The impact of lockdown on children's education: a nationwide analysis

Mainstream state schools show substantial reductions in attainment between 2019 and 2020 and not all pupils appear to have been affected equally. This study looks at the impact of deprivation levels, location, subject and year group on performance.

November 2020
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Summary

This paper analyses changes in attainment among primary pupils in England following the school closures and suspension of most in-person teaching during the spring and summer of 2020. The analysis is based on the test results from over 250,000 primary school pupils who sat an *RS Assessment from Hodder Education* assessment in 2020. These tests include Progress in Understanding Mathematics Assessment (PUMA), Progress in Reading Assessment (PiRA) and Progress in Grammar, Punctuation and Spelling Assessment (GAPS).

Key findings include:

- There were substantial drops in attainment between 2019 and 2020 across all subjects and year groups.

- Not all pupils appear to have been affected equally. Younger year groups generally showed bigger reductions in attainment than older year groups, and children eligible for the Pupil Premium showed larger average declines than those who are not.

- There were also considerable differences by school type. Those with higher levels of deprivation, situated in urban areas or located in the north or midlands, tended to show greater declines.

- Differences were also seen between topics within the same subject. For example, Fractions scores were affected more than Number, while Punctuation fared worse than Spelling.

- These results are consistent with increases in various well-established educational attainment gaps, particularly those related to poverty.

Introduction

The COVID-19 pandemic resulted in national lockdowns across the UK during the spring of 2020, including the suspension of in-person teaching for most pupils for the latter part of the spring term and almost the whole of the summer term. Pupils returned to school in September, but an urgent question for educators and policymakers is the size and nature of the effect that this disruption has had on children's learning.

During the first half of the autumn term 2020, many schools have taken the opportunity to have their Year 1 to 6 pupils sit the Summer Papers that they missed at the end of the previous year. This provides attainment benchmarks to inform priorities and interventions for individual schools and pupils. In addition, it creates a valuable opportunity to understand the effects of recent educational disruptions at a wider national level.

Throughout this report we refer to the Summer Papers from Paper R to Paper 5 which are test papers designed to be taken at the end of the summer term, for year groups Reception to Year 5. In summer 2019 the papers were taken by the correct year group, whereas in September and October 2020, pupils had moved up a year group meaning, for example, those sitting Paper 2 in 2020 had just started Year 3, and those sitting Paper 5 were now in Year 6. For this reason, results for Paper 6 are not shown because most of those pupils have progressed to secondary school.

This paper analyses aggregate, anonymised results from Summer Papers sat by primary pupils at mainstream state schools in England during the 2020 autumn term, and compares these with the results obtained from the previous cohort in summer 2019. As we are not comparing two identical test windows, any differences can therefore be attributed to a combination of:

- higher pupil age (by around 4 months)

- the replacement of in-person teaching with remote learning and home schooling

- the effects of 'normal' learning loss during the school summer holiday.

Throughout the paper, primary teaching experts have given their reflections on the findings.

Analysis by subject

As shown in Figure 1, there were large reductions in attainment from 2019 to 2020 across all subjects and year groups. The largest reductions were seen for Maths, in particular Paper 2 and 3 taken by pupils in Year 3 and 4 in 2020. However, GPS (Grammar, Punctuation and Spelling) saw significant drops each year too. Note: Paper R is not shown for reading because the Standardised Scores[1] are calculated slightly differently. There is no Paper R for GPS.

Figure 1: Change in mean Standardised Score from 2019 to 2020
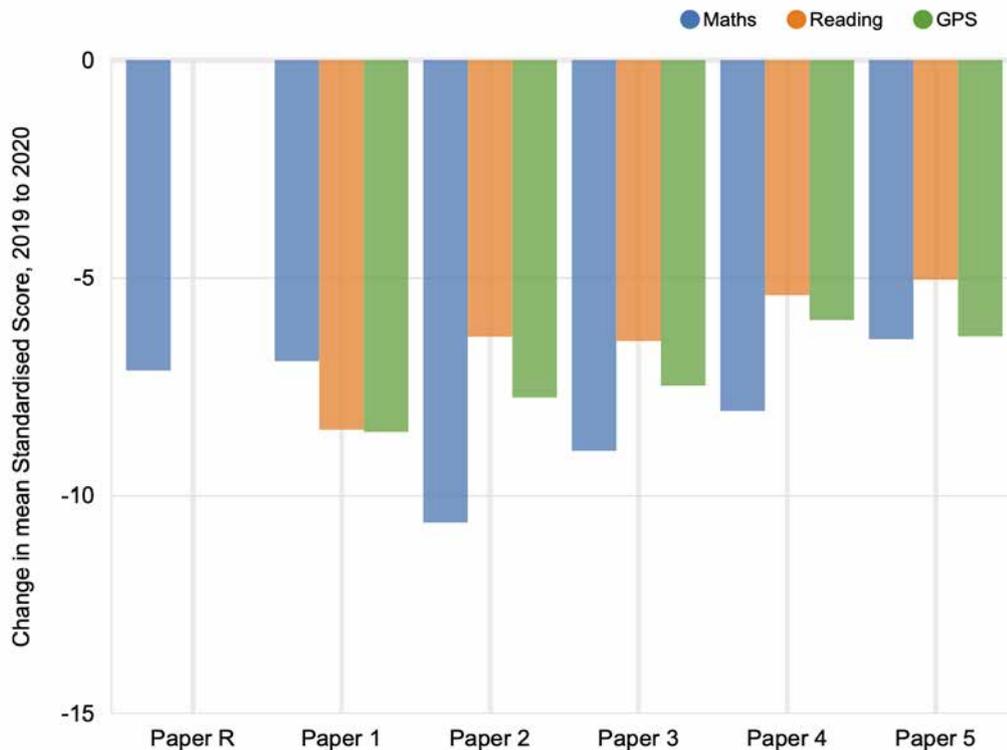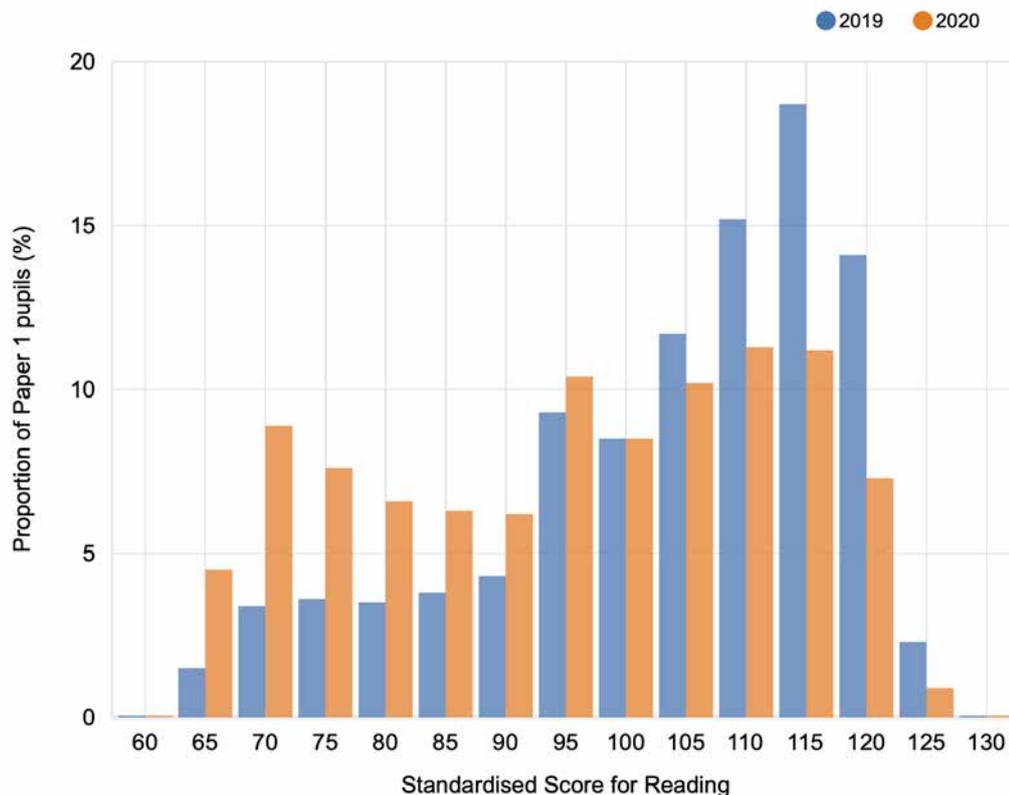

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 10,700 – 90,700 tests

To put these results in context, mean Standardised Scores for these specific Papers were in the range 103–106 in summer 2019 and historically have rarely changed by more than 0.5 points from year to year. In 2020, we saw year-on-year reductions of 5–10 points, sometimes more, which is significant.

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[1] Standardised Scores control for potential variation in the relative difficulties of tests sat in different terms or by different year groups. This does not have any particular significance for the analysis presented here, which focused on Summer Papers and looks mainly at year-on-year changes for the same tests.

These changes in mean score often represent complex underlying patterns. For example, Figure 2 shows the distributions of scores for Paper 1 in Reading for 2019 (blue columns) and 2020 (orange columns).

Figure 2: Distributions of Standardised Scores for Summer Paper 1 in Reading

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 37,800 – 75,600 tests

As well as showing fewer Year 2 pupils scoring more than 100 (right-hand side of the chart), 2020 also produced an unusually large proportion of Year 2 pupils with scores of 80 or less. If all pupils had been affected similarly, we would have expected the shape of the histograms to be similar, and for 2020 to be shifted leftwards compared to 2019. The very different shapes suggest that some pupils have been affected much more than others.

Shareen Wilkinson, Primary English and assessment adviser:
"*Crucially, this demonstrates the disparity in attainment between learning at home for older and younger pupils and those from disadvantaged backgrounds. Now, more than ever, pupils need high quality teaching in the classroom. This involves explicit modelling and demonstrating of key learning, metacognition and feedback on how they can improve.*"

Disadvantaged children

A very common concern regarding potential learning loss during school closures has been that disadvantaged pupils may have been more badly affected than others.

As well as test results, MARK also contains information about individual Pupil Premium status where schools have chosen to add this.[2] Pupil Premium status is used as a proxy for disadvantage in this analysis. Figure 3 shows the change in attainment in maths between 2019 and 2020 for Pupil Premium pupils (blue columns) and non-Pupil Premium pupils (orange columns). For all year groups, the attainment of Pupil Premium pupils fell by more than those of other pupils. These gaps were particularly large for younger year groups.

Sarah-Anne Fernandes and Trevor Dixon, SMASH Maths (Mathematics Consultants and Education Authors):
"*For Maths, the fact that Pupil Premium children have fared worse than other pupils during lockdown is likely due to their relative lack of access to IT hardware and online learning support. With attainment levels already lower than other students in 2019, the widening gap needs to be addressed urgently. Greater investment in IT, and ensuring access to this in pupils' homes, is needed as part of Pupil Premium funding to help close the attainment gap. There needs to be a particular focus on deploying resources for younger Pupil Premium children where the attainment gaps are widest, to make sure this disadvantage is not carried through to later years.*"

Figure 3: Change in mean Standardised Score for Maths from 2019 to 2020
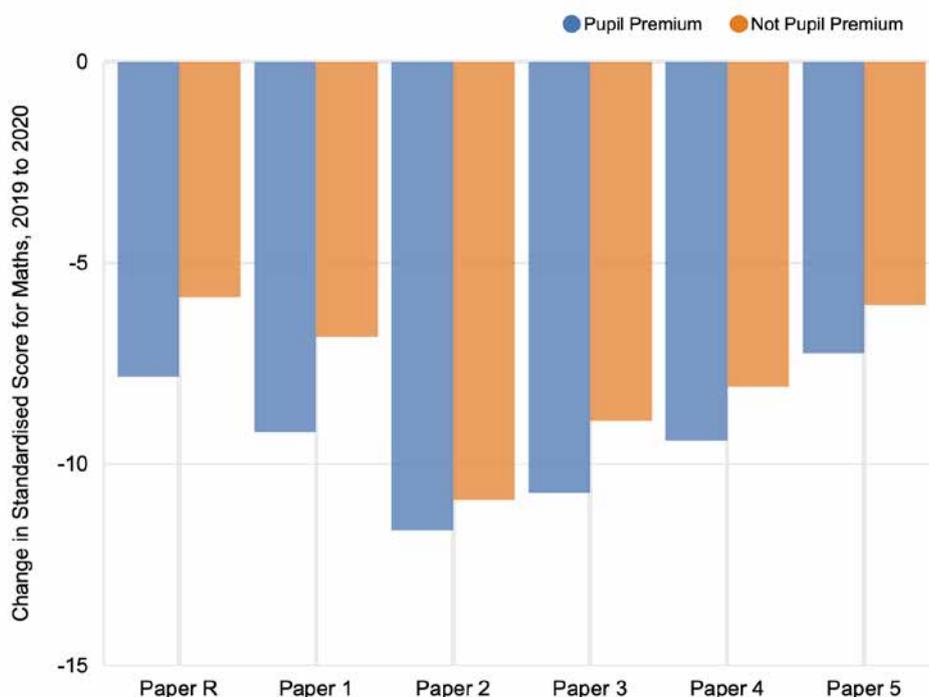
Sources: MARK, SchoolDash analysis

Sample sizes: In the range 810 – 37,200 tests

[2] We analysed only those schools with overall Pupil Premium percentages in MARK that were broadly consistent with the proportion reported publicly for that school by the Department for Education, and omitted any pupils with unknown Pupil Premium status, resulting in a smaller number of results for this section.

It is important to note that the absolute attainment level of Pupil Premium pupils in 2019 (and earlier years) was already lower than that of other pupils. These differential reductions in attainment have further increased this gap. For example, the Pupil Premium gap for Paper R grew from 4.2 points in 2019 to 6.2 points in 2020 when Year 1 took the paper; that for Paper 5 grew from 7.8 to 8.9 in 2020 when Year 6 took the paper.

Figure 4 shows a similar analysis for Reading. Once again, Pupil Premium pupils fared worse than other pupils in all age groups, but especially younger ones.

Kate Ruttle, literacy assessment expert and author of PiRA:

"My main 'takeaway' from these figures is that learning, for many children, requires a teacher. Throughout the spring and summer, teachers worked very hard to provide opportunities for children to progress with their learning, however without teachers giving diagnostic feedback, intervening to correct misconceptions, monitoring each child's pace of learning and helping children to engage, the children's learning was often less efficient, and many children lost confidence and impetus."

Figure 4: Change in mean Standardised Score for Reading from 2019 to 2020
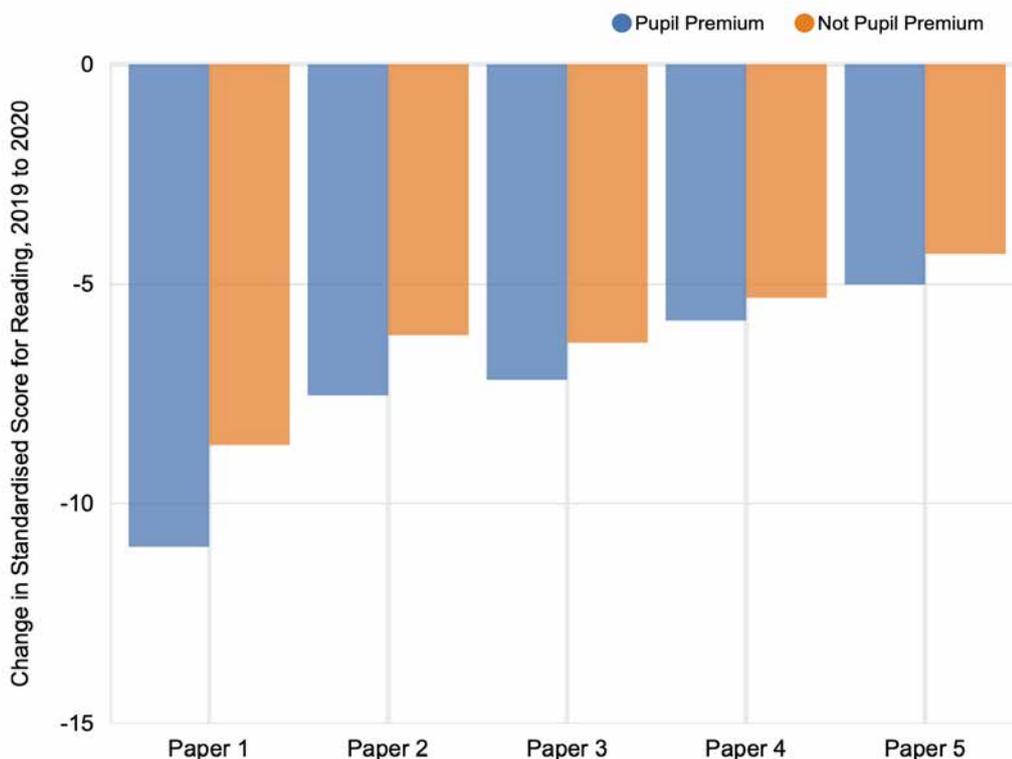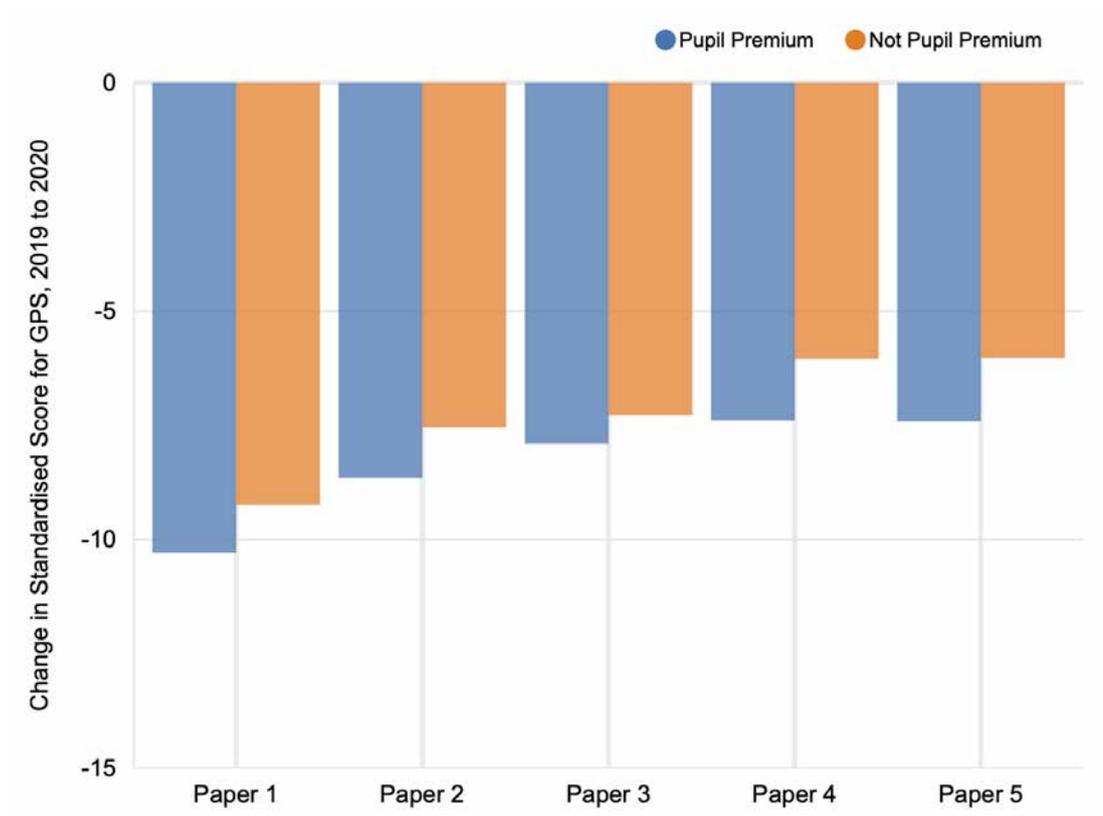

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 3,140 – 38,500 tests

There was a similar pattern for GPS (Grammar, Punctuation and Spelling), although the gap appears to grow in the later papers, as shown in Figure 5.

Shareen Wilkinson, Primary English and assessment adviser:
"Using intervention resources, as well as one-to-one tuition, will be vital in supporting all pupils to make rapid progress."

Figure 5: Change in mean Standardised Score for GPS from 2019 to 2020

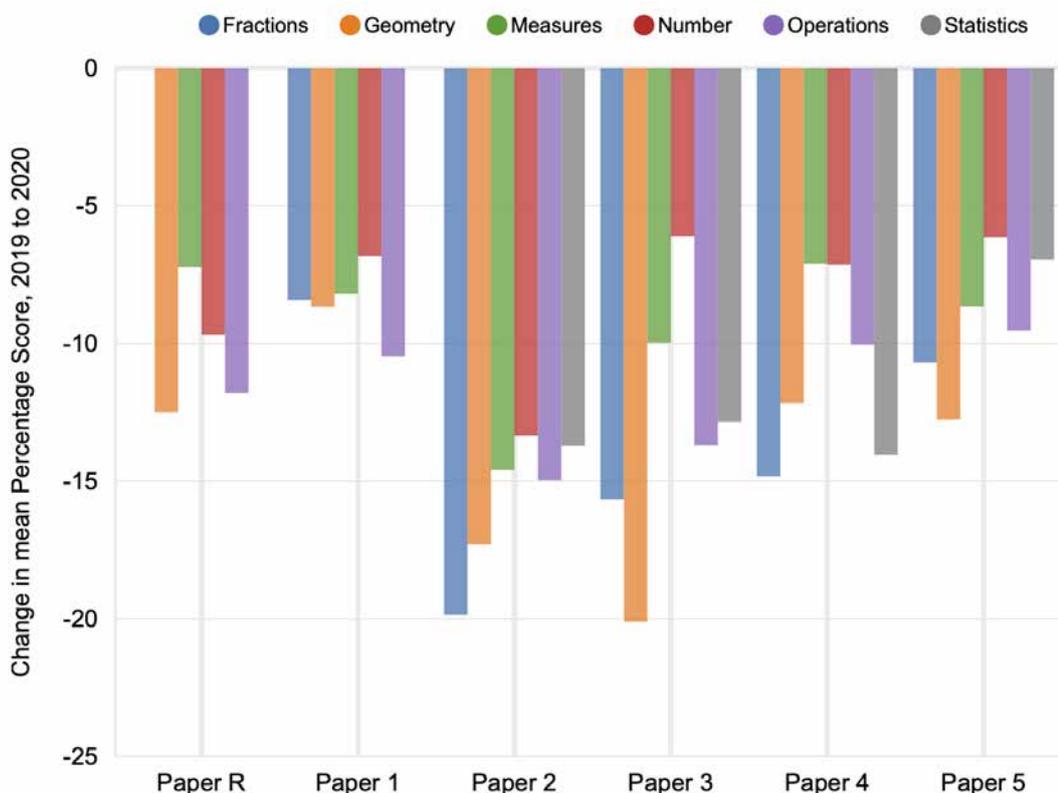

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 910 – 14,000 tests

Topics within subjects

As well the differences between subjects described above, there were also considerable variations between topics within each subject. Figure 6 shows year-on-year changes for Maths topics.[3] The largest reductions were seen in Fractions and Geometry, especially for Papers 2 and 3, taken by Year 3 and 4 in 2020, perhaps indicating that these topics and year groups were particularly adversely affected by lack of in-person teaching.

Sarah-Anne Fernandes and Trevor Dixon, SMASH Maths (Mathematics Consultants and Education Authors): *"Lockdown has highlighted how the loss of in-person teaching has impacted different areas of the mathematics curriculum to varying degrees. In Maths, Fractions and Geometry have suffered the greatest detriment to achievement levels, reflecting how the required depth and nuance that comes with teaching these topics in person has been negatively impacted by the lockdown. In contrast, Number has clearly been less affected. This is very pleasing to see, given how recent maths teaching has placed a strong emphasis on embedding Number in light of the government's investment in teaching for mastery. This now needs to be broadened out to Fractions and Geometry and other topic areas, with the aim of achieving more balanced attainment levels across the whole Maths curriculum."*

Figure 6: Change in mean Percentage Scores for Maths from 2019 to 2020
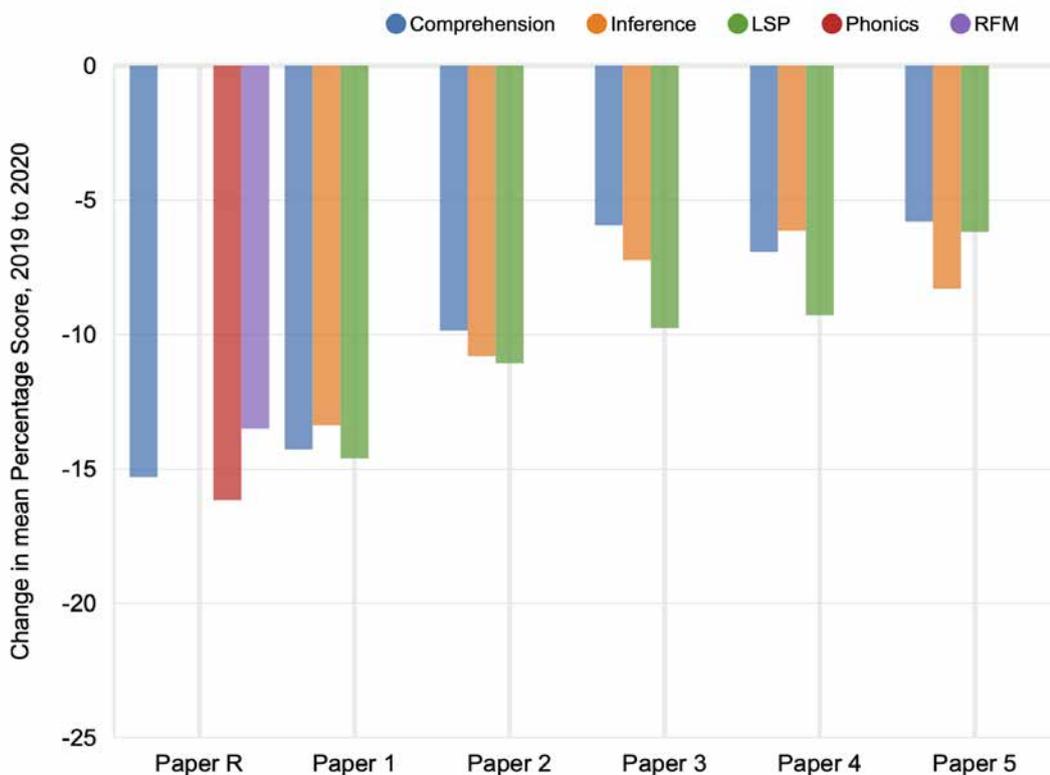

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 7,200 – 43,000 tests

[3] Standardised Scores are calculated only at the subject level, not at the topic level, so for this analysis we used Percentage Scores. This distinction does not affect the conclusions drawn.

Figure 7 shows a similar analysis for Reading topics. In this case, younger year groups in 2020 (Year 1 to 3) suffered roughly equally across all topics, while older year groups (Year 4 and 5) tended to regress more in Language, Structure and Presentation (LSP) than in other topics.

Colin McCarty, educational assessment expert and test developer of PiRA and PUMA:
"Both the GPS and reading analyses indicate the need for the technical aspects of reading to receive the highest priority with any intervention strategy."

Figure 7: Change in mean Percentage Scores for Reading from 2019 to 2020

Sources: MARK, SchoolDash analysis
Sample sizes: In the range 15,200 – 90,700 tests

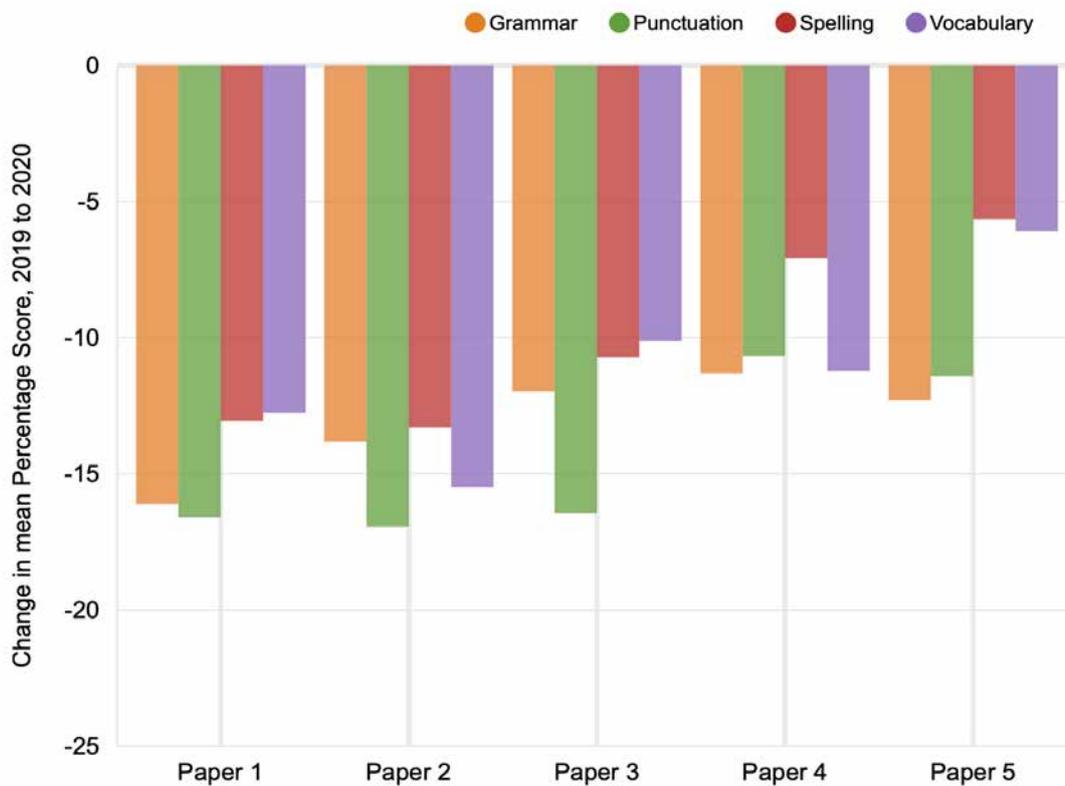Shareen Wilkinson, Primary English and assessment adviser:
"Reading comprehension strategies are vital for supporting pupils to make rapid progress in their reading. Activities such as making predictions, asking questions about the text, clarifying unfamiliar words and applying these skills across the curriculum will be essential. Teachers need to model and demonstrate these strategies, so that the children can then apply them independently."

As shown in Figure 8, most year groups fared worst in Grammar and Punctuation, while declining less in Spelling, perhaps indicating that home schooling has, on average, been somewhat less effective for the former than the latter.

Kate Ruttle, literacy expert and author of PiRA:
"Teachers now need to concentrate on restoring confidence and embedding the skills and knowledge that children need in order to progress with this year's learning. The temptation to accelerate the pace of teaching is likely to be strong, but securing children's understanding of prior learning is critical for their progress, attainment and engagement in the longer term."

Figure 8: Change in mean Percentage Scores for GPS from 2019 to 2020

Sources: MARK, SchoolDash analysis

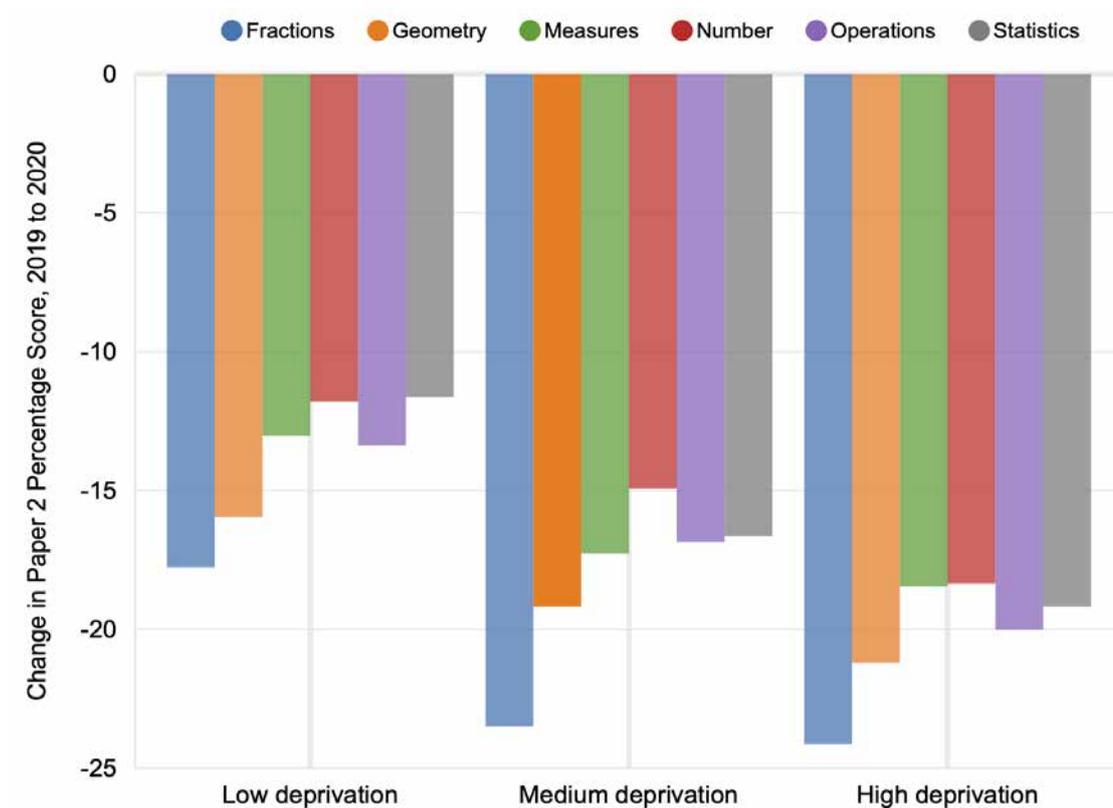Sample sizes: In the range 5,200 – 15,200 tests

Shareen Wilkinson, Primary English and assessment adviser:
"Although it is important to teach grammar in context, if children have not grasped the basics then it might be necessary to teach grammar explicitly, so that they are clear about the key concepts and can apply them across the curriculum."

To download this white paper, visit **risingstars-uk.com/whitepaper2020**

Differences by school type

There are also clear trends by school characteristic. By way of example, Figure 9 shows the change in attainment by school deprivation level[4] for Maths Paper 2, sat by pupils in Year 3 in 2020. While the trends by topic within each type of school are very consistent, schools with higher levels of deprivation invariably showed larger falls in attainment.

Figure 9: Change in mean Percentage Scores for Maths from 2019 to 2020
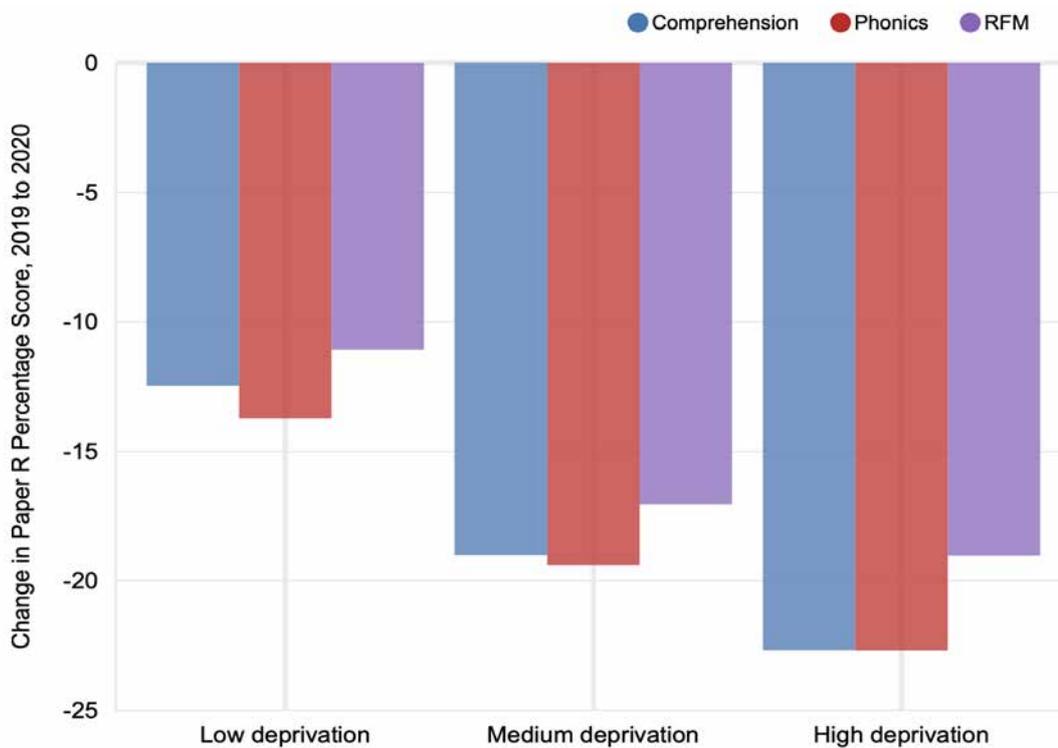

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 2,700 – 14,300 tests

[4] Based on the proportions of pupils who are eligible for free school meals.

The same is true for Reading. Figure 10 shows data for Paper R, sat by Year 1 in 2020: reductions in Comprehension, Phonics and RFM (Reading for Meaning) attainment all correlated with deprivation level.

Shareen Wilkinson, Primary English and assessment adviser:
"Having a class book (read by the teacher) and promoting reading for pleasure will be essential for all year groups. Phonics (especially in EYFS and KS1) will need to be taught discretely and daily, so that all pupils can catch up."

Figure 10: Change in mean Percentage Scores for Reading from 2019 to 2020
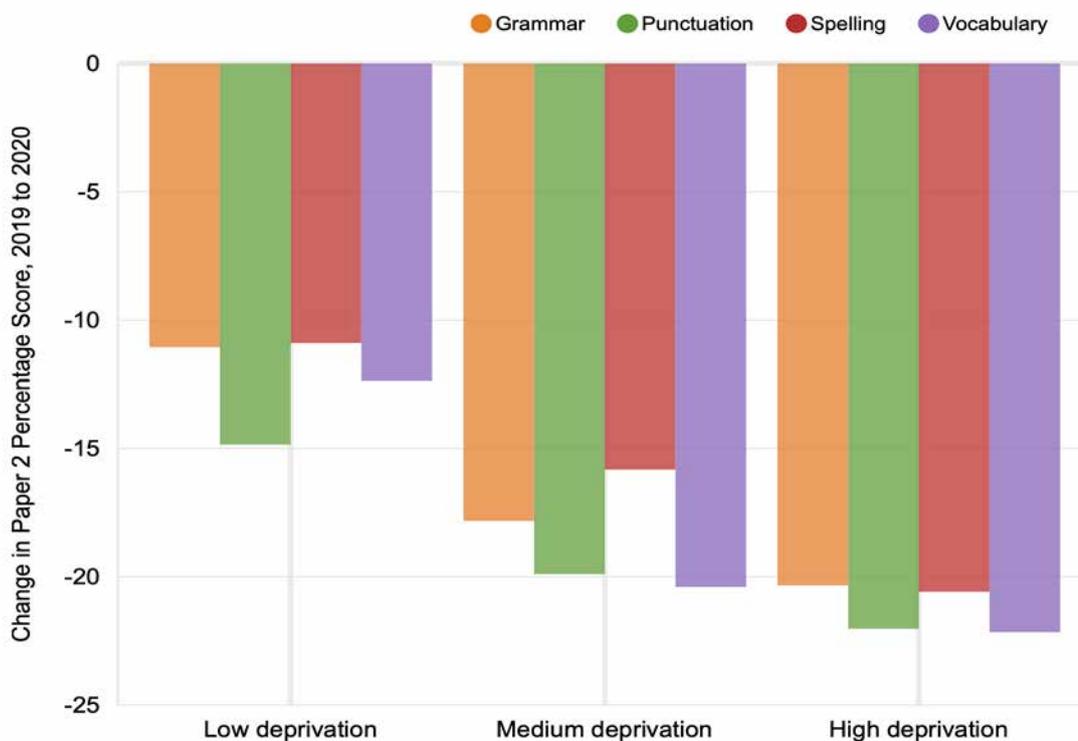

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 800 – 4,800 tests

GPS was similarly affected, as shown in Figure 11, using Paper 2 as sat by Year 3 in 2020, as an example.

Shareen Wilkinson, Primary English and assessment adviser:
"*The decline in vocabulary here unequivocally demonstrates that pupils need to be taught vocabulary explicitly and to collect and understand words implicitly through their reading. Attention needs to focus on unpicking and understanding the meaning of unfamiliar words. Teaching strategies such as: reading around the word to decipher the context, reading backwards, and reading forwards, telling pupils to use any root words and identifying prefixes or suffixes to help to determine the definition, will be helpful.*"

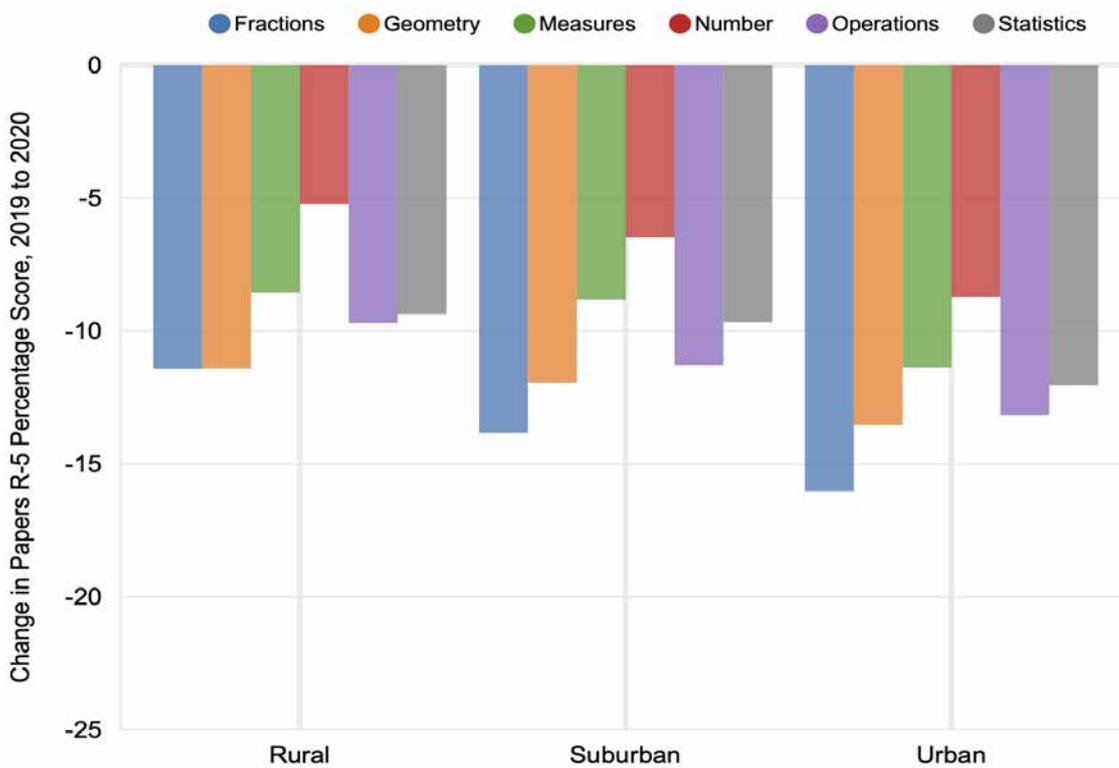*Figure 11: Change in mean Percentage Scores for GPS from 2019 to 2020*

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 900 – 5,000 tests

Deprivation also tends to be higher in urban areas, which may explain at least in part why pupils at urban schools tended to fall further behind than those at suburban or rural schools. Figure 12 shows combined data for all Maths papers (Paper R to Paper 5 inclusive, sat by Year 1 to 6 in 2020) by level of urbanisation.

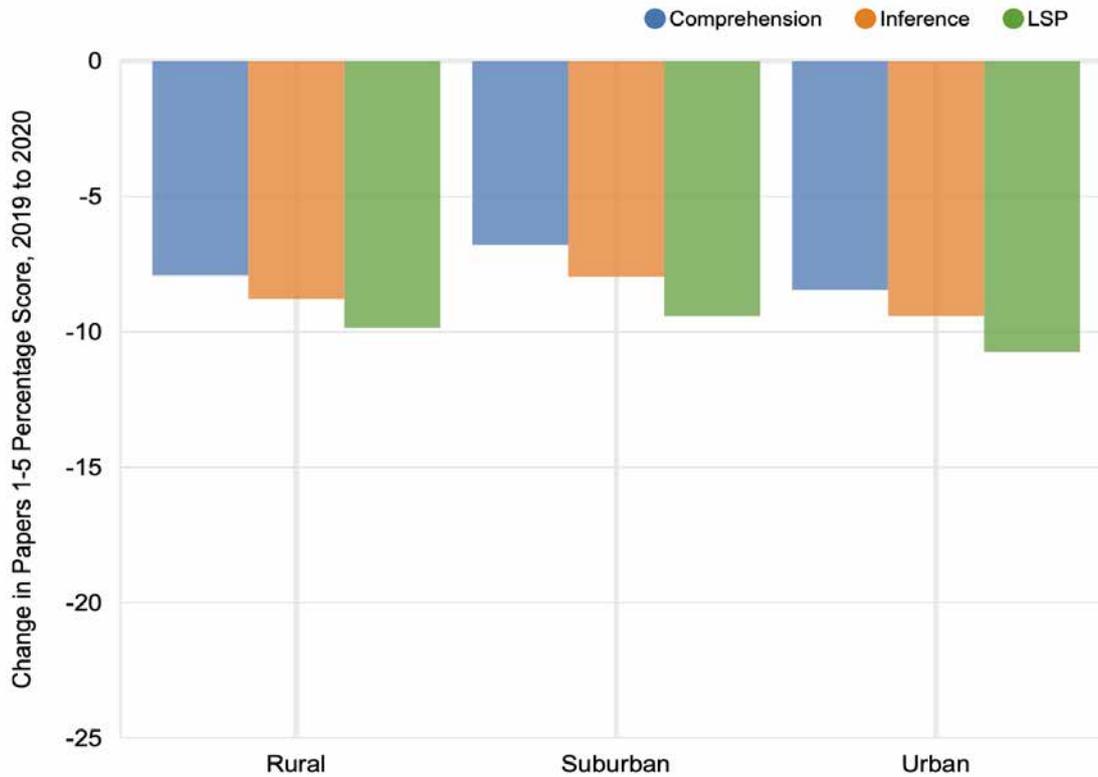*Figure 12: Change in mean Percentage Scores for Maths from 2019 to 2020*

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 6,300 – 101,300 tests

This effect is less pronounced for Reading (Papers 1 to 5 inclusive, sat by Year 2 to 6 in 2020), as shown in Figure 13.

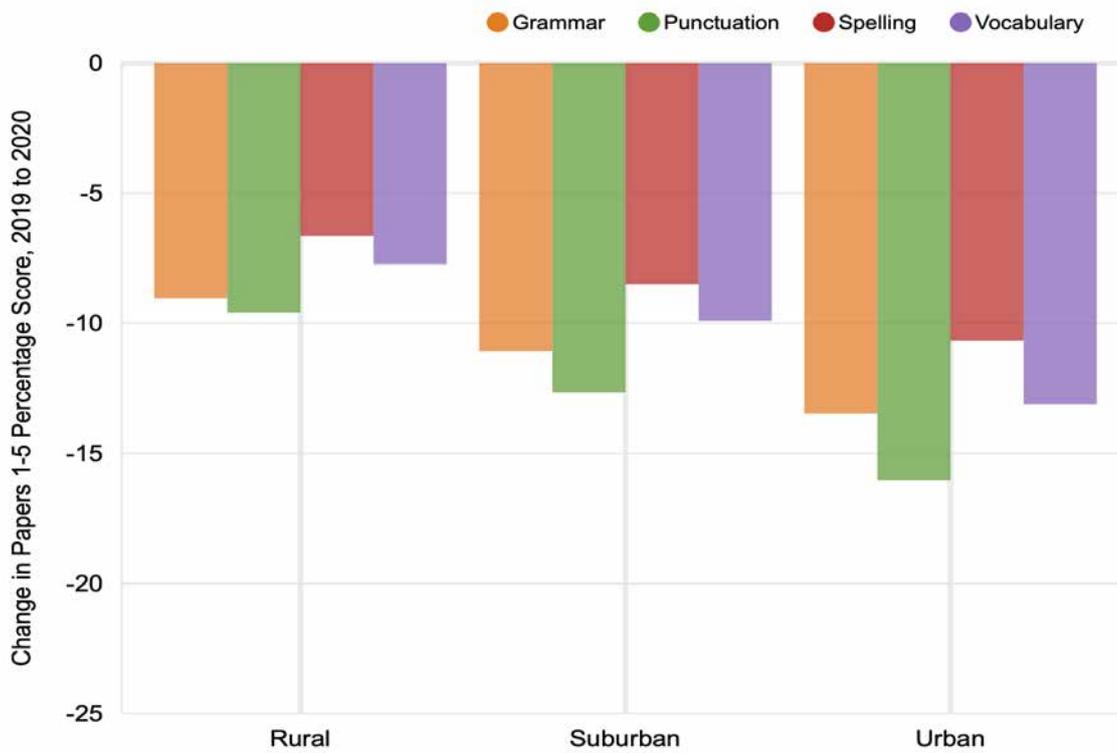*Figure 13: Change in mean Percentage Scores for Reading from 2019 to 2020*

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 6,200 – 100,300 tests

However, it is very apparent for GPS (Papers 1 to 5 combined, sat by Year 2 to 6 in 2020), which is shown in Figure 14.

*Figure 14: Change in mean Percentage Scores for GPS from 2019 to 2020*

Sources: MARK, SchoolDash analysis

Sample sizes: In the range 2,200 – 35,600 tests

England also displays large regional variations in educational and socioeconomic indicators, and we can see corresponding differences in attainment reductions, as shown for Maths (Paper 1 to Paper 5 inclusive, sat by Year 2 to 6 in 2020) in Figure 15. The pattern of a schools located in the north or midlands tending to show larger declines in attainment was seen across Reading and GPS too.

Figure 15: Change in mean Percentage Scores for Maths from 2019 to 2020
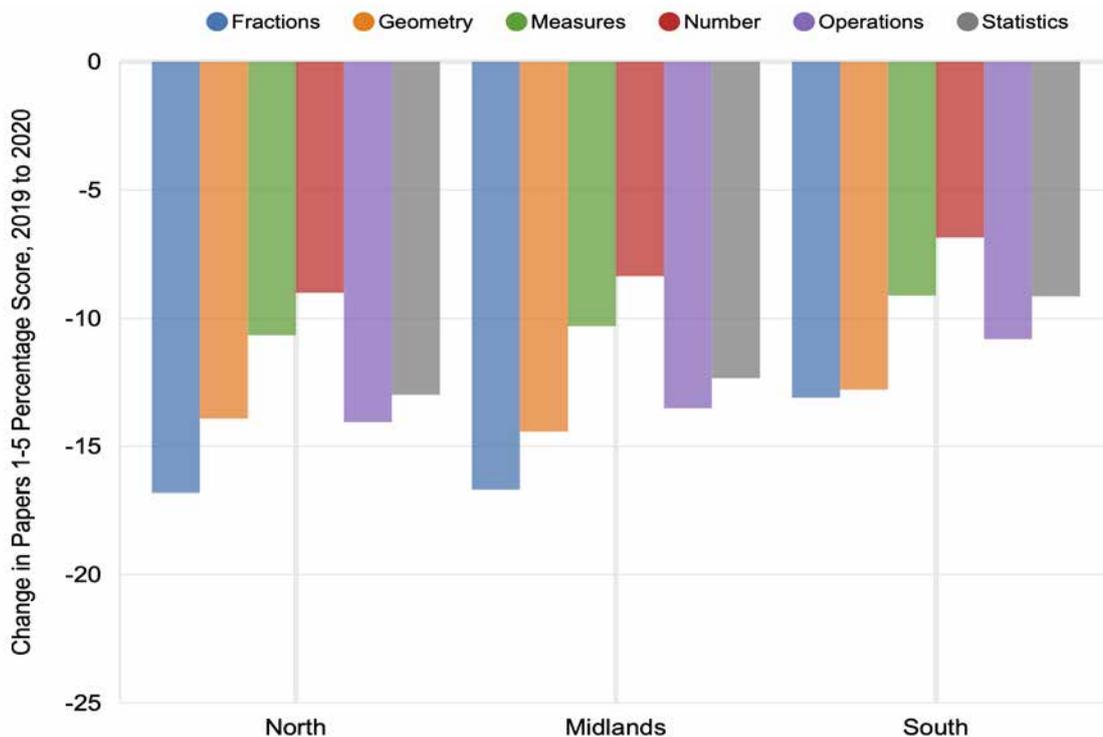
Sources: MARK, SchoolDash analysis

Sample sizes: In the range 1,800 – 30,500 tests

The results presented here indicate that across every subject, age group and region, there have been large reductions in attainment in the Summer Papers between 2019 and 2020. It is important to note that we cannot distinguish between learning loss that took place during school closures from that which arose during the summer holiday. Nevertheless, whatever the relative proportions of these effects, it is clear that they did not affect all regions, schools or pupils equally, and that they have served to increase pre-existing educational inequalities, particularly those related to poverty.

For further insight and interactive graphs, visit **risingstars-uk.com/whitepaper20**

This study forms part of an ongoing research initiative. We intend to release further insight on the Autumn Papers in early 2021.

Join in the conversation at **#rsawhitepaper20**

Appendix

We have previously analysed aggregate, anonymous data to reveal national attainment trends across schools in England, including variations by pupil age, season of birth and gender, as well as by subject and even individual topics within each subject. See risingstars-uk.com/whitepapers for these previous analyses. In order to protect the confidentiality of the institutions and individuals concerned, results have been analysed and presented in an anonymised aggregate form. All data has been processed in line with MARK terms and conditions which can be found at risingstars-uk.com/specialpages/assessment/mark-terms-conditions.

Represented schools

This analysis is limited to mainstream state primary schools in England. All regions and major school types are included, and the sample is broadly representative.

Tests and scores

The data used in this report comes from standardised, termly tests Summer Papers: PUMA, PiRA and GAPS. The tests were taken in summer 2019 and September/October 2020 and entered into MARK, a free marksheet and reporting service. The termly tests are marked by teachers using a robust mark scheme, and raw scores are converted to Standardised Scores automatically in MARK. Only mainstream state schools in England have been included. We have analysed only results from fully completed tests, with non-zero scores sat by a pupil within the correct age range. Tests sat at the wrong time of year have been omitted except for summer 2020 tests sat during the 2020 autumn term.

Where results are presented as a change in score, summer 2019 is treated as the baseline comparison point.