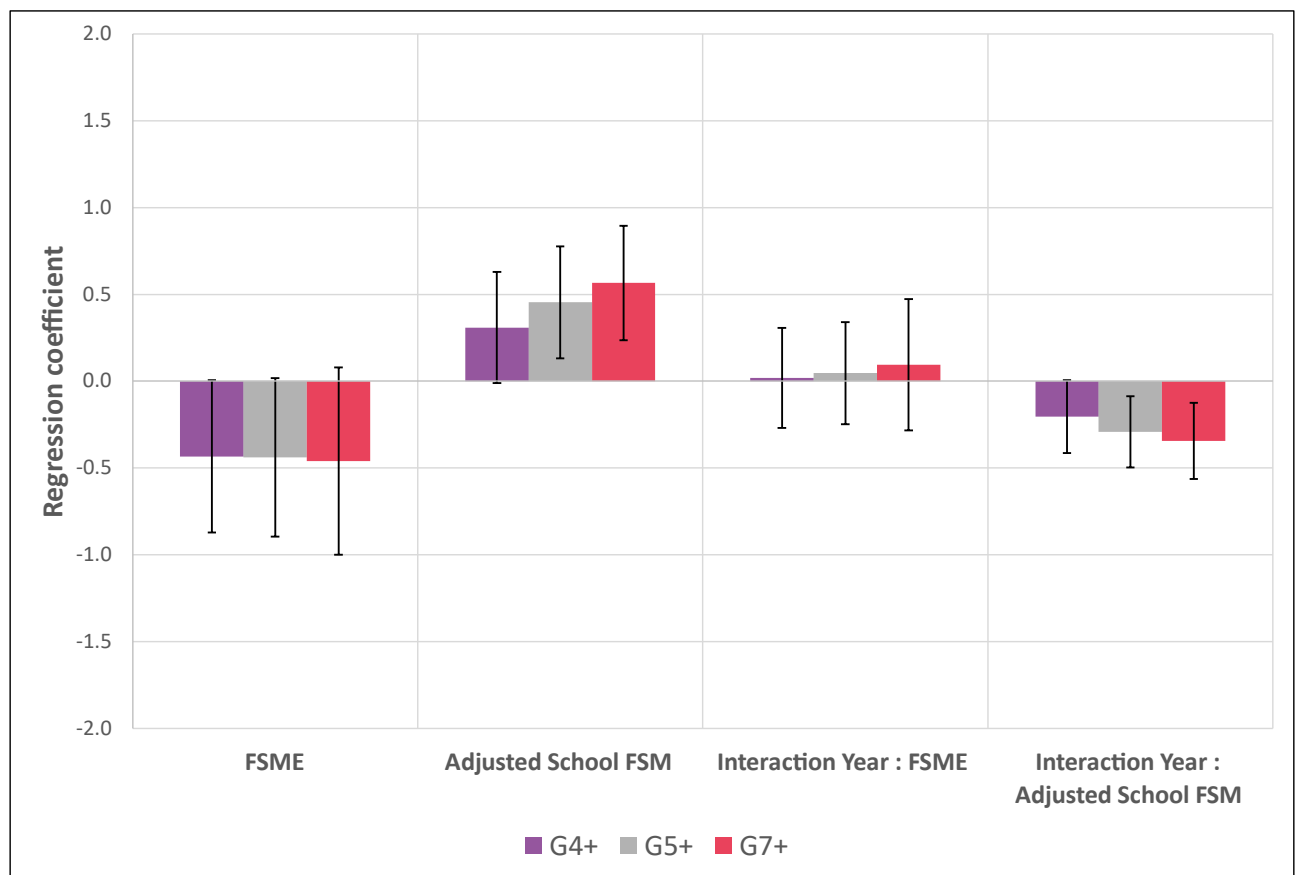
At grade 5 the regression coefficient for an increase of ten percentage points in the school-level FSM rate in 2020 was 0.45, which can be converted into an odds ratio of 1.57. The equivalent regression coefficient in 2021, from the interaction parameter, was -0.29, which can be converted to an odds ratio of 0.75. Similarly, the regression coefficient for the interaction parameter at grade 7 was -0.34, which can be converted into an odds ratio of 0.71. This indicates that, at both grade

boundaries, for an increase of ten percentage points in the FSM rate in 2021, the odds ratio was reduced to around three-quarters of the size of the same effect in 2020.

To help put the regression coefficients into context, we can consider a worked example where all variables remain constant aside from the year and the variable of interest. Consider a sub-group of students who have never been eligible for free school meals, do not have EAL or SEND, are white males and achieved average levels of prior attainment at Key Stage 2. They attend local authority-maintained schools in urban areas in the East Midlands. The size, historical GCSE performance and absence rates for their schools are as for the average of all students across the sample. These students differ in terms of which year they took the NRT and in the percentage of students eligible for FSM within their school. The interaction plots in Figures 12 and 13 show the relationship between the percentage of students eligible for FSM within the school (adjusted by dividing by ten) and the estimated likelihood of achieving grade 5 and above or grade 7 and above in mathematics respectively. Within each plot, this relationship is shown for the students taking the NRT in 2020 and in 2021 by the different coloured lines. The plots illustrate how the relationship between the school-level percentage of students eligible for free school meals and estimated performance has changed between the two years: for the 2020 sample, we see a positive relationship once other variables are accounted for, while for 2021, we see a negative relationship. This also suggests that students in schools with low levels of free school meal eligibility performed better in 2021 than in 2020, all else being equal, whereas the performance dropped in 2021 for students in schools with higher levels of deprivation.

Figure 12   Likelihood of achieving grade 5 and above by school level FSM
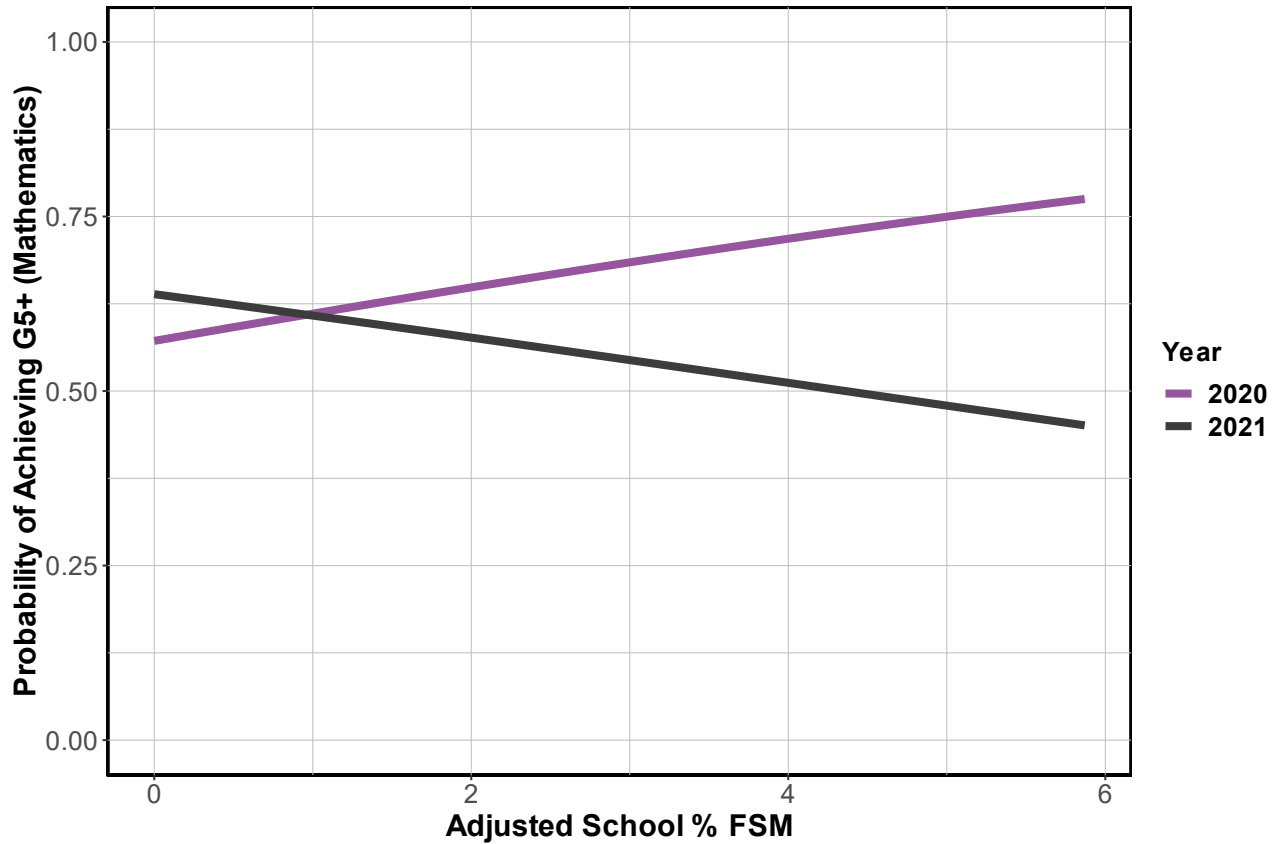
For the purpose of this plot all binary variables (FSME, EAL, Ethnicity, SEND, gender, urban/rural and region dummy variables) were set to 0, continuous variables (historical GCSE performance, school size and absence rate were set to their mean values calculated across all students) and KS2 performance was set to quintile 3. Note that the Y axis represents the modelled probability arising from the logistic regression model and, as such, contains error.

Figure 13 Likelihood of achieving grade 7 and above by school level FSM
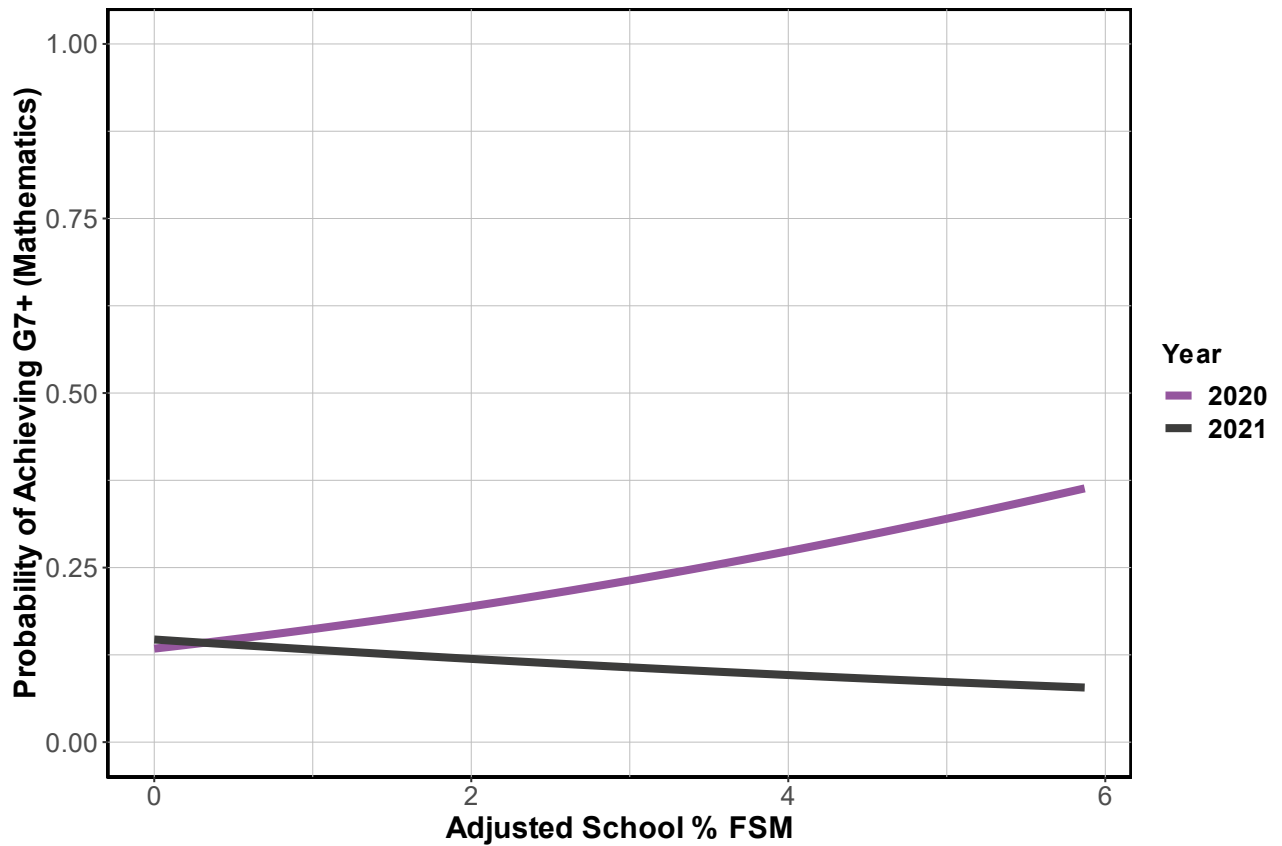
For the purpose of this plot, all binary variables (FSME, EAL, Ethnicity, SEND, gender, urban/rural and region dummy variables) were set to 0, continuous variables (historical GCSE performance, school size and absence rate were set to their mean values calculated across all students) and KS2 performance was set to quintile 3. Note that the Y axis represents the modelled probability arising from the logistic regression model and, as such, contains error.

The finding that the relationship between the school-level deprivation measure and performance changed significantly between the years but individual student FSM-Ever status did not, may be counterintuitive. To illustrate the relationship between these variables and performance on the NRT, Figures 14 and 15 show the percentage of students achieving at or above each grade broken down by school FSM quintile and student FSM-Ever status. The confidence intervals are fairly wide given the samples are broken down into relatively small groups, so the purpose of these plots is illustrative rather than to establish statistical significance. Broadly speaking, they do appear to show that, within a school FSM band, the change in performance for students classified as FSM-Ever and those who have never been eligible for FSM is very similar.

Figure 14   Proportion of students at each grade in the NRT each year by school level FSM quintile and FSM-Ever - English
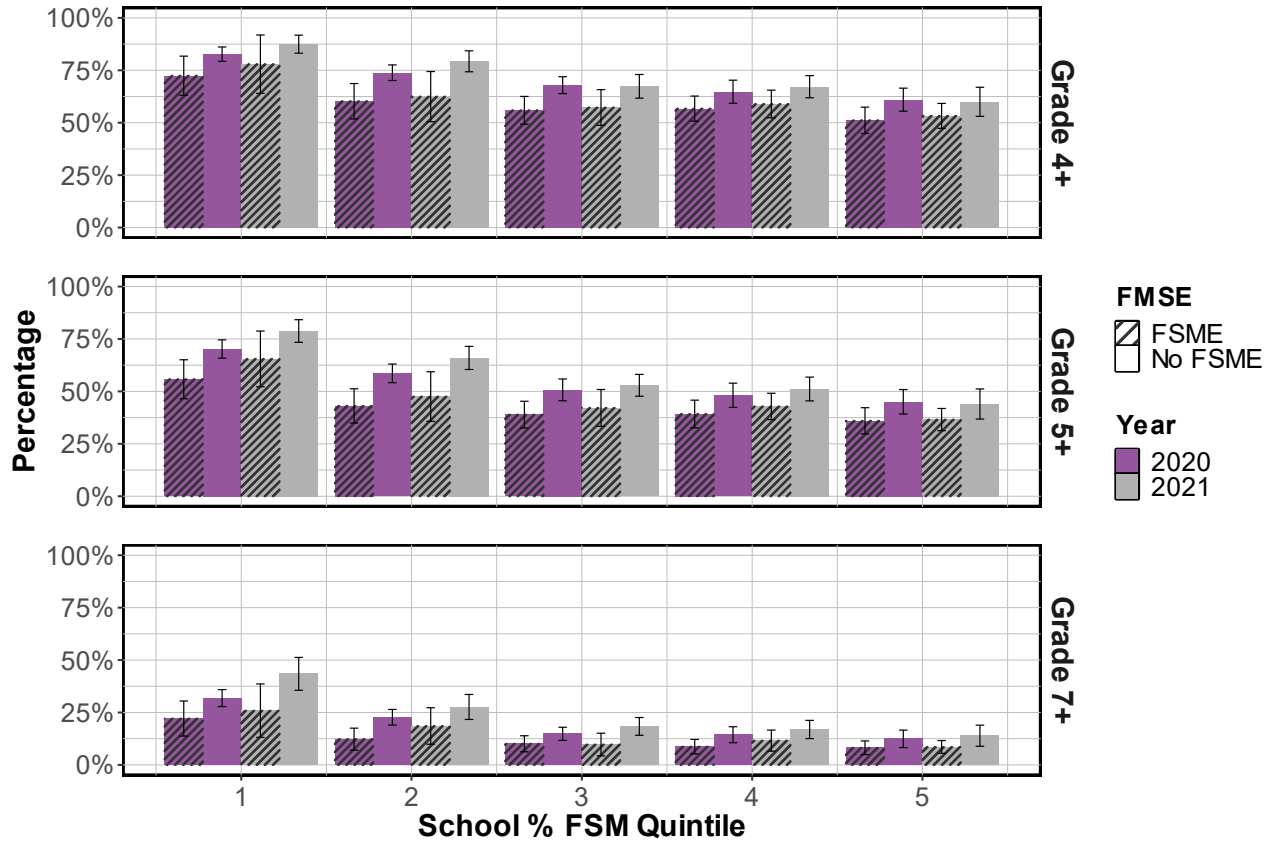
Figure 15 **Proportion of students at each grade in the NRT each year by school-level FSM quintile and FSM-Ever – mathematics**
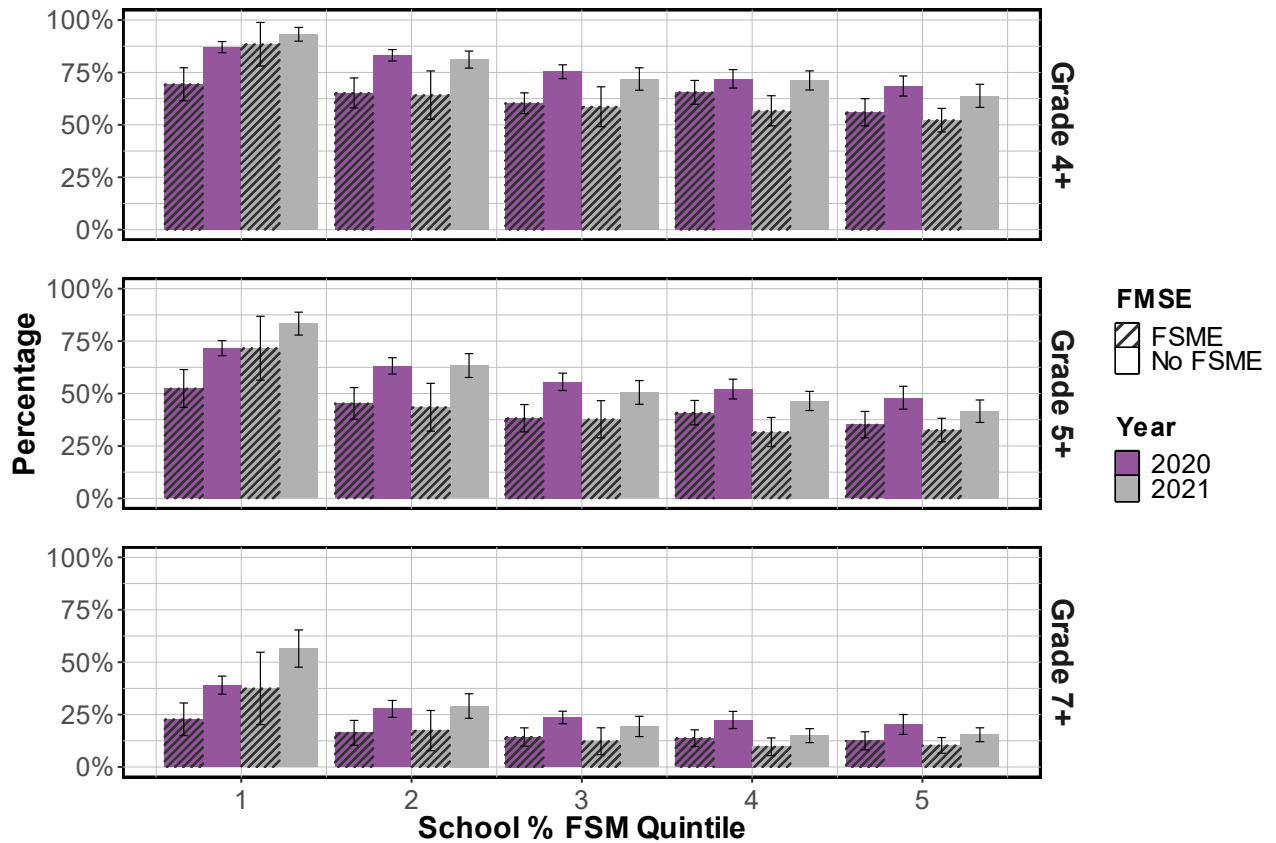
4.1.4 Summary

The results described in this section show that, while there are some cases of the disadvantage gap appearing to have widened in the raw percentages of students performing at levels equivalent to three key grade boundaries, the changes in the disadvantage gap at student-level were mostly not at a level to be considered statistically significant. That is to say that the confidence intervals around the estimates of change derived from this data do not enable us to say confidently that the same pattern would exist if the *entire* cohort had each taken *all* of the questions on the NRT (and the test had perfect reliability). The exception to this was in the IDACI index at the grade 5 boundary for mathematics: the difference in the likelihood of achieving grade 5 or above in mathematics between students in the highest and lowest IDACI quintiles increased significantly between 2020 and 2021.

For a change in the student-level disadvantage gap related to FSM eligibility to have been statistically significant in the individual sub-group comparison, the change would need to be much greater than seen in the data. The confidence interval for the change would need to be either entirely above or below 0 to be considered significant. As an example, the difference in the percentage of students achieving grade 4 and above in mathematics for those who have or have not ever been eligible for free school meals (FSM-Ever) changed by 1.1 percentage point from 2020 to 2021, with a confidence interval from -4.1 to 6.4. This means that the change in the gap

between groups would have needed to have been over 5.2 percentage points in order for the change to be statistically significant: that is, for us to have confidence that the change would be observed in the population.

Significant differences were observed in the performance of students in schools with different levels of disadvantage. This relationship was strongest in mathematics at grades 5 and 7, where the interaction terms in the regression model were statistically significant. Students in schools with the very lowest levels of disadvantage improved in performance from 2020 to 2021 despite a general decline in performance in mathematics.

4.2   Prior attainment and historical performance

Data was available relating to prior attainment at student-level and historical performance at school-level. For students, prior attainment reflects their performance on National Curriculum assessments at the end of Key Stage 2 (KS2). Quintile bands were created based on a normalised test score combining marks on the reading and mathematics National Curriculum Tests, with band 1 representing the lowest KS2 scores and band 5 the highest. Performance was compared at school-level based on GCSE attainment of the school in 2019, grouped into quintiles with band 5 representing schools with the highest GCSE English or mathematics points scores, and band 1 representing schools with the lowest scores.

4.2.1   English

Figure 16 shows the percentage of students in the 2020 and 2021 samples estimated to have demonstrated a level of ability in English equivalent to achieving grade 4 and above, grade 5 and above or grade 7 and above at GCSE, broken down by KS2 prior attainment quintiles.

Figure 16 **Proportion of students at each grade in the NRT each year by KS2 prior attainment - English**
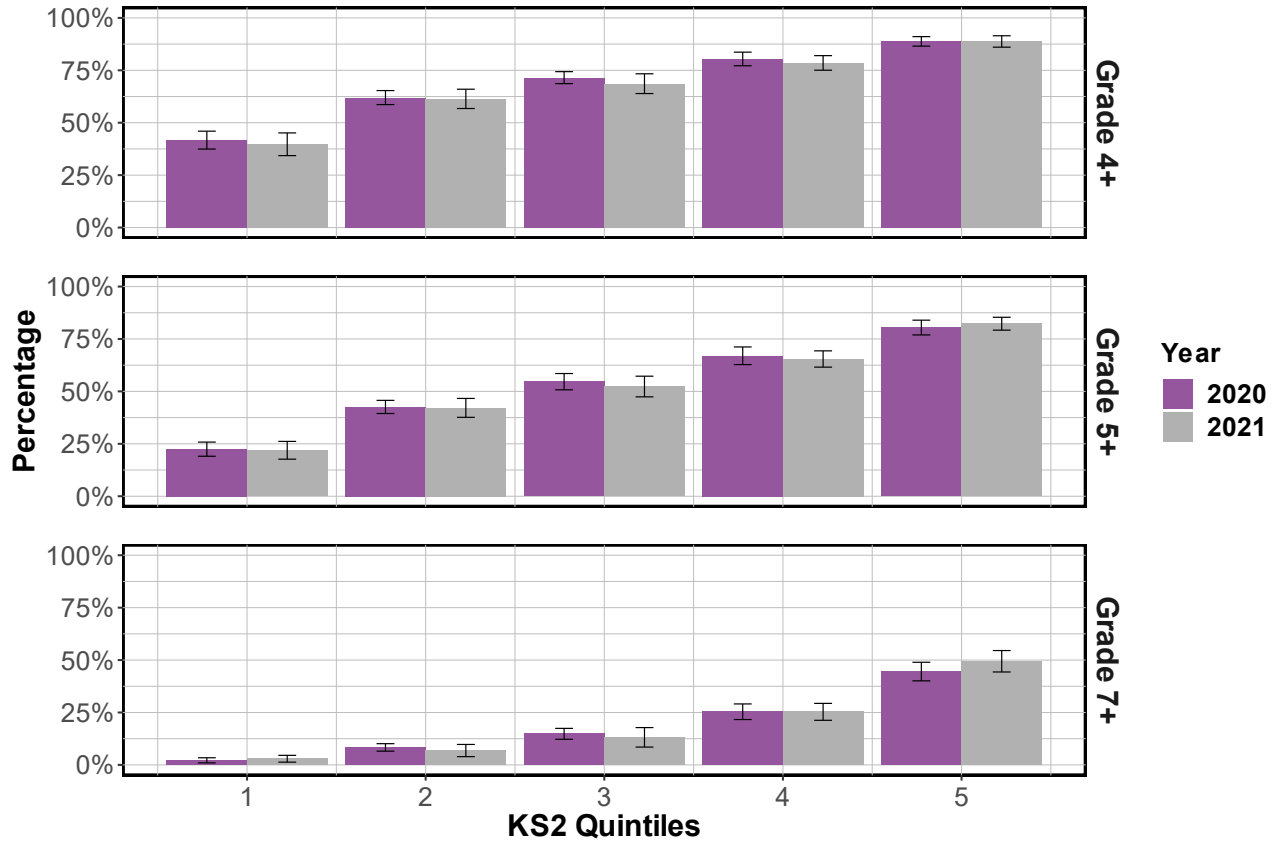
The chart shows that, unsurprisingly, students with higher levels of attainment at KS2 were more likely to achieve at or above each of the three grade points in both years. The values are provided in Table 6, along with estimates of the gaps between students with high and low levels of prior attainment, the change in that gap between 2020 and 2021, and all associated confidence intervals. The gap in achievement between students in the lowest and highest bands of prior attainment did not change significantly, despite performance appearing to have dropped slightly for students in the lowest four prior attainment bands and to have improved in the highest band.

Table 6   Proportion of students at each grade in the NRT each year by KS2 prior attainment – English

Bands of KS2 prior attainment	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	41.7 (37.4 to 46.0)	22.4 (19.1 to 25.8)	2.2 (1.0 to 3.4)
Band 1	2021	39.7 (34.3 to 45.1)	21.9 (17.7 to 26.1)	2.9 (1.3 to 4.6)
Band 2	2020	62.0 (58.7 to 65.3)	42.6 (39.4 to 45.7)	8.3 (6.6 to 10.1)
Band 2	2021	61.4 (56.8 to 66.0)	42.1 (37.6 to 46.6)	6.8 (3.9 to 9.8)
Band 3	2020	71.5 (68.6 to 74.4)	54.6 (50.8 to 58.5)	14.8 (12.2 to 17.4)
Band 3	2021	68.6 (63.9 to 73.3)	52.3 (47.4 to 57.3)	13.2 (8.5 to 17.8)
Band 4	2020	80.4 (77.2 to 83.7)	67.0 (62.8 to 71.2)	25.4 (21.6 to 29.1)
Band 4	2021	78.5 (75.0 to 82.0)	65.5 (61.6 to 69.3)	25.3 (21.3 to 29.3)
Band 5	2020	88.8 (86.5 to 91.1)	80.4 (76.9 to 84.0)	44.5 (40.1 to 49.0)
Band 5	2021	88.8 (86.0 to 91.5)	82.3 (79.2 to 85.4)	49.4 (44.3 to 54.5)
KS2 prior attainment gap (Band 5 – Band 1)	2020	47.1 (42.3 to 51.9)	58.0 (53.1 to 62.9)	42.3 (37.7 to 46.9)
KS2 prior attainment gap (Band 5 – Band 1)	2021	49.0 (43.0 to 55.1)	60.4 (55.1 to 65.6)	46.5 (41.1 to 51.8)
Change in KS2 prior attainment gap	Change	1.9 (-5.8 to 9.7)	2.4 (-4.8 to 9.5)	4.1 (-2.9 to 11.2)

Figure 17 shows the percentage of students at schools in each of the five bands of performance in GCSE English in 2019 achieving grades 4, 5 and 7 and above in the NRT in 2020 and 2021.

Figure 17   Proportion of students at each grade in the NRT each year by school level GCSEs English prior attainment – English
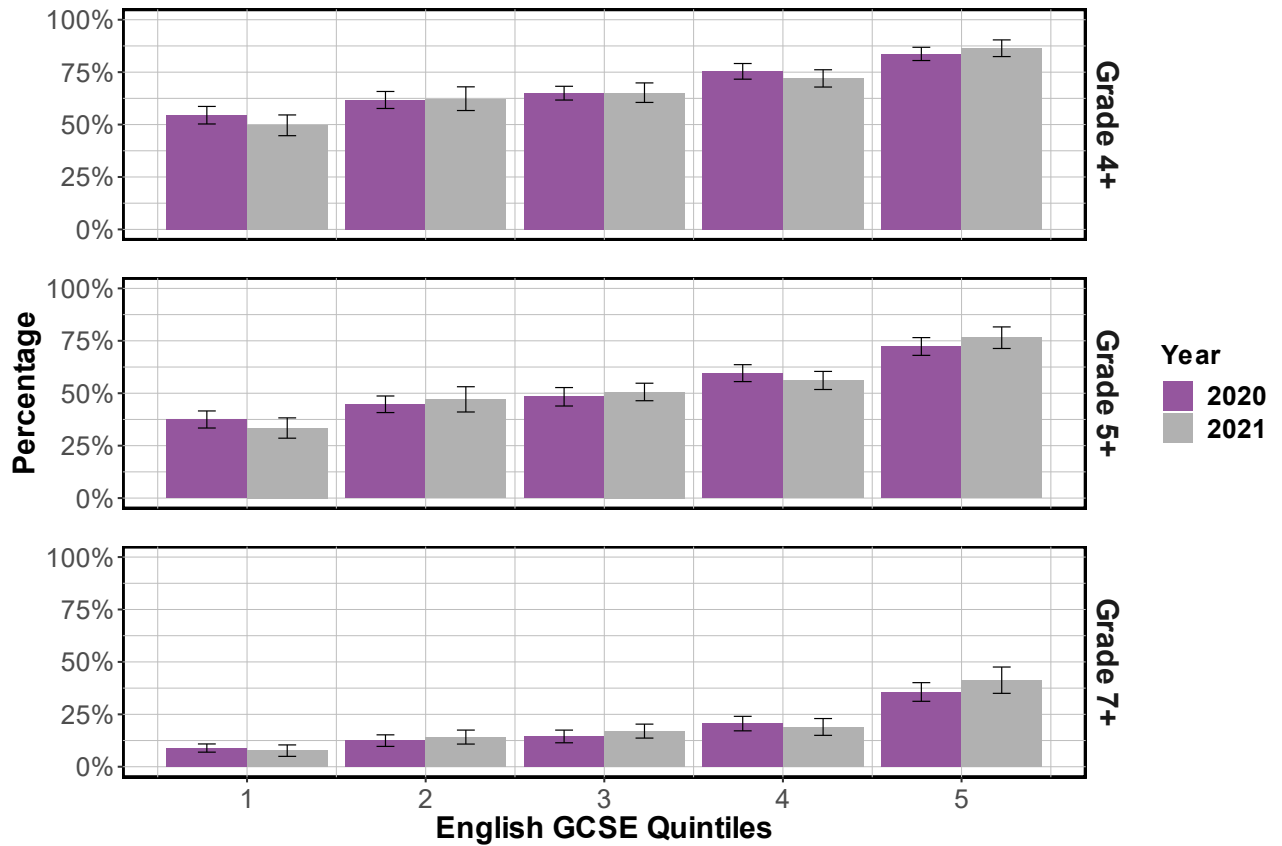
As with student prior attainment, the chart appears to show a drop in performance for students in schools in the lowest band, and an increase for students in schools in the highest band, but the gap between the students in schools with the lowest and highest historical GCSE performance did not change significantly between the two years.

Table 7   Proportion of students at each grade in the NRT each year by historical school-level GCSE English performance – English

Bands of historical school-level GCSE performance	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	54.5 (50.3 to 58.7)	37.5 (33.4 to 41.6)	8.9 (7.0 to 10.9)
Band 1	2021	49.6 (44.7 to 54.6)	33.4 (28.6 to 38.3)	7.7 (5.0 to 10.4)
Band 2	2020	61.7 (57.7 to 65.8)	44.7 (40.8 to 48.7)	12.5 (9.7 to 15.2)
Band 2	2021	62.3 (56.7 to 68.0)	47.1 (41.1 to 53.1)	14.2 (10.8 to 17.5)
Band 3	2020	65.0 (61.7 to 68.3)	48.3 (43.9 to 52.7)	14.5 (11.4 to 17.5)
Band 3	2021	65.2 (60.6 to 69.9)	50.6 (46.4 to 54.8)	17.0 (13.7 to 20.3)
Band 4	2020	75.4 (71.6 to 79.1)	59.6 (55.6 to 63.6)	20.6 (17.1 to 24.0)
Band 4	2021	72.0 (67.9 to 76.1)	56.1 (51.8 to 60.4)	19.0 (15.0 to 23.0)
Band 5	2020	83.7 (80.5 to 86.9)	72.3 (68.1 to 76.5)	35.7 (31.2 to 40.1)
Band 5	2021	86.4 (82.4 to 90.4)	76.5 (71.4 to 81.6)	41.3 (35.0 to 47.6)
School historical GCSE performance gap (Band 5 – Band 1)	2020	29.2 (24.0 to 34.5)	34.8 (28.9 to 40.7)	26.7 (21.9 to 31.6)
School historical GCSE performance gap (Band 5 – Band 1)	2021	36.8 (30.4 to 43.1)	43.1 (36.0 to 50.1)	33.6 (26.8 to 40.4)
Change in gap	Change	7.5 (-0.7 to 15.8)	8.3 (-0.9 to 17.5)	6.9 (-1.5 to 15.2)

4.2.2　Mathematics

Figure 18 shows the percentage of students in the 2020 and 2021 samples estimated to have demonstrated a level of ability in mathematics equivalent to achieving grade 4 and above, grade 5 and above or grade 7 and above at GCSE, broken down by KS2 prior attainment quintile.

**Figure 18　Proportion of students at each grade in the NRT each year by KS2 prior attainment – mathematics**
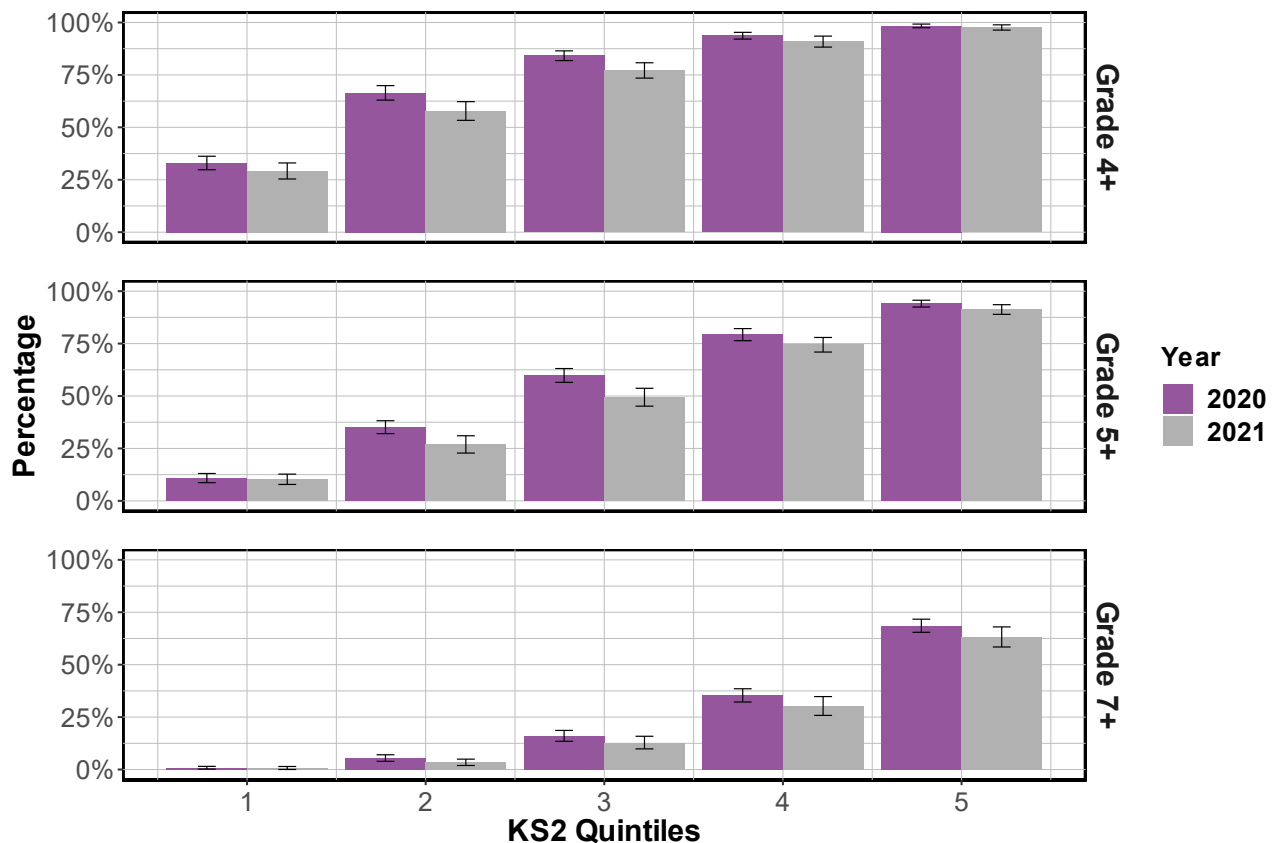
In line with the overall NRT results for mathematics, the chart suggests that there was a decline in performance from 2020 to 2021 across the groups, however, the drop was not statistically significant for all groups. For students in bands 2 and 3, the drop is more clearly visible, and statistically significant, for both the proportions achieving at least grade 4 and at least grade 5. In addition, the drop in the proportion achieving at least grade 5 is statistically significant for the students in band 4. The changes in proportions in all other bands for all other grades were not statistically significant. This is partly because of the strong relationship between a student's prior attainment at KS2 and their performance on the NRT. Very few students in the lowest quintile of KS2 performance achieved a performance in line with the higher grades, and very few students in the highest quintile achieved a performance lower than a grade 4. As such, it is difficult to identify changes in the relationship at these extremes due to floor and ceiling effects: less than one per cent of students in the lowest KS2 prior attainment group attained a level of performance equivalent to a grade 7 or above in the NRT in 2020, so there was very little potential for this figure to drop.

The values from Figure 18 are also provided in Table 8. Estimates of the gaps between students in bands 2 and 4 are provided because these avoid the issues caused by being at the extremes of the distribution. This gap in achievement between bands 2 and 4 at and above grade 4 has increased by a statistically significant 5.8 percentage points. The changes at the other grade boundaries were not statistically significant. Generally, the change in the relationship between prior attainment and NRT performance is difficult to interpret by itself due to the floor and ceiling effects when comparing performance at each grade boundary. It is clear though that taking into account prior attainment when considering other effects will be important given the strength of the relationship.

Table 8   Proportion of students at each grade in the NRT each year by KS2 prior attainment – mathematics

Bands of KS2 prior attainment	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	33.0 (29.8 to 36.2)	10.9 (8.7 to 13.1)	0.8 (0.2 to 1.5)
Band 1	2021	29.2 (25.4 to 33.0)	10.3 (7.8 to 12.7)	0.7 (0.0 to 1.4)
Band 2	2020	66.4 (63.0 to 69.9)	35.1 (32.1 to 38.2)	5.5 (3.9 to 7.0)
Band 2	2021	57.8 (53.3 to 62.2)	26.9 (22.8 to 31.0)	3.4 (1.9 to 5.0)
Band 3	2020	84.2 (81.8 to 86.5)	59.8 (56.5 to 63.1)	16.1 (13.5 to 18.7)
Band 3	2021	77.1 (73.5 to 80.8)	49.4 (45.2 to 53.7)	12.9 (9.8 to 15.9)
Band 4	2020	93.7 (92.1 to 95.3)	79.3 (76.4 to 82.2)	35.4 (32.2 to 38.5)
Band 4	2021	90.9 (88.3 to 93.5)	74.4 (71.0 to 77.9)	30.3 (25.8 to 34.8)
Band 5	2020	98.4 (97.5 to 99.3)	94.1 (92.4 to 95.7)	68.6 (65.5 to 71.7)
Band 5	2021	97.6 (96.4 to 98.9)	91.3 (88.9 to 93.6)	63.2 (58.4 to 68.0)
KS2 prior attainment gap (Band 4 – Band 2)	2020	27.3 (23.9 to 30.6)	44.1 (41.4 to 46.8)	29.9 (26.7 to 33.1)
KS2 prior attainment gap (Band 4 – Band 2)	2021	33.1 (29.1 to 37.1)	47.5 (44.2 to 50.9)	26.9 (22.0 to 31.7)

Bands of KS2 prior attainment	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Change in KS2 prior attainment gap	Change	5.8 (0.6 to 11.1)	3.4 (-0.9 to 7.7)	-3.0 (-8.8 to 2.8)

Figure 19 shows the percentage of students at schools in each of the five bands of attainment in GCSE mathematics in 2019 achieving grades 4, 5 and 7 and above in 2020 and 2021. It appears to indicate a relatively consistent drop for bands 1 to 4 at all three grade boundaries and less change for the highest band. However, the gap between the students in schools with the lowest and highest levels of historical GCSE performance did not change significantly between the years.

Figure 19   Proportion of students at each grade in the NRT each year by school-level GCSEs mathematics prior attainment - mathematics
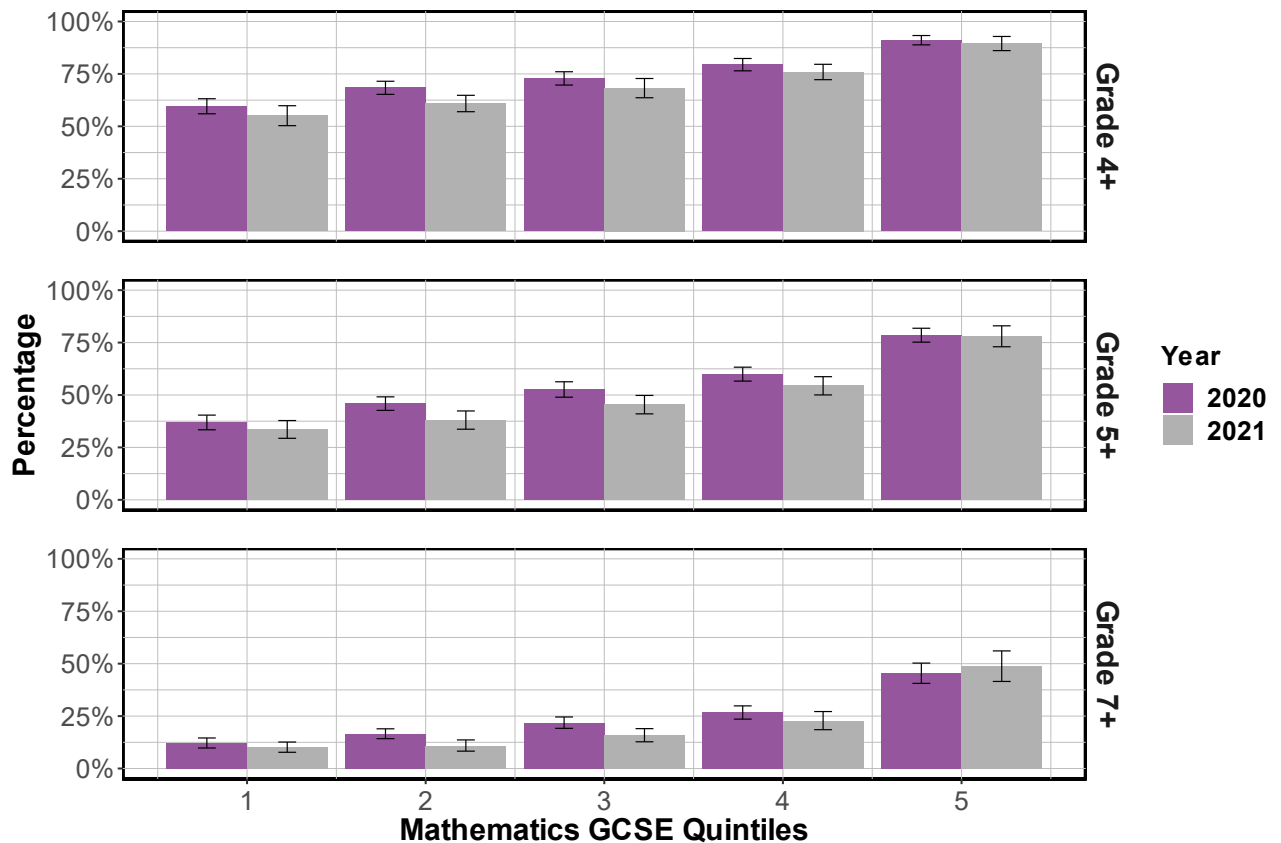
Table 9   **Proportion of students at each grade in the NRT each year by school-level GCSE mathematics prior attainment – mathematics**

Bands of historical school-level GCSE performance	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	59.6 (56.0 to 63.2)	36.9 (33.4 to 40.4)	12.2 (9.8 to 14.6)
Band 1	2021	55.1 (50.3 to 59.8)	33.6 (29.3 to 37.8)	10.2 (7.7 to 12.6)
Band 2	2020	68.4 (65.2 to 71.5)	45.9 (42.7 to 49.1)	16.6 (14.2 to 18.9)
Band 2	2021	60.9 (57.0 to 64.8)	38.0 (33.7 to 42.4)	11.0 (8.3 to 13.6)
Band 3	2020	72.9 (69.7 to 76.0)	52.6 (49.0 to 56.3)	21.9 (19.2 to 24.6)
Band 3	2021	68.2 (63.6 to 72.8)	45.4 (41.0 to 49.8)	15.9 (12.7 to 19.0)
Band 4	2020	79.4 (76.5 to 82.4)	60.0 (56.6 to 63.3)	26.7 (23.6 to 29.9)
Band 4	2021	75.9 (72.3 to 79.6)	54.4 (50.0 to 58.7)	22.8 (18.5 to 27.2)
Band 5	2020	91.1 (88.9 to 93.3)	78.5 (75.2 to 81.8)	45.4 (40.6 to 50.3)
Band 5	2021	89.5 (86.1 to 92.9)	78.0 (73.0 to 83.0)	48.8 (41.5 to 56.1)
School GCSE prior attainment gap (Band 5 – Band 1)	2020	31.5 (27.3 to 35.7)	41.6 (36.8 to 46.4)	33.3 (27.9 to 38.7)
School GCSE prior attainment gap (Band 5 – Band 1)	2021	34.4 (28.6 to 40.2)	44.4 (37.9 to 51.0)	38.6 (30.9 to 46.3)
Change in gap	Change	2.9 (-4.3 to 10.1)	2.8 (-5.3 to 10.9)	5.4 (-4.0 to 14.7)

4.2.3   Regression outputs

Figures 20 and 21 show the estimates of the logistic regression coefficients for the prior attainment variables. They show that student KS2 prior attainment is a significant predictor of performance on the NRT in both subjects. Historical school GCSE performance is a significant predictor of performance in English at grade 5 and in mathematics at all grades. None of the interaction terms

are significant, in line with the findings from the direct comparisons reported in sections 4.2.1 and 4.2.2.

Figure 20   Regression coefficients for prior attainment variables - English
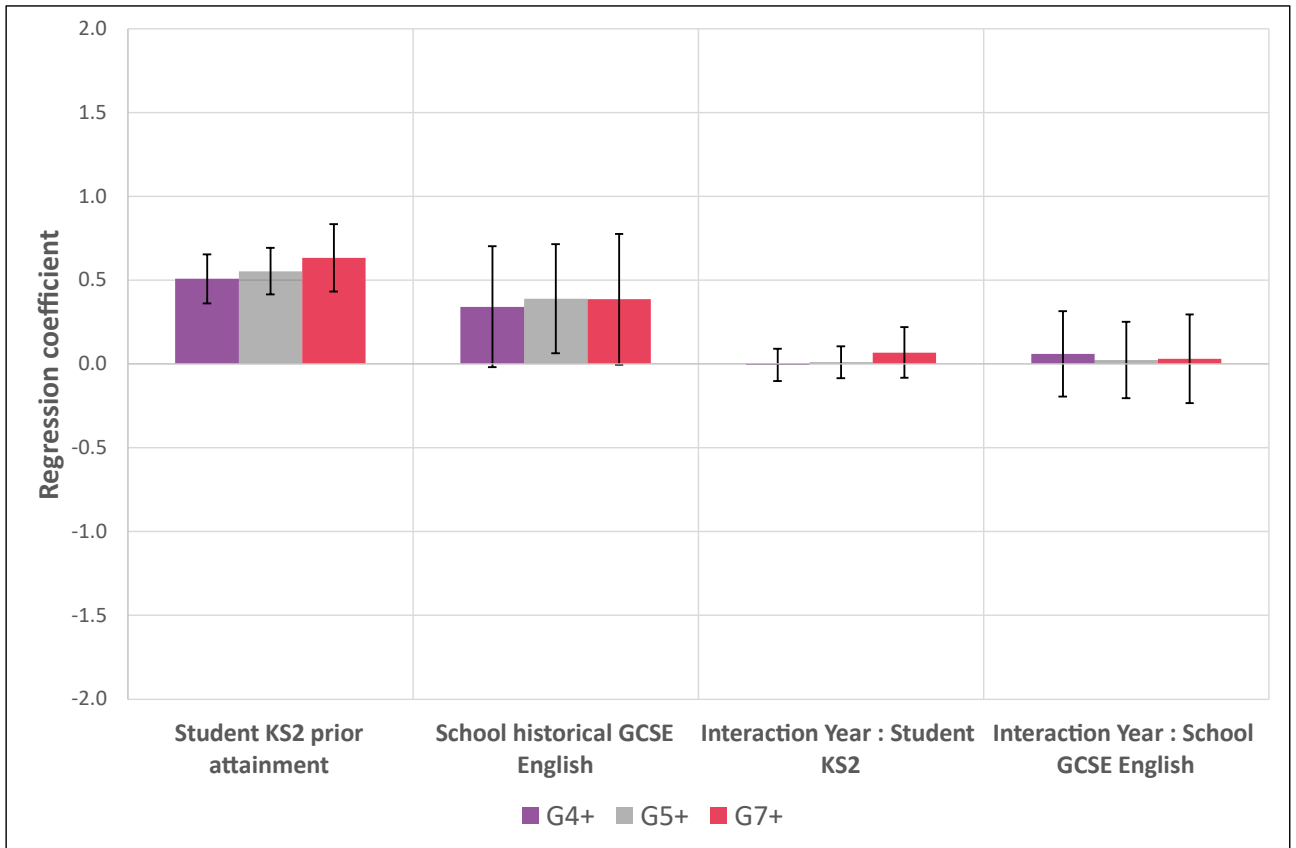
Figure 21   Regression coefficients for prior attainment variables - mathematics
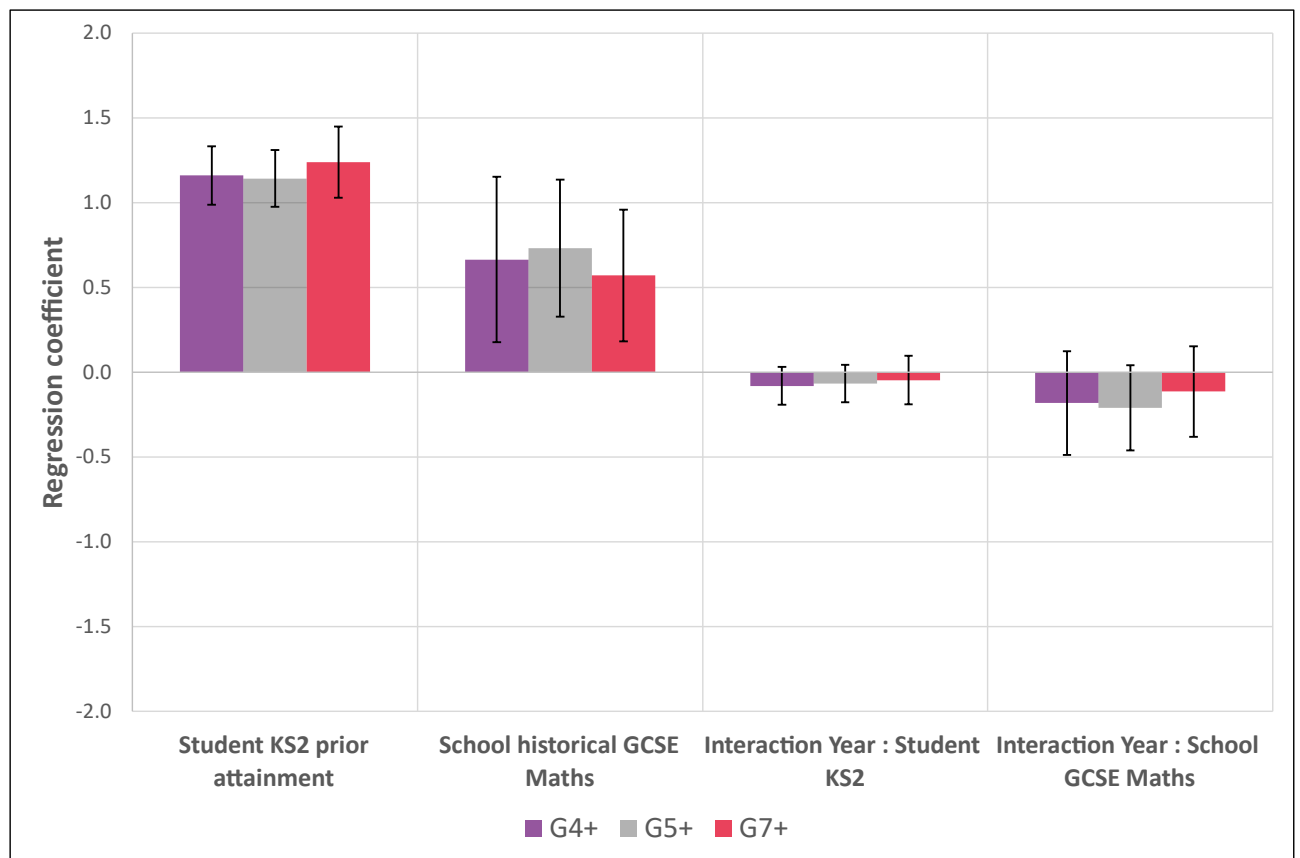
4.2.4   Summary

The data described in this section shows that, as expected, prior attainment at student-level and historical school performance are both strongly related to NRT outcomes (the latter more so for mathematics). There were some indications of the gap widening slightly in 2021 but these differences were very small and mostly not found to be statistically significant. The single exception was the gap in the proportions achieving at least Grade 4 in mathematics between KS2 prior attainment bands 2 and 4, which did increase significantly. Overall, there is limited evidence to suggest that the performance of students and schools with different levels of previous performance were impacted differentially between 2020 and 2021.

4.3   Student characteristics

Performance was compared based on four student characteristics: gender, having English as an additional language, ethnicity and having special educational needs and disabilities (SEND).

4.3.1   English

Figures 22 to 26 show the percentage of students in the 2020 and 2021 samples estimated to have demonstrated a level of ability in English equivalent to achieving grade 4 and above, grade 5 and above or grade 7 and above at GCSE, broken down by various student demographics. The

values are also provided in Table 10, along with estimates of the gaps between groups of students, the change in that gap between 2020 and 2021, and all associated confidence intervals.

Figure 22 shows that girls were more likely to achieve at or above each of the three grade points in both years. Despite appearing to have reduced slightly from 2020 to 2021, with performance for boys seeming to improve in 2021, the changes in the gaps between girls and boys were not statistically significant.

Figure 22   Proportion of students at each grade in the NRT each year by gender – English
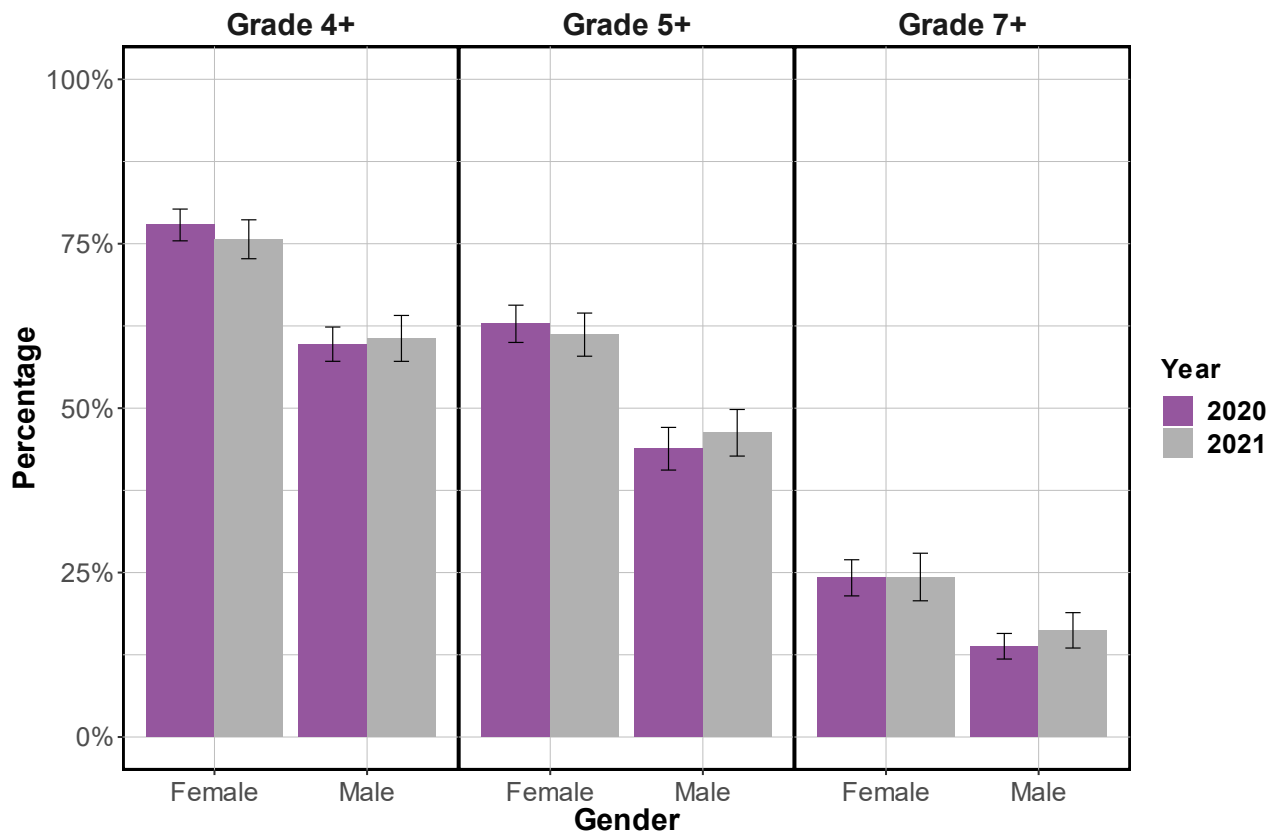
Figure 23 shows that students with EAL were slightly less likely to achieve at or above each of the three grade points in both years (with the EAL gap being significant in 2020 at grade 4 and grade 5 and above). Although the gap appeared to decrease slightly in 2021, with performance of students with EAL seeming to improve, these changes were not statistically significant.

Figure 23   Proportion of students at each grade in the NRT each year by EAL – English
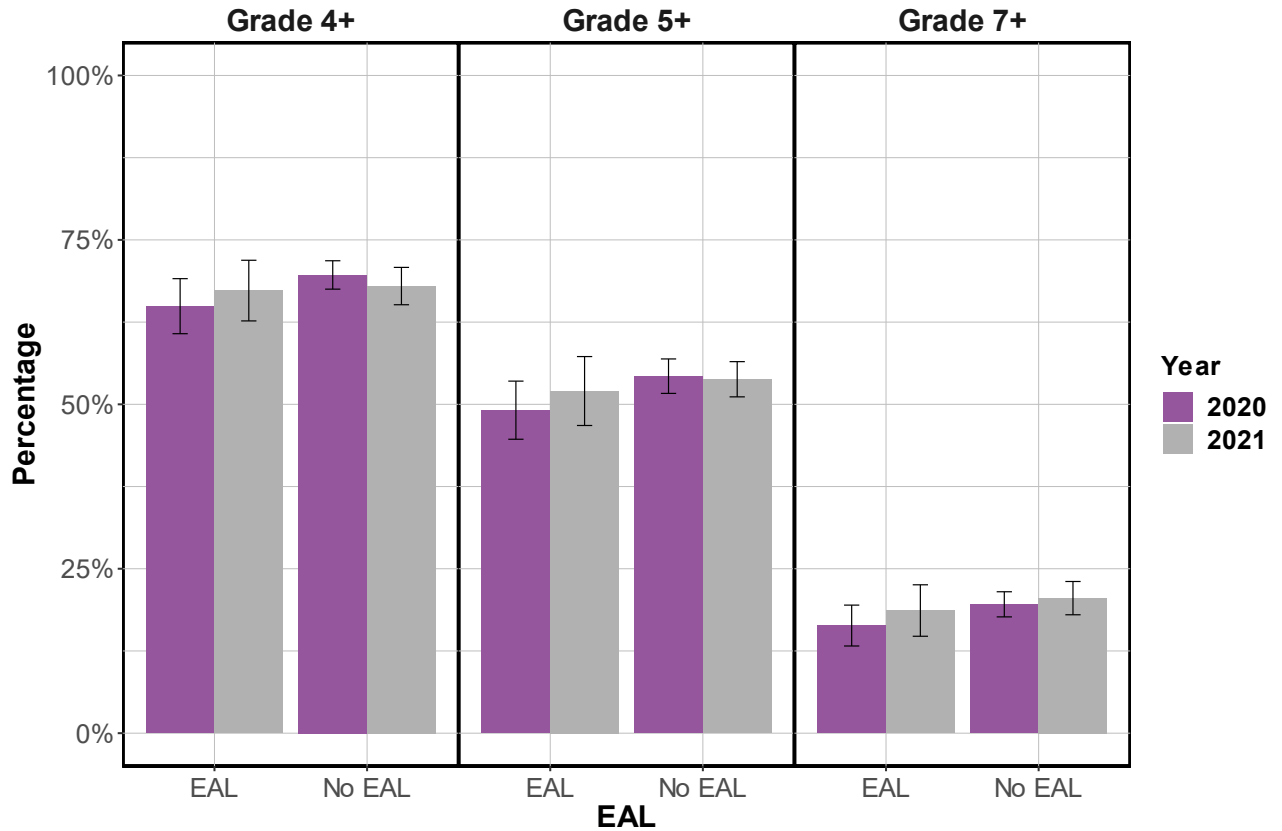
Figure 24 compares the performance of students from an ethnic minority group with those who are white, while Figure 25 breaks performance down into smaller ethnicity groups. As the sample sizes for individual groups are very small, the confidence intervals for some groups are very wide and comparison becomes difficult.

The performance gap between the two broad groups (white and ethnic minority) is very small in both years, and not significant. The gap did not change significantly between the years.

Figure 24   Proportion of students at each grade in the NRT each year by aggregated ethnicity – English
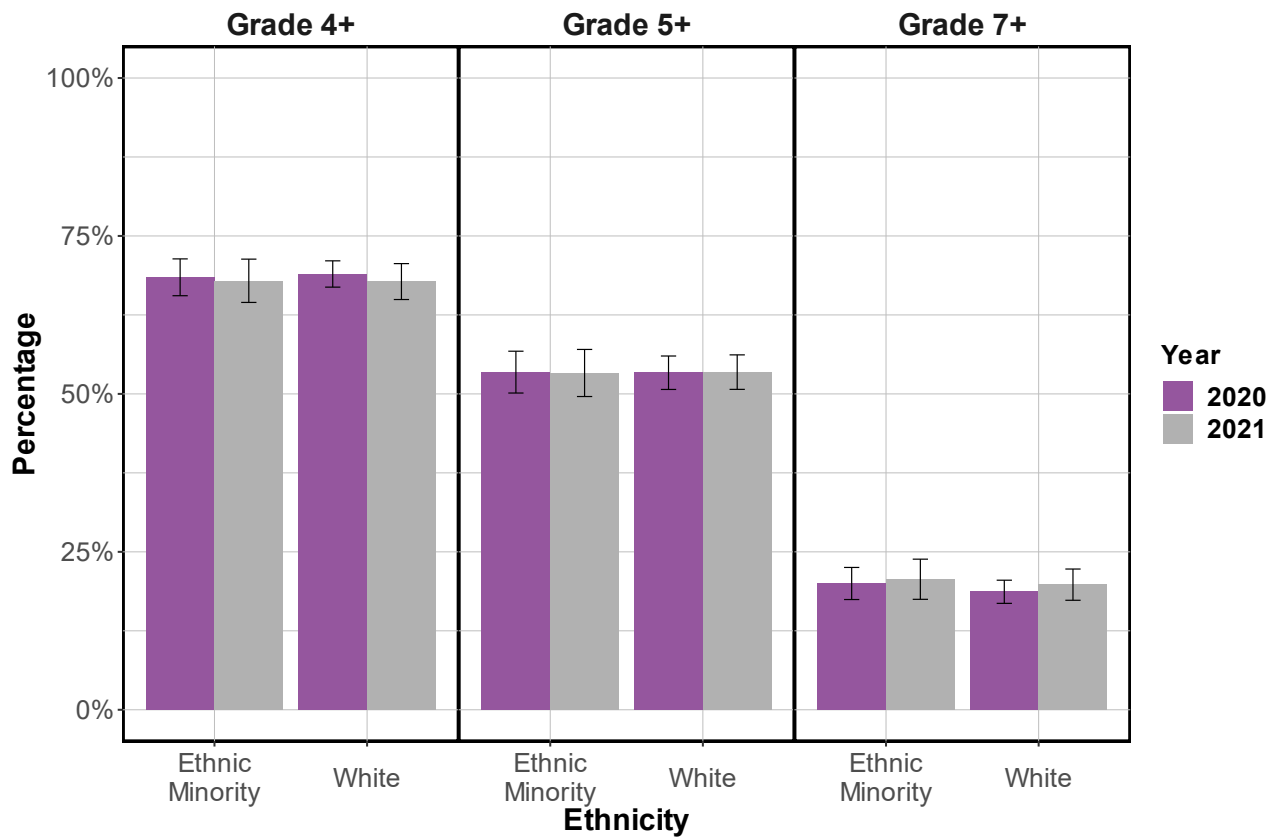
Figure 25 Proportion of students at each grade in the NRT each year by ethnicity – English
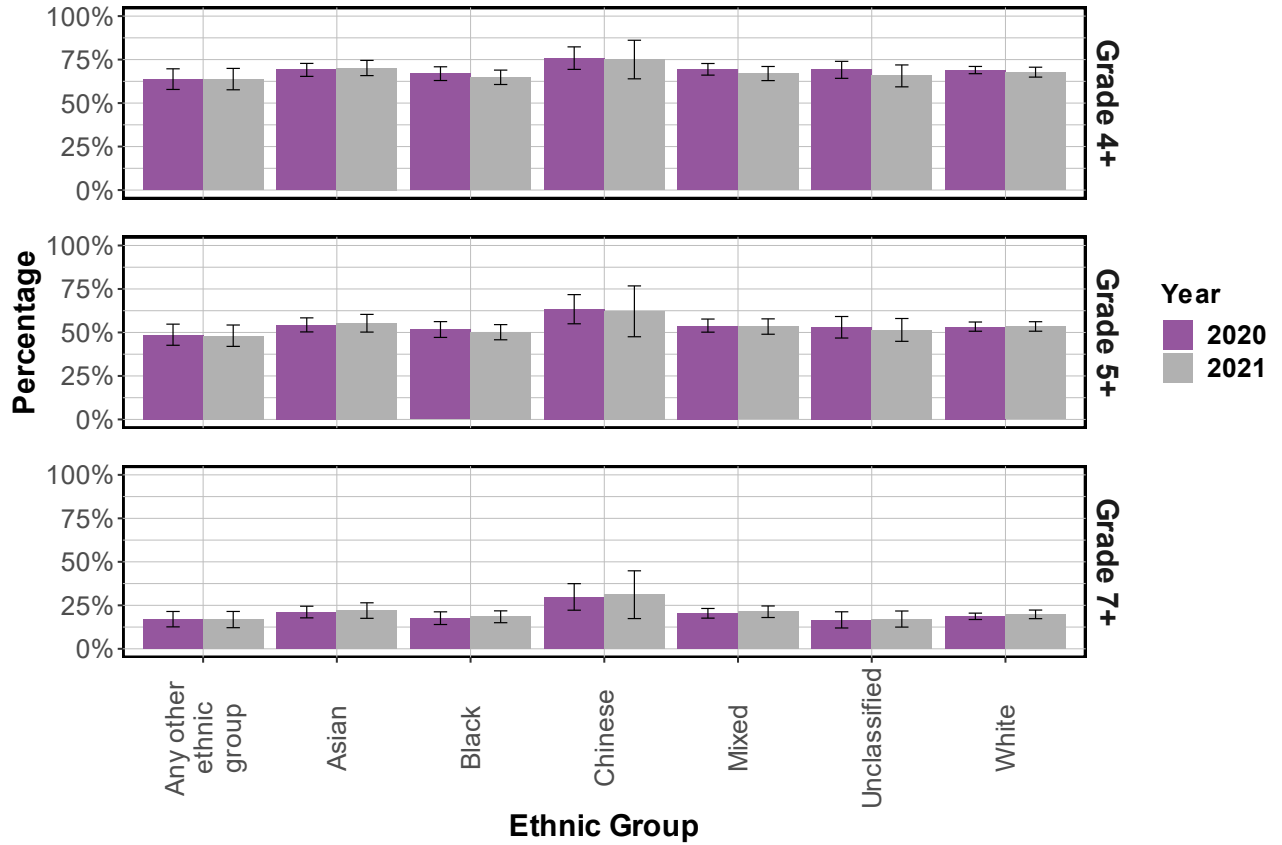
Figure 26   Proportion of students at each grade in the NRT each year by SEND – English
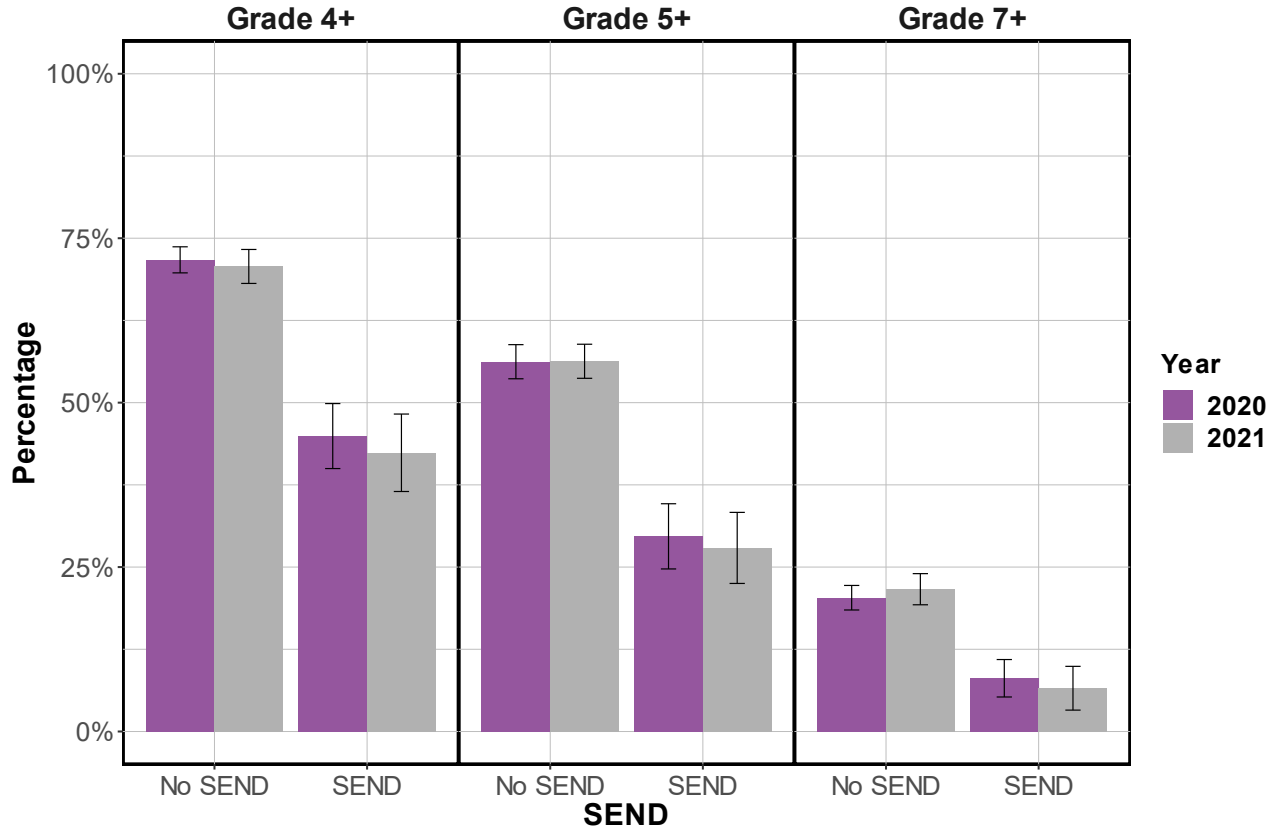
Figure 26 shows that students with SEND are less likely to achieve at or above each of the three grade points in both years. This gap in achievement at all grades did not change significantly between the years, despite appearing to have increased slightly.

Table 10   Proportion of students at each grade in the NRT each year by student demographics – English

Factor	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Gender Boys	2020	59.7 (57.1 to 62.3)	43.8 (40.6 to 47.1)	13.8 (11.9 to 15.7)
Gender Boys	2021	60.6 (57.1 to 64.1)	46.3 (42.7 to 49.8)	16.2 (13.5 to 18.9)
Gender Girls	2020	77.9 (75.4 to 80.3)	62.8 (60.0 to 65.7)	24.2 (21.5 to 27.0)
Gender Girls	2021	75.7 (72.7 to 78.6)	61.2 (57.9 to 64.5)	24.3 (20.7 to 27.9)
Gender gap (Girls - boys)	2020	18.1 (14.6 to 21.7)	19.0 (14.7 to 23.3)	10.4 (7.0 to 13.8)
Gender gap (Girls - boys)	2021	15.1 (10.5 to 19.6)	14.9 (10.1 to 19.7)	8.1 (3.6 to 12.6)
Change in gender gap	Change	-3.1 (-8.8 to 2.7)	-4.1 (-10.5 to 2.4)	-2.3 (-7.9 to 3.3)
English as an additional language (EAL) No EAL	2020	69.7 (67.5 to 71.8)	54.3 (51.7 to 56.9)	19.6 (17.7 to 21.5)
English as an additional language (EAL) No EAL	2021	68.0 (65.1 to 70.8)	53.8 (51.1 to 56.5)	20.5 (18.0 to 23.1)
English as an additional language (EAL) EAL	2020	64.9 (60.7 to 69.1)	49.1 (44.7 to 53.5)	16.4 (13.3 to 19.5)
English as an additional language (EAL) EAL	2021	67.3 (62.7 to 71.9)	52.0 (46.8 to 57.3)	18.6 (14.7 to 22.6)
EAL gap (No EAL – EAL)	2020	4.7 (0.0 to 9.5)	5.2 (0.0 to 10.3)	3.2 (-0.4 to 6.9)
EAL gap (No EAL – EAL)	2021	0.7 (-4.7 to 6.1)	1.8 (-4.1 to 7.7)	1.9 (-2.8 to 6.5)
Change in EAL gap	Change	-4.1 (-11.2 to 3.1)	-3.4 (-11.2 to 4.4)	-1.3 (-7.3 to 4.6)

Factor	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Ethnicity Ethnic minority (all groups other than white aggregated)	2020	68.5 (65.5 to 71.4)	53.4 (50.1 to 56.8)	20.0 (17.5 to 22.5)
Ethnicity Ethnic minority (all groups other than white aggregated)	2021	67.9 (64.5 to 71.3)	53.3 (49.6 to 57.0)	20.7 (17.5 to 23.8)
Ethnicity White	2020	69.0 (66.9 to 71.1)	53.4 (50.7 to 56.0)	18.7 (16.8 to 20.5)
Ethnicity White	2021	67.8 (64.9 to 70.6)	53.4 (50.7 to 56.2)	19.8 (17.3 to 22.3)
Ethnicity Asian	2020	69.1 (65.3 to 72.8)	54.3 (50.3 to 58.4)	21.1 (17.8 to 24.5)
Ethnicity Asian	2021	70.2 (65.8 to 74.5)	55.3 (50.2 to 60.4)	22.0 (17.5 to 26.4)
Ethnicity Black	2020	66.9 (63.0 to 70.9)	51.7 (47.1 to 56.2)	17.6 (14.0 to 21.3)
Ethnicity Black	2021	64.8 (60.7 to 69.0)	50.1 (45.8 to 54.5)	18.4 (15.0 to 21.8)
Ethnicity Chinese	2020	75.8 (69.4 to 82.3)	63.4 (55.0 to 71.8)	29.8 (22.2 to 37.5)
Ethnicity Chinese	2021	75.0 (63.9 to 86.1)	62.1 (47.5 to 76.8)	31.1 (17.4 to 44.8)
Ethnicity Mixed	2020	69.4 (66.1 to 72.7)	53.9 (50.2 to 57.7)	20.4 (17.6 to 23.2)
Ethnicity Mixed	2021	67.0 (62.9 to 71.0)	53.4 (49.0 to 57.8)	21.3 (18.0 to 24.6)
Any other ethnic group	2020	63.8 (57.8 to 69.7)	48.7 (42.6 to 54.8)	17.0 (12.6 to 21.5)

Factor	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Any other ethnic group	2021	63.8 (57.6 to 69.9)	48.1 (42.0 to 54.3)	16.8 (12.2 to 21.5)
Ethnicity gap (White – minority ethnic group)	2020	0.5 (-3.1 to 4.1)	-0.1 (-4.3 to 4.1)	-1.3 (-4.4 to 1.8)
Ethnicity gap (White – minority ethnic group)	2021	-0.1 (-4.6 to 4.3)	0.1 (-4.5 to 4.8)	-0.9 (-4.9 to 3.2)
Change in ethnicity gap	Change	-0.7 (-6.4 to 5.1)	0.2 (-6.0 to 6.5)	0.5 (-4.6 to 5.6)
Special educational needs and disabilities (SEND) No SEND	2020	71.7 (69.7 to 73.7)	56.2 (53.6 to 58.8)	20.3 (18.5 to 22.2)
Special educational needs and disabilities (SEND) No SEND	2021	70.7 (68.1 to 73.3)	56.3 (53.7 to 58.9)	21.6 (19.3 to 24.0)
SEND	2020	44.9 (40.0 to 49.9)	29.7 (24.7 to 34.6)	8.1 (5.2 to 10.9)
SEND	2021	42.4 (36.5 to 48.3)	27.9 (22.5 to 33.3)	6.6 (3.3 to 9.9)
SEND gap (No SEND – SEND)	2020	26.8 (21.5 to 32.1)	26.6 (21.0 to 32.1)	12.2 (8.8 to 15.6)
SEND gap (No SEND – SEND)	2021	28.3 (21.9 to 34.8)	28.4 (22.4 to 34.4)	15.1 (11.0 to 19.1)
Change in SEND gap	Change	1.5 (-6.8 to 9.9)	1.8 (-6.4 to 10.0)	2.8 (-2.5 to 8.1)

4.3.2   Mathematics

Figures 27 to 31 show the percentage of students in the 2020 and 2021 samples estimated to have demonstrated a level of ability in mathematics equivalent to achieving grade 4 and above, grade 5 and above or grade 7 and above at GCSE, broken down by various student demographics. The values are also provided in Table 11, along with estimates of the gaps between groups of students, the change in that gap between 2020 and 2021, and all associated confidence

intervals. Figure 27 shows that the pattern for gender in mathematics is somewhat mixed. There was no significant difference between boys and girls at any of the grade boundaries in 2020; in 2021 a significantly higher proportion of boys attained grade 7 and above than girls, but there were no significant differences for the other grades. The decline in performance appeared to have been greater for girls than boys but the change in the gender gap was not significant at any of the grade boundaries.

Figure 27   Proportion of students at each grade in the NRT each year by gender - mathematics
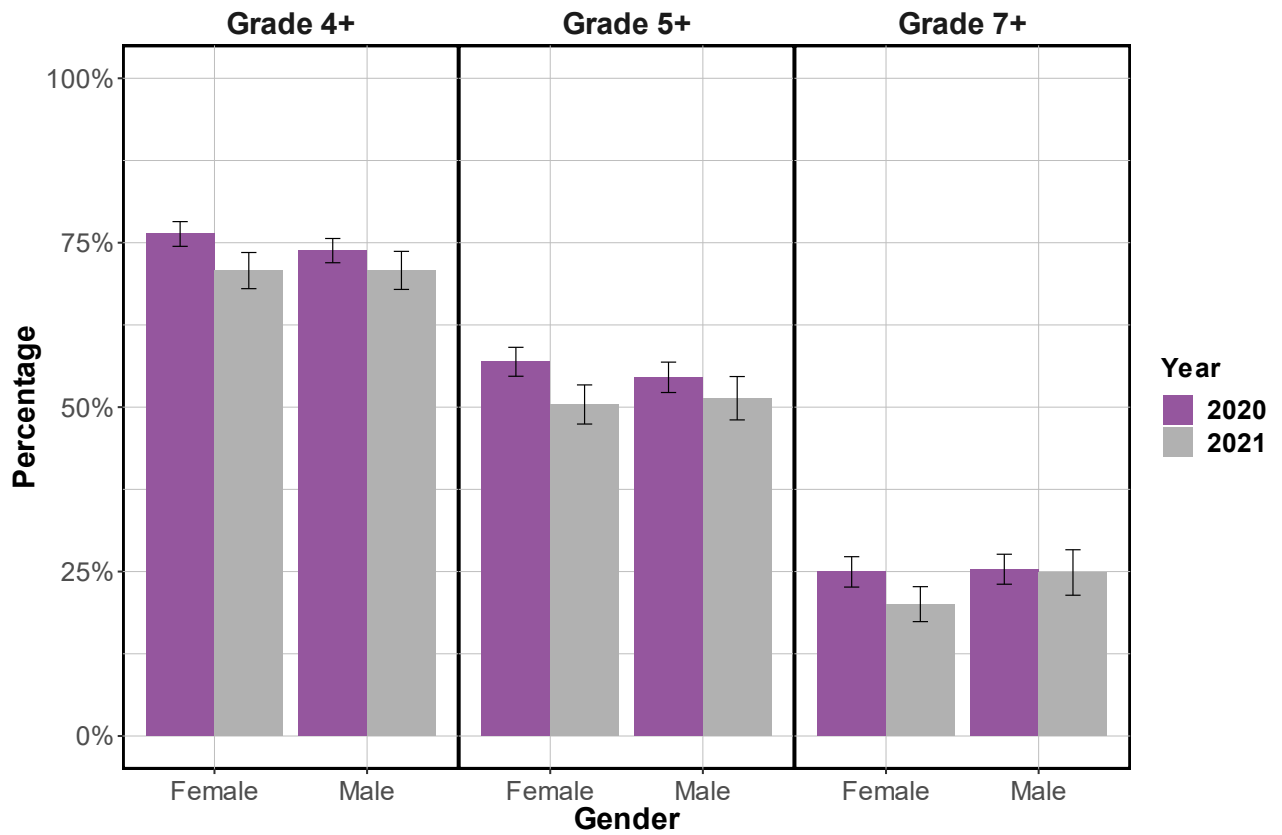
Figure 28 appears to suggest that the drop in performance in 2021 was bigger for students with EAL than for those without but these changes in the gaps between groups were not statistically significant.

Figure 28   Proportion of students at each grade in the NRT each year by EAL - mathematics
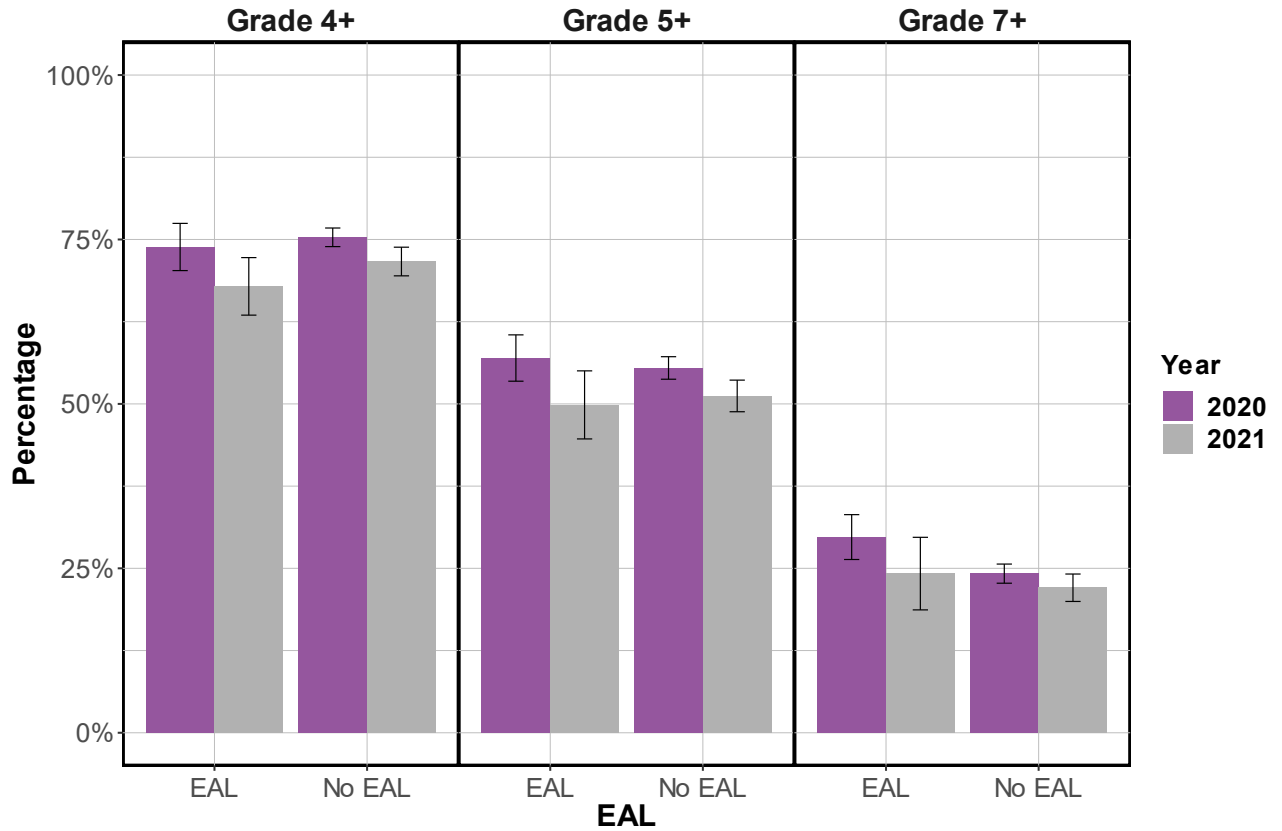
Figure 29 compares the performance of students from ethnic minority groups with those who are white, while Figure 30 breaks performance down further into smaller groups. The changes in the gaps between students who are white and those from minority ethnic groups were not statistically significant, despite the chart suggesting a slightly bigger performance drop for students in ethnic minority groups at the grade 7 boundary.

Figure 29   Proportion of students at each grade in the NRT each year by aggregated ethnicity - mathematics
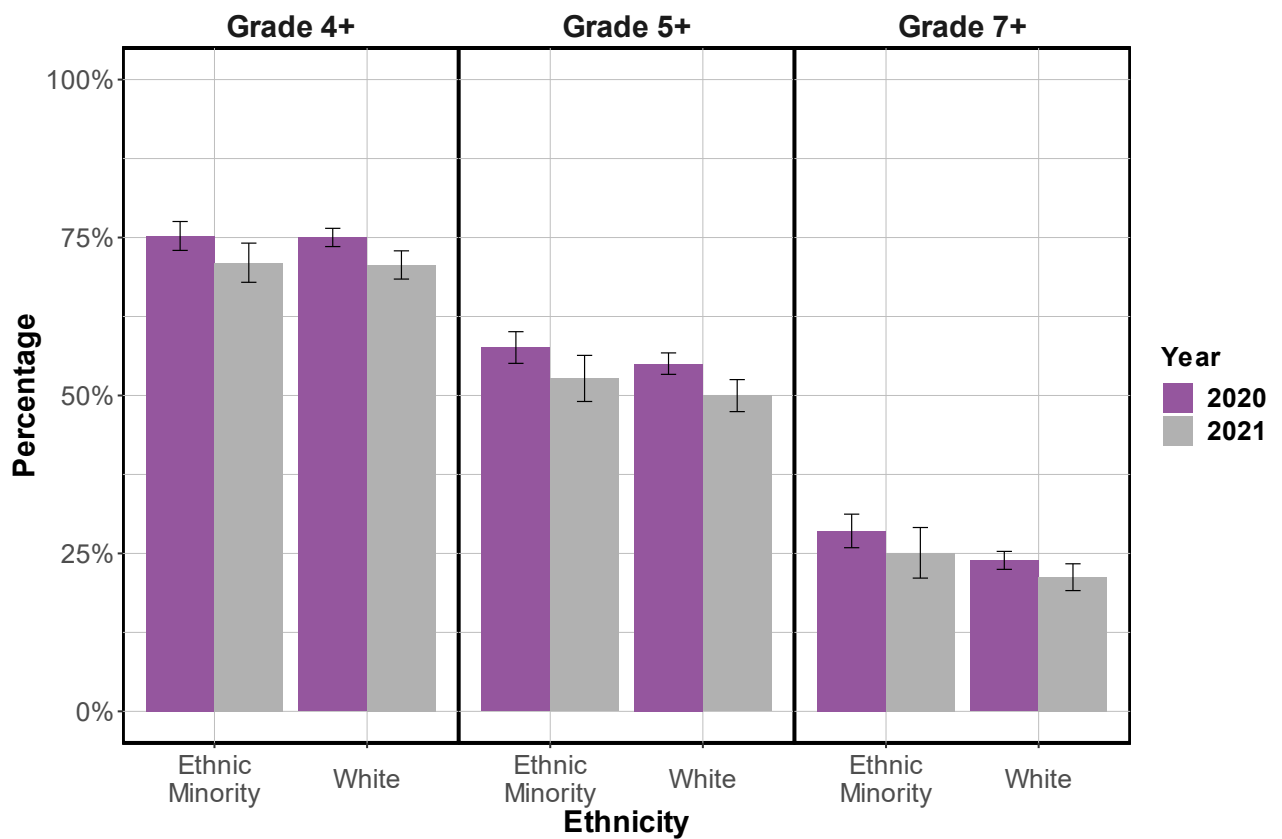
Figure 30 Proportion of students at each grade in the NRT each year by ethnicity - mathematics
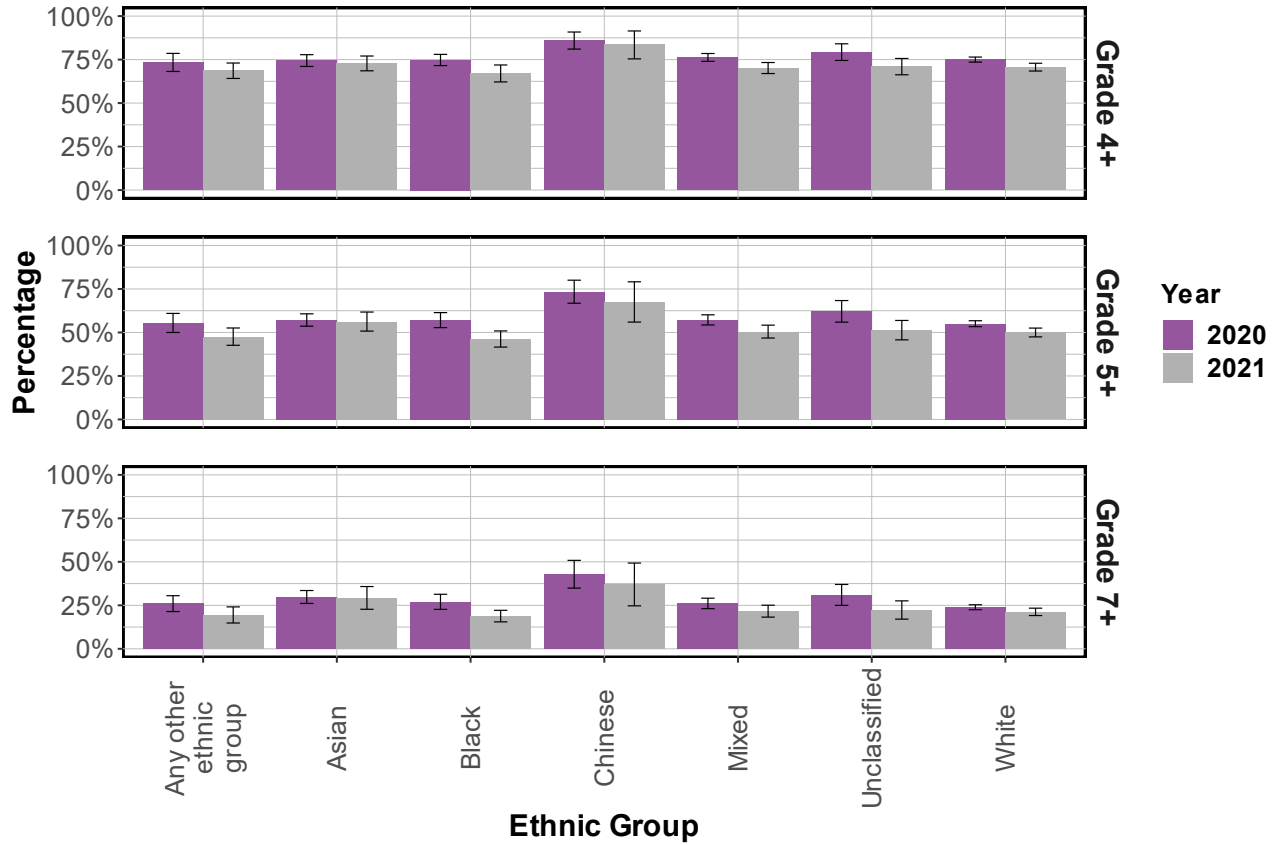
Figure 31 shows that students with SEND were less likely to achieve at or above each of the three grade points in both years. However, their performance changed very little between the years despite the overall drop in performance for the sample as a whole. Although there appears to have been a reduction in the gaps between the groups, the changes are not statistically significant, largely due to the wider confidence intervals around the estimates for SEND students due to their smaller sample size (they comprise around 10 per cent of the sample).

Figure 31   Proportion of students at each grade in the NRT each year by SEND - mathematics
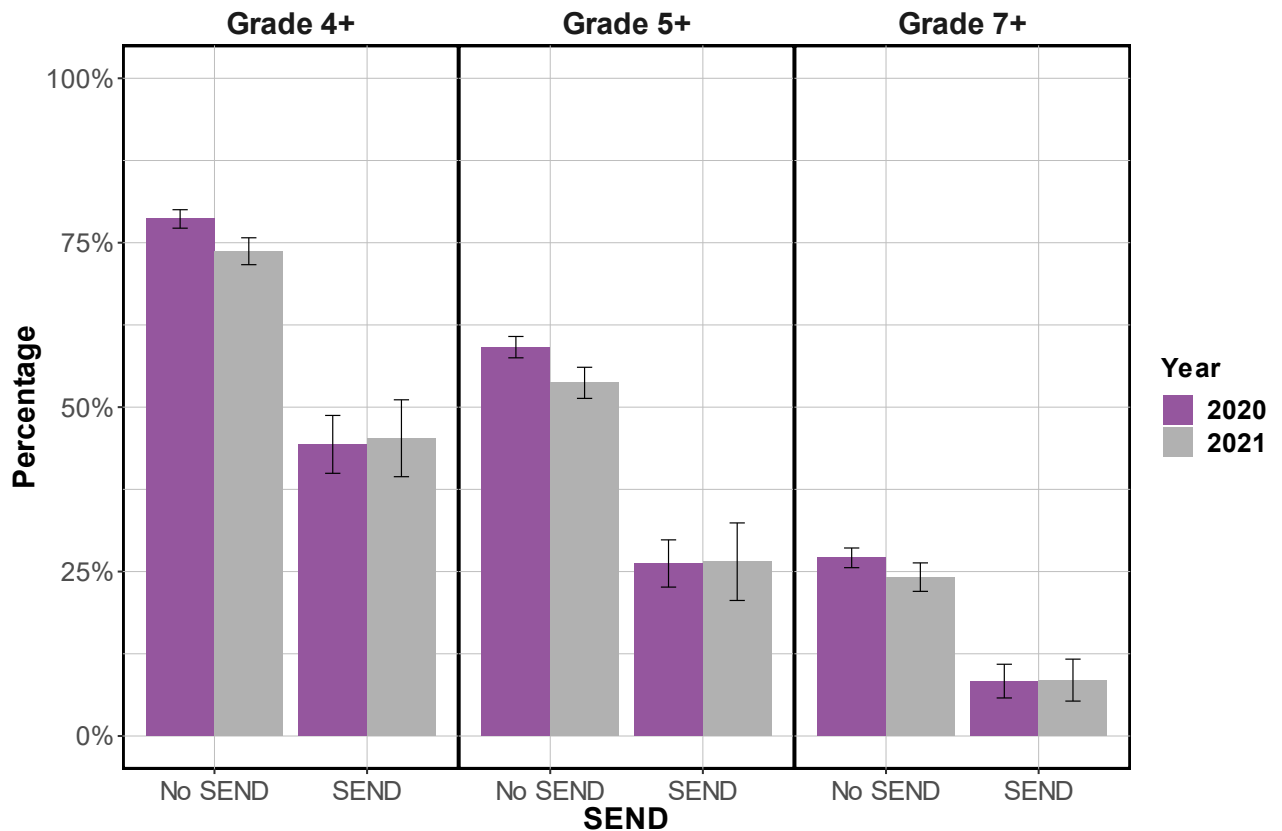
Table 11   Proportion of students at each grade in the NRT each year by student demographics – mathematics

Factor	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Gender Boys	2020	73.8 (72.0 to 75.6)	54.5 (52.2 to 56.8)	25.4 (23.1 to 27.6)
Gender Boys	2021	70.8 (67.9 to 73.7)	51.4 (48.1 to 54.7)	24.9 (21.4 to 28.3)
Gender Girls	2020	76.3 (74.4 to 78.2)	56.9 (54.7 to 59.1)	25.0 (22.6 to 27.3)
Gender Girls	2021	70.8 (68.0 to 73.5)	50.4 (47.4 to 53.4)	20.0 (17.4 to 22.7)
Gender gap (Girls - boys)	2020	2.5 (-0.1 to 5.2)	2.4 (-0.8 to 5.6)	-0.4 (-3.6 to 2.8)
Gender gap (Girls - boys)	2021	0.0 (-4.0 to 4.0)	-1.0 (-5.4 to 3.5)	-4.8 (-9.2 to -0.5)
Change in gender gap	Change	-2.6 (-7.3 to 2.2)	-3.3 (-8.8 to 2.2)	-4.4 (-9.8 to 1.0)
English as an additional language (EAL) No EAL	2020	75.3 (73.9 to 76.7)	55.5 (53.8 to 57.2)	24.2 (22.7 to 25.6)
English as an additional language (EAL) No EAL	2021	71.6 (69.5 to 73.8)	51.2 (48.8 to 53.6)	22.0 (20.0 to 24.1)
English as an additional language (EAL) EAL	2020	73.9 (70.3 to 77.4)	57.0 (53.5 to 60.5)	29.8 (26.3 to 33.2)
English as an additional language (EAL) EAL	2021	67.9 (63.5 to 72.2)	49.8 (44.7 to 55.0)	24.2 (18.7 to 29.7)

Factor	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
EAL gap (No EAL – EAL)	2020	1.5 (-2.4 to 5.3)	-1.5 (-5.4 to 2.4)	-5.6 (-9.3 to -1.9)
EAL gap (No EAL – EAL)	2021	3.8 (-1.1 to 8.7)	1.4 (-4.3 to 7.1)	-2.1 (-8.0 to 3.7)
Change in EAL gap	Change	2.3 (-3.9 to 8.5)	2.9 (-4.0 to 9.8)	3.4 (-3.6 to 10.4)
Ethnicity Ethnic minority (all groups other than white aggregated)	2020	75.3 (73.0 to 77.5)	57.6 (55.1 to 60.1)	28.6 (25.9 to 31.2)
Ethnicity Ethnic minority (all groups other than white aggregated)	2021	71.0 (67.9 to 74.1)	52.7 (49.0 to 56.3)	25.1 (21.1 to 29.1)
Ethnicity White	2020	75.0 (73.6 to 76.5)	55.0 (53.3 to 56.7)	23.9 (22.5 to 25.3)
Ethnicity White	2021	70.7 (68.4 to 72.9)	50.0 (47.4 to 52.5)	21.2 (19.1 to 23.4)
Ethnicity Asian	2020	74.4 (71.1 to 77.8)	57.1 (53.6 to 60.7)	29.8 (26.1 to 33.5)
Ethnicity Asian	2021	72.8 (68.6 to 77.1)	56.3 (50.8 to 61.7)	29.3 (22.7 to 35.8)
Ethnicity Black	2020	74.8 (71.6 to 78.0)	57.1 (52.8 to 61.4)	27.0 (22.7 to 31.3)
Ethnicity Black	2021	67.0 (62.2 to 71.9)	46.2 (41.6 to 50.9)	18.8 (15.5 to 22.1)
Ethnicity Chinese	2020	85.9 (81.0 to 90.8)	73.4 (66.8 to 80.0)	42.9 (34.9 to 50.8)
Ethnicity Chinese	2021	83.4 (75.4 to 91.5)	67.5 (56.0 to 79.1)	37.0 (24.7 to 49.3)

Factor	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Ethnicity Mixed	2020	76.2 (74.0 to 78.5)	57.2 (54.3 to 60.1)	26.1 (23.1 to 29.1)
Ethnicity Mixed	2021	70.1 (67.0 to 73.3)	50.5 (46.8 to 54.2)	21.6 (18.2 to 25.1)
Any other ethnic group	2020	73.4 (68.2 to 78.6)	55.5 (50.0 to 60.9)	26.0 (21.4 to 30.5)
Any other ethnic group	2021	68.6 (64.2 to 73.0)	47.6 (42.6 to 52.6)	19.5 (14.8 to 24.1)
Ethnicity gap (White – minority ethnic group)	2020	-0.2 (-2.9 to 2.5)	-2.5 (-5.6 to 0.5)	-4.7 (-7.7 to -1.6)
Ethnicity gap (White – minority ethnic group)	2021	-0.4 (-4.2 to 3.5)	-2.7 (-7.2 to 1.7)	-3.9 (-8.4 to 0.7)
Change in ethnicity gap	Change	-0.1 (-4.8 to 4.6)	-0.2 (-5.5 to 5.2)	0.8 (-4.6 to 6.2)
Special educational needs and disabilities (SEND) No SEND	2020	78.6 (77.2 to 80.0)	59.1 (57.5 to 60.7)	27.1 (25.6 to 28.6)
Special educational needs and disabilities (SEND) No SEND	2021	73.7 (71.7 to 75.8)	53.7 (51.3 to 56.1)	24.2 (22.0 to 26.3)
SEND	2020	44.3 (39.9 to 48.7)	26.2 (22.6 to 29.8)	8.3 (5.8 to 10.9)
SEND	2021	45.3 (39.4 to 51.1)	26.5 (20.6 to 32.4)	8.5 (5.3 to 11.7)
SEND gap (No SEND – SEND)	2020	34.3 (29.7 to 38.9)	32.9 (29.0 to 36.8)	18.7 (15.8 to 21.7)
SEND gap (No SEND – SEND)	2021	28.4 (22.2 to 34.6)	27.2 (20.8 to 33.5)	15.7 (11.8 to 19.5)
Change in SEND gap	Change	-5.8 (-13.6 to 1.9)	-5.7 (-13.2 to 1.8)	-3.1 (-7.9 to 1.8)

4.3.3   Regression outputs

Figures 32 and 33 show the estimates of the coefficients for student characteristics from the three logistic regressions. Figure 32 shows that gender (being female) is a significant predictor of performance at all three grade boundaries in English. However, the interaction term is not significant, so the relationship did not change between 2020 and 2021. Having SEND is a significant predictor of the likelihood of achieving grade 4 and above in English, with the negative coefficient indicating that students with SEND are less likely to achieve the grade. None of the other variables or their interactions were significant. Although it may appear counterintuitive that a variable such as having SEND only appears as a significant predictor for one grade, particularly given the plots seen in the previous sub-sections, this is likely to be due to there being variables such as KS2 prior attainment in the model, which will also be strongly related to variables such as SEND.

Figure 32   Regression coefficients for student demographic variables - English
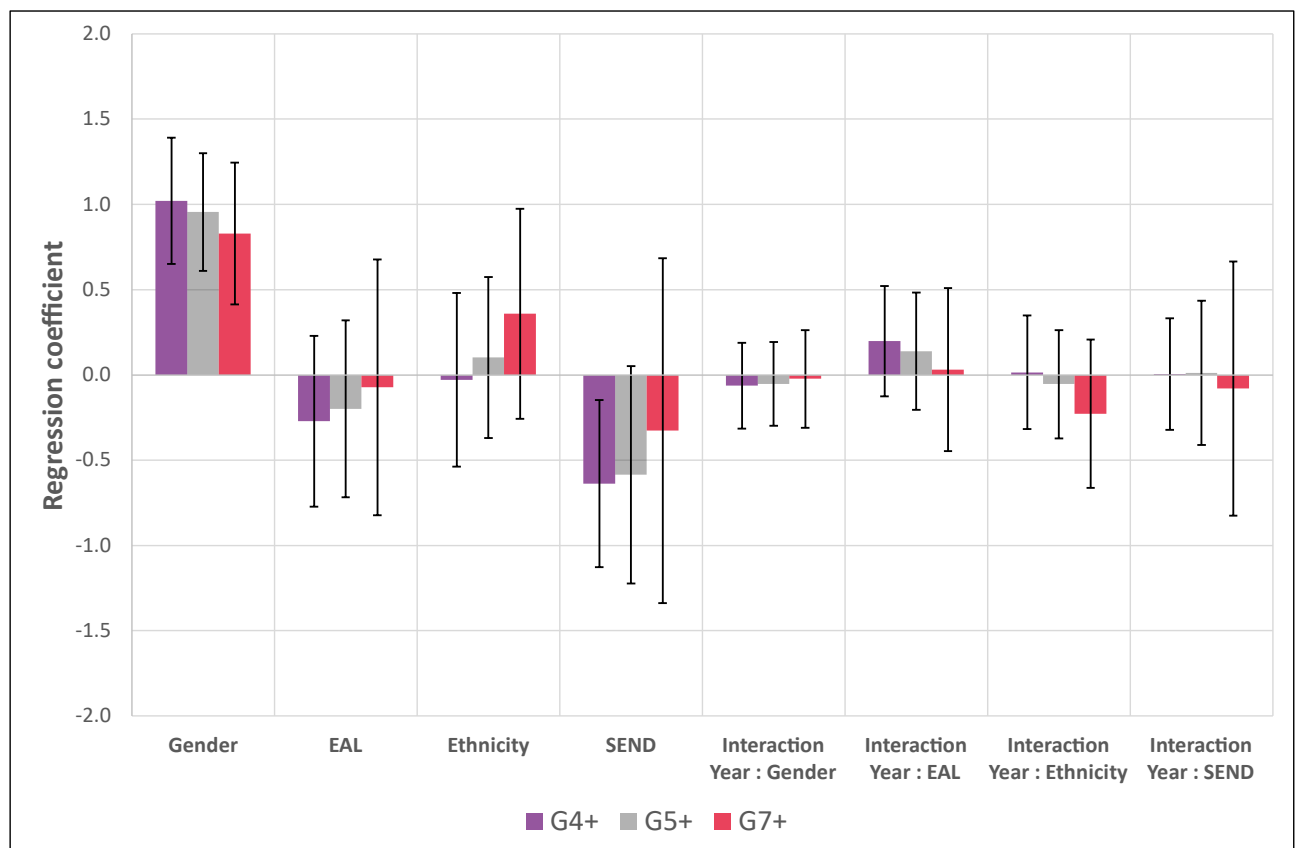
Figure 33 shows that, for mathematics, having EAL significantly increases the likelihood of achieving grades 5 and 7 and above, while having SEND significantly decreases the likelihood of achieving at least grades 4 and 5. The interaction between year and EAL is a significant predictor of achieving grade 7 and above. The coefficient is negative, confirming the larger drop seen for students with EAL in Figure 28 in the previous section. Although this effect was not statistically

significant when the sub-groups were compared directly, the fact that it has been identified as significant in the logistic regression model shows that there is a strong relationship once other factors have been taken into account. The regression coefficient for EAL in 2020 was 1.20, which can be converted to an odds ratio of 3.32. The regression coefficient for EAL in 2021 (from the interaction term) was -0.54, which can be converted to an odds ratio of 0.58. This means that the odds ratio for students classified as EAL compared with students without EAL reduced by about 40 per cent in 2021.

Figure 33   Regression coefficients for student demographic variables - mathematics
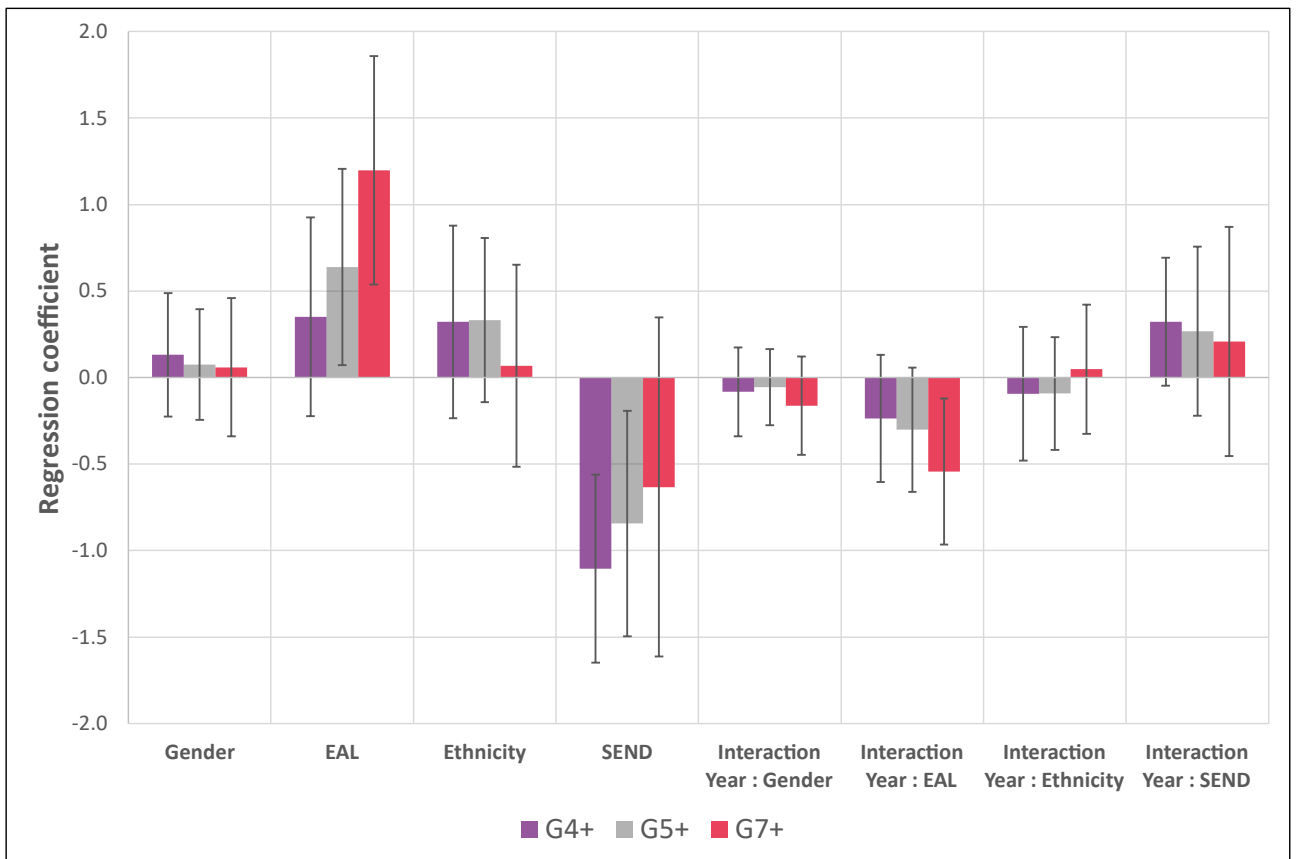
To help put the regression coefficients into context, we can consider a worked example where all variables remain constant other than the year and the variable of interest. Consider a sub-group of students who have never been eligible for free school meals, do not have SEND, are white males and achieved average levels of prior attainment at Key Stage 2. They attend local authority-maintained schools of average size, located in an urban area of the East Midlands, with average historical GCSE performance, average levels of FSM eligibility and average absence rates in the autumn term prior to taking the NRT. These students differ in terms of which year they took the NRT and in their EAL status. The interaction plot in Figure 34 shows the relationship between the EAL status of the student and the estimated likelihood of achieving grade 7 and above in the NRT. It shows that for students without EAL, the likelihood of them achieving grade 7 and above did not change between the two years, while for students with EAL the likelihood of achieving the grade

was reduced in 2021 relative to 2020. It also suggests that, in 2020, students with EAL were more likely to achieve grade 7 and above than students without EAL (all else being equal), while in 2021 the two groups had similar likelihood of achieving the grade.

Figure 34   Likelihood of achieving grade 7 and above by student EAL status
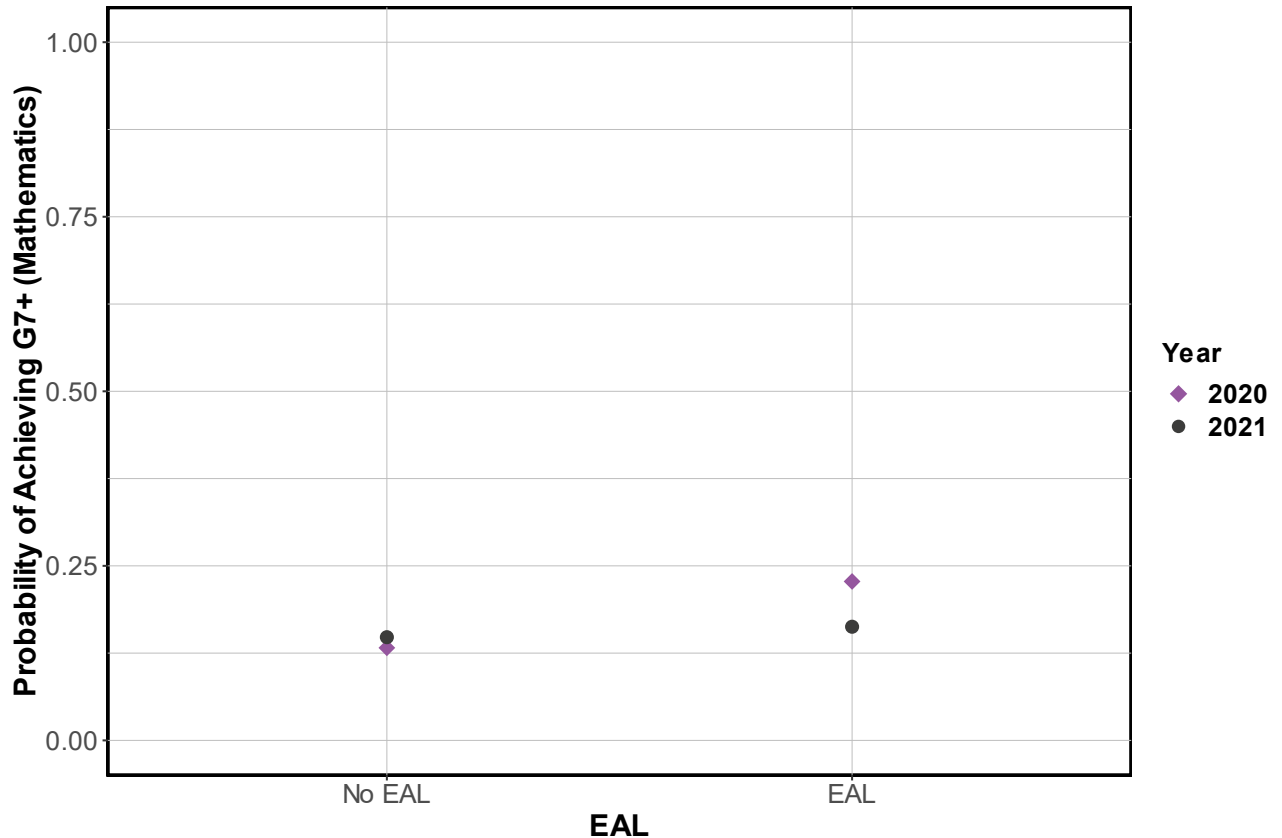
For the purpose of this plot all binary variables (FSME, Ethnicity, SEND, gender, urban/rural and region dummy variables) were set to 0, continuous variables (historical GCSE performance, percentage of pupils eligible for FSM, school size and absence rate) were set to their mean values and KS2 performance was set to quintile 3. Note that the Y axis represents the modelled probability arising from the logistic regression model and, as such, contains error.

4.3.4   Summary

The data described in this section shows that, while there are some cases of the gaps between groups based on student demographics changing, in the main, the changes were not at a level to be considered statistically significant.

There was one significant interaction term in the logistic regression models, which showed a significant drop in the proportion of students with EAL achieving grade 7 and above in mathematics relative to students with English as a first language. The odds ratio for having EAL compared with not having EAL reduced by about 40 per cent in 2021. This means that, although more students with EAL achieved grade 7 in both years, the gap in likelihood of achieving that grade between EAL and non-EAL students was reduced relative to that which existed in 2020.

4.4 School characteristics

Performance was compared based on school type, size and being defined as urban or rural. Note that historically, very few independent schools have tended to take part in the NRT and none took part in 2021. This means that, unfortunately, the school type comparisons in this section do not enable us to make comparisons of the effect of the pandemic on state schools compared with independent schools.

4.4.1 English

Differences, both between school types and in the gap over time, were very small and not statistically significant.

Figure 35 appears to show that students in independent schools performed slightly better than state schools in 2020, but the confidence interval is very wide (rendering the difference non-significant) due to the small number of independent schools taking part in 2020. In addition, no comparison is available for 2021. Across the other broad school types of academies, free schools and local authority-maintained schools, there appear to be only very small differences. The groups are aggregated in Figure 36 to allow comparison of LA maintained schools against the other school types but, again, no significant differences were identified.

Figure 35   Proportion of students at each grade in the NRT each year by school type - English
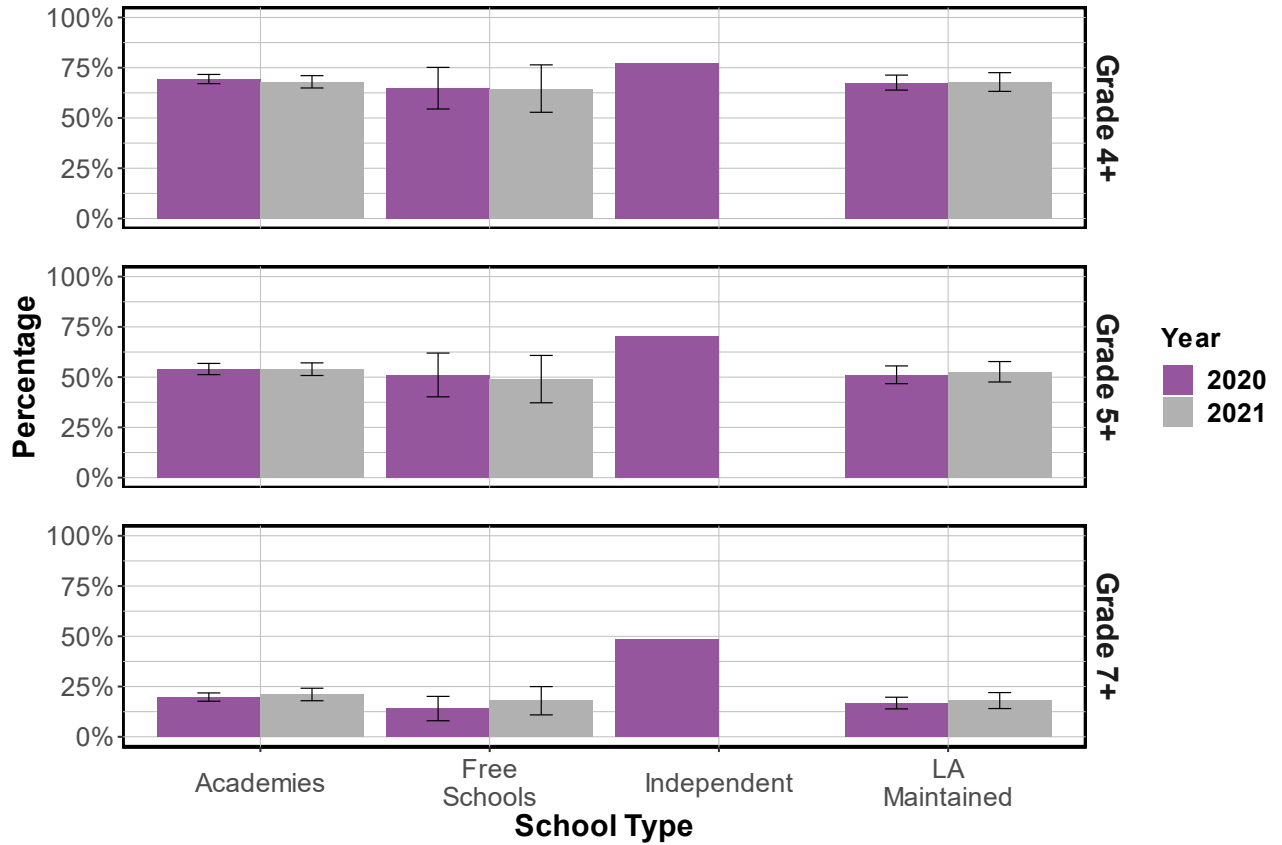
Confidence intervals are not provided for independent schools because they are too wide to display due to the small number of independent schools taking part in the NRT.

Figure 36   Proportion of students at each grade in the NRT each year by school type aggregated - English

Figure 37 suggests that students in rural schools performed slightly better, on average, than those in urban schools but these small differences are not statistically significant and are similar across the years.

Figure 37 Proportion of students at each grade in the NRT each year by urban/rural English
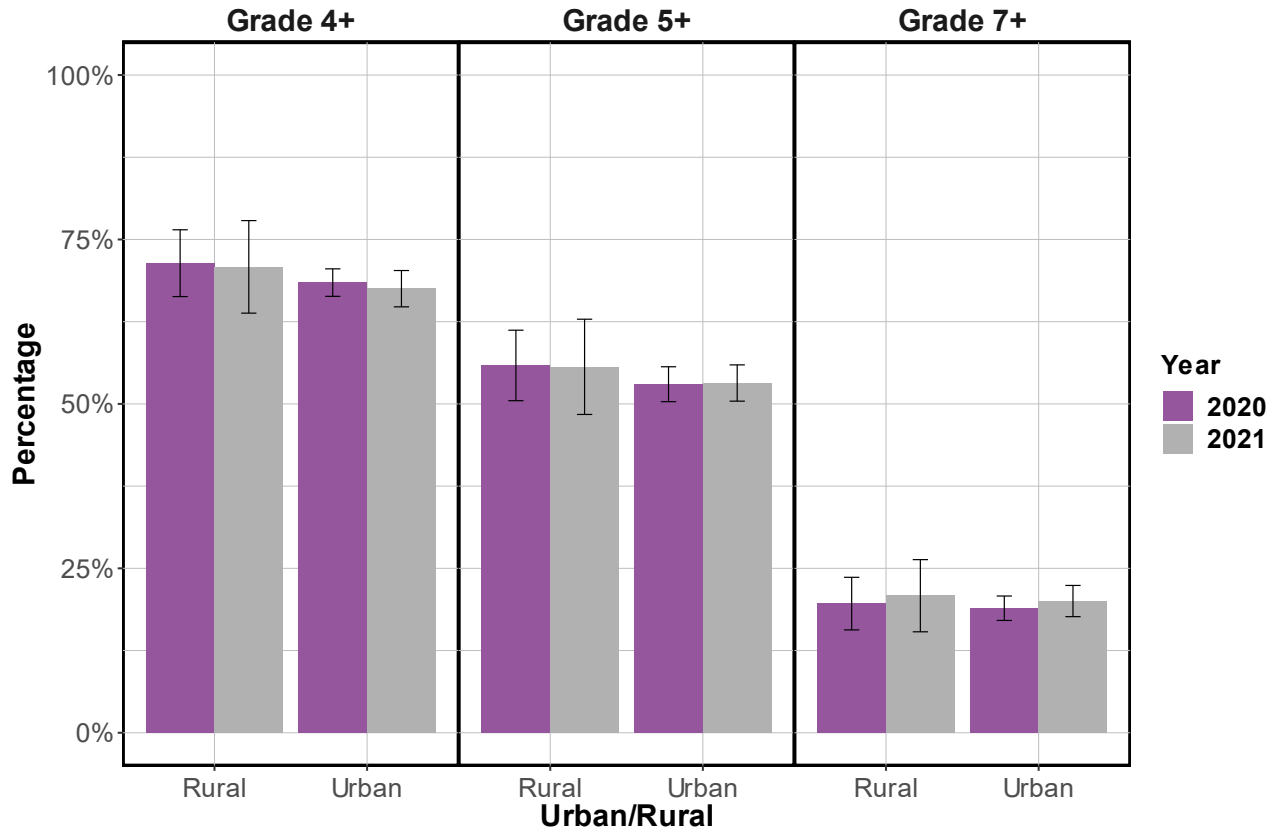
Table 12   Proportion of students at each grade in the NRT each year by school demographics - English

School type	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Academies	2020	69.4 (67.1 to 71.6)	54.0 (51.3 to 56.8)	19.8 (17.7 to 21.8)
Academies	2021	68.0 (64.9 to 71.1)	54.0 (50.8 to 57.1)	21.1 (17.9 to 24.2)
Free schools	2020	64.8 (54.5 to 75.2)	51.1 (40.2 to 62.0)	14.0 (8.0 to 20.1)
Free schools	2021	64.6 (52.8 to 76.4)	49.0 (37.3 to 60.8)	17.9 (10.9 to 25.0)
Independents	2020	77.3 (37.3 to 117.3)	70.6 (23.7 to 117.5)	48.5 (1.7 to 95.3)
Independents	2021	NA	NA	NA
Local authority maintained	2020	67.6 (63.9 to 71.3)	51.2 (46.7 to 55.6)	16.8 (13.9 to 19.7)
Local authority maintained	2021	67.9 (63.2 to 72.5)	52.7 (47.6 to 57.8)	18.0 (14.1 to 22.0)
Non LA maintained combined (academies / free schools / independents)	2020	69.2 (67.0 to 71.4)	54.0 (51.2 to 56.8)	19.7 (17.6 to 21.7)
Non LA maintained combined (academies / free schools / independents)	2021	67.8 (64.7 to 70.9)	53.7 (50.6 to 56.7)	20.9 (17.9 to 23.9)
School type gap (Academy / free school / independents – LA maintained)	2020	1.6 (-2.8 to 5.9)	2.8 (-2.4 to 8.0)	2.9 (-0.7 to 6.4)
School type gap (Academy / free school /	2021	-0.1 (-5.7 to 5.5)	1.0 (-4.9 to 6.9)	2.8 (-2.1 to 7.8)

School type	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
independents – LA maintained)				
Change in school type gap	Change	-1.7 (-8.7 to 5.4)	-1.8 (-9.7 to 6.1)	0.0 (-6.1 to 6.1)
Urban	2020	68.4 (66.4 to 70.5)	53.0 (50.3 to 55.6)	18.9 (17.1 to 20.8)
Urban	2021	67.5 (64.8 to 70.3)	53.2 (50.4 to 55.9)	20.0 (17.7 to 22.4)
Rural	2020	71.4 (66.3 to 76.5)	55.8 (50.5 to 61.2)	19.6 (15.6 to 23.6)
Rural	2021	70.8 (63.8 to 77.9)	55.6 (48.4 to 62.9)	20.8 (15.3 to 26.3)
Urban / rural gap (Rural – urban)	2020	3.0 (-2.5 to 8.4)	2.9 (-3.1 to 8.8)	0.7 (-3.7 to 5.1)
Urban / rural gap (Rural – urban)	2021	3.3 (-4.2 to 10.9)	2.5 (-5.3 to 10.2)	0.8 (-5.2 to 6.8)
Change in urban/rural gap	Change	0.4 (-9.0 to 9.7)	-0.4 (-10.2 to 9.4)	0.1 (-7.3 to 7.5)

Figure 38 shows performance broken down by quintiles of school size. Note that in the regression models this is included as a continuous variable (the number of students in the school divided by one thousand) but for ease of interpretation it is presented here in quintiles. The chart appears to indicate that students at larger schools had an increased likelihood of achieving each grade, although the gaps between schools in the largest and smallest bands were not all statistically significant. Although the gap between the band representing the largest schools and the band representing the smallest schools appears to have increased slightly, with small schools performing worse in 2021 and large schools performing better, the changes in the gap of 8.9, 9.8 and 7.0 percentage points respectively across the grades were not statistically significant.

Figure 38   Proportion of students at each grade in the NRT each year by school size - English

Table 13 **Proportion of students at each grade in the NRT each year by school size – English**

Bands of school size	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	63.5 (59.1 to 67.8)	47.7 (42.8 to 52.6)	16.1 (12.2 to 20.1)
Band 1	2021	56.9 (51.4 to 62.5)	41.4 (35.8 to 47.0)	12.1 (8.6 to 15.5)
Band 2	2020	67.0 (62.2 to 71.9)	51.9 (46.9 to 56.9)	18.3 (14.6 to 22.0)
Band 2	2021	64.8 (59.0 to 70.5)	50.4 (44.1 to 56.7)	18.2 (13.2 to 23.2)
Band 3	2020	68.1 (64.2 to 72.0)	52.8 (47.6 to 57.9)	18.8 (14.5 to 23.0)
Band 3	2021	68.3 (61.8 to 74.9)	54.0 (46.9 to 61.2)	20.8 (14.6 to 27.0)
Band 4	2020	72.4 (68.0 to 76.8)	56.7 (51.3 to 62.1)	20.7 (16.9 to 24.5)
Band 4	2021	72.1 (66.9 to 77.2)	58.3 (52.4 to 64.3)	24.2 (19.0 to 29.4)
Band 5	2020	72.5 (68.6 to 76.3)	57.0 (52.2 to 61.9)	20.8 (16.8 to 24.9)
Band 5	2021	74.9 (70.9 to 78.9)	60.5 (55.8 to 65.2)	23.8 (18.8 to 28.7)
School size gap (Band 5 – Band 1)	2020	9.0 (3.2 to 14.8)	9.3 (2.4 to 16.2)	4.7 (-0.9 to 10.3)
School size gap (Band 5 – Band 1)	2021	17.9 (11.1 to 24.8)	19.1 (11.8 to 26.5)	11.7 (5.7 to 17.8)
Change in school size gap	Change	8.9 (-0.1 to 17.9)	9.8 (-0.3 to 19.9)	7.0 (-1.2 to 15.3)

4.4.2　Mathematics

Figure 39 appears to show, as for English, that the small number of independent schools which took part in 2020 performed better than other school types but, again, the confidence intervals are very wide, and no comparison is available for independent schools in 2021. As for English, there are no significant changes in the gap between different school types from 2020 to 2021. In 2020 there were significant differences in the proportion of students at or above the grade 5 and 7 boundaries in local authority-maintained schools compared with other school types; the smaller sample size and non-participation of independent schools in 2021 will have contributed to these differences no longer being significant.

Figure 39　Proportion of students at each grade in the NRT each year by school type - mathematics

Confidence intervals are not provided for independent schools at grades 4 and 5 because they are too wide to display due to the small number of independent schools taking part in the NRT.

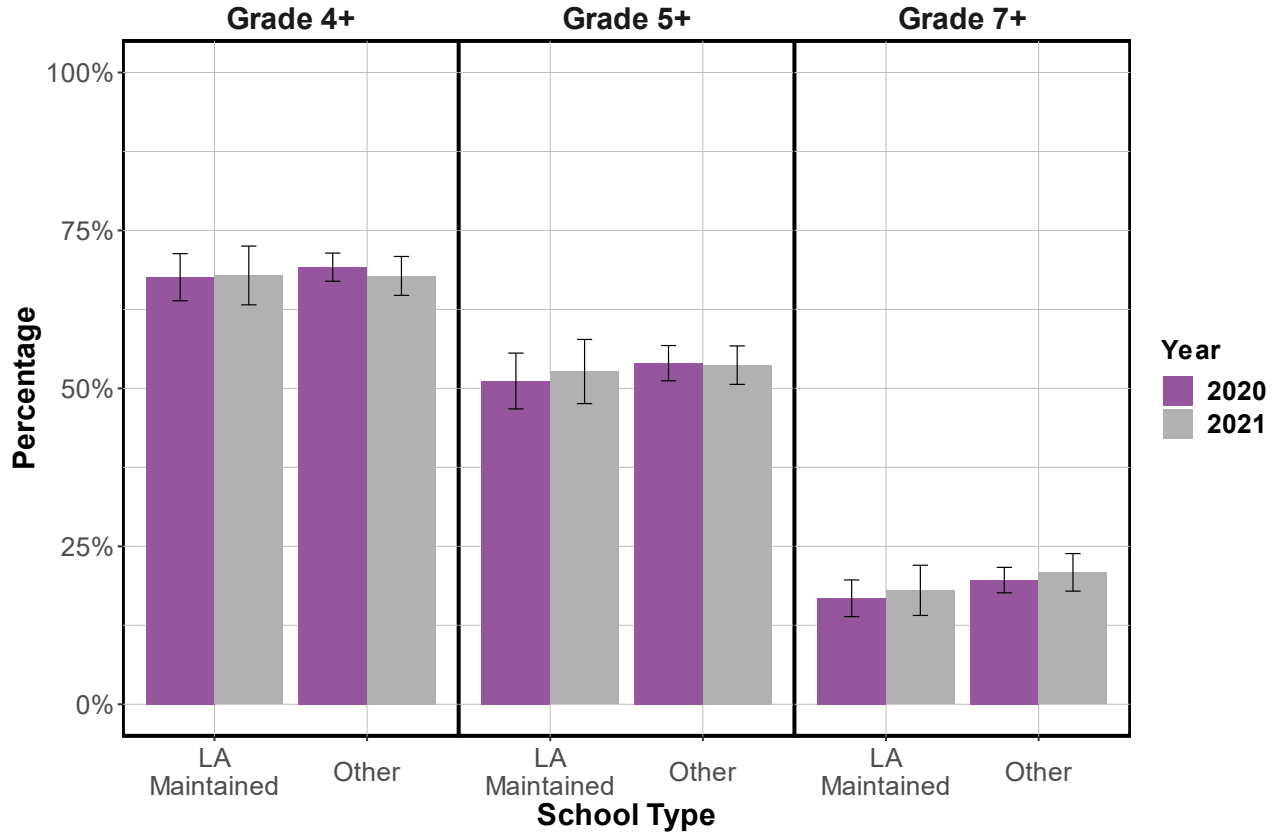**Figure 40   Proportion of students at each grade in the NRT each year by school type aggregated - mathematics**
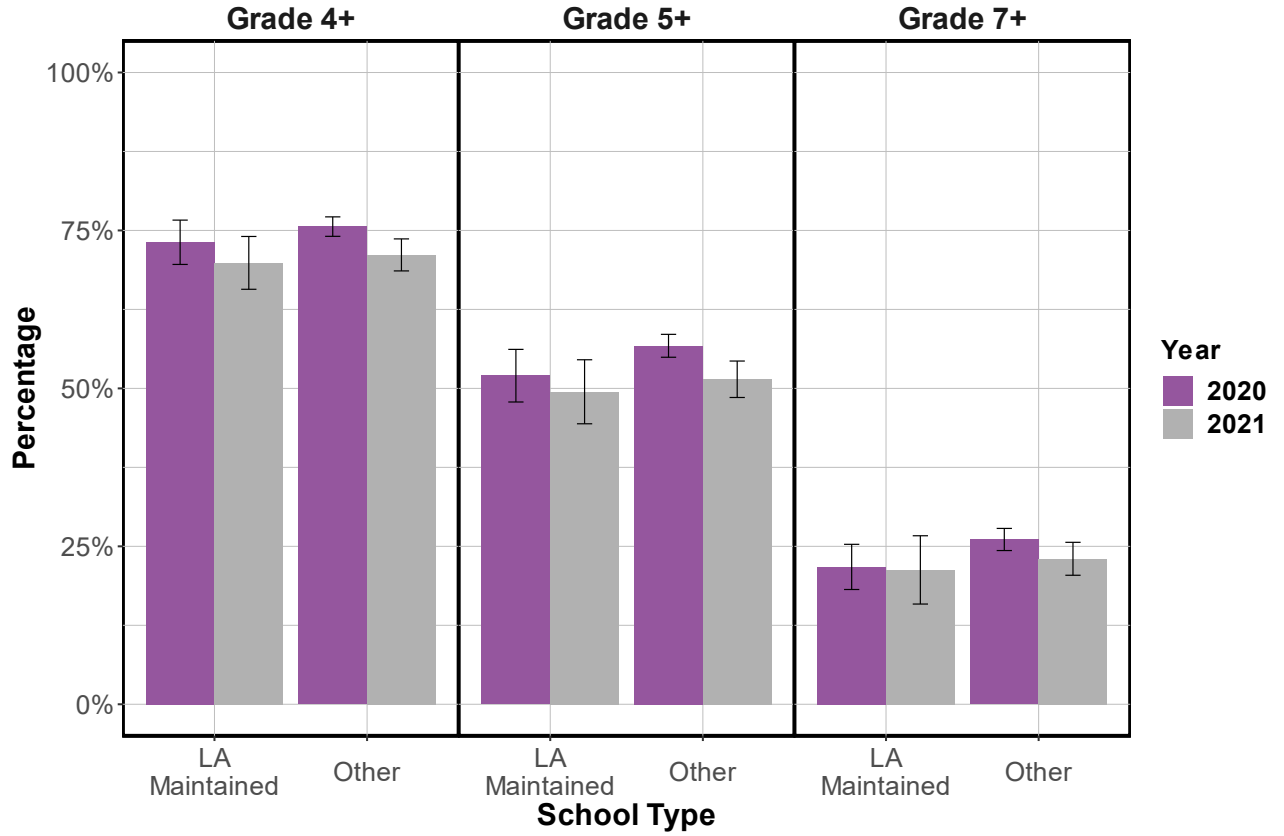
Figure 41 suggests that students in rural schools tend to perform similarly to their counterparts in urban schools on average. Despite students in urban schools appearing to be more likely to achieve Grade 7 or above in 2020, none of the differences are statistically significant. Although the gap appeared to decrease slightly in favour of students in rural schools between 2020 and 2021 at Grade 7, these differences were not statistically significant.

Figure 41   Proportion of students at each grade in the NRT each year by urban / rural - mathematics
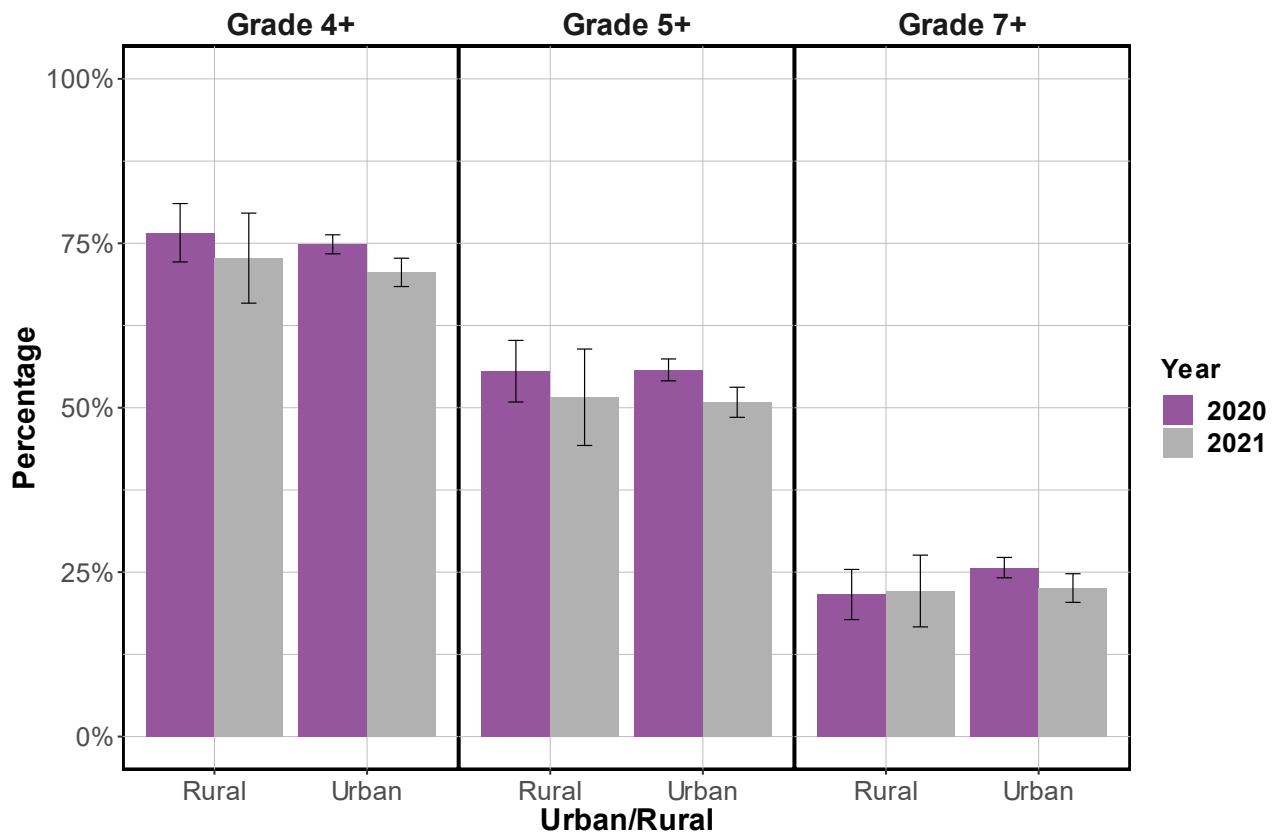
Table 14   Proportion of students at each grade in the NRT each year by school demographics – mathematics

School type	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Academies	2020	75.6 (74.0 to 77.2)	56.7 (54.8 to 58.6)	26.1 (24.3 to 27.9)
Academies	2021	71.0 (68.4 to 73.5)	51.3 (48.4 to 54.2)	23.0 (20.3 to 25.8)
Free schools	2020	74.8 (67.7 to 81.9)	55.4 (45.8 to 65.0)	24.2 (16.3 to 32.1)
Free schools	2021	73.6 (59.9 to 87.3)	54.3 (37.3 to 71.3)	22.7 (10.7 to 34.6)
Independents	2020	90.7 (71.8 to 109.6)	76.0 (48.9 to 103.1)	36.9 (6.1 to 67.7)
Independents	2021	NA	NA	NA
Local authority maintained	2020	73.1 (69.6 to 76.6)	52.0 (47.8 to 56.2)	21.7 (18.2 to 25.3)
Local authority maintained	2021	69.9 (65.7 to 74.0)	49.5 (44.4 to 54.5)	21.3 (15.9 to 26.7)
Non-LA maintained combined (academies / free schools / independents)	2020	75.6 (74.1 to 77.1)	56.7 (54.9 to 58.6)	26.1 (24.3 to 27.8)
Non-LA maintained combined (academies / free schools / independents)	2021	71.1 (68.6 to 73.7)	51.4 (48.6 to 54.3)	23.0 (20.4 to 25.6)
School type gap (Academy/free school/independents – LA maintained)	2020	2.5 (-1.4 to 6.3)	4.7 (0.2 to 9.3)	4.3 (0.4 to 8.3)
School type gap (Academy/free school/independents – LA maintained)	2021	1.3 (-3.6 to 6.1)	2.0 (-3.9 to 7.8)	1.8 (-4.2 to 7.8)
Change in school type gap	Change	-1.2 (-7.4 to 5.0)	-2.8 (-10.1 to 4.6)	-2.6 (-9.8 to 4.6)

School type	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Urban	2020	74.8 (73.4 to 76.3)	55.8 (54.1 to 57.4)	25.7 (24.1 to 27.2)
Urban	2021	70.6 (68.4 to 72.7)	50.8 (48.5 to 53.1)	22.6 (20.4 to 24.8)
Rural	2020	76.6 (72.2 to 81.0)	55.6 (50.9 to 60.2)	21.6 (17.8 to 25.4)
Rural	2021	72.7 (65.9 to 79.6)	51.6 (44.3 to 58.9)	22.1 (16.7 to 27.6)
Urban / rural gap (Rural – urban)	2020	1.8 (-2.9 to 6.4)	-0.2 (-5.2 to 4.8)	-4.1 (-8.2 to 0.0)
Urban / rural gap (Rural – urban)	2021	2.2 (-5.0 to 9.3)	0.8 (-6.9 to 8.4)	-0.4 (-6.3 to 5.4)
Change in urban / rural gap	Change	0.4 (-8.2 to 9.0)	1.0 (-8.2 to 10.1)	3.6 (-3.5 to 10.8)

Figure 42 shows performance broken down by quintiles of school size. The chart shows that students at larger schools had an increased likelihood of achieving each grade in both years, with a statistically significant gap between schools in the largest and smallest bands. These gaps were relatively consistent across the two years. Although the gap appeared to increase slightly at grade 4 and above, none of the changes were statistically significant.

Figure 42   Proportion of students at each grade in the NRT each year by school size - mathematics
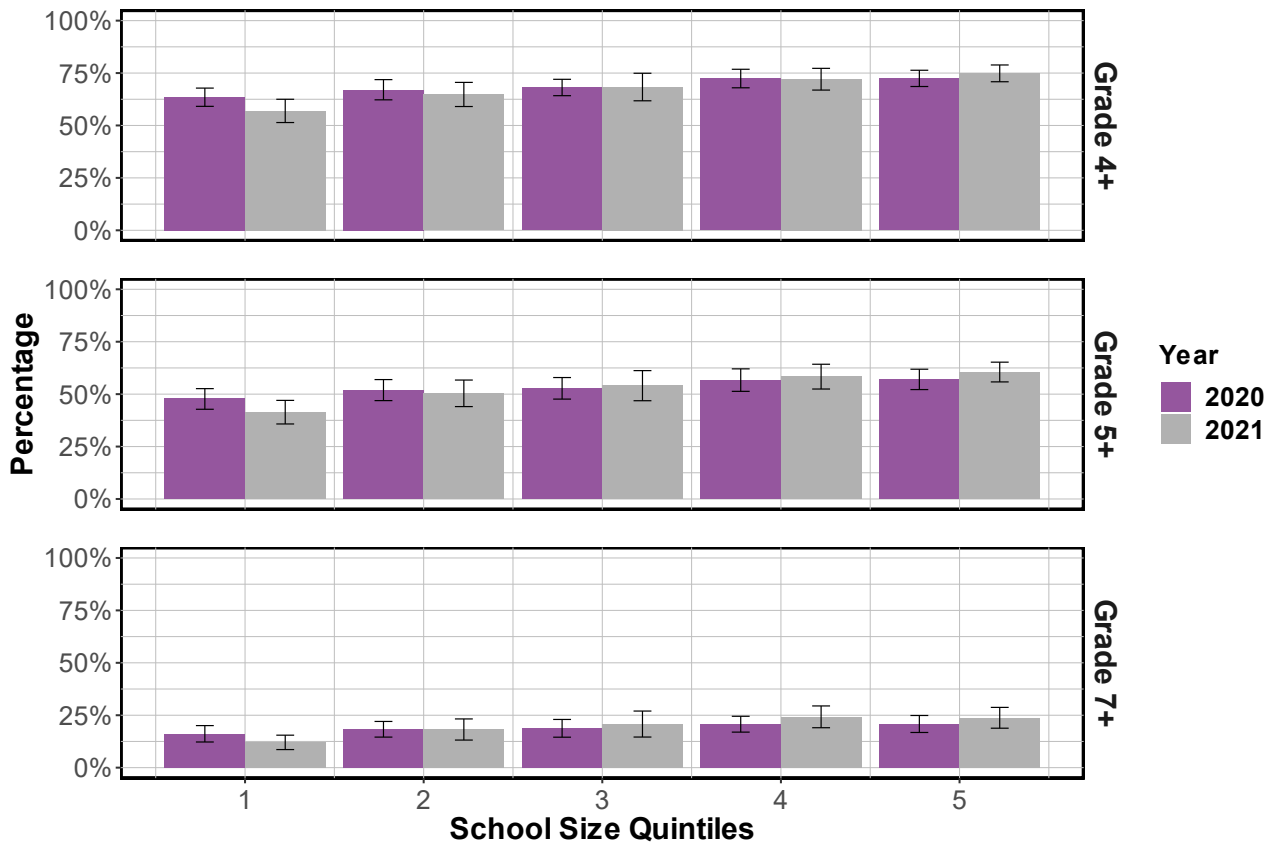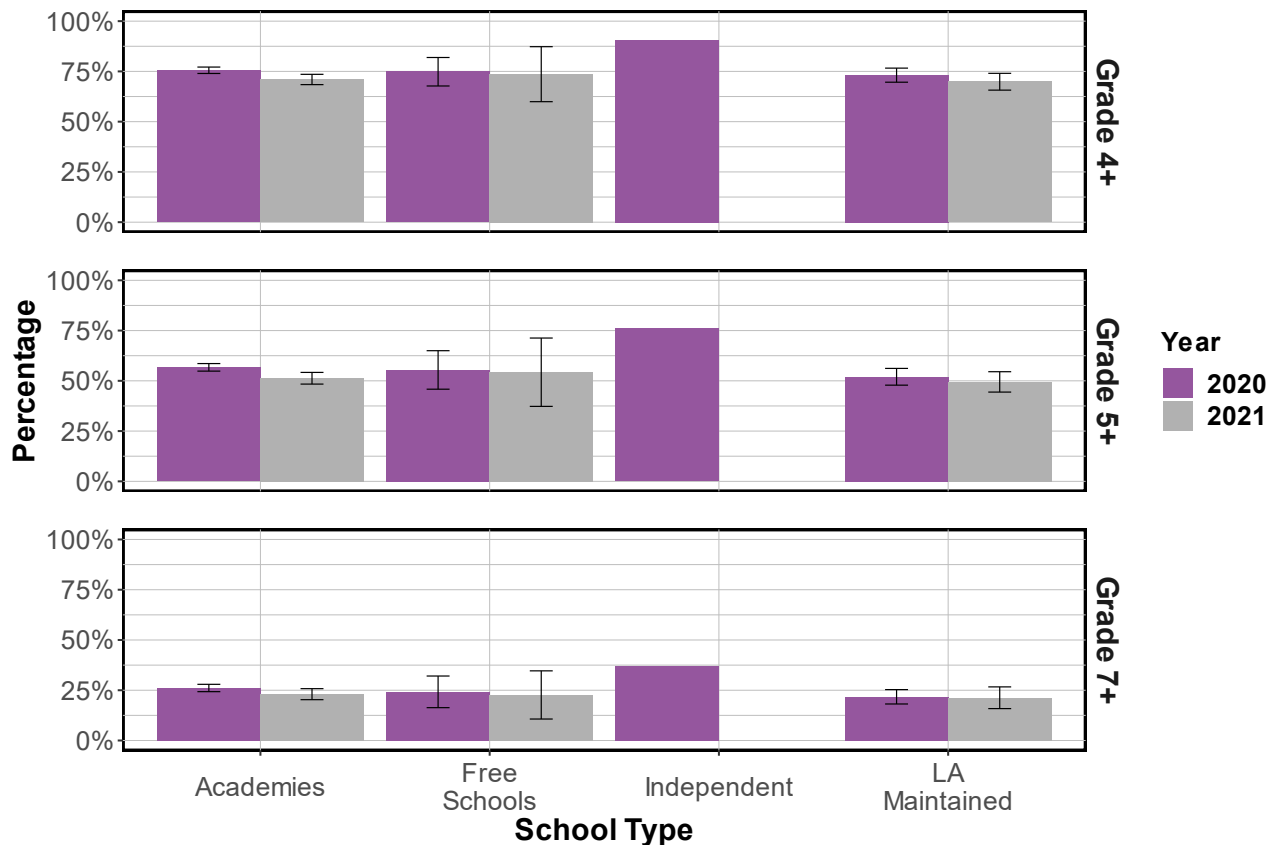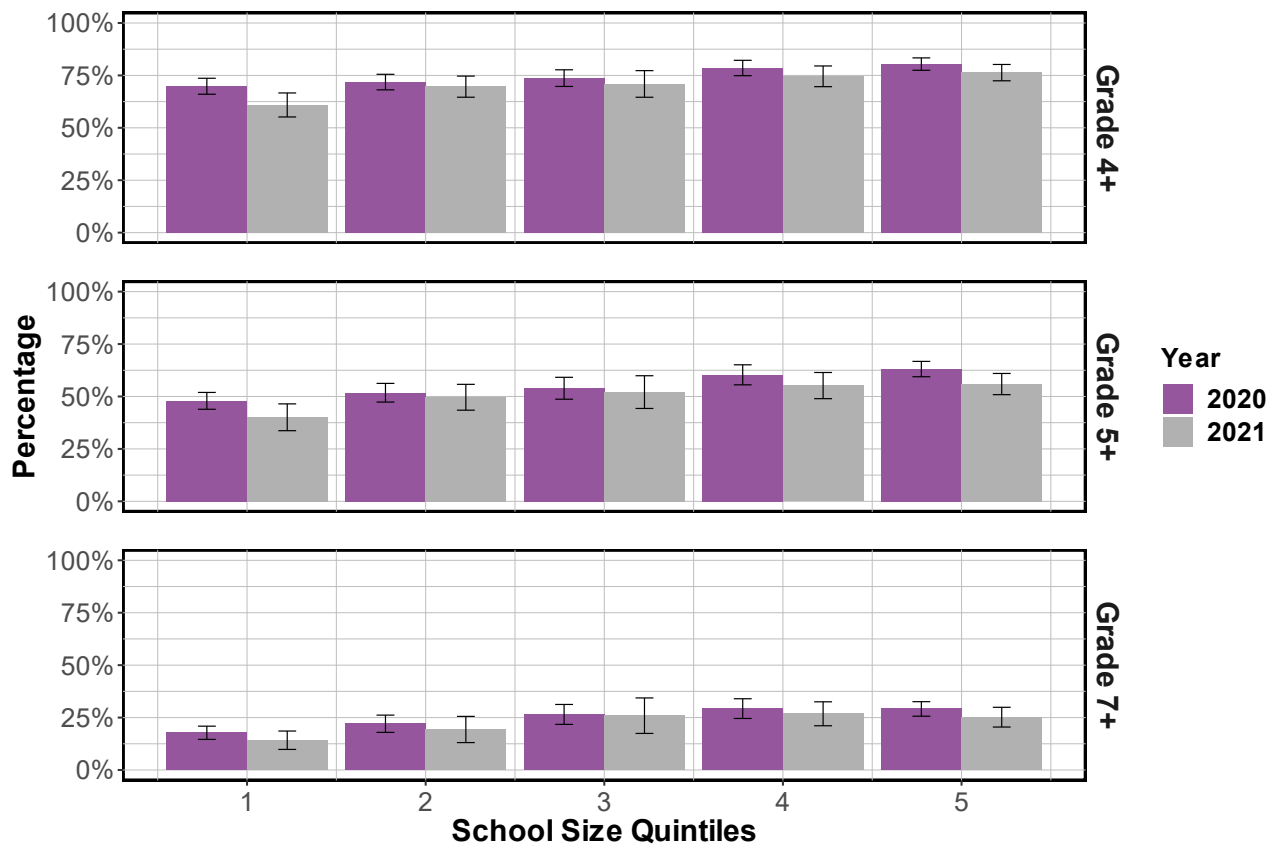
Table 15   Proportion of students at each grade in the NRT each year by school size – mathematics

Bands of school size	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	69.8 (66.0 to 73.6)	47.9 (43.9 to 51.9)	17.7 (14.6 to 20.9)
Band 1	2021	60.9 (55.2 to 66.6)	40.1 (33.7 to 46.5)	14.2 (9.8 to 18.6)
Band 2	2020	71.8 (68.1 to 75.5)	51.8 (47.3 to 56.2)	22.1 (17.9 to 26.2)
Band 2	2021	69.6 (64.6 to 74.7)	49.6 (43.5 to 55.8)	19.3 (13.1 to 25.6)
Band 3	2020	73.7 (69.7 to 77.7)	53.9 (48.7 to 59.2)	26.5 (21.7 to 31.3)
Band 3	2021	70.9 (64.6 to 77.3)	52.1 (44.3 to 59.9)	25.9 (17.4 to 34.4)
Band 4	2020	78.5 (74.9 to 82.2)	60.3 (55.6 to 65.1)	29.3 (24.6 to 34.0)
Band 4	2021	74.6 (69.6 to 79.5)	55.2 (49.0 to 61.4)	26.8 (21.1 to 32.5)
Band 5	2020	80.4 (77.4 to 83.3)	63.1 (59.4 to 66.7)	29.1 (25.7 to 32.6)
Band 5	2021	76.3 (72.4 to 80.2)	55.9 (50.9 to 61.0)	25.2 (20.5 to 29.9)
School size gap (Band 5 – Band 1)	2020	10.6 (5.8 to 15.4)	15.2 (9.7 to 20.6)	11.4 (6.7 to 16.1)
School size gap (Band 5 – Band 1	2021	15.4 (8.5 to 22.3)	15.8 (7.7 to 24.0)	11.0 (4.6 to 17.4)
Change in school size gap	Change	4.8 (-3.6 to 13.3)	0.7 (-9.1 to 10.5)	-0.4 (-8.3 to 7.6)

4.4.3   Regression outputs

Figures 43 and 44 show the estimates of the coefficients for school characteristics from the three logistic regressions. Both figures show, in line with the analysis presented in sections 4.4.1 and 4.4.2, that school type and being defined as urban versus rural were not significant predictors of performance on the NRT. Their interactions with year were also not significant, showing that the relationship did not change between 2020 and 2021. In contrast to the individual sub-group comparisons, school size was not a significant predictor of performance in either subject once other factors were taken account of in the regression model. Nor were the school size interaction

variables significant, suggesting that the relationship between school size and performance on the NRT did not change between years.

Figure 43   Regression coefficients for school demographic variables - English
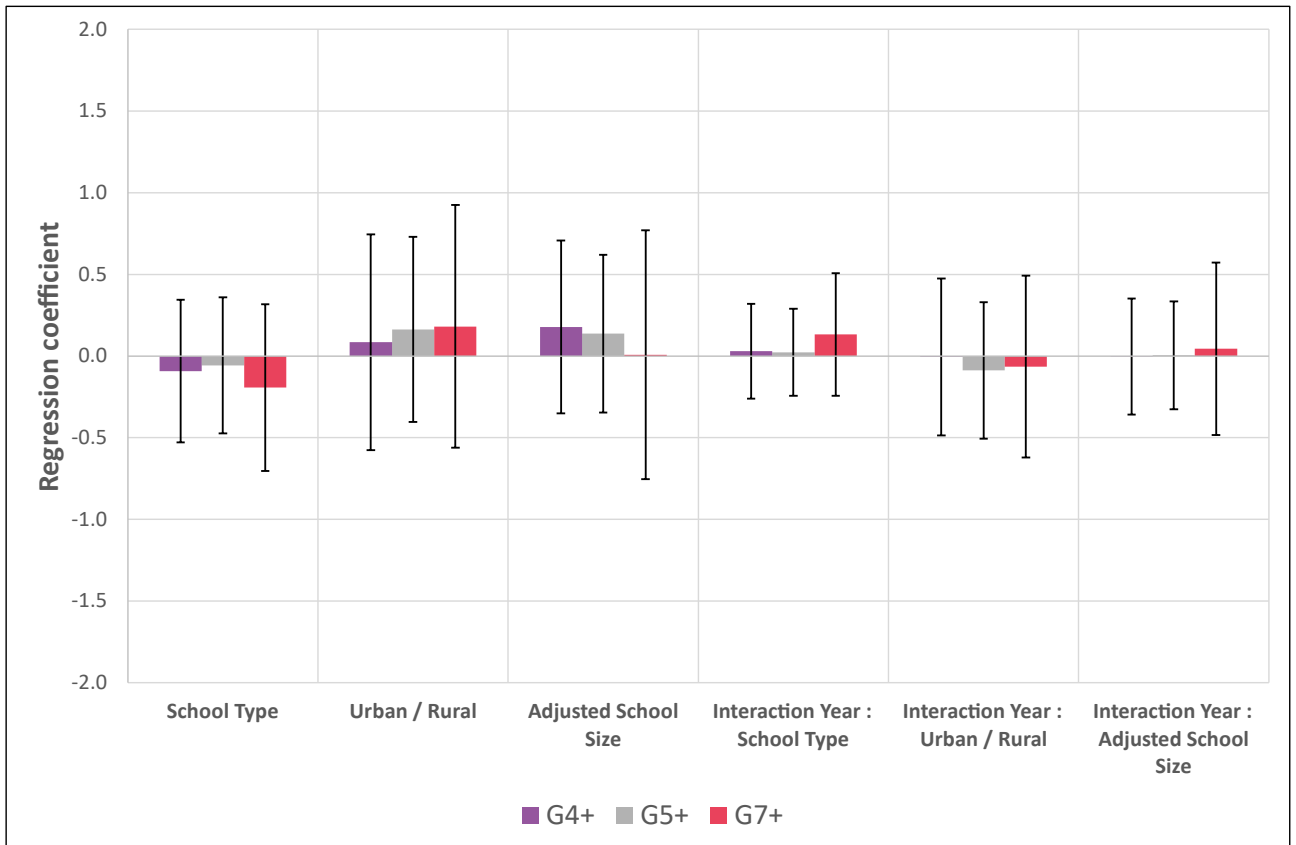
Figure 44   Regression coefficients for school demographic variables - mathematics
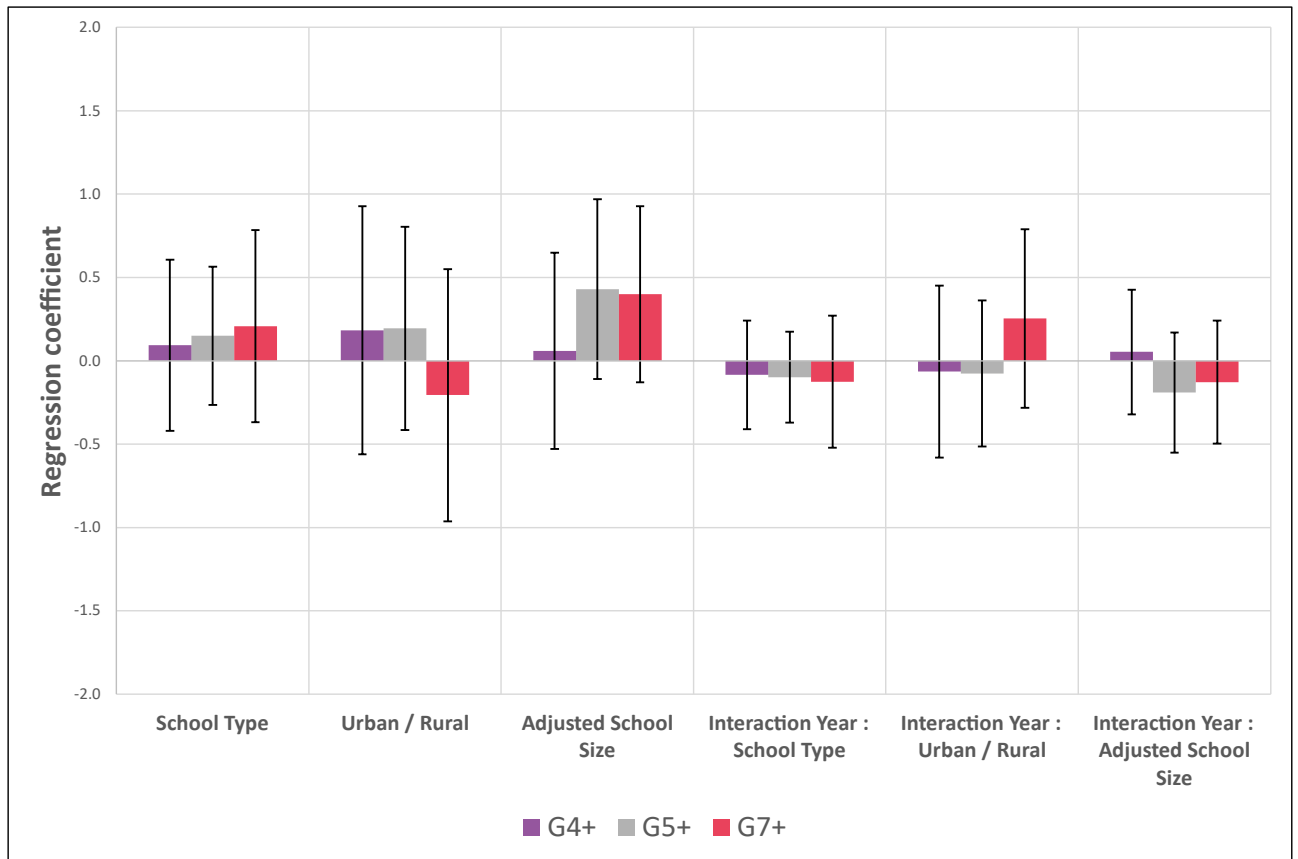
4.4.4   Summary

The data described in this section shows that school characteristics such as school type, and being defined as urban versus rural were not significant predictors of performance on the NRT. The impact of school size was more mixed: comparisons of performance on this variable alone indicated a relationship with performance but it was not found to be a significant predictor in the regression models alongside other variables. The relationship between these variables and performance did not change significantly across the years. It should be noted that the data used in this study does not enable us to compare the effect of the pandemic between independent schools and state schools given that no independent schools took part in the NRT in 2021 and, even if they had, numbers of independent schools taking part have historically been too low to have enabled a valid comparison.

4.5   Geographical region

Performance was compared between the nine geographical regions of England. Comparisons at this level are difficult because once the sample is broken down into this number of sub-groups, the confidence intervals are very wide. This may mean that there are differences at region level which are not picked up by the comparisons reported here.

4.5.1 English

Figure 45 shows the proportion of students from each geographical region achieving grades 4, 5 and 7 and above on the NRT in each year. The only statistically significant change was for the proportion of students in the East of England achieving grade 4 or above, which fell by 10.2 percentage points in 2021. Although the chart indicates other apparent changes, such as the proportion of students in the East of England achieving grade 5 or above also falling, these were not significant. Similarly, the North East saw changes of a similar magnitude in the opposite direction, with the percentages of students achieving at or above grades 4 and 5 both increasing by around ten percentage points, but these changes were not statistically significant due to wider confidence intervals.

Figure 45   Proportion of students at each grade in the NRT each year by region - English
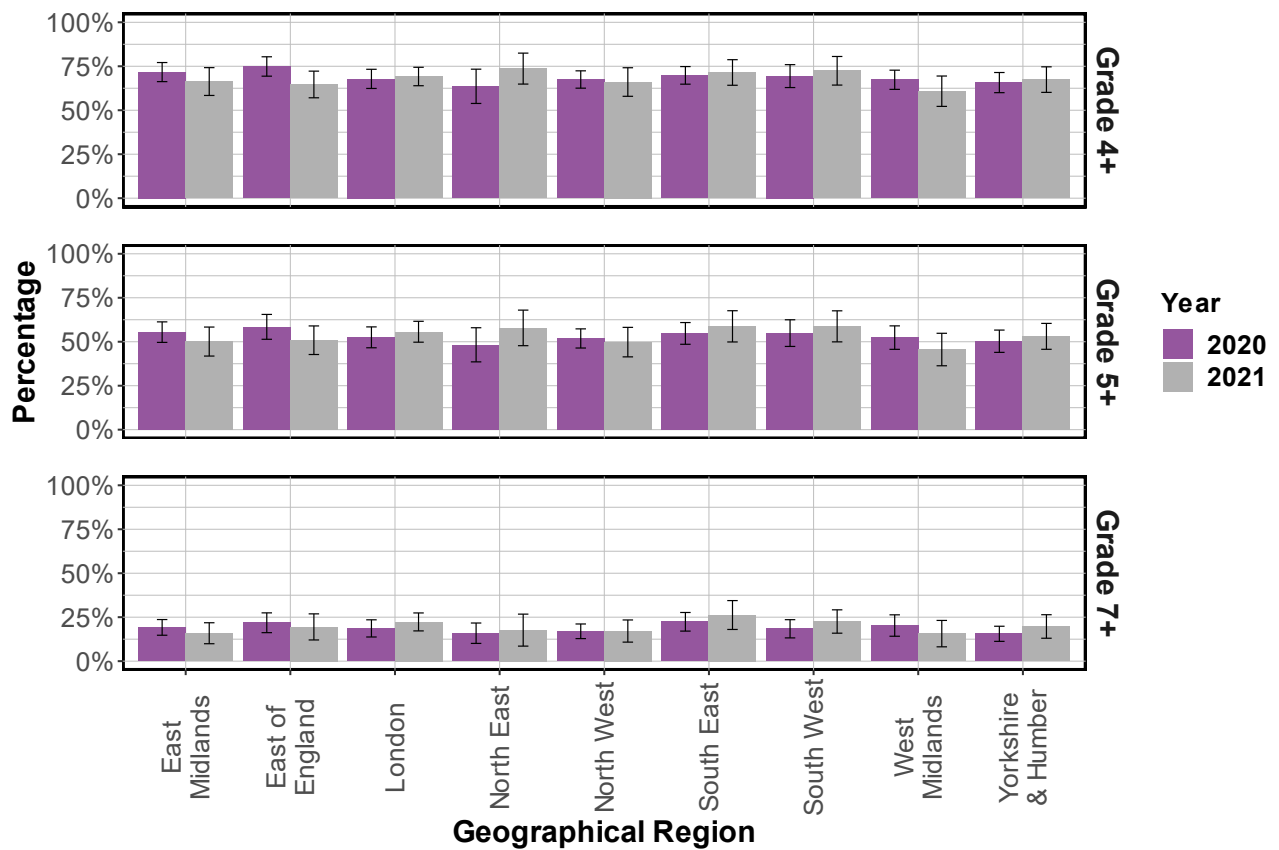
Table 16   Proportion of students at each grade in the NRT each year by region – English

Region	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
London	2020	67.8 (62.4 to 73.3)	52.5 (46.6 to 58.4)	18.6 (13.7 to 23.5)
London	2021	69.2 (63.9 to 74.4)	55.7 (49.7 to 61.6)	22.3 (17.2 to 27.4)
Change in gap	Change (2021 – 2020)	1.3 (-6.2 to 8.9)	3.2 (-5.2 to 11.6)	3.7 (-3.4 to 10.8)
South East	2020	69.8 (64.8 to 74.8)	54.7 (48.5 to 60.9)	22.4 (17.1 to 27.7)
South East	2021	71.5 (64.2 to 78.7)	58.7 (49.9 to 67.6)	26.2 (18.0 to 34.4)
Change in gap	Change (2021 – 2020)	1.6 (-7.2 to 10.5)	4.0 (-6.8 to 14.8)	3.8 (-5.9 to 13.6)
East Midlands	2020	71.7 (66.3 to 77.1)	55.5 (49.6 to 61.3)	19.2 (14.7 to 23.7)
East Midlands	2021	66.3 (58.4 to 74.2)	50.1 (41.9 to 58.3)	15.9 (9.9 to 21.8)
Change in gap	Change (2021 – 2020)	-5.4 (-15.0 to 4.2)	-5.4 (-15.5 to 4.7)	-3.3 (-10.8 to 4.1)
East of England	2020	74.9 (69.4 to 80.4)	58.5 (51.4 to 65.5)	21.8 (16.2 to 27.5)
East of England	2021	64.7 (57.1 to 72.2)	50.9 (42.7 to 59.0)	19.5 (12.1 to 26.9)
Change in gap	Change (2021 – 2020)	-10.2 (-19.6 to -0.9)	-7.6 (-18.4 to 3.2)	-2.4 (-11.7 to 6.9)
West Midlands	2020	67.3 (61.9 to 72.8)	52.3 (45.7 to 59.0)	20.3 (14.2 to 26.3)
West Midlands	2021	60.8 (52.2 to 69.5)	45.6 (36.3 to 54.8)	15.7 (8.2 to 23.2)
Change in gap	Change (2021 – 2020)	-6.5 (-16.7 to 3.7)	-6.8 (-18.2 to 4.6)	-4.6 (-14.3 to 5.1)
South West	2020	69.4 (62.9 to 75.9)	54.9 (47.3 to 62.5)	18.4 (13.2 to 23.6)

Region	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
South West	2021	72.4 (64.3 to 80.6)	58.7 (49.9 to 67.6)	22.5 (15.9 to 29.2)
Change in gap	Change (2021 – 2020)	3.0 (-7.4 to 13.4)	3.8 (-7.8 to 15.5)	4.1 (-4.3 to 12.6)
North West	2020	67.5 (62.6 to 72.4)	51.9 (46.4 to 57.3)	17.0 (12.8 to 21.1)
North West	2021	66.0 (57.9 to 74.2)	49.8 (41.4 to 58.2)	17.1 (10.8 to 23.4)
Change in gap	Change (2021 – 2020)	-1.4 (-10.9 to 8.1)	-2.1 (-12.1 to 7.9)	0.1 (-7.4 to 7.7)
North East	2020	63.6 (53.9 to 73.3)	48.3 (38.6 to 58.0)	15.9 (10.1 to 21.7)
North East	2021	73.7 (64.9 to 82.5)	57.9 (47.8 to 68.0)	17.6 (8.6 to 26.7)
Change in gap	Change (2021 – 2020)	10.1 (-3.1 to 23.2)	9.6 (-4.4 to 23.6)	1.8 (-9.0 to 12.5)
Yorkshire & Humber	2020	65.7 (60.0 to 71.5)	50.3 (43.9 to 56.6)	15.6 (11.3 to 19.9)
Yorkshire & Humber	2021	67.4 (60.2 to 74.7)	53.1 (45.7 to 60.4)	19.7 (13.0 to 26.4)
Change in gap	Change (2021 – 2020)	1.7 (-7.6 to 10.9)	2.8 (-6.9 to 12.5)	4.2 (-3.8 to 12.1)

4.5.2 Mathematics

Figure 46 shows the proportion of students from each geographical region achieving grades 4, 5 and 7 and above on the NRT in each year. The only statistically significant changes from 2020 to 2021 were for the North West: the percentage of students achieving at or above grades 4 and 5 dropped by 14.0 and 10.6 percentage points respectively. Some regions appeared to have bucked the general trend of an overall significant drop in mathematics performance, such as the South East, where the percentage of students achieving grade 7 or above increased by 5.4 percentage points, but this was not a statistically significant change.

Figure 46 Proportion of students at each grade in the NRT each year by region - mathematics
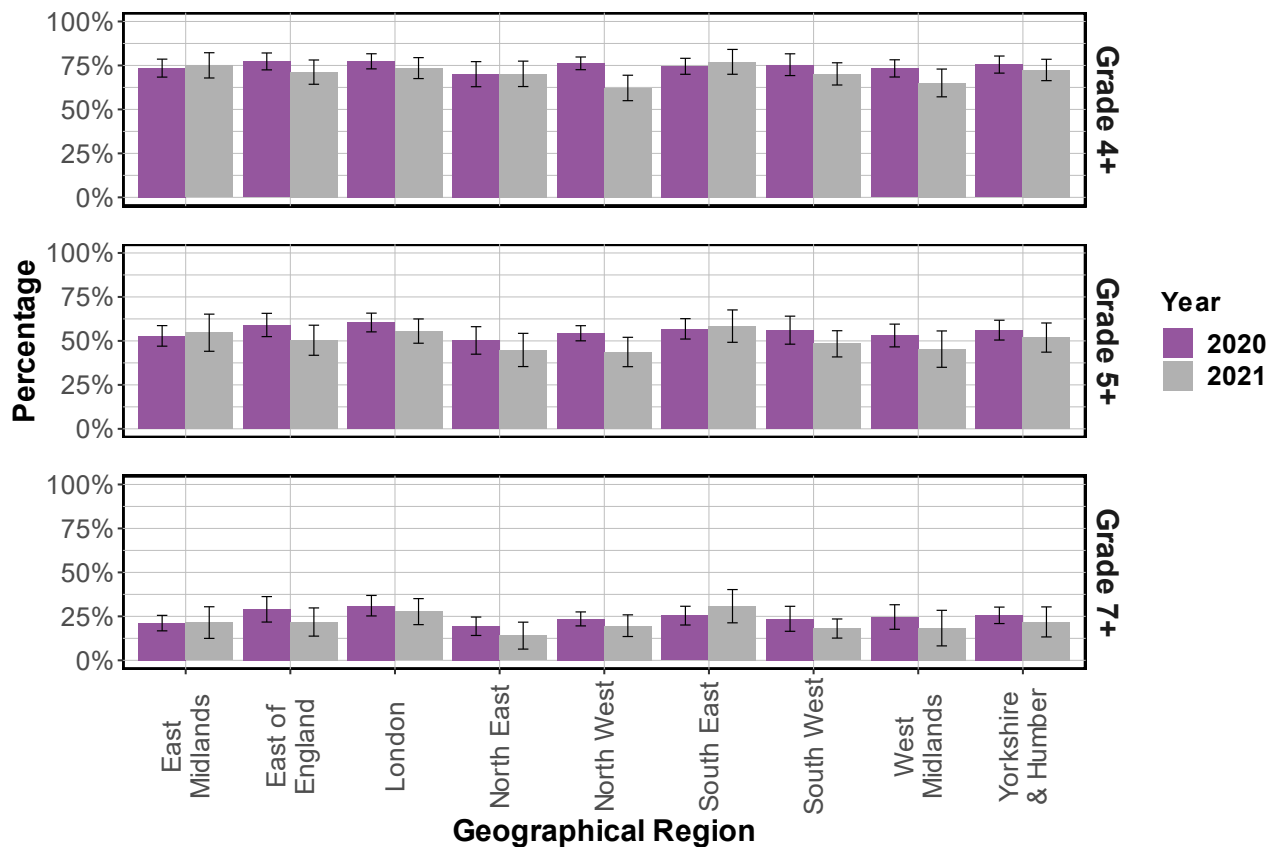
Table 17   Proportion of students at each grade in the NRT each year by region – mathematics

Region	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
London	2020	77.3 (73.1 to 81.6)	60.5 (55.1 to 65.8)	31.1 (25.2 to 36.9)
London	2021	73.5 (67.5 to 79.4)	55.6 (48.7 to 62.5)	27.7 (20.3 to 35.1)
Change in gap	Change (2021 – 2020)	-3.9 (-11.2 to 3.5)	-4.9 (-13.6 to 3.8)	-3.4 (-12.8 to 6.0)
South East	2020	74.5 (70.0 to 79.1)	56.9 (51.1 to 62.6)	25.4 (20.1 to 30.7)
South East	2021	77.0 (70.0 to 84.1)	58.4 (49.2 to 67.6)	30.8 (21.3 to 40.2)
Change in gap	Change (2021 – 2020)	2.5 (-5.9 to 10.9)	1.6 (-9.3 to 12.4)	5.4 (-5.5 to 16.2)
East Midlands	2020	73.5 (68.4 to 78.6)	52.8 (47.0 to 58.7)	21.2 (16.8 to 25.6)
East Midlands	2021	75.0 (67.9 to 82.2)	54.7 (44.1 to 65.2)	21.5 (12.5 to 30.5)
Change in gap	Change (2021 – 2020)	1.6 (-7.2 to 10.4)	1.8 (-10.3 to 13.9)	0.3 (-9.7 to 10.3)
East of England	2020	77.3 (72.5 to 82.1)	59.1 (52.4 to 65.7)	29.0 (21.8 to 36.2)
East of England	2021	71.2 (64.3 to 78.1)	50.4 (41.8 to 58.9)	21.8 (13.8 to 29.8)
Change in gap	Change (2021 – 2020)	-6.1 (-14.5 to 2.3)	-8.7 (-19.5 to 2.1)	-7.2 (-18.0 to 3.6)
West Midlands	2020	73.3 (68.4 to 78.2)	53.1 (46.6 to 59.5)	24.6 (17.7 to 31.6)
West Midlands	2021	65.0 (57.2 to 72.9)	45.3 (35.0 to 55.7)	18.3 (8.2 to 28.4)
Change in gap	Change (2021 – 2020)	-8.3 (-17.6 to 1.0)	-7.7 (-19.9 to 4.5)	-6.3 (-18.6 to 6.0)
South West	2020	75.4 (69.2 to 81.6)	56.1 (48.1 to 64.1)	23.6 (16.5 to 30.7)

Region	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
South West	2021	70.2 (63.9 to 76.5)	48.3 (40.9 to 55.8)	18.1 (12.6 to 23.5)
Change in gap	Change (2021 – 2020)	-5.2 (-14.1 to 3.6)	-7.8 (-18.7 to 3.1)	-5.5 (-14.5 to 3.4)
North West	2020	76.2 (72.6 to 79.8)	54.3 (50.0 to 58.7)	23.6 (19.6 to 27.5)
North West	2021	62.2 (55.0 to 69.4)	43.7 (35.3 to 52.0)	19.7 (13.5 to 25.9)
Change in gap	Change (2021 – 2020)	-14.0 (-22.1 to -5.9)	-10.6 (-20.0 to -1.3)	-3.9 (-11.2 to 3.5)
North East	2020	70.0 (62.9 to 77.2)	50.3 (42.4 to 58.1)	19.4 (14.1 to 24.6)
North East	2021	70.2 (63.0 to 77.4)	44.9 (35.4 to 54.3)	14.0 (6.4 to 21.7)
Change in gap	Change (2021 – 2020)	0.2 (-10.0 to 10.3)	-5.4 (-17.7 to 6.9)	-5.3 (-14.6 to 3.9)
Yorkshire & Humber	2020	75.5 (70.6 to 80.3)	56.1 (50.5 to 61.8)	25.6 (20.9 to 30.3)
Yorkshire & Humber	2021	72.4 (66.4 to 78.5)	51.9 (43.6 to 60.2)	21.8 (13.3 to 30.4)
Change in gap	Change (2021 – 2020)	-3.1 (-10.8 to 4.7)	-4.2 (-14.3 to 5.8)	-3.7 (-13.5 to 6.0)

4.5.3   Regression outputs

Figures 47 and 48 show the estimates of the coefficients for region from the three logistic regressions. The regions were split into multiple binary variables for the purpose of the regressions, with the East Midlands as the reference group. This means that the coefficients from the regression determine whether students from each region performed significantly differently from students in the East Midlands.

Figure 47 shows that for English, the coefficient for the London was significant at the grade 7 boundary. This is a negative main effect, suggesting performance in London at grade 7 was significantly worse than in the East Midlands. None of the interaction terms were statistically significant, suggesting that the differences between regions did not change significantly between the two years.

Note that from the visual patterns of performance, students in the North East appeared to have improved the most clearly and the North East also has the greatest positive regression coefficients for the interaction terms. However, there are wider confidence intervals around the estimates for this region, which have rendered any change non-significant.

Figure 47   Regression coefficients for geographical region – English
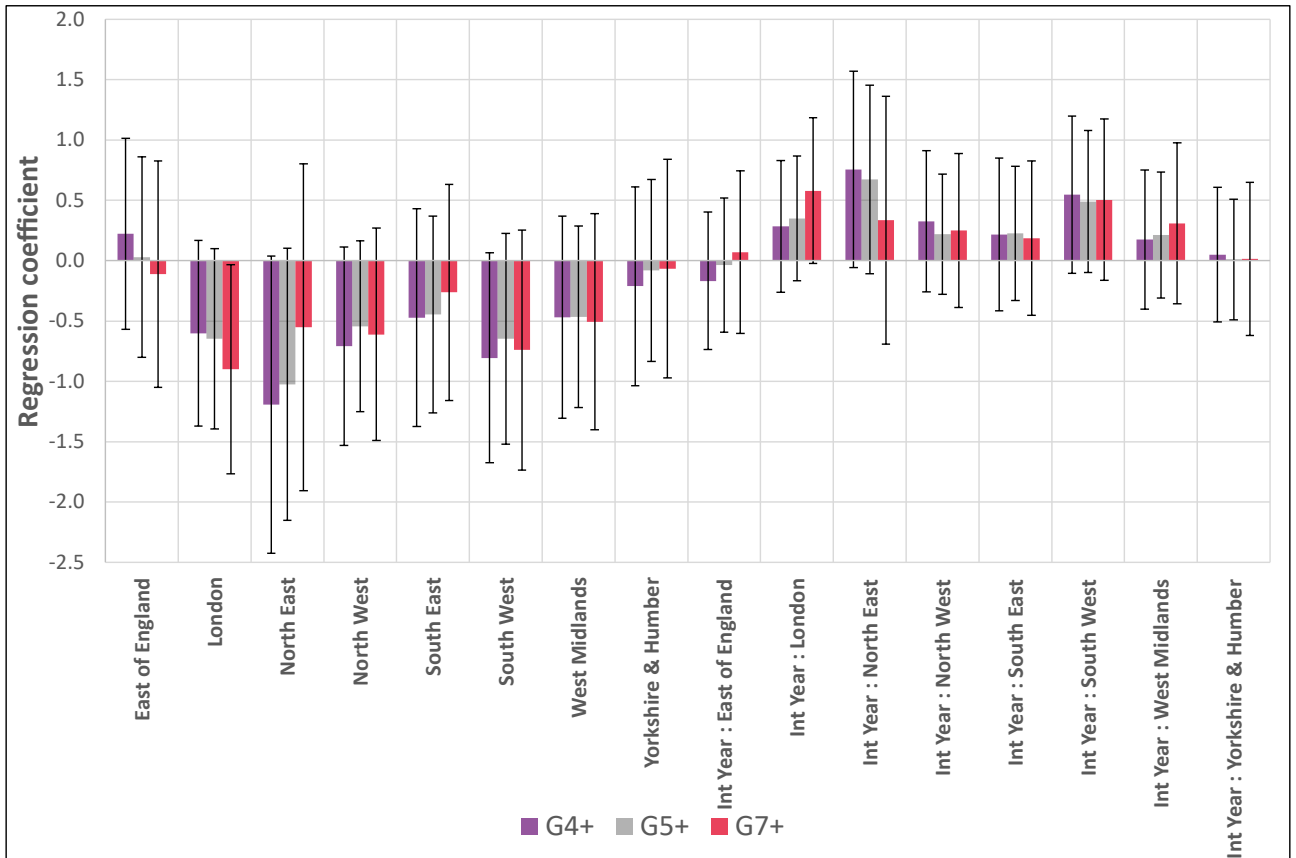
Figure 48 shows that none of the main effects for region for mathematics were significant, suggesting that overall performance across individual regions does not differ significantly from performance in the East Midlands (the reference group). However, there is a significant interaction for the North West at the grade 4 boundary. The estimate of the coefficient is negative, suggesting that students in the North West experienced a greater decline in performance in 2021 compared with the East Midlands. This is consistent with the pattern shown in Figure 44. The regression coefficient for being in the North West relative to the East Midlands in 2020 was 0.80, which can be converted into an odds ratio of 2.23. The regression coefficient for being in the North West relative to the East Midlands in 2021 was -0.76, which can be converted into an odds ratio of 0.47. This means that the odds ratio for being in the North West relative to the East Midlands approximately halved in 2021.

Figure 48   Regression coefficients for geographical region - mathematics
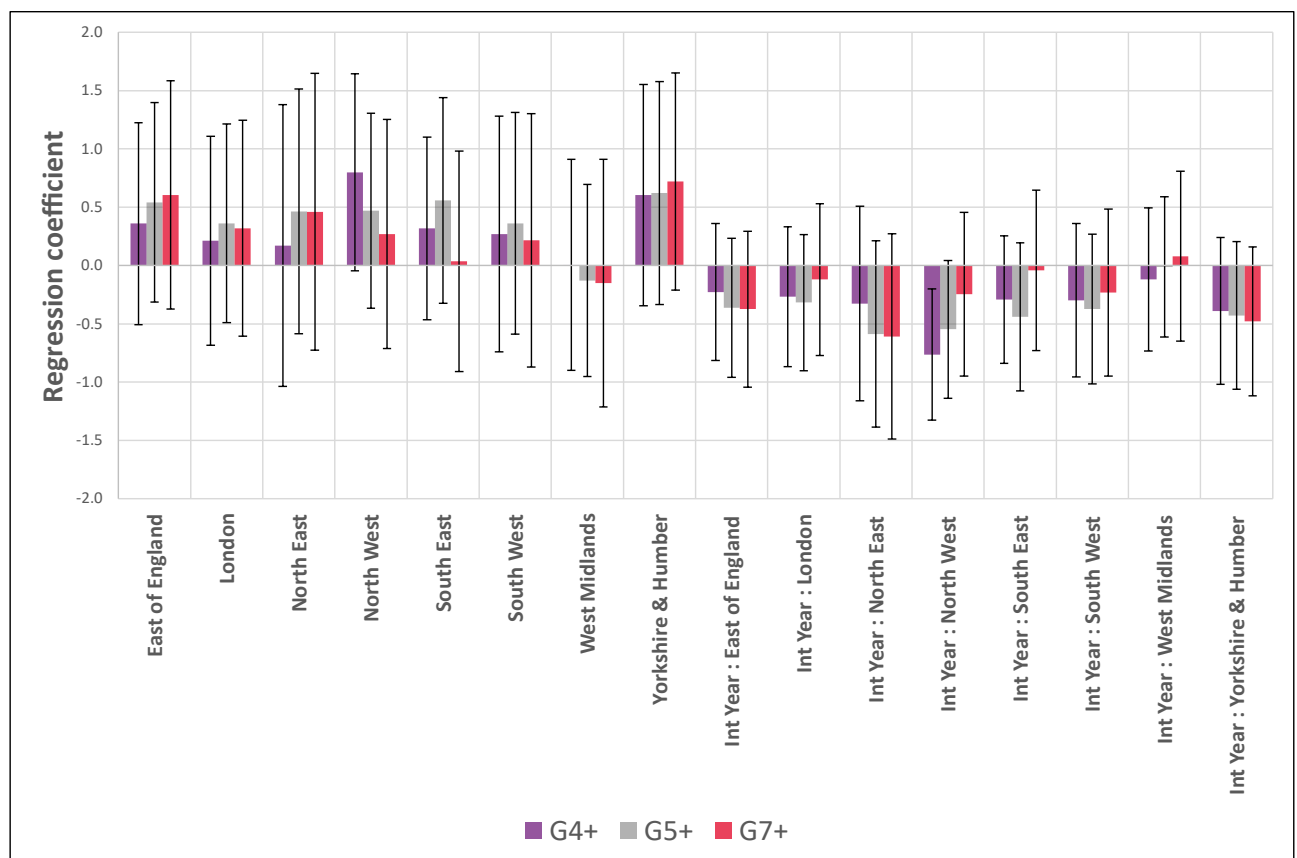
4.5.4   Summary

The pattern of changes in performance across different regions of England is quite difficult to interpret, particularly as confidence intervals are quite wide once the sample is broken down into the nine regional groups. However, the evidence indicates that, for mathematics, the proportion of students achieving grade 4 and above dropped significantly more in the North West compared to the reference group.

4.6 Absence rates

Data on average rates of absence at school-level in the autumn term prior to taking the NRT were obtained, with the intention that for the 2021 sample this may be useful as a proxy for the level of Covid-19 disruption encountered during the autumn term of 2020. This was a time when schools were open but suffering varied levels of disruption due to Covid-19 cases and student 'bubbles' being required to isolate.

Although absence rate is included in the regression model as a continuous variable, it was split into quintiles for the purpose of individual sub-group analysis.

4.6.1 English

Figure 49 shows that being in a school with a higher absence rate is associated with a lower likelihood of achieving each of the three grades in English, with a statistically significant gap between schools in band 1 and band 5 in both years. Although this gap appears to have reduced in 2021, the changes were not statistically significant.

Figure 49   Proportion of students at each grade in the NRT each year by school absence rate - English
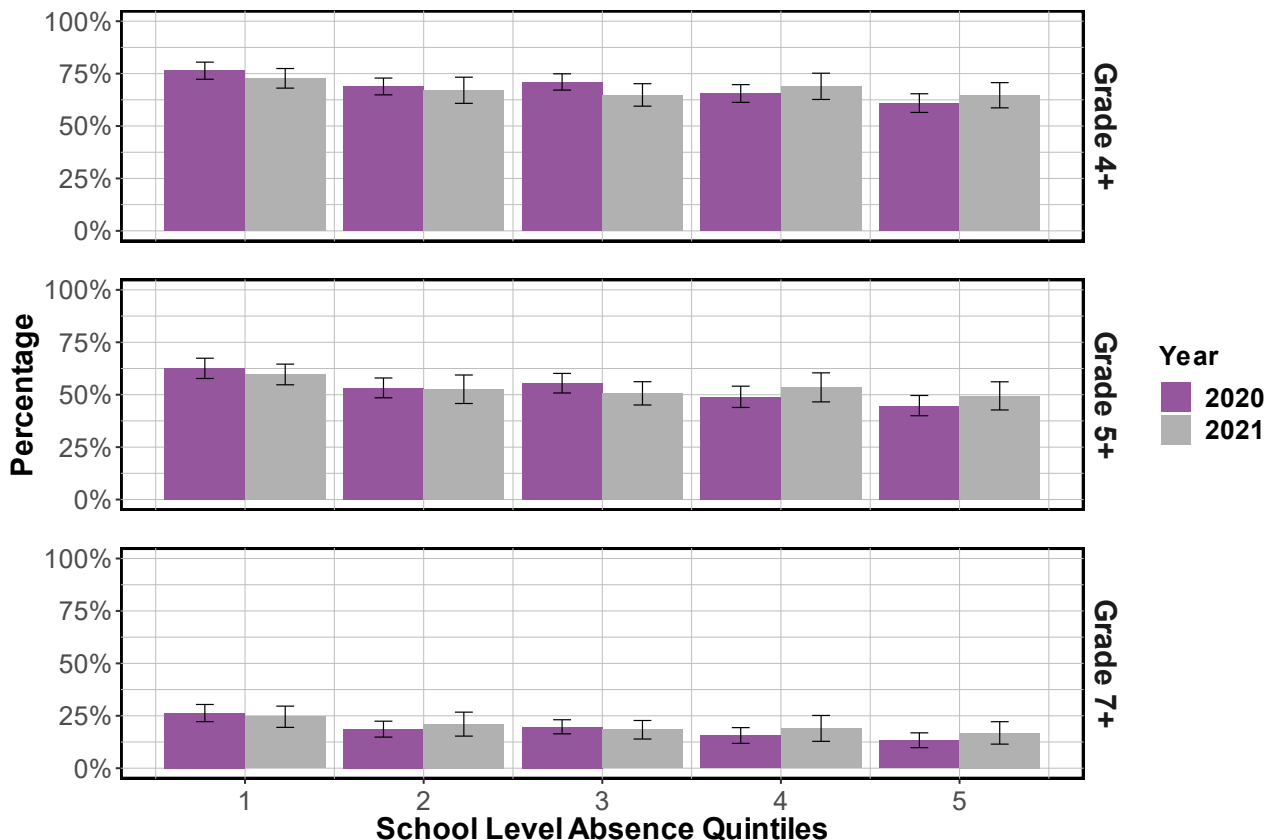
Table 18   Proportion of students at each grade in the NRT each year by school absence rate – English

Bands of absence rate	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	76.4 (72.3 to 80.5)	62.6 (57.7 to 67.4)	26.3 (22.2 to 30.4)
Band 1	2021	72.7 (68.1 to 77.4)	59.7 (54.7 to 64.6)	24.5 (19.5 to 29.6)
Band 2	2020	68.9 (64.9 to 72.9)	53.2 (48.5 to 58.0)	18.6 (14.8 to 22.4)
Band 2	2021	67.1 (60.8 to 73.3)	52.6 (45.8 to 59.4)	21.0 (15.3 to 26.7)
Band 3	2020	71.0 (67.1 to 74.9)	55.5 (50.8 to 60.2)	19.7 (16.4 to 23.1)
Band 3	2021	64.8 (59.5 to 70.2)	50.6 (45.1 to 56.2)	18.3 (13.9 to 22.8)
Band 4	2020	65.5 (61.3 to 69.7)	49.0 (43.9 to 54.1)	15.6 (11.8 to 19.3)
Band 4	2021	68.9 (62.7 to 75.2)	53.5 (46.6 to 60.4)	19.0 (12.8 to 25.2)
Band 5	2020	60.9 (56.5 to 65.4)	44.8 (40.0 to 49.6)	13.3 (9.8 to 16.9)
Band 5	2021	64.7 (58.7 to 70.7)	49.4 (42.7 to 56.1)	16.8 (11.5 to 22.2)
Absence rate gap (Band 1 – Band 5)	2020	15.4 (9.4 to 21.5)	17.8 (10.9 to 24.6)	13.0 (7.6 to 18.4)
Absence rate gap (Band 1 – Band 5)	2021	8.1 (0.5 to 15.7)	10.2 (1.9 to 18.5)	7.7 (0.3 to 15.1)
Change in absence gap	Change	-7.4 (-17.1 to 2.3)	-7.5 (-18.3 to 3.2)	-5.3 (-14.4 to 3.9)

4.6.2   Mathematics

Figure 50 shows that, again, students in schools with higher rates of absence were less likely to achieve each of the three grades. Similar to English, the gap between schools with the highest and lowest absence rates appeared to decrease in 2021, but these differences were not statistically significant.

Figure 50   Proportion of students at each grade in the NRT each year by school absence rate - mathematics
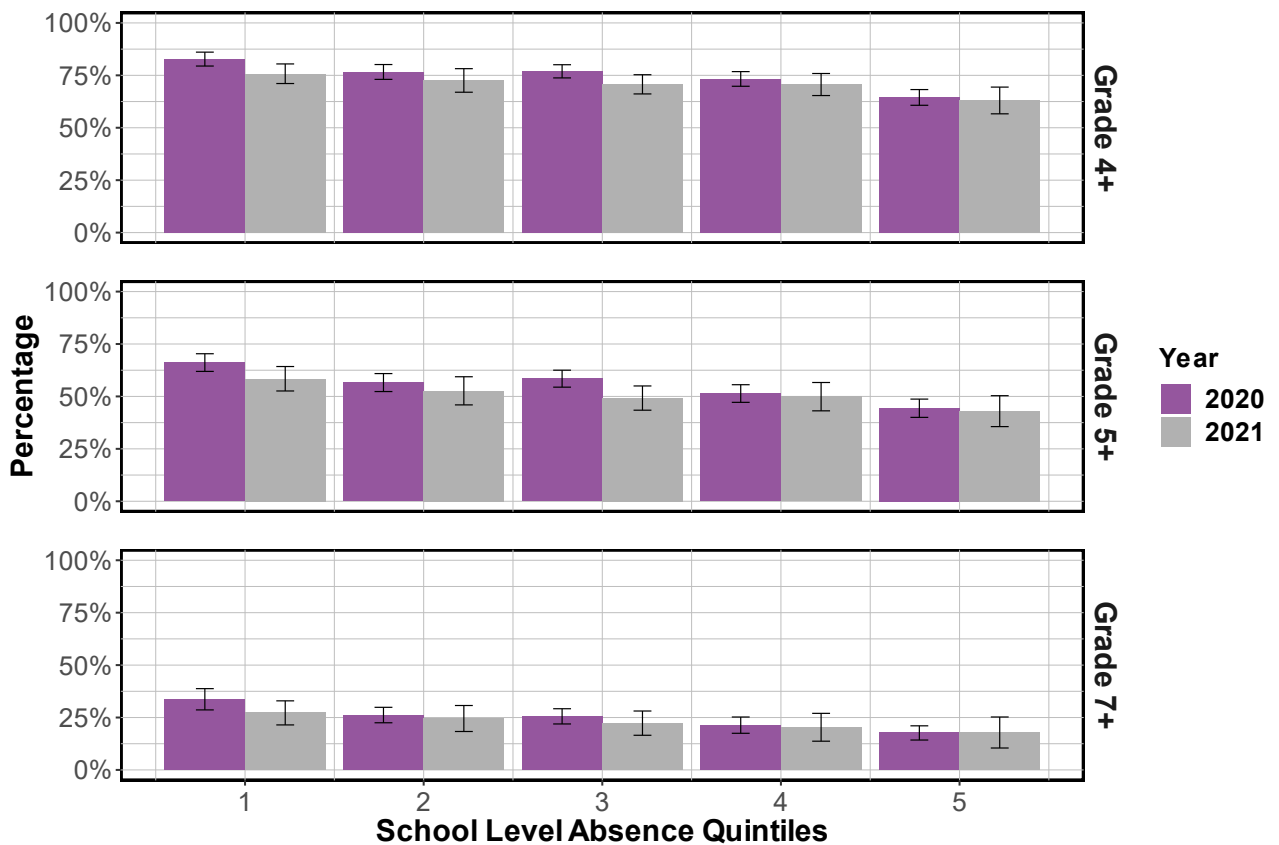
Table 19   Proportion of students at each grade in the NRT each year by school absence rate – mathematics

Bands of absence rate	Year	Grade 4 and above	Grade 5 and above	Grade 7 and above
Band 1	2020	82.7 (79.4 to 86.1)	66.1 (61.9 to 70.4)	33.7 (28.6 to 38.8)
Band 1	2021	75.8 (71.1 to 80.4)	58.4 (52.6 to 64.3)	27.2 (21.5 to 33.0)
Band 2	2020	76.6 (73.1 to 80.1)	56.6 (52.3 to 60.9)	26.2 (22.5 to 29.9)
Band 2	2021	72.6 (66.9 to 78.2)	52.7 (46.0 to 59.4)	24.5 (18.3 to 30.7)
Band 3	2020	76.9 (73.8 to 80.1)	58.5 (54.4 to 62.5)	25.6 (21.9 to 29.2)
Band 3	2021	70.7 (66.1 to 75.3)	49.2 (43.4 to 55.0)	22.3 (16.5 to 28.1)
Band 4	2020	73.3 (69.8 to 76.8)	51.4 (47.2 to 55.6)	21.4 (17.5 to 25.2)
Band 4	2021	70.6 (65.4 to 75.9)	49.9 (43.1 to 56.6)	20.3 (13.7 to 27.0)
Band 5	2020	64.5 (60.7 to 68.2)	44.4 (40.0 to 48.7)	17.6 (14.3 to 21.0)
Band 5	2021	63.0 (56.6 to 69.4)	43.0 (35.6 to 50.4)	17.9 (10.5 to 25.2)
Absence rate gap (Band 1 – Band 5)	2020	18.3 (13.3 to 23.3)	21.8 (15.7 to 27.8)	16.1 (10.0 to 22.1)
Absence rate gap (Band 1 – Band 5)	2021	12.8 (4.8 to 20.7)	15.4 (6.0 to 24.8)	9.4 (0.0 to 18.7)
Change in absence gap	Change	-5.5 (-14.9 to 3.8)	-6.3 (-17.5 to 4.9)	-6.7 (-17.9 to 4.5)

4.6.3 Regression outputs

Figures 51 and 52 show the estimates of the coefficients for absence from the three logistic regressions. Figure 51 shows significant main and interaction effects for absence on the likelihood of achieving grade 4 and above in English, but no significant effects for the higher grades. The coefficient for the main effect, the relationship between absence rates and likelihood of achieving the grade in general, is negative, suggesting that students in schools with higher absence rates were less likely to achieve grade 4 and above. The coefficient for the interaction term is positive, suggesting a significant reduction in the impact of school absence rates on performance in 2021. This is consistent with the pattern shown in Figure 49.

The interaction term for school-level absence has a coefficient of 4.98 for the logistic regression for grade 4. This represents the effect of going from an absence rate of 0 to 1, so the coefficients can be made more meaningful by dividing by ten to consider the effect of an increase of 0.1 in the absence rate. The regression coefficient for an increase of 0.1 in the absence rate in 2020 was -0.93, which can be converted to an odds ratio of 0.39. The regression coefficient for an increase of 0.1 in the absence rate in 2021 was 0.50, which can be converted into an odds ratio of 1.64. This means that the odds ratio associated with an increase of 0.1 in the absence rate increased by around 64 per cent in 2021 relative to that in 2020.

Figure 51   Regression coefficients for absence - English
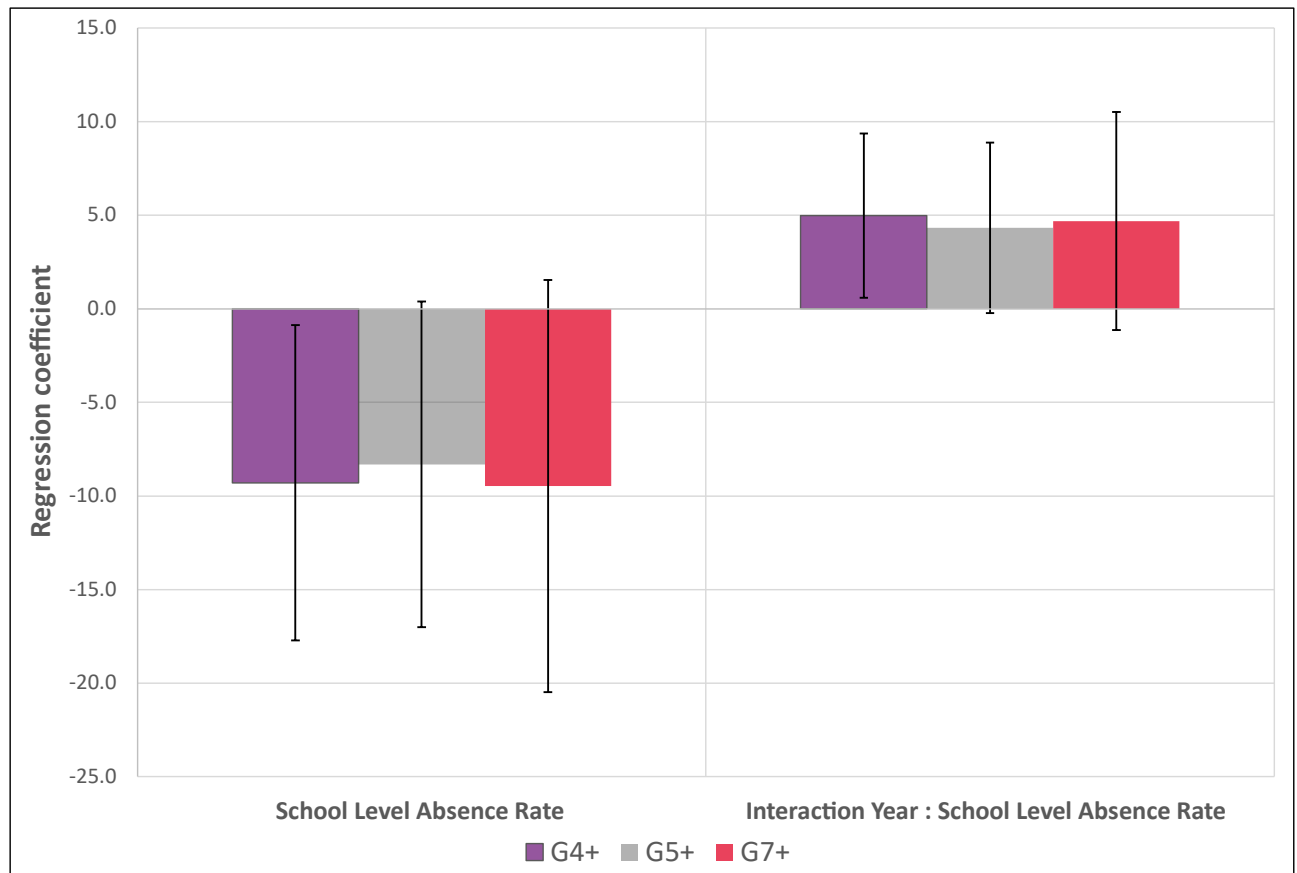
Figure 52 shows that the absence rates at school-level did not have a significant impact on student likelihood of achieving any of the grades in mathematics once other factors were taken into account, and that this relationship did not significantly change between the years.

Figure 52   Regression coefficients for absence - mathematics
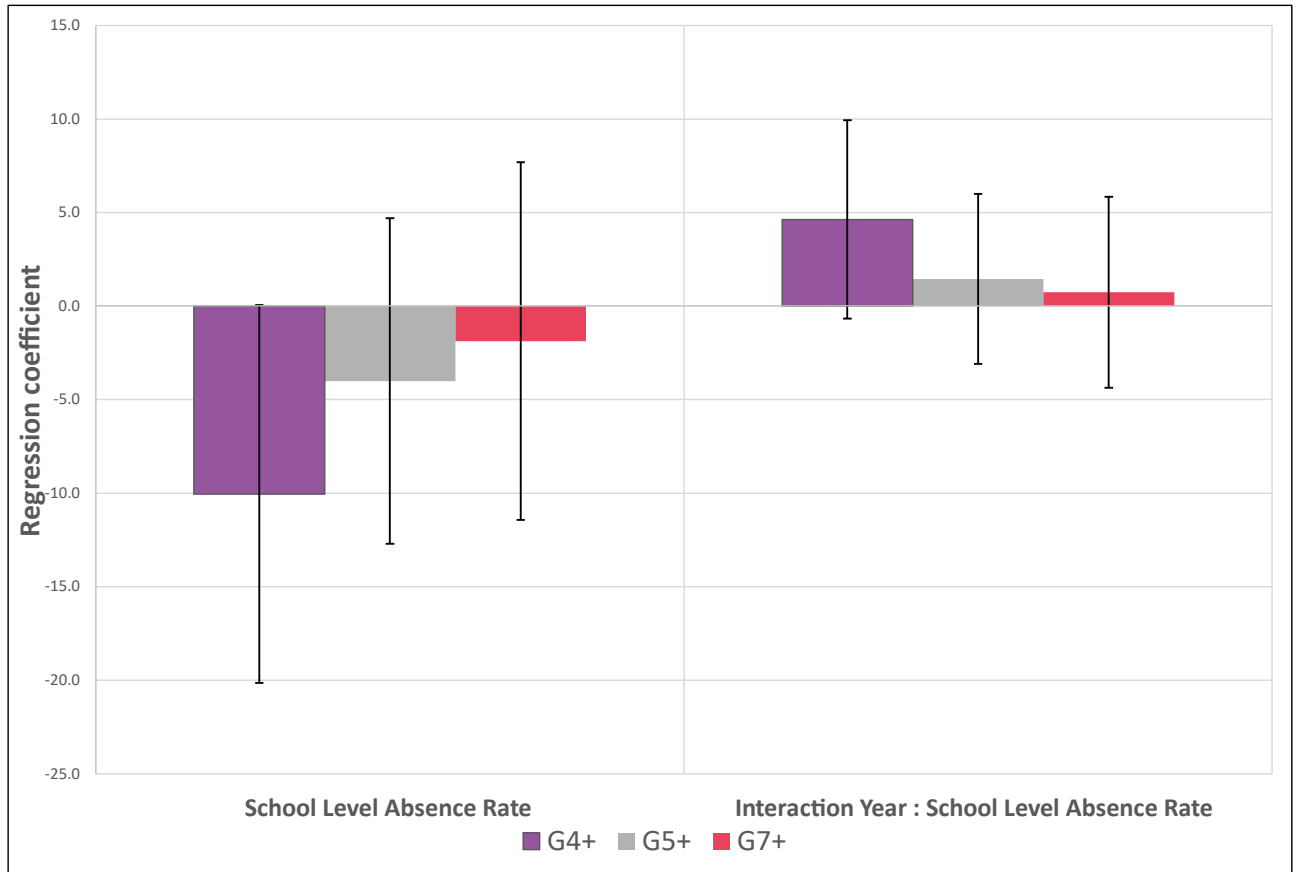
4.6.4   Summary

There is some evidence in this section to suggest that, for English at grade 4, there is a general relationship between school-level absence rates and likelihood of students achieving at or above the grade, but that the gap reduced in 2021. This could be due to the fact that the nature of student absence changed in 2021, with a large proportion of absences due to Covid-19 rather than other school-level factors related to absence, which have a greater impact on student performance.

5   Conclusion

The purpose of this study was to examine which student-level and school-level characteristics may have been related to any decline in performance on the NRT from 2020 to 2021 due to disruption to learning experienced during the Covid-19 pandemic. The outcomes of the NRT in 2021 showed a drop in mathematics attainment but very similar performance in English.

It is reasonable to hypothesise that specific groups of students and schools may have been more adversely impacted by the disruption and show significantly worse performance on the NRT in 2021 compared with other groups. Two key themes explored as part of this research were socio-economic factors and prior performance. Additionally, the analysis included a range of other demographic factors at both student-level and school-level that could potentially play a role in explaining how the impact of disruption due to the pandemic may vary across the population.

Socio-economic factors

For both English and mathematics, there were mostly no significant changes in the relationship between the socio-economic status of the student (measured by ever having been eligible for free school meals, current free school meal status and IDACI scores) and performance on the NRT between 2020 and 2021. The exception to this was in the IDACI index at the grade 5 boundary: the difference in the likelihood of achieving grade 5 or above between students in the highest and lowest IDACI quintiles increased significantly between 2020 and 2021.

There was a significant impact related to being in a school with greater levels of deprivation. For mathematics, students in schools with higher proportions of students eligible for free school meals experienced a greater decline in performance. The likelihood of achieving grade 5 and above in 2021 was almost halved for each extra point in the percentage of students with FSM, compared with the effect of the percentage of FSM in 2020. The same is true for the likelihood of achieving grade 7 and above.

For English, there also appeared to be an effect of school-level disadvantage on the change in the likelihood of achieving a grade 7 or above between 2020 and 2021, but this effect was not significant once entered into the regression model where other factors were taken into account.

Prior performance

School prior attainment, in terms of GCSE outcomes in 2019 and student prior attainment, in terms of performance in national curriculum tests at the end of KS2, were included in the model to test the hypothesis that high performing schools or students may have coped better with the disruption caused by the pandemic. There was no evidence that this was the case. While prior attainment had a significant impact on performance on the NRT, the relationships between NRT performance and prior school and student performance did not change significantly across the two years.

Student characteristics

A range of additional student-level characteristics was also included in the analysis as potential indicators of differential impacts of the Covid-19 pandemic. Students with EAL experienced a significantly greater decline in performance in mathematics than students with English as a first language. This decline appears to have had a greater impact at the higher end of the ability scale: the likelihood of achieving grade 7 and above in 2021 was reduced by over a third for having EAL

relative to not having EAL, compared to the difference in likelihood between those groups in 2020. This finding was not replicated in English.

The relationships between gender, ethnicity and SEND and performance on the NRT were not found to have changed significantly between the two years. This result was arguably surprising for SEND, given it might have been expected that students with SEND would have been more likely to be adversely affected by school closures.

School characteristics

A range of additional school-level characteristics was also included in the analysis as potential indicators of differential impacts of the Covid-19 pandemic. The type of school, being defined as urban versus rural, and school size were not significant predictors of performance on the NRT, and nor did the relationship between these variables and performance change significantly across the years. It should be noted that the data used in this study does not enable us to compare the effect of the pandemic between independent schools and state schools given the very small numbers of independent schools taking part in the NRT in 2020 (and none taking part in 2021).

Region

The pattern of changes in performance across different regions of England is difficult to interpret, particularly as confidence intervals are quite wide once the sample is broken down into the nine regional groups. However, there is some evidence to suggest that the proportion of students achieving grade 4 and above in mathematics dropped significantly more in the North West compared to the reference group.

Absence rates

There is some evidence to suggest that there is a significant relationship between school-level absence rates and likelihood of students achieving at or above grade 4 in English, but that this relationship was weakened in 2021. This could be due to the fact that the nature of student absence changed in 2021, with a large proportion of absences due to Covid-19 rather than other school-level factors related to absence, which have a greater impact on student performance. School-level absence did not have a significant impact on likelihood of achieving any of the grades in mathematics, and nor did the relationship appear to have changed significantly in 2021.

6   References

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Appendix A: Data used in the study

Table A1   Variables included in the regression models

Data label	Values	Description
Year	1 = 2020 2 = 2021	Year of NRT administration.
FSM	0 = not eligible for free school meals 1 = eligible for free school meals	Free school meal eligibility in spring term 2021.
FSME	0 = never eligible for free school meals 1= eligible for free school meals now or previously	Indicator of whether a student has ever been eligible for free school meals, up to spring term 2021
IDACI quintiles	1 to 5	IDACI is the Income Deprivation Affecting Children Index. Quintiles were created by arranging the data in ascending order based on IDACI score in 2019 and splitting the data into five equal groups. In this data, a higher quintile therefore indicates a higher level of deprivation.
Gender	0 = male 1= female	Indication of gender from the NRT data collection
SEND	0 = no identified special educational need or disability 1 = registered as having special educational needs or a disability	Indication of whether a student has special educational needs or a disability.
EAL	0 = Language group major is English 1 = Language group is something other than English	Indicator of whether a student has English as an additional language
Ethnicity	0 = Ethnic group major is white 1= Ethnic group major is other than white	Indicator of whether a student is white or from a black, Asian or other minority ethnic group
KS2 quintiles	1 to 5	Based on a KS2 normalised test score which combines marks on the KS2 reading and mathematics tests.

		Quintiles were created by arranging the data for the matched NRT samples in ascending order based on this score and splitting the data into five equal groups, with a higher decile indicating a higher level of performance at KS2.
School type	LA maintained Academy Free school Independent school	Aggregated into four groups from the publically available type of establishment variable (from the Get Information About Schools website)
School size	Continuous	The number of students in year 11, from the school census data a year prior to the NRT, used for sample selection
Percentage FSM	Continuous 0-100%	Percentage of students in the school eligible for FSM, retrieved from school census data
Urban/rural	0=Urban 1=Rural	
Geographical region	East of England East Midlands London North East North West South East South West West Midlands Yorkshire & Humber	Geographical region The East Midlands was used as the reference region in the regression models.
GCSE English	Continuous	Average GCSE points score in English language for the school in 2019
GCSE mathematics	Continuous	Average GCSE points score in mathematics for the school in 2019
Absence rate	Continuous 0-1	Statutory absence data from the NPD, aggregated to school-level across all students in the GCSE target year for the autumn term prior to taking GCSEs/NRT

Table A2   Summary of missing data by variable

Data label	English				Mathematics			
	2020		2021		2020		2021	
	N	%	N	%	N	%	N	%
KS2 quintiles	918	13.83	589	14.62	994	14.71	588	14.19
School GCSE English	579	8.72	545	13.52	598	8.85	559	13.49
School GCSE mathematics	600	9.04	545	13.52	576	8.53	559	13.49
IDACI quintiles	329	4.96	151	3.75	344	5.09	168	4.06
FSM	301	4.53	133	3.30	317	4.69	149	3.60
FSME	301	4.53	139	3.45	316	4.68	150	3.62
SEND provision	300	4.52	133	3.30	316	4.68	147	3.55
Ethnicity	297	4.47	130	3.23	316	4.68	145	3.50
EAL	296	4.46	128	3.18	312	4.62	145	3.50
School percentage FSM	37	0.56	0	0.00	33	0.49	0	0.00
School absence rate	0	0.00	0	0.00	76	1.12	0	0.00

Appendix B: Regression Outputs - English

Table B1   Coefficients of logistic regression – Grade 4 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	0.37	0.56	-0.75	1.49	0.51
Year	-0.68	0.37	-1.42	0.05	0.07
Gender	1.02	0.19	0.64	1.40	0.00
FSM Ever	-0.31	0.20	-0.71	0.09	0.13
SEND	-0.64	0.25	-1.13	-0.15	0.01
EAL	-0.27	0.26	-0.78	0.23	0.29
Ethnicity	-0.03	0.26	-0.55	0.49	0.92
KS2 performance	0.51	0.08	0.36	0.66	0.00
School type	-0.09	0.22	-0.53	0.35	0.68
School size	0.18	0.27	-0.36	0.72	0.51
School proportion FSM	0.08	0.14	-0.20	0.36	0.56
Urban / Rural	0.09	0.34	-0.58	0.75	0.80
Region: East of England	0.22	0.40	-0.58	1.02	0.58
Region: London	-0.60	0.39	-1.37	0.17	0.13
Region: North East	-1.19	0.63	-2.43	0.05	0.06
Region: North West	-0.71	0.42	-1.54	0.13	0.10
Region: South East	-0.47	0.46	-1.40	0.45	0.31
Region: South West	-0.81	0.44	-1.68	0.07	0.07
Region: West Midlands	-0.47	0.43	-1.32	0.39	0.28
Region: Yorkshire & Humber	-0.21	0.42	-1.05	0.63	0.62
School GCSE performance – English	0.34	0.18	-0.02	0.70	0.07
School-level absence – autumn	-9.30	4.30	-17.76	-0.84	0.03
Interaction Year: gender	-0.06	0.13	-0.32	0.19	0.62
Interaction Year: FSME	0.03	0.13	-0.23	0.28	0.84
Interaction Year: SEND	0.00	0.17	-0.32	0.33	0.98
Interaction Year: EAL	0.20	0.17	-0.13	0.52	0.23
Interaction Year: Ethnicity	0.02	0.17	-0.32	0.35	0.93
Interaction Year: KS2 performance	-0.01	0.05	-0.10	0.09	0.92
Interaction Year: School type	0.03	0.15	-0.26	0.32	0.85
Interaction Year: School size	0.00	0.18	-0.36	0.36	0.99
Interaction Year: Proportion FSM	-0.05	0.09	-0.24	0.13	0.57
Interaction Year: Urban / Rural	-0.01	0.25	-0.49	0.48	0.98
Interaction Year: East of England	-0.17	0.29	-0.74	0.41	0.57
Interaction Year: London	0.28	0.28	-0.27	0.83	0.31
Interaction Year: North East	0.76	0.42	-0.06	1.58	0.07
Interaction Year: North West	0.33	0.30	-0.27	0.92	0.28
Interaction Year: South East	0.22	0.32	-0.43	0.87	0.50
Interaction Year: South West	0.55	0.33	-0.11	1.20	0.10
Interaction Year: West Midlands	0.18	0.29	-0.41	0.76	0.55
Interaction Year: Yorkshire & Humber	0.05	0.29	-0.52	0.62	0.86
Interaction Year: school GCSE English	0.06	0.13	-0.20	0.32	0.65
Interaction Year: school level absence	4.98	2.24	0.57	9.39	0.03

Table B2 Coefficients of logistic regression – Grade 5 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-0.84	0.57	-1.96	0.28	0.14
Year	-0.56	0.38	-1.31	0.18	0.14
Gender	0.96	0.18	0.61	1.31	0.00
FSM Ever	-0.28	0.18	-0.65	0.08	0.13
SEND	-0.59	0.33	-1.24	0.07	0.08
EAL	-0.20	0.27	-0.73	0.33	0.46
Ethnicity	0.10	0.24	-0.38	0.58	0.67
KS2 performance	0.55	0.07	0.41	0.70	0.00
School type	-0.06	0.21	-0.48	0.36	0.79
School size	0.14	0.25	-0.35	0.63	0.58
School proportion FSM	0.13	0.13	-0.14	0.39	0.34
Urban / Rural	0.16	0.29	-0.41	0.73	0.57
Region: East of England	0.03	0.42	-0.82	0.88	0.94
Region: London	-0.65	0.38	-1.40	0.11	0.09
Region: North East	-1.03	0.58	-2.16	0.11	0.08
Region: North West	-0.54	0.36	-1.25	0.17	0.13
Region: South East	-0.44	0.42	-1.28	0.39	0.29
Region: South West	-0.65	0.45	-1.53	0.23	0.15
Region: West Midlands	-0.47	0.38	-1.23	0.29	0.23
Region: Yorkshire & Humber	-0.08	0.39	-0.84	0.68	0.83
School GCSE performance – English	0.39	0.17	0.06	0.72	0.02
School-level absence – autumn	-8.31	4.44	-17.06	0.44	0.06
Interaction Year: gender	-0.05	0.13	-0.30	0.20	0.68
Interaction Year: FSME	0.02	0.12	-0.21	0.25	0.87
Interaction Year: SEND	0.01	0.22	-0.42	0.44	0.96
Interaction Year: EAL	0.14	0.18	-0.21	0.49	0.43
Interaction Year: Ethnicity	-0.05	0.16	-0.38	0.27	0.74
Interaction Year: KS2 performance	0.01	0.05	-0.09	0.11	0.84
Interaction Year: School type	0.02	0.14	-0.24	0.29	0.86
Interaction Year: School size	0.00	0.17	-0.33	0.34	0.98
Interaction Year: Proportion FSM	-0.08	0.09	-0.26	0.10	0.36
Interaction Year: Urban / Rural	-0.09	0.21	-0.51	0.33	0.68
Interaction Year: East of England	-0.04	0.28	-0.60	0.53	0.90
Interaction Year: London	0.35	0.26	-0.17	0.87	0.18
Interaction Year: North East	0.67	0.40	-0.12	1.46	0.09
Interaction Year: North West	0.22	0.25	-0.28	0.72	0.39
Interaction Year: South East	0.23	0.28	-0.34	0.79	0.43
Interaction Year: South West	0.49	0.30	-0.10	1.08	0.10
Interaction Year: West Midlands	0.21	0.27	-0.31	0.74	0.43
Interaction Year: Yorkshire & Humber	0.01	0.26	-0.49	0.52	0.97
Interaction Year: school GCSE English	0.02	0.12	-0.21	0.25	0.85
Interaction Year: school-level absence	4.33	2.33	-0.26	8.92	0.06

Table B3   Coefficients of logistic regression – Grade 7 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-3.10	0.82	-4.76	-1.44	0.00
Year	-0.76	0.56	-1.89	0.38	0.18
Gender	0.83	0.21	0.41	1.25	0.00
FSM Ever	-0.22	0.29	-0.81	0.36	0.45
SEND	-0.33	0.52	-1.37	0.71	0.53
EAL	-0.07	0.38	-0.85	0.70	0.85
Ethnicity	0.36	0.31	-0.27	0.99	0.26
KS2 performance	0.63	0.10	0.43	0.84	0.00
School type	-0.19	0.26	-0.71	0.32	0.46
School size	0.01	0.39	-0.79	0.80	0.98
School proportion FSM	0.06	0.19	-0.31	0.43	0.76
Urban / Rural	0.18	0.38	-0.58	0.94	0.64
Region: East of England	-0.11	0.48	-1.06	0.84	0.82
Region: London	-0.90	0.44	-1.77	-0.03	0.04
Region: North East	-0.55	0.69	-1.92	0.82	0.43
Region: North West	-0.61	0.45	-1.50	0.28	0.18
Region: South East	-0.26	0.46	-1.17	0.64	0.57
Region: South West	-0.74	0.51	-1.74	0.26	0.15
Region: West Midlands	-0.51	0.46	-1.41	0.40	0.27
Region: Yorkshire & Humber	-0.07	0.46	-0.98	0.85	0.89
School GCSE performance – English	0.39	0.20	-0.01	0.78	0.06
School-level absence – autumn	-9.47	5.61	-20.58	1.64	0.09
Interaction Year: gender	-0.02	0.15	-0.31	0.27	0.88
Interaction Year: FSME	-0.04	0.19	-0.42	0.35	0.86
Interaction Year: SEND	-0.08	0.38	-0.85	0.69	0.84
Interaction Year: EAL	0.03	0.24	-0.46	0.52	0.90
Interaction Year: Ethnicity	-0.23	0.22	-0.67	0.22	0.31
Interaction Year: KS2 performance	0.07	0.08	-0.09	0.22	0.38
Interaction Year: School type	0.13	0.19	-0.25	0.51	0.49
Interaction Year: School size	0.04	0.27	-0.51	0.59	0.87
Interaction Year: Proportion FSM	-0.02	0.12	-0.26	0.21	0.84
Interaction Year: Urban / Rural	-0.06	0.28	-0.63	0.51	0.82
Interaction Year: East of England	0.07	0.34	-0.61	0.75	0.84
Interaction Year: London	0.58	0.31	-0.02	1.19	0.06
Interaction Year: North East	0.34	0.52	-0.71	1.38	0.52
Interaction Year: North West	0.25	0.33	-0.39	0.89	0.44
Interaction Year: South East	0.19	0.33	-0.46	0.83	0.57
Interaction Year: South West	0.51	0.34	-0.17	1.18	0.14
Interaction Year: West Midlands	0.31	0.34	-0.36	0.98	0.36
Interaction Year: Yorkshire & Humber	0.02	0.32	-0.62	0.65	0.96
Interaction Year: school GCSE English	0.03	0.14	-0.24	0.30	0.82
Interaction Year: school-level absence	4.69	2.97	-1.20	10.58	0.12

Appendix C: Regression Outputs - Mathematics

Table C1   Coefficients of logistic regression – Grade 4 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-1.12	0.62	-2.34	0.10	0.07
Year	0.07	0.39	-0.69	0.84	0.85
Gender	0.13	0.18	-0.23	0.49	0.47
FSM Ever	-0.43	0.22	-0.88	0.01	0.06
SEND	-1.11	0.28	-1.65	-0.56	0.00
EAL	0.35	0.29	-0.23	0.93	0.23
Ethnicity	0.32	0.28	-0.25	0.89	0.26
KS2 performance	1.16	0.09	0.99	1.33	0.00
School type	0.09	0.26	-0.43	0.61	0.72
School size	0.06	0.30	-0.53	0.65	0.84
School proportion FSM	0.31	0.16	-0.01	0.63	0.06
Urban / Rural	0.18	0.38	-0.57	0.93	0.63
Region: East of England	0.36	0.44	-0.51	1.23	0.42
Region: London	0.21	0.46	-0.68	1.11	0.64
Region: North East	0.17	0.62	-1.05	1.39	0.78
Region: North West	0.80	0.43	-0.05	1.65	0.06
Region: South East	0.32	0.40	-0.47	1.10	0.43
Region: South West	0.27	0.52	-0.75	1.29	0.60
Region: West Midlands	0.01	0.46	-0.90	0.92	0.99
Region: Yorkshire & Humber	0.60	0.49	-0.35	1.56	0.22
School GCSE performance – maths	0.66	0.25	0.16	1.17	0.01
School-level absence – autumn	-10.05	5.16	-20.22	0.13	0.05
Interaction Year: gender	-0.08	0.13	-0.34	0.18	0.53
Interaction Year: FSME	0.02	0.15	-0.27	0.31	0.90
Interaction Year: SEND	0.32	0.19	-0.05	0.70	0.09
Interaction Year: EAL	-0.24	0.19	-0.61	0.14	0.21
Interaction Year: Ethnicity	-0.09	0.20	-0.49	0.30	0.64
Interaction Year: KS2 performance	-0.08	0.06	-0.19	0.03	0.15
Interaction Year: School type	-0.08	0.17	-0.41	0.25	0.61
Interaction Year: School size	0.05	0.19	-0.32	0.43	0.78
Interaction Year: Proportion FSM	-0.21	0.11	-0.42	0.01	0.06
Interaction Year: Urban / Rural	-0.07	0.26	-0.59	0.45	0.80
Interaction Year: East of England	-0.23	0.30	-0.82	0.37	0.45
Interaction Year: London	-0.27	0.31	-0.87	0.33	0.38
Interaction Year: North East	-0.33	0.43	-1.17	0.52	0.45
Interaction Year: North West	-0.76	0.29	-1.33	-0.20	0.01
Interaction Year: South East	-0.29	0.28	-0.84	0.25	0.29
Interaction Year: South West	-0.30	0.34	-0.96	0.37	0.38
Interaction Year: West Midlands	-0.12	0.31	-0.74	0.50	0.70
Interaction Year: Yorkshire & Humber	-0.39	0.32	-1.03	0.25	0.23
Interaction Year: school GCSE maths	-0.18	0.16	-0.49	0.13	0.25
Interaction Year: school-level absence	4.63	2.71	-0.72	9.97	0.09

Table C2   Coefficients of logistic regression – Grade 5 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-3.03	0.54	-4.09	-1.98	0.00
Year	0.34	0.35	-0.34	1.02	0.33
Gender	0.08	0.16	-0.24	0.40	0.64
FSM Ever	-0.44	0.23	-0.91	0.03	0.07
SEND	-0.84	0.33	-1.51	-0.18	0.01
EAL	0.64	0.29	0.06	1.21	0.03
Ethnicity	0.33	0.24	-0.15	0.81	0.17
KS2 performance	1.14	0.09	0.97	1.31	0.00
School type	0.15	0.21	-0.27	0.57	0.48
School size	0.43	0.28	-0.12	0.98	0.12
School proportion FSM	0.45	0.17	0.13	0.78	0.01
Urban / Rural	0.20	0.31	-0.42	0.81	0.53
Region: East of England	0.54	0.44	-0.32	1.41	0.22
Region: London	0.36	0.44	-0.50	1.22	0.41
Region: North East	0.47	0.54	-0.59	1.52	0.39
Region: North West	0.47	0.43	-0.38	1.32	0.27
Region: South East	0.56	0.45	-0.34	1.45	0.22
Region: South West	0.36	0.49	-0.59	1.32	0.46
Region: West Midlands	-0.13	0.42	-0.96	0.70	0.76
Region: Yorkshire & Humber	0.62	0.49	-0.35	1.59	0.21
School GCSE performance – maths	0.73	0.21	0.32	1.15	0.00
School-level absence – autumn	-4.00	4.44	-12.71	4.71	0.37
Interaction Year: gender	-0.06	0.11	-0.28	0.16	0.62
Interaction Year: FSME	0.05	0.15	-0.25	0.35	0.76
Interaction Year: SEND	0.27	0.25	-0.23	0.77	0.29
Interaction Year: EAL	-0.30	0.18	-0.67	0.06	0.10
Interaction Year: Ethnicity	-0.09	0.17	-0.42	0.24	0.58
Interaction Year: KS2 performance	-0.07	0.06	-0.18	0.04	0.23
Interaction Year: School type	-0.10	0.14	-0.37	0.18	0.48
Interaction Year: School size	-0.19	0.18	-0.56	0.17	0.30
Interaction Year: Proportion FSM	-0.29	0.11	-0.50	-0.08	0.01
Interaction Year: Urban / Rural	-0.08	0.22	-0.51	0.36	0.73
Interaction Year: East of England	-0.36	0.30	-0.97	0.24	0.24
Interaction Year: London	-0.32	0.30	-0.91	0.27	0.29
Interaction Year: North East	-0.59	0.41	-1.39	0.22	0.15
Interaction Year: North West	-0.55	0.30	-1.15	0.06	0.07
Interaction Year: South East	-0.44	0.32	-1.09	0.21	0.18
Interaction Year: South West	-0.37	0.33	-1.03	0.28	0.26
Interaction Year: West Midlands	-0.01	0.31	-0.62	0.60	0.97
Interaction Year: Yorkshire & Humber	-0.43	0.32	-1.07	0.22	0.19
Interaction Year: school GCSE maths	-0.21	0.13	-0.47	0.05	0.11
Interaction Year: school-level absence	1.45	2.32	-3.11	6.01	0.53

Table C3   Coefficients of logistic regression – Grade 7 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-5.54	0.75	-7.01	-4.06	0.00
Year	0.18	0.51	-0.82	1.18	0.72
Gender	0.06	0.20	-0.34	0.46	0.77
FSM Ever	-0.46	0.28	-1.01	0.09	0.10
SEND	-0.63	0.50	-1.64	0.37	0.21
EAL	1.20	0.34	0.53	1.87	0.00
Ethnicity	0.07	0.30	-0.52	0.66	0.82
KS2 performance	1.24	0.11	1.03	1.45	0.00
School type	0.21	0.29	-0.38	0.79	0.48
School size	0.40	0.27	-0.13	0.93	0.14
School proportion FSM	0.57	0.17	0.24	0.90	0.00
Urban / Rural	-0.21	0.39	-0.97	0.56	0.59
Region: East of England	0.61	0.50	-0.38	1.59	0.23
Region: London	0.32	0.47	-0.61	1.25	0.50
Region: North East	0.46	0.61	-0.73	1.65	0.45
Region: North West	0.27	0.50	-0.73	1.27	0.59
Region: South East	0.04	0.48	-0.92	1.00	0.94
Region: South West	0.22	0.55	-0.88	1.31	0.70
Region: West Midlands	-0.15	0.54	-1.24	0.93	0.78
Region: Yorkshire & Humber	0.72	0.48	-0.22	1.66	0.13
School GCSE performance – maths	0.57	0.20	0.17	0.97	0.01
School-level absence – autumn	-1.87	4.88	-11.43	7.69	0.70
Interaction Year: gender	-0.16	0.15	-0.45	0.12	0.26
Interaction Year: FSME	0.09	0.19	-0.29	0.48	0.63
Interaction Year: SEND	0.21	0.34	-0.47	0.89	0.54
Interaction Year: EAL	-0.54	0.22	-0.97	-0.12	0.01
Interaction Year: Ethnicity	0.05	0.19	-0.33	0.43	0.80
Interaction Year: KS2 performance	-0.05	0.07	-0.19	0.10	0.52
Interaction Year: School type	-0.13	0.20	-0.53	0.28	0.53
Interaction Year: School size	-0.13	0.19	-0.50	0.24	0.50
Interaction Year: Proportion FSM	-0.34	0.11	-0.56	-0.12	0.00
Interaction Year: Urban / Rural	0.25	0.27	-0.29	0.79	0.36
Interaction Year: East of England	-0.37	0.34	-1.05	0.30	0.27
Interaction Year: London	-0.12	0.33	-0.78	0.54	0.72
Interaction Year: North East	-0.61	0.45	-1.49	0.28	0.18
Interaction Year: North West	-0.25	0.36	-0.96	0.47	0.49
Interaction Year: South East	-0.04	0.35	-0.74	0.66	0.91
Interaction Year: South West	-0.23	0.37	-0.95	0.49	0.53
Interaction Year: West Midlands	0.08	0.37	-0.67	0.83	0.83
Interaction Year: Yorkshire & Humber	-0.48	0.33	-1.12	0.17	0.14
Interaction Year: school GCSE maths	-0.11	0.14	-0.39	0.16	0.41
Interaction Year: school-level absence	0.74	2.60	-4.36	5.85	0.78

Note that, although the regression coefficient for year is not significant in these tables, contrary to the main findings of the NRT, this is due to the inclusion of interaction parameters in the model which all include the year variable.

Appendix D: Regression Outputs including IDACI - English

Table D1   Coefficients of logistic regression including IDACI – Grade 4 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	0.60	0.58	-0.55	1.74	0.30
Year	-0.76	0.37	-1.50	-0.03	0.04
Gender	1.03	0.19	0.66	1.41	0.00
IDACI quintile	-0.09	0.08	-0.25	0.06	0.23
SEND	-0.66	0.25	-1.14	-0.17	0.01
EAL	-0.22	0.26	-0.74	0.29	0.39
Ethnicity	-0.03	0.26	-0.55	0.50	0.92
KS2 performance	0.52	0.07	0.37	0.66	0.00
School type	-0.10	0.22	-0.54	0.34	0.65
School size	0.17	0.27	-0.37	0.71	0.53
School proportion FSM	0.11	0.15	-0.19	0.40	0.47
Urban / Rural	0.05	0.34	-0.61	0.72	0.87
Region: East of England	0.20	0.40	-0.60	0.99	0.63
Region: London	-0.62	0.39	-1.40	0.15	0.11
Region: North East	-1.20	0.63	-2.44	0.05	0.06
Region: North West	-0.76	0.42	-1.58	0.07	0.07
Region: South East	-0.51	0.46	-1.43	0.42	0.28
Region: South West	-0.81	0.45	-1.69	0.07	0.07
Region: West Midlands	-0.48	0.43	-1.33	0.37	0.26
Region: Yorkshire & Humber	-0.24	0.42	-1.09	0.61	0.57
School GCSE performance – English	0.34	0.18	-0.02	0.71	0.06
School-level absence – autumn	-9.45	4.30	-17.92	-0.98	0.03
Interaction Year: gender	-0.07	0.13	-0.33	0.18	0.57
Interaction Year: IDACI quintile	0.02	0.05	-0.08	0.12	0.73
Interaction Year: SEND	0.01	0.17	-0.32	0.33	0.97
Interaction Year: EAL	0.19	0.17	-0.14	0.51	0.27
Interaction Year: Ethnicity	0.02	0.17	-0.33	0.36	0.92
Interaction Year: KS2 performance	-0.01	0.05	-0.10	0.09	0.90
Interaction Year: School type	0.04	0.15	-0.26	0.33	0.81
Interaction Year: School size	0.00	0.18	-0.36	0.36	0.99
Interaction Year: Proportion FSM	-0.06	0.10	-0.26	0.13	0.51
Interaction Year: Urban / Rural	0.01	0.25	-0.47	0.49	0.97
Interaction Year: East of England	-0.16	0.29	-0.73	0.41	0.58
Interaction Year: London	0.28	0.28	-0.27	0.83	0.32
Interaction Year: North East	0.75	0.41	-0.06	1.57	0.07
Interaction Year: North West	0.35	0.30	-0.24	0.94	0.24
Interaction Year: South East	0.23	0.32	-0.41	0.88	0.47
Interaction Year: South West	0.55	0.33	-0.11	1.21	0.10
Interaction Year: West Midlands	0.18	0.29	-0.40	0.76	0.53
Interaction Year: Yorkshire & Humber	0.06	0.29	-0.51	0.63	0.83
Interaction Year: school GCSE English	0.05	0.13	-0.20	0.31	0.68
Interaction Year: school-level absence	5.07	2.24	0.66	9.48	0.02

Table D2 Coefficients of logistic regression including IDACI – Grade 5 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-0.61	0.59	-1.78	0.56	0.31
Year	-0.64	0.38	-1.40	0.11	0.09
Gender	0.97	0.18	0.62	1.32	0.00
IDACI quintile	-0.09	0.08	-0.24	0.07	0.26
SEND	-0.60	0.32	-1.25	0.04	0.07
EAL	-0.16	0.27	-0.69	0.38	0.56
Ethnicity	0.11	0.24	-0.38	0.59	0.67
KS2 performance	0.56	0.07	0.42	0.70	0.00
School type	-0.07	0.21	-0.49	0.35	0.75
School size	0.13	0.25	-0.36	0.62	0.60
School proportion FSM	0.16	0.14	-0.13	0.44	0.27
Urban / Rural	0.13	0.29	-0.44	0.70	0.65
Region: East of England	0.01	0.43	-0.84	0.86	0.99
Region: London	-0.67	0.38	-1.42	0.09	0.08
Region: North East	-1.03	0.58	-2.16	0.11	0.08
Region: North West	-0.59	0.36	-1.29	0.11	0.10
Region: South East	-0.48	0.42	-1.31	0.35	0.25
Region: South West	-0.66	0.45	-1.54	0.23	0.15
Region: West Midlands	-0.48	0.39	-1.24	0.28	0.22
Region: Yorkshire & Humber	-0.11	0.39	-0.88	0.66	0.77
School GCSE performance – English	0.39	0.17	0.06	0.72	0.02
School-level absence – autumn	-8.45	4.45	-17.23	0.32	0.06
Interaction Year: gender	-0.06	0.13	-0.31	0.19	0.63
Interaction Year: IDACI quintile	0.02	0.05	-0.09	0.12	0.78
Interaction Year: SEND	0.01	0.21	-0.42	0.44	0.96
Interaction Year: EAL	0.13	0.18	-0.23	0.48	0.47
Interaction Year: Ethnicity	-0.05	0.17	-0.38	0.27	0.75
Interaction Year: KS2 performance	0.01	0.05	-0.09	0.11	0.85
Interaction Year: School type	0.03	0.14	-0.24	0.30	0.82
Interaction Year: School size	0.01	0.17	-0.33	0.35	0.96
Interaction Year: Proportion FSM	-0.09	0.10	-0.29	0.10	0.34
Interaction Year: Urban / Rural	-0.07	0.21	-0.50	0.35	0.73
Interaction Year: East of England	-0.03	0.28	-0.59	0.54	0.92
Interaction Year: London	0.35	0.26	-0.17	0.87	0.19
Interaction Year: North East	0.67	0.40	-0.12	1.45	0.09
Interaction Year: North West	0.24	0.25	-0.25	0.74	0.34
Interaction Year: South East	0.24	0.28	-0.32	0.80	0.39
Interaction Year: South West	0.49	0.30	-0.10	1.08	0.10
Interaction Year: West Midlands	0.22	0.27	-0.30	0.74	0.41
Interaction Year: Yorkshire & Humber	0.02	0.26	-0.48	0.53	0.93
Interaction Year: school GCSE English	0.02	0.12	-0.21	0.25	0.88
Interaction Year: school-level absence	4.42	2.33	-0.18	9.02	0.06

Table D3   Coefficients of logistic regression including IDACI – Grade 7 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-2.98	0.82	-4.63	-1.34	0.00
Year	-0.80	0.57	-1.94	0.35	0.17
Gender	0.83	0.21	0.42	1.25	0.00
IDACI quintile	-0.05	0.10	-0.24	0.15	0.63
SEND	-0.33	0.52	-1.37	0.72	0.53
EAL	-0.06	0.38	-0.83	0.71	0.87
Ethnicity	0.37	0.32	-0.27	1.00	0.25
KS2 performance	0.64	0.10	0.43	0.84	0.00
School type	-0.20	0.26	-0.71	0.31	0.44
School size	0.01	0.39	-0.79	0.80	0.99
School proportion FSM	0.07	0.20	-0.32	0.46	0.73
Urban / Rural	0.16	0.38	-0.59	0.91	0.67
Region: East of England	-0.12	0.48	-1.06	0.82	0.80
Region: London	-0.92	0.44	-1.78	-0.05	0.04
Region: North East	-0.54	0.69	-1.91	0.83	0.43
Region: North West	-0.65	0.45	-1.53	0.23	0.15
Region: South East	-0.29	0.45	-1.19	0.61	0.52
Region: South West	-0.74	0.51	-1.74	0.26	0.15
Region: West Midlands	-0.50	0.46	-1.40	0.40	0.28
Region: Yorkshire & Humber	-0.09	0.46	-1.00	0.81	0.84
School GCSE performance – English	0.39	0.20	0.00	0.79	0.05
School-level absence – autumn	-9.54	5.56	-20.54	1.46	0.09
Interaction Year: gender	-0.03	0.15	-0.31	0.26	0.86
Interaction Year: IDACI quintile	0.00	0.07	-0.13	0.13	0.96
Interaction Year: SEND	-0.09	0.38	-0.87	0.68	0.81
Interaction Year: EAL	0.03	0.24	-0.45	0.52	0.89
Interaction Year: Ethnicity	-0.23	0.23	-0.68	0.22	0.30
Interaction Year: KS2 performance	0.07	0.08	-0.08	0.22	0.36
Interaction Year: School type	0.14	0.19	-0.24	0.52	0.47
Interaction Year: School size	0.04	0.27	-0.51	0.59	0.88
Interaction Year: Proportion FSM	-0.03	0.13	-0.28	0.22	0.81
Interaction Year: Urban / Rural	-0.06	0.28	-0.62	0.51	0.84
Interaction Year: East of England	0.07	0.34	-0.61	0.75	0.84
Interaction Year: London	0.58	0.31	-0.02	1.19	0.06
Interaction Year: North East	0.33	0.52	-0.71	1.37	0.53
Interaction Year: North West	0.27	0.32	-0.36	0.91	0.40
Interaction Year: South East	0.20	0.32	-0.44	0.85	0.53
Interaction Year: South West	0.51	0.34	-0.16	1.17	0.14
Interaction Year: West Midlands	0.31	0.34	-0.37	0.98	0.37
Interaction Year: Yorkshire & Humber	0.03	0.32	-0.60	0.66	0.93
Interaction Year: school GCSE English	0.03	0.13	-0.24	0.29	0.85
Interaction Year: school-level absence	4.74	2.94	-1.09	10.58	0.11

Appendix E: Regression Outputs including IDACI - Mathematics

Table E1   Coefficients of logistic regression including IDACI – Grade 4 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-0.85	0.68	-2.19	0.48	0.21
Year	0.00	0.43	-0.84	0.85	0.99
Gender	0.13	0.18	-0.22	0.49	0.47
IDACI quintile	-0.11	0.08	-0.27	0.05	0.18
SEND	-1.11	0.28	-1.66	-0.57	0.00
EAL	0.41	0.30	-0.18	0.99	0.17
Ethnicity	0.30	0.28	-0.27	0.86	0.30
KS2 performance	1.17	0.09	1.00	1.34	0.00
School type	0.04	0.26	-0.47	0.55	0.88
School size	0.08	0.30	-0.52	0.67	0.80
School proportion FSM	0.31	0.18	-0.03	0.66	0.08
Urban / Rural	0.12	0.38	-0.62	0.86	0.75
Region: East of England	0.35	0.44	-0.52	1.21	0.43
Region: London	0.17	0.46	-0.72	1.07	0.71
Region: North East	0.20	0.61	-1.01	1.41	0.75
Region: North West	0.81	0.43	-0.04	1.65	0.06
Region: South East	0.24	0.40	-0.54	1.03	0.54
Region: South West	0.27	0.52	-0.75	1.29	0.60
Region: West Midlands	0.00	0.46	-0.91	0.91	1.00
Region: Yorkshire & Humber	0.58	0.48	-0.37	1.54	0.23
School GCSE performance – maths	0.65	0.25	0.15	1.14	0.01
School-level absence – autumn	-9.99	5.15	-20.15	0.17	0.05
Interaction Year: gender	-0.09	0.13	-0.34	0.17	0.51
Interaction Year: IDACI quintile	0.00	0.06	-0.11	0.11	0.96
Interaction Year: SEND	0.31	0.19	-0.06	0.68	0.10
Interaction Year: EAL	-0.23	0.19	-0.61	0.14	0.22
Interaction Year: Ethnicity	-0.08	0.20	-0.48	0.31	0.67
Interaction Year: KS2 performance	-0.08	0.06	-0.19	0.03	0.15
Interaction Year: School type	-0.05	0.16	-0.37	0.27	0.76
Interaction Year: School size	0.04	0.19	-0.34	0.42	0.82
Interaction Year: Proportion FSM	-0.20	0.11	-0.42	0.02	0.07
Interaction Year: Urban / Rural	-0.04	0.26	-0.55	0.48	0.88
Interaction Year: East of England	-0.21	0.30	-0.80	0.38	0.48
Interaction Year: London	-0.26	0.31	-0.86	0.34	0.39
Interaction Year: North East	-0.34	0.42	-1.18	0.49	0.42
Interaction Year: North West	-0.77	0.28	-1.32	-0.21	0.01
Interaction Year: South East	-0.26	0.28	-0.81	0.29	0.35
Interaction Year: South West	-0.30	0.34	-0.96	0.37	0.38
Interaction Year: West Midlands	-0.11	0.31	-0.73	0.51	0.72
Interaction Year: Yorkshire & Humber	-0.38	0.32	-1.01	0.26	0.24
Interaction Year: school GCSE maths	-0.18	0.16	-0.49	0.13	0.26
Interaction Year: school-level absence	4.64	2.70	-0.70	9.97	0.09

Table E2   Coefficients of logistic regression including IDACI – Grade 5 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-3.05	0.58	-4.19	-1.91	0.00
Year	0.42	0.38	-0.32	1.16	0.27
Gender	0.08	0.16	-0.24	0.40	0.62
IDACI quintile	-0.03	0.08	-0.19	0.14	0.75
SEND	-0.86	0.33	-1.52	-0.20	0.01
EAL	0.68	0.29	0.09	1.26	0.02
Ethnicity	0.28	0.24	-0.20	0.76	0.25
KS2 performance	1.15	0.09	0.98	1.32	0.00
School type	0.11	0.21	-0.31	0.52	0.61
School size	0.44	0.28	-0.10	0.99	0.11
School proportion FSM	0.41	0.17	0.09	0.74	0.01
Urban / Rural	0.15	0.32	-0.47	0.78	0.63
Region: East of England	0.54	0.44	-0.33	1.41	0.22
Region: London	0.34	0.44	-0.52	1.20	0.44
Region: North East	0.50	0.53	-0.55	1.54	0.35
Region: North West	0.47	0.43	-0.38	1.33	0.27
Region: South East	0.52	0.45	-0.38	1.42	0.25
Region: South West	0.38	0.49	-0.57	1.34	0.43
Region: West Midlands	-0.11	0.42	-0.94	0.72	0.80
Region: Yorkshire & Humber	0.63	0.49	-0.34	1.59	0.20
School GCSE performance – maths	0.73	0.20	0.32	1.14	0.00
School-level absence – autumn	-3.91	4.39	-12.52	4.71	0.37
Interaction Year: gender	-0.06	0.11	-0.28	0.16	0.59
Interaction Year: IDACI quintile	-0.04	0.05	-0.15	0.07	0.47
Interaction Year: SEND	0.27	0.25	-0.23	0.76	0.28
Interaction Year: EAL	-0.30	0.19	-0.67	0.07	0.11
Interaction Year: Ethnicity	-0.06	0.17	-0.39	0.27	0.71
Interaction Year: KS2 performance	-0.07	0.06	-0.18	0.04	0.22
Interaction Year: School type	-0.07	0.14	-0.34	0.21	0.62
Interaction Year: School size	-0.20	0.19	-0.57	0.17	0.28
Interaction Year: Proportion FSM	-0.26	0.11	-0.47	-0.05	0.02
Interaction Year: Urban / Rural	-0.06	0.23	-0.51	0.39	0.79
Interaction Year: East of England	-0.36	0.30	-0.96	0.24	0.24
Interaction Year: London	-0.32	0.30	-0.91	0.27	0.29
Interaction Year: North East	-0.60	0.40	-1.39	0.19	0.14
Interaction Year: North West	-0.55	0.30	-1.15	0.06	0.08
Interaction Year: South East	-0.43	0.32	-1.08	0.22	0.19
Interaction Year: South West	-0.39	0.33	-1.04	0.27	0.24
Interaction Year: West Midlands	-0.02	0.31	-0.64	0.59	0.94
Interaction Year: Yorkshire & Humber	-0.43	0.32	-1.08	0.21	0.18
Interaction Year: school GCSE maths	-0.21	0.13	-0.47	0.04	0.10
Interaction Year: school-level absence	1.44	2.30	-3.07	5.96	0.53

Table E3   Coefficients of logistic regression including IDACI – Grade 7 and above

	Estimate	SE	Lower CI	Upper CI	p-value
(Intercept)	-5.28	0.77	-6.80	-3.75	0.00
Year	0.09	0.53	-0.95	1.13	0.86
Gender	0.08	0.20	-0.32	0.48	0.71
IDACI quintile	-0.12	0.09	-0.29	0.05	0.18
SEND	-0.62	0.49	-1.60	0.37	0.22
EAL	1.25	0.34	0.59	1.92	0.00
Ethnicity	0.06	0.30	-0.54	0.65	0.85
KS2 performance	1.25	0.11	1.03	1.46	0.00
School type	0.17	0.30	-0.42	0.76	0.57
School size	0.40	0.27	-0.13	0.94	0.14
School proportion FSM	0.60	0.18	0.25	0.94	0.00
Urban / Rural	-0.25	0.39	-1.02	0.52	0.52
Region: East of England	0.58	0.50	-0.41	1.57	0.25
Region: London	0.30	0.47	-0.62	1.23	0.52
Region: North East	0.50	0.60	-0.68	1.68	0.41
Region: North West	0.25	0.50	-0.76	1.25	0.63
Region: South East	-0.01	0.48	-0.96	0.94	0.98
Region: South West	0.22	0.55	-0.88	1.31	0.70
Region: West Midlands	-0.11	0.54	-1.19	0.97	0.83
Region: Yorkshire & Humber	0.71	0.48	-0.23	1.66	0.14
School GCSE performance – maths	0.58	0.20	0.18	0.98	0.01
School-level absence – autumn	-2.00	4.81	-11.44	7.43	0.68
Interaction Year: gender	-0.17	0.15	-0.46	0.11	0.23
Interaction Year: IDACI quintile	0.02	0.06	-0.10	0.14	0.70
Interaction Year: SEND	0.19	0.34	-0.48	0.87	0.57
Interaction Year: EAL	-0.56	0.22	-0.98	-0.14	0.01
Interaction Year: Ethnicity	0.06	0.19	-0.32	0.43	0.76
Interaction Year: KS2 performance	-0.05	0.07	-0.19	0.10	0.51
Interaction Year: School type	-0.10	0.20	-0.51	0.30	0.62
Interaction Year: School size	-0.13	0.19	-0.50	0.24	0.49
Interaction Year: Proportion FSM	-0.35	0.12	-0.59	-0.12	0.00
Interaction Year: Urban / Rural	0.27	0.27	-0.27	0.82	0.32
Interaction Year: East of England	-0.36	0.34	-1.03	0.31	0.29
Interaction Year: London	-0.12	0.33	-0.77	0.53	0.72
Interaction Year: North East	-0.62	0.44	-1.49	0.25	0.16
Interaction Year: North West	-0.23	0.36	-0.95	0.49	0.53
Interaction Year: South East	-0.02	0.35	-0.71	0.68	0.96
Interaction Year: South West	-0.23	0.37	-0.96	0.49	0.52
Interaction Year: West Midlands	0.05	0.37	-0.69	0.80	0.89
Interaction Year: Yorkshire & Humber	-0.48	0.32	-1.12	0.16	0.14
Interaction Year: school GCSE maths	-0.12	0.14	-0.40	0.15	0.38
Interaction Year: school-level absence	0.83	2.57	-4.21	5.87	0.75

Note that, although the regression coefficient for year is not significant in these tables, contrary to the main findings of the NRT, this is due to the inclusion of interaction parameters in the model which all include the year variable.

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