RESEARCH AND ANALYSIS

Student-level equalities analyses for GCSE and A level

Summer 2020

ofqual

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1 Executive summary

The summer 2020 exam series was cancelled as part of the government's response to the coronavirus (COVID-19) pandemic, which included the closure of schools and colleges to all but the children of key workers and vulnerable children from 20 March 2020. The majority of pupils did not return until the beginning of the autumn term in September 2020.

To enable as many students as possible to progress to the next stage of their education, training or employment, the great majority of candidates for the summer examination series were to receive qualification results based on the best available evidence. Where this was not possible, or where candidates wished to improve their grades, they would be able to sit the exams in an additional autumn 2020 series.

This report provides an in-depth analysis of the impact of the summer 2020 arrangements on equalities. It shows that for GCSEs and A levels, there is no evidence that the arrangements put in place to award candidates grades this year, including the final grades themselves, systematically disadvantaged candidates with protected characteristics or from less advantaged socio-economic backgrounds.

In the case of GCSEs and A levels (and some other general qualifications), schools and colleges were asked to provide two pieces of data for each subject:

- a centre assessment grade for each of their candidates
- a rank order of students, within each grade

Ofqual issued guidance to centres[1] on the best evidence to use and how to avoid unconscious bias toward candidates, including based on any protected characteristics they may have or their socio-economic background. In line with government policy, a method of statistical moderation was developed that would align the centre assessment grades (CAGs) across centres and with the standards set in previous examination series.

Part of the development process for the standardisation model was an equalities impact analysis, which suggested the model would not adversely affect groups of candidates who shared protected characteristics or were from lower socio-economic backgrounds. When the CAGs were received and standardised using the model, we ran a further equalities analysis. By comparing attainment gaps in 2020 with those from exam results in 2018 and 2019, this demonstrated that the calculated grades originally issued to candidates on A level results day – their standardised CAGs – neither introduced new, nor exacerbated any existing, attainment gaps based on protected characteristics or socio-economic status.

It became apparent following the issue of A level results, that the above approach did not command public confidence. Consequently Ofqual instructed awarding organisations to reissue A level results, awarding candidates the higher of their CAG and their calculated grade. On GCSE results day, candidates received grades on the same basis without the need for reissue. There remained concerns, nevertheless, that the process of grade awarding this year, for GCSEs and A levels, could have

[1] The term 'centre' is used throughout this report to refer to any organisation undertaking the delivery of an assessment to candidates on behalf of an awarding organisation. In the context of general qualifications, these are typically schools and colleges but may include other types of institution.

adversely affected groups of candidates who shared protected characteristics or were from lower socio-economic backgrounds.

Our interim technical report, released on A level results day, included equalities analyses of the calculated grades for AS and A level results. In this final technical report, we provide a more in-depth analysis. It shows that for GCSEs and A levels, there is no evidence that either the calculated grades or the final grades awarded this year were systematically biased against candidates with protected characteristics or from disadvantaged backgrounds.

We report equalities analyses for three sets of grades for the A levels and GCSE results:

(i) the unstandardised CAGs – the grades provided to awarding organisations by centres;

(ii) standardised CAGs or 'calculated grades' – the grades candidates were originally intended to receive in summer 2020; and

(iii) the 'final grades' received by candidates – either the CAG or the calculated grade, whichever was the higher.

The analyses compare 2020 outcomes, using CAGs, calculated grades, and final grades, with results from 2018 and 2019. For each set of grades at A level and GCSE, we present results statistics for all entries broken down by candidates' gender, ethnicity, first language, special educational needs status, free school meals eligibility, and socio-economic status. This allows us to compare existing attainment gaps between groups over the last three years and to see whether the CAGs, calculated grades, or final grades changed (or would have changed) the size of those gaps.

Multivariate modelling of the same variables, in addition to candidates' prior attainment, is then presented for a large sample of subjects collectively, and for a sample of subjects individually, for both the A levels and GCSEs. These analyses estimate the effect of each characteristic on candidates' attainment once the effects of all other characteristics are accounted for.

The univariate analyses for both GCSEs and A levels showed that the calculated grades more closely maintained the established relationships between candidate characteristics and outcomes than do either CAGs or final grades. However, the changes seen by using final grades are small and do not suggest that any groups of candidates who share a protected characteristic or socio-economic status have been systematically disadvantaged.

There was some evidence that some 6,300 GCSE entries by low prior attainers with unknown socioeconomic status (most of whom are at independent schools) may have received disproportionately overestimated grades. This effect was equally noticeable in grades using CAGs, calculated grades, and final grades. The effect was not seen for A level.

The multivariate analyses are clear that, at both GCSE and A level, the most consistent and significant effect is an uplift in outcomes overall using CAGs and final grades; but not using calculated grades. At A level, there was further narrowing of the attainment gap that had previously seen males outperform females (when prior attainment, protected characteristics, and socio-economic status are accounted for), such that there was no real effect of gender this year. This was true for CAGs,

calculated grades, and final grades. That an equivalent change was absent from the GCSE data is some assurance that, at A level, it genuinely reflects attainment and is not the result of systematic bias in favour of female candidates.

In conclusion, for GCSEs and A Levels, there is no evidence that either the calculated grades or the final grades awarded this year were systematically biased against candidates with protected characteristics or from disadvantaged backgrounds.

2 Introduction

2.1 Purpose

In summer 2020, exams were cancelled owing to the coronavirus (COVID-19) pandemic. The grades awarded to GCSE, AS, and A level candidates were based on centre assessment grades (CAGs) – either the original centre estimate or a statistically moderated grade, whichever was higher.

Here we report analyses carried out by Ofqual to examine concerns that the process of grade awarding this year, for GCSEs and A levels, could have introduced new – or affected any pre-existing – inequalities in attainment along the lines of candidate characteristics, including gender, ethnicity, having English as an additional language, special educational needs, and socio-economic status. The analyses examine the original CAGs, the statistically moderated CAGs or 'calculated grades', and the final set of grades that candidates received.

2.2 Background context

On 18 March 2020 the Secretary of State for Education told Parliament that, in response to the coronavirus (COVID-19) pandemic, schools and colleges in England would shut to all but the children of critical workers and vulnerable children after 20 March. In line with these measures, exams scheduled for the summer would not take place. The Secretary of State said that the government would work with the education sector and with Ofqual to make sure students who were preparing to take GCSEs, AS, and A level exams in the summer would not be unfairly penalised.

In the direction Ofqual received on 31 March 2020, the Secretary of State explained that, despite the cancellation of exams, it was government policy that students be issued with a set of results that allowed them to progress to further study or employment. The direction confirmed that these students should be issued with calculated results based on their exam centres' judgments of their ability, supplemented by a range of other evidence. The direction further explained that

> '[i]n order to mitigate the risk to standards as far as possible, the approach should be standardised across centres'

and that the distribution of grades should follow a similar profile to that in previous years. It also confirmed that students who did not feel their calculated grades reflected their ability should be afforded an opportunity to sit an exam at the earliest reasonable opportunity.

Following these announcements, Ofqual worked with others from across the sector to develop an approach that enabled the fairest possible award of grades in these qualifications, in the absence of any exams. Ofqual's aims in this work were to ensure that candidates would receive grades to enable them to move on to the next stages of their lives without further disruption; that the grades would have the same currency as those of any other year; and that the approach would be as fair as it could be.

To support this work, Ofqual engaged with a wide range of organisations, including those with a particular interest in equalities issues, in order to consider the potential

impact of the proposed arrangements on particular student groups. Ofqual also carried out a public consultation on the proposed arrangements, which received a large number of responses – over 12,500 in total. We received responses from representative groups, schools and colleges, teachers, parents or carers, and individual students – all of which we considered when making decisions regarding the approach to awarding grades in summer 2020. Ofqual also brought together an External Advisory Group on Exam Grading to consider technical matters relating to the award of grades, in addition to working with technical colleagues from the exam boards.

The great majority of students who had been entered to take exams in summer 2020 were to receive a calculated grade for each of their subjects. Students who felt that the grade did not reflect their ability, or those for whom it was not possible to issue a grade, would be able to take exams in the additional autumn series or, if they preferred, next summer.

The remainder of section 2 outlines: the calculated grades approach to awarding grades in summer 2020 (2.3); the equalities analyses carried out for both the CAGs (2.3.1) and the standardisation method (2.4.1); the approach taken to ensuring as many private candidates as possible could receive a grade (2.4.2); and how events unfolded, leading to awarding organisations issuing candidates the best result of either their CAG or their calculated grade – 'final grades' (2.5).

2.3 Centre assessment grades and rank orders

In the absence of exams in summer 2020, candidates' grades were instead based on evidence of their expected performances, had exams gone ahead. In April 2020, Ofqual published guidance for Heads of Centre, which was updated and republished on 22 May following further review of the literature on bias in teacher judgment (see section 2.3.1) and engagement with equalities organisations. Centres were asked to submit to exam boards, for each candidate and for each subject for which they were entered, the grade they judged the candidate would most likely have received had the exams taken place (the centre assessment grade or CAG), and the rank order of each candidate within each grade for each subject in that centre.

While the approach to awarding grades in summer 2020 was still at the early stages of consideration, it was judged that both sources of evidence would be needed to standardise grades. Rank order information would provide a more granular scale than using grades alone.

Ofqual's guidance to centres included: the use of evidence and data in forming holistic professional judgements; how to avoid unconscious bias in decision making; and the use of previous years' data in identifying tendencies to over- or underpredict the examination performance of candidates who share a protected characteristic or socio-economic status. The guidance also made clear that schools and colleges should not discuss their evaluation of the evidence, or disclose the judgements they reached, with students, or their parents or carers, before final results were issued. This was to enable teachers to make their judgements fairly and without being put under pressure.

The guidance stated that each set of CAGs for a subject must be signed off by at least two teachers in that subject, one of whom should be the head of department/subject lead (or where there is only one teacher [available], by the Head

of Centre). In addition, Heads of Centre were required to submit a declaration that the grades and rank orders being submitted were accurate and represented the objective and professional judgements made by the centre's staff.

In line with the direction from the Secretary of State, Ofqual were clear that the CAGs would be standardised using a statistical model that would take account of the historical results in that subject in the centre, and the prior attainment profile of the cohort of candidates taking that subject compared to previous years.

2.3.1 Equalities considerations (CAGs)

It was important to consider the implications of using teacher estimates from an equalities perspective. In April, Ofqual published a review of the literature considering the nature and extent of any bias that might arise in CAGs in summer 2020. In summary, studies of potential bias in teacher assessment suggest that differences between teacher assessment and exam assessment results can sometimes be linked to student characteristics, including gender, age within year group, ethnicity, special educational needs, and having English as an additional language. However, such effects are not always seen, and when they are, they tend to be small and inconsistent across subjects.

The accuracy of teachers' estimates has been considered when examining the accuracy of teachers' A level grade predictions for students' university admission applications, and in other research using individual exam board data to examine the accuracy of the GCSE and A level estimated grades that boards previously collected from teachers. The same distribution of exactly accurate and over-/under-predictions, and pattern of attainment-dependent prediction accuracy, have been found in both strands of research. Findings on individual variables are also broadly similar: subject has a small but unsystematic effect; gender and age have small effects that are inconsistent across subjects; and centre type has a small effect that can be attributed to the ability of the students attending different types of centres.

The literature also suggests there are likely some effects on prediction accuracy of ethnicity (that is, more over-prediction for some ethnic minority groups) and disadvantage (that is, more over-prediction for disadvantaged students in general, but less over-prediction for high-attaining disadvantaged students). Further work would be required to properly estimate these effects.

2.4 Standardisation

A preliminary analysis of the CAGs confirmed the expectation that the net effect of using teachers' estimates would be unprecedented increases in outcomes in GCSE, AS, and A level results. The approach to standardising CAGs was to adjust the distribution of grades within each centre.[2] The approach was essentially to:

1) Establish the historical distribution of grades in the centre for the subject in previous summer series;[3]

[2] Although some centres' CAGs were not adjusted, all CAGs went through the same process.
[3] For AS and A levels, 3 years of data were used. For GCSEs, it was 2 years if the reformed specification was first awarded in 2017 or 2018, and 1 year if reformed later.

2) Establish the value-added relationship between prior attainment (Key Stage 2 for GCSE; GCSE for AS & A level) and subject grade at national cohort level in previous summer series;[3]
3) Using the value-added relationship established above, generate a grade distribution based on the prior attainment profile for this year's cohort and another based on the prior attainment profile of candidates combined across the historical data;
4) Adjust the historical distribution of grades constructed in step 1 based on the difference between the two grade distributions calculated in step 3;
5) Award grades to the 2020 candidates based on this adjusted grade distribution, with grades given to students being determined by the rank order judgments made by teachers for the students at their centre.

The details of this process are in the interim technical report published on A level results day. To be clear, no additional information relating to centres (e.g. centre type or location) or candidates (e.g. protected characteristics or socio-economic status) were included in the standardisation model, and it would have been inappropriate to have included such information.

2.4.1 Equalities considerations (standardisation)

To judge the fairness of the calculated grades approach to awarding grades in summer 2020, it was important to evaluate whether any candidates who share protected characteristics or socio-economic status were advantaged or disadvantaged. In the interim technical report Ofqual presented:

(i) a centre-level equalities analysis, conducted prior to the summer series, that considered the impact of applying the standardisation model using 2019 AS and A level data. This demonstrated that the standardisation model did not itself introduce bias into the grading: a key consideration when deciding which standardisation model to adopt. It could not, however, evaluate the extent of bias in the entire process, as no rank order information was available at this stage.

(ii) a candidate-level analysis of 2020 AS and A level calculated grades data undertaken to check the equalities impact of the full approach, including the rank orders submitted by centres. This analysis only considered calculated grades, not the raw CAGs.

The findings suggested that the standardisation approach did not introduce systematic bias relating to protected characteristics or socio-economic status. The evidence indicated that any attainment gap in the results issued on AS/A level results day in 2020 was not wider than any gap already seen in previous years.

2.4.2 Private candidates

In the context of exams being cancelled, Ofqual aimed to make sure as many students as possible – including private candidates – could receive grades, so they could move on to the next stage of their lives. During the development of the standardisation process, it was important to ensure the equitable treatment of private candidates for whom centres were able to provide CAGs.

Formally, a private candidate is any candidate for whom there is no 'Relevant Centre', which is defined in the GQ extraordinary regulatory framework as:

Relevant Centre - In relation to a Learner, a Centre which –

a) *has purchased the GQ Qualification on behalf of the Learner, and*
b) *materially contributed to the preparation of the Learner for the assessment (whether through teaching or instruction provided by Teachers employed by it or otherwise).*

In practice, there is a wide range of different local arrangements that are in place for private candidates, but, typically, a private candidate can be considered as one who does not have as close a relationship with the centre through which they sit their exams as other candidates in the centre. It may be that the relationship between the candidate and the centre is purely functional, with the candidate only engaging for the purposes of sitting the assessments themselves.

The issues considered regarding the standardisation of private candidates' CAGs were both technical and behavioural. Ofqual's guidance stated that

> 'Heads of centre must be as confident in the centre assessment grades and rank order for private candidates as they are for their other students'.

It is likely that it would have been more challenging for the centres to form a robust and consistent evaluation of the potential performance of a private candidate, as typically they would have less evidence of their work. To allow as many private candidates as possible to receive robust CAGs, Ofqual updated the guidance for Heads of Centre to outline additional ways in which this could be done.

Furthermore, from a technical perspective, the argument that private candidates' CAGs should be standardised according to the historical performance of the centre through which they entered (in terms of their absolute outcomes or their value-added) is questionable. The fact that private candidates complete a large proportion – or all – of their study independently of their centre, means it is likely that the quality of teaching and learning at the centre would have had little or no impact on their performance, had the exams been sat in summer 2020.

In addition to these more technical considerations, questions were also raised regarding how centres might incorporate private candidates into their rank orders. The concern was that centres may be less able to compare a private candidate's likely performance with that of the centre's other candidates, which could result in the private candidate being positioned lower in the rank order than their attainment would indicate. To overcome this, Ofqual announced that private candidates would not impact on the standardisation, and thereby results, of other candidates within the centre.

Nonetheless, as the CAGs of private candidates were subject to the same judgement process as other candidates entering the subject with the centre, it was important that these CAGs were also standardised, but for the reasons given they were treated differently through the process. The operationalisation of this is described in the interim technical report published to coincide with A level results day.

2.5 From calculated grades to 'final grades'

The four nations of the UK took broadly similar approaches to issuing examination results in summer 2020: grades awarded by teachers, based on the best available

evidence of candidates' attainment, standardised by the awarding organisations to achieve consistency between centres and cohorts, with an appeals process in place to consider concerns about results in specified circumstances. .

In Scotland, on 4 August, the results for Scottish National 5s, Higher, and Advanced Highers were issued based on teacher estimates, built around preliminary (essentially mock) exam results and submitted course work. The previous performance of centres was used for standardisation. With teachers awarding noticeably more A grades than in previous years, the Scottish Qualifications Authority (SQA) accepted almost three-quarters of estimates, but 124,564 results were adjusted down by one grade.

Concerns were expressed that the standardisation process had disadvantaged students from lower socio-economic backgrounds. Questions were asked about the processes to be used in England, Wales, and Northern Ireland and whether those results would prove similarly controversial.

On 11 August, the Chief Executive of the Scottish Qualifications Authority (Scotland's Chief Examining Officer) announced that, following a Ministerial direction, SQA would change the approach to certification this year and award candidates the highest of their teacher-estimated grade and their existing result. This led to speculation as to whether the remaining UK nations would follow suit.

On the same day – two days ahead of A level results day – the Secretary of State announced that candidates in England dissatisfied with their calculated grade would be able to appeal on the basis of a valid mock exam result. On results day, candidates in England, Wales, and Northern Ireland received calculated grades, as planned; as usual, the results had been released to UCAS a week ahead of results day.

Notwithstanding the appeals process, and ability of students to subsequently be able to take exams, there was continuing concern about using historic centre performance to calculate the results of current candidates – in particular, high-achieving candidates in centres with weaker historic results – and the awarding of CAGs to candidates in centres with very small entries (disproportionately found in the independent sector).

In light of developments which indicated that calculated grades did not command sufficient public confidence, on 17 August, Ofqual announced that candidates would receive the higher of their CAG and their calculated grade. We refer to this hybrid set of grades as 'final grades'. This would be retrospectively applied to AS and A level results; GCSE results were revisited on this basis and released to candidates as planned on 20 August.

3 Equalities impact analyses

3.1 Introduction

To assess any differential effect of the grading process – CAGs, calculated grades, and final grades – on candidates with particular characteristics, we examined the extent to which the relationship between grade outcomes and candidate background variables in 2018 and 2019 would be maintained in the 2020 outcomes.

It should be noted that differences in outcomes between groups can have complex causes. Whilst assessment can be susceptible to cultural biases or present barriers to candidates with disabilities – and care must be taken to minimise or remove these – an unbiased assessment will simply highlight group differences where the students concerned demonstrate different levels of attainment, not create or eradicate them.

The aim of the arrangements for summer 2020 was to award candidates the grades they would most likely have received had the exams taken place, and this was the basis of the CAGs. For this reason, it is appropriate to compare attainment gaps in 2020 with those based on exam results in previous years.

Section 0 documents the findings of candidate-level analyses undertaken to check the equalities impact of:

- unstandardised CAGs
- calculated grades
- final grades

There are three main strands of analysis:

i) univariate analyses for all subjects of the key background variables outlined in section 3.2.2
ii) multivariate analyses across a sample of subjects
iii) multivariate analyses of a sample of individual subjects

Each strand is reported separately for GCSE and A level.[4]

3.2 Data

3.2.1 Examination data

To ensure like-with-like comparisons, we limited our analyses to:

- subjects examined under the same specifications in 2018-2020[5]
- centres with entries in these subjects in each of the years 2018, 2019, 2020

[4] Entries for reformed AS levels are small compared with the legacy specifications, and continue to decline. This instability is not ideal for analysing outcomes over multiple years. The AS level analyses presented in the interim technical report did not suggest that the awarding processes affected AS and levels differently, so we focussed further analyses on A level data only.
[5] Criterion (i) means that only phase 1 and phase 2 reformed subjects (that is, subjects/specifications that were first assessed in 2017 and 2018 respectively) were included in the analysis. Note that A level mathematics, as a phase 3 reformed subject, was excluded from the cross-subject analyses, but included as a separate subject analysis.

- candidates who by 31 August of the respective year was, or would be, at the target age of the qualification level of their entries[6]

Table 3.1 and Table 3.2 show the number of entries by target-age candidates, centres and subjects in the resultant datasets for A level and GCSE, respectively.

Table 3.1. Number of entries, centres, and subjects in datasets for A level equalities analysis.

Year	Entries	Centres	Subjects
2018	457,464	2,547	30
2019	475,296	2,547	30
2020	471,229	2,547	30

Table 3.2. Number of entries, centres, and subjects in GCSE dataset for equalities analysis[7].

Year	Entries	Centres	Subjects
2018	4,008,938	4,787	31
2019	4,129,234	4,787	31
2020	4,225,996	4,787	31

3.2.2 Candidate background variables

The examination datasets were augmented with data on a range of candidate background variables.

Data on the following variables were taken from the entries data supplied to Ofqual:

- Gender: each entry was classed as belonging to a male or female candidate. A very small number of entries had neither male nor female as gender. They were grouped with entries with missing gender information in a third category of the gender variable, 'Neither or not known'.[8]
- Prior attainment (A level entries): a normalised mean GCSE score, which can range from 0 to 100 was used as the prior attainment measure. Entries by candidates with unknown mean GCSE score and entries with out-of-range scores were marked as missing prior attainment data. Entries with non-missing prior attainment data were also classed as belonging to a candidate with a high, medium, or low level of prior attainment. To classify candidates based on their

[6] Centre exclusion was carried out on a subject-by-subject basis. For example, suppose for A Level French, a centre has both 18-year-old and 19-year-old candidates in each of 2018-2020, and for A Level German, it has both 18-year-old and 19-year-old candidates in 2018 and 2019 but only 19-year-old candidates in 2020. Following criterion (iii), data on all three years' 19-year-old candidates in both languages was excluded, and following criterion (ii), data on all three years' 18-year-old candidates in French was included and data on the preceding two years' 18-year-old candidates in German was excluded.

[7] The seven title options in art and design were counted as seven subjects. Combined science was counted once as a subject, and each candidate in combined science was counted as making two entries. Short course entries were counted as the same as full course entries.

[8] It could be a candidate's choice not to say, not to define themselves as male or female, or an administrative error.

prior attainment, we identified in our dataset all unique candidates in 2020 with non-missing prior attainment data, and then set the two boundary marks on the normalised mean GCSE score scale that would divide the 2020 candidates into three groups of roughly equal size defined by high, medium, and low prior attainment. The same two boundary marks were used to class each 2018 and 2019 (as well as 2020) entry as belonging to a candidate with a high, medium, or low level of prior attainment.

- Prior attainment (GCSE entries): a normalised mean Key Stage 2 score, which can range from 0 to 100 was used as the prior attainment measure. The method used was the same as for A level entries (above), but using mean Key Stage 2 rather than GCSE attainment.

Data on the following background socio-economic and demographic variables were obtained by matching the datasets to extracts of the National Pupil Database (NPD) using candidates' first name, last name, and date of birth as the match key and retaining only the unique matches. Entries by candidates who could not be uniquely matched or who could be uniquely matched but who had no relevant information in the NPD were marked as missing data on the relevant variable.

- Ethnicity: the EthnicGroupMajor variable in the NPD provided the ethnicity grouping in our analyses. The seven ethnic groups used in the NPD are: AOEG (any other ethnic group), ASIA (Asian), BLAC (Black), CHIN (Chinese), MIXD (mixed background), UNCL (unclassified), WHIT (White).
- Major (or native) language: the LanguageGroupMajor variable in the NPD provided the major language grouping used in our analyses. The three major language categories are: ENG (English), OTH (other than English), UNCL (unclassified).
- Special educational needs (SEN): the SENProvisionMajor variable in the NPD provided the SEN provision grouping used in our analyses. The three categories are: NON (no SEN), SNS (SEN without Statement), SS (SEN with Statement), UNCL (unclassified).
- Free school meal (FSM): the FSMeligible variable in the NPD provided the FSM eligibility grouping used in our analyses. The two categories are: YES (eligible), NO (not eligible). The FSMeligible variable was chosen over the EVERFSM variable because it gave us fewer entries with missing FSM data.
- Social economic status (SES): the SES grouping used in our analyses was based on the IDACIScore variable in the NPD. To classify candidates into SES groups, we identified within each dataset (GCSE or A level) all unique candidates in 2020 with non-missing IDACI score, and then set the two boundary scores on the IDACI score scale that would divide the 2020 candidates into three groups of roughly equal size defined by low, mid, and high SES. The same two boundary scores were used to class each 2018 and 2019 (as well as 2020) entry as belonging to a candidate with low, mid, or high SES.

3.2.3 Missing data analyses

While data on gender are nearly complete, data on other variables are missing to varying degrees and not necessarily at random, as can be seen in the following breakdown by centre type of the percentage of entries (not candidates) with missing

data on each background variable. Table 3.3 and Table 3.5 show the missing data rate by centre type (that is, how much of each centre type's data is missing) for GCSE and A level entries, respectively. Table 3.4 and Table 3.6 show the composition of missing data by centre type (that is, each centre type's share of the missing data) for GCSE and A level entries, respectively.

At GCSE, state secondary schools have near enough complete data for the demographic variables and socio-economic status (Table 3.3).[9] Typically, around 11 per cent of entries are missing prior attainment (Key Stage 2) data.[10] Independent schools have the highest proportion of missing data in all categories. Although the missing rate for demographic variables and SES are a little under 30 percent, they account for 80 to 90 per cent of this kind of missing data across centre types (Table 3.4). Independent centres' missing rate for prior attainment is particularly high at around 55 per cent of their entries (Table 3.3). This most likely reflects the fact that those candidates in independent schools who were also educated privately at Key Stage 2 did not sit the statutory tests. Although GCSE entries from colleges have higher rates of missing data than secondary schools, Table 3.4 shows that these entries account for a very small proportion of missing data across centre types.

At A level, colleges and independent schools have similar levels of missing demographic and SES data – around 40 percent (Table 3.5). Prior attainment data – mean GCSE in this case – has a low missing rate overall but is notably higher in independent centres. Sixth forms account for the largest share of missing demographic data (around 43%), followed by independent centres (34%); independent centres, however, accounted for the majority of entries (57%) missing prior attainment data (Table 3.6).

Missing data can be problematic, particularly where it is systematic rather than at random. Nonetheless, the comparisons of interest here concern not so much the between-group differences within each year, but rather any changes in the pattern of those differences in 2020 compared with 2018 and 2019. As the missing data rates are comparable across the three years, we can reasonably assume the subgroups are comparable. That is to say, whilst we might interpret between-group differences within each year cautiously, any change to those differences over time can be interpreted as a change in outcomes for different groups. This also means that, if the same gap in outcomes exists over time, it is unlikely that this is an effect of missing values.

[9] Data missing in this category is most likely the result of schools / colleges not returning the census.
[10] Key Stage 2 data could be missing for a variety of reasons, including: candidates being absent from school at the time of the tests; candidates attending private school at Key Stage 2; candidates attending school outside of England at the time of the tests; and data matching problems.

Table 3.3. GCSE: Missing data rate by centre type (that is, how much of each centre type's data is missing).

	2018				2019				2020			
	Number of entries	% Missing			Number of entries	% Missing			Number of entries	% Missing		
		Other variables	IDACI/ SES	Prior attainment		Other variables	IDACI/ SES	Prior attainment		Other variables	IDACI/ SES	Prior attainment
Secondary comprehensive	1,244,390	0	0	12	1,277,688	0	0	11	1,308,687	0	0	11
Secondary selective	93,120	0	0	11	95,650	0	0	11	96,876	0	0	11
Secondary modern	65,214	0	0	11	65,826	0	0	11	67,585	0	0	10
Independent	187,684	27	27	55	195,546	28	28	54	198,908	28	28	55
FE college	4,092	18	19	19	4,578	19	19	20	5,135	23	23	20
6th form college	2,266	10	10	19	2,011	9	9	16	1,971	7	7	15
Tertiary college	2,735	4	4	21	2,890	7	7	23	3,334	6	6	20
Other	47,804	3	3	22	48,995	3	3	20	51,247	3	3	19
City academy	2,318,474	0	0	11	2,388,369	0	0	11	2,443,560	0	0	10
Free school	43,101	0	1	17	47,604	1	1	15	48,627	0	0	14
Unknown	58	7	7	31	77	16	16	21	66	18	18	35

Table 3.4. GCSE: Composition of missing data by centre type (that is, each centre type's share of the missing data).

	Ethnicity, Major language, SEN and FSM			IDACI/SES			Prior attainment		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
Number of entries with missing data on the variable	57,972	61,984	61,559	64,506	68,217	67,557	547,518	541,902	521,094
Secondary comprehensive (%)	2	2	1	6	5	4	27	27	26
Secondary selective (%)	0	0	0	0	0	0	2	2	2
Secondary modern (%)	0	0	0	0	0	0	1	1	1
Independent (%)	88	89	90	80	81	82	19	20	21
FE college (%)	1	1	2	1	1	2	0	0	0
6th form college (%)	0	0	0	0	0	0	0	0	0
Tertiary college (%)	0	0	0	0	0	0	0	0	0
Other (%)	2	2	2	2	2	2	2	2	2
City academy (%)	5	4	3	10	10	9	47	47	46
Free school (%)	0	0	0	0	1	0	1	1	1
Unknown (%)	0	0	0	0	0	0	0	0	0

Table 3.5. A level: Missing data rate by centre type (that is, how much of each centre type's data is missing).

	2018				2019				2020			
	Number of entries	% Missing			Number of entries	% Missing			Number of entries	% Missing		
		Other variables	IDACI/SES	Prior attainment		Other variables	IDACI/SES	Prior attainment		Other variables	IDACI/SES	Prior attainment
Secondary comprehensive	70,864	0	1	3	74,239	1	1	2	72,894	0	0	2
Secondary selective	21,619	0	0	5	21,844	0	0	4	21,865	0	0	3
Secondary modern	2,352	1	1	1	2,305	0	0	2	2,430	0	0	2
Independent	59,497	42	42	29	60,403	44	44	30	58,891	44	44	28
FE college	10,600	40	41	7	11,140	42	42	7	11,679	43	43	6
6th form college	76,598	41	41	5	78,506	42	42	5	79,421	43	43	5
Tertiary college	12,318	35	35	5	12,748	37	37	5	12,874	37	37	5
Other	2,201	17	17	9	2,350	19	19	12	2,328	19	19	10
City academy	198,570	4	4	2	208,401	4	4	2	205,443	3	3	2
Free school	2,845	1	1	6	3,360	1	1	6	3,404	0	0	5

Table 3.6. A level: Composition of missing data by centre type (that is, each centre type's share of the missing data).

	Ethnicity, Major language, SEN and FSM			IDACI/SES			Prior attainment		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
Number of entries with missing data on the variable	73,075	77,876	76,747	73,877	78,613	77,479	30,755	31,717	28,404
Secondary comprehensive (%)	0	1	0	1	1	0	6	6	6
Secondary selective (%)	0	0	0	0	0	0	3	3	2
Secondary modern (%)	0	0	0	0	0	0	0	0	0
Independent (%)	34	34	34	34	34	34	57	57	57
FE college (%)	6	6	7	6	6	6	2	3	2
6th form college (%)	43	43	44	43	42	44	13	13	14
Tertiary college (%)	6	6	6	6	6	6	2	2	2
Other (%)	0	1	1	0	1	1	1	1	1
City academy (%)	10	10	9	10	11	9	16	16	15
Free school (%)	0	0	0	0	0	0	1	1	1

3.3 Outline of analyses

3.3.1 Univariate analysis: across subjects

To assess the attainment difference between groups of candidates, we examined three measures of attainment at the group level:

i) the percentage of entries in the relevant group awarded ***A level grade A and above / GCSE grade 7 and above***
ii) the percentage of entries in the relevant group awarded ***A level grade C and above / GCSE grade 4 and above***
iii) ***the mean of grades***[11] ***awarded*** for entries in the relevant group

3.3.2 Multivariate analysis: across subjects

Multivariate analyses allow the effect of a variable to be examined while holding other variables constant. For example, in a given test, a univariate analysis might show that: a) females outperform males; and b) candidates with high prior attainment outperform candidates with low prior attainment. A multivariate analysis allows us to hold prior attainment constant while estimating the effect of gender, and vice versa. If the effect of gender disappears, we would conclude that the females in our sample were of higher ability than the males and that it was this that led to their superior performance, not their being female *per se*.

To this end, we carried out linear mixed effects modelling. We measured attainment both as a point score[11] and as the probability of attaining ***A level grade A and above / GCSE grade 7 and above*** and ***A level grade C and above / GCSE grade 4 and above***. The analysis aimed to model the relationship between an entry's numeric grade[11] / probability of attaining a key grade or higher, on the one hand, and background information about the candidate that the entry belonged to, and the year of the entry, on the other.

We used multilevel regression models – or, where probabilities were considered as dependent variables, linear probability models – to account for the hierarchical structure of the data. This included candidates doing multiple subjects (for the cross-subject analyses only) in addition to candidates clustered within schools. Centres and candidates within centres were treated as random effects (that is, a random intercept was estimated for each candidate and centre) in what in effect was a three-level model. The fixed effects included were:

- Gender: male, female (*reference category*), unknown
- Prior attainment: low (*reference category*), mid, high, unknown
- FSM: NO (*reference category*), YES, unknown[12]
- Ethnicity: AOEG, ASIA, BLAC, CHIN, MIXD, UNCL, WHIT (*reference category*), unknown (dropped because of collinearity[12])

[11] Grades were converted into numbers: A*=6, A=5…U=0 for A level; 9=9, 8=8…U=0 for GCSE.
[12] Regarding Ethnicity, Language, SEN and FSM (but not IDACI), if one variable is missing for a candidate, the other three variables are normally missing for the same candidate. In modelling, because unknown Ethnicity is entirely predictive of unknown Language, unknown SEN, and unknown FSM, only one of the 'unknown' categories – in this case FSM – is retained.

- Language: ENG (*reference category*), OTH, UNCL, unknown (dropped because of collinearity[12])
- SEN: NON (*reference category*), SNS, SS, UNCL, unknown (dropped because of collinearity[12])
- SES: low (*reference category*), mid, high, unknown
- Subject: Psychology (***A level** reference category*), Geography (***GCSE** reference category*)
- Year: 2018, 2019 (*reference category*), 2020[13]
- Interactions: Gender*Year; Prior attainment*Year; Ethnicity*Year; Language*Year; SEN*Year; FSM*Year; SES*Year

(See appendix 5.1.1 for the formula.)

It is important to note that, because our prior attainment measure was based on Key Stage 2 / GCSE performance and there were correlations between most variables in the model and prior attainment (as can be verified by examining the prior attainment means at different levels of each variable in Table 5.1 to Table 5.6 [A level][14] in appendix 5.2.1 and Table 5.10 to Table 5.15 [GCSE] in appendix 5.3.1), the effects of many variables on GCSE (or A level) outcome were likely to be wrapped up in their effects on Key Stage 2 (or GCSE) attainment. As the model quantifies the effect of each variable after controlling for prior attainment, among other variables, the effects relate to changes between groups that would have taken place between candidates taking their Key Stage 2 (or GCSEs) and their GCSE (or A level), rather than the effects which may be introduced across an entire school career.

Due to limitations in computing power, the cross subject multivariate analyses were conducted on subsets of the datasets used for the univariate analyses. The subject with the most entries was taken as the reference category of the Subject variable in the respective analysis. The modelling exercises presented below used data from:

> **A level** → biology, business studies, chemistry, economics, English literature, geography, history, physics, psychology, sociology.[15]
>
> **GCSE** → art & design, biology, chemistry, citizenship studies, classical Greek, computing, dance, drama, food preparation & nutrition, French, German,

[13] Note that, while Year was modelled for the A level analyses, for the GCSE analyses, separate models were estimated for each year. (See appendix 5.1.3 for the formula.)

[14] Take FSM and 2019 as an example. It can be seen in Table 3.11, for example, under **mean grade**, that the FSM-ineligible group had higher outcomes than the FSM-eligible group, which suggests an effect of FSM eligibility on A level outcomes. But it can also be seen under Prior attainment in

Table 5.5 (appendix 5.2.1) that there was a correlation between prior attainment and the FSM variable in that the FSM-eligible and FSM-ineligible groups did not have the same level of prior attainment (at GCSE). After controlling for prior attainment, the model may find no effect of FSM-eligibility on A level outcomes. This null effect of the model indicates that FSM-eligibility does not lead to any disparity in learning experience in the two years of A level study that can explain the FSM-eligible group's lower A level performance (relative to the FSM-ineligible group's), but it does not deny that FSM-eligibility can be related to disparity in learning experience in the years leading up to GCSEs that can explain the FSM-eligible group's lower GCSE performance (relative to the FSM-ineligible group's).

[15] Over one million entries over three years, representing 78% of the data used in the univariate analyses.

geography, Latin, music, physical education,[16] physics, religious studies,[16] and Spanish.[17]

Estimates of the parameters of the models are presented in sections 3.4.2 and 3.5.2 for A levels and GCSEs, respectively. For the sake of brevity, only results referring to prior attainment, protected characteristics, and socio-economic status are presented.

3.3.3 Multivariate analysis: specific subjects

The multivariate modelling across subjects, described in section 3.3.2, was conducted by pulling together data from multiple subjects to provide an overall picture of how attainment gaps, after controlling for other variables, have changed year on year.

In addition to the cross-subject analyses, we also carried out modelling of point score using three years' data in a selection of individual subjects. For A level, mathematics[18] was chosen as it is the largest entry subject, but was outside of the scope of those included in the cross-subject analyses. Music, German, and Latin were chosen because they tend to have (proportionally) more small centre entries than the ten largest entry subjects included in the cross-subject analyses, so will allow us to examine any effect of this on outcomes for the three grading approaches.

For GCSE, the subjects were chosen because they are large subjects that could not be included in the cross-subject analyses owing to limitations in computing power. Small centre entries are less prevalent at GCSE.

The details of the statistical model are essentially the same as those in 3.3.2[19]. A model was built for:

- **A level** mathematics,[20] music, German, and Latin.
- **GCSE** mathematics, English language, English literature, combined science,[21] and history.

(See appendix 5.1.2 for the formula.)

Estimates of the parameters of the models are presented in sections 3.4.3 and 3.5.3 for A levels and GCSEs, respectively.

3.4 A level

3.4.1 Univariate analysis

Table 3.7 to Table 3.12 show: percentage at **grade A and above**; percentage at **grade C and above**; and **mean grade** for outcomes in 2018 and 2019, plus 2020 outcomes based on final grades, CAGs, and calculated grades, broken down by: candidate's gender, ethnicity, major language, SEN provision status, FSM eligibility

[16] Full course and short course.
[17] Representing 38% of the data used in the univariate analyses.
[18] For the A level mathematics analysis, we included candidates of all ages from all centres.
[19] The single subject models do not have a random intercept for each candidate, but only for centres. Whereas the cross-subject analysis was based on three-level models, the single subject analysis was based on two-level models.
[20] Mathematics was chosen as it is a large entry subject, outside of the scope of those included in the analyses presented above.
[21] To maintain the 0-9 grade scale, double award grades were converted as such: 11=1, 21=1.5, 22=2, 32=2.5, ...98=8.5, 99=9.

status, and socio-economic status. The corresponding entry numbers and prior attainment data for each group are reported in appendix 5.2.1.

In view of concerns about the centre assessment of high-attaining low-SES candidates, further breakdowns by SES are provided separately for candidates with low, medium, and high levels of prior attainment in 3.1 to 3.3 (and Table 5.7 to Table 5.9 in appendix 5.2.2).

Table 3.13, Table 3.14, and Table 3.15 summarise the attainment gaps on each attainment measure, calculated from the figures presented in Table 3.7 to Table 3.12.[22] By examining the extent to which attainment gaps in the 2020 grade outcomes have changed relative to the attainment gaps seen in previous years' grade outcomes, we can assess any differential effect of the 2020 grade awarding processes on different groups of candidates.

For all but the SES variable, the attainment gap was calculated by subtracting the outcome of the group with fewer entries from the outcome of the group with most entries. Therefore, a positive number indicates higher performance of the majority group while a negative number indicates lower performance of the majority group. For the SES variable, the attainment gap was calculated by subtracting the outcome of the low SES group from that of the high SES group and therefore a positive number indicates higher outcomes for the high SES group.

When two or more groups were combined to be contrasted with another group, a weighted average was calculated for the composite group. For example, under FSM, a weighted average of the NO and YES groups was calculated to be compared with the 'unknown' group; under Ethnicity, a weighted average of the AOEG, ASIA, BLAC, CHIN, MIXD, and WHIT groups was calculated to be compared with the weighted average of the UNCL and 'unknown' groups.

To illustrate how to read Table 3.13 to Table 3.15, the first row of Table 3.13 is considered as an example. The first row shows: in 2018 the proportion of entries by female candidates receiving grade A was higher than the proportion of entries by male candidates receiving grade A. This gap was 1.32 percentage points. The attainment gap continued in 2019, widening by 0.77 percentage point to 2.08 percentage points. In 2020 the attainment gap for final grades is 5.02 percentage points, which represents an increase of 2.94 percentage points from 2019 and 3.31 percentage points from the weighted average attainment gap across 2018 and 2019. The highlighted cells indicate the greatest difference out of final grades, CAGs, and calculated grades.

As the '19-18 Difference' columns in Table 3.13 to Table 3.15 illustrate, attainment gaps seldom stay constant from year-to-year. At **grade A and above**, the largest changes on the 2018-19 patterns are seen in the final grades, although these changes are (unsurprisingly) very similar to the CAGs. The calculated grades would have most closely reproduced the patterns seen in 2018-19, including continuing the trend of a small but growing gap between females and males (Table 3.7 and Table 3.13). The differences are all overall small, but final grades appear to have very slightly favoured females over males (Table 3.7 and Table 3.13), Chinese over white (Table 3.8 and Table 3.13), and non-SEN over SEN (Table 3.10 and Table 3.13).

[22] Differences are calculated using unrounded outcomes, not those reported to two decimal places in the tables. This results in the occasional discrepancy between reported outcomes and their difference.

At **grade C and above**, the overall pattern is again that final grades and CAGs are similar and that final grades led to greater changes on the 2018-19 patterns than calculated grades would have done. In this case, calculated grades would have favoured females over males, whereas the final grades produced the smallest increase (Table 3.7 and Table 3.14). Within ethnicity, the final grades have reduced the gap between white and other known groups compared with 2018-19 (Table 3.8 and Table 3.14). Final grades have also narrowed the socio-economic status gap at **grade C and above** (Table 3.12 and Table 3.14).

For **mean grade (0 to 6)**, the overall pattern is again that final grades and CAGs are similar and that final grades led to greater changes on the 2018-19 pattern than calculated grades would have done. Nonetheless, the effect on differences in **mean grade** is demonstrably tiny, the largest change being 0.07 – or 7% – of a grade (Table 3.15).

Figure 3.1 to Figure 3.3 (and Table 5.7 to Table 5.9) show the descriptive statistics for entries from different socio-economic backgrounds split by prior attainment (low, medium, and high). In 2018 and 2019, among entries with similar prior attainment, A level attainment increased with socio-economic status level. This was true of the percentage of entries at each socio-economic status level achieving **grade A and above**, **grade C and above**, and the **mean grade** achieved.

It is clear that calculated grades would have produced a similar pattern of results to those seen in 2018 and 2019. The small fluctuations in calculated grade outcomes are akin to the fluctuations between 2018 and 2019 and as such do not suggest that this process of awarding grades was biased for or against candidates from different socio-economic backgrounds. Although there would have been a small increase in the proportion of candidates with high prior attainment achieving grade A, this would have been irrespective of socio-economic background (Figure 3.3, Table 5.9).

The CAGs and final grades produced higher outcomes for every socio-economic status group than they achieved in 2018 and 2019; however, the pattern and size of the differences between groups appear comparable, so the process used to award final grades this year does not appear to have created or exacerbated any differences.

Table 3.7. Breakdown by candidates' gender against percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

GENDER	**2018**		**2019**		**2020**					
					Final		***CAG***		***Calculated***	
Grade A & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
Female	26.19		25.45		38.92		38.31		26.48	
Male	24.88		23.37		33.89		33.25		23.65	
Grade C & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
Female	79.58		78.87		90.01		89.41		80.61	
Male	75.83		74.59		85.47		84.64		74.70	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Female	3.60	1.35	3.57	1.36	4.09	1.24	4.06	1.25	3.63	1.33
Male	3.48	1.41	3.42	1.41	3.89	1.30	3.85	1.32	3.43	1.41

Table 3.8. Breakdown by candidates' ethnicity against percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

ETHNICITY	2018		2019		2020					
					Final		CAG		Calculated	
Grade A & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
AOEG	23.37		21.64		34.41		33.46		22.85	
ASIA	22.82		21.15		33.11		32.48		22.03	
BLAC	17.28		16.38		27.76		27.07		17.68	
CHIN	36.64		38.26		52.61		51.76		39.74	
MIXD	25.71		24.82		36.86		36.22		24.94	
UNCL	24.12		23.82		33.84		33.19		23.32	
WHIT	25.68		24.65		37.36		36.71		25.50	
UnknownEthnicity	28.93		28.13		39.72		39.25		28.73	
Grade C & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
AOEG	75.08		73.76		87.49		86.42		76.59	
ASIA	73.98		72.60		85.56		84.72		74.03	
BLAC	72.26		70.19		84.18		83.22		71.25	
CHIN	83.28		84.67		93.22		92.58		86.01	
MIXD	77.59		77.08		87.96		87.20		78.17	
UNCL	75.73		76.47		85.94		84.94		75.27	
WHIT	78.68		77.80		88.83		88.13		79.08	
UnknownEthnicity	79.34		78.81		88.42		87.97		79.48	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
AOEG	3.42	1.42	3.36	1.40	3.94	1.26	3.90	1.28	3.46	1.36
ASIA	3.40	1.40	3.33	1.40	3.87	1.28	3.83	1.30	3.38	1.38
BLAC	3.25	1.34	3.18	1.35	3.73	1.25	3.69	1.27	3.23	1.35
CHIN	3.89	1.41	3.96	1.39	4.45	1.23	4.42	1.25	4.02	1.34
MIXD	3.54	1.39	3.52	1.39	4.00	1.27	3.96	1.29	3.54	1.36

Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
UNCL	3.46	1.41	3.48	1.41	3.90	1.28	3.86	1.30	3.44	1.40
WHIT	3.57	1.36	3.53	1.37	4.03	1.26	4.00	1.27	3.58	1.35
UnknownEthnicity	3.65	1.40	3.62	1.40	4.07	1.29	4.05	1.30	3.65	1.39

Table 3.9. Breakdown by candidates' major language against percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

MAJOR LANGUAGE	2018		2019		2020					
					Final		***CAG***		***Calculated***	
Grade A & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
1_ENG	25.51		24.46		36.86		36.22		25.12	
2_OTH	21.67		20.25		33.07		32.39		21.89	
3_UNCL	18.60		22.72		33.46		32.46		23.32	
UnknownLanguage	28.93		28.13		39.72		39.25		28.73	
Grade C & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
1_ENG	78.42		77.49		88.47		87.76		78.57	
2_OTH	73.39		72.02		85.95		85.04		74.33	
3_UNCL	72.30		77.28		85.96		84.86		74.30	
UnknownLanguage	79.34		78.81		88.42		87.97		79.48	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
1_ENG	3.56	1.36	3.52	1.37	4.01	1.26	3.98	1.27	3.55	1.36
2_OTH	3.36	1.40	3.30	1.40	3.88	1.28	3.84	1.29	3.39	1.38
3_UNCL	3.26	1.42	3.47	1.32	3.87	1.28	3.82	1.29	3.42	1.39
UnknownLanguage	3.65	1.40	3.62	1.40	4.07	1.29	4.05	1.30	3.65	1.39

Table 3.10. Breakdown by candidates' SEN provision status against percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

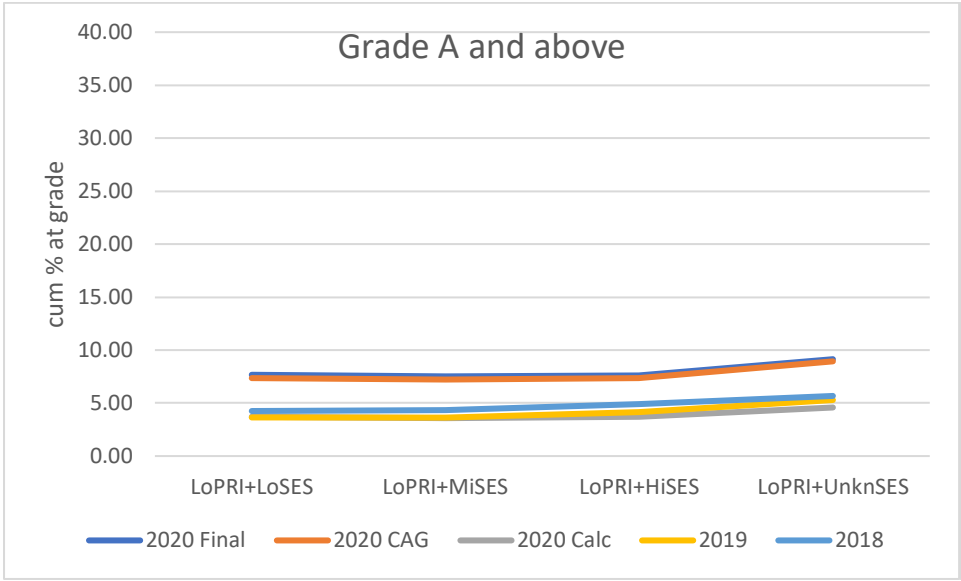
SEN	2018		2019		2020					
					Final		***CAG***		***Calculated***	
Grade A & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
1_NON	25.09		23.92		36.51		35.86		24.78	
2_SNS	23.37		23.42		32.24		31.66		21.99	
3_SS	26.10		24.77		35.73		35.06		25.39	
4_UNCL	0.00		0.00		0.00		0.00		0.00	
UnknownSEN	28.93		28.13		39.72		39.25		28.73	
Grade C & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
1_NON	77.91		76.82		88.22		87.47		78.07	
2_SNS	75.61		75.78		86.09		85.40		75.74	
3_SS	76.25		76.83		86.96		86.32		77.07	
4_UNCL	0.00		0.00		0.00		0.00		0.00	
UnknownSEN	79.34		78.81		88.42		87.97		79.48	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
1_NON	3.54	1.37	3.49	1.38	4.00	1.26	3.97	1.28	3.54	1.36
2_SNS	3.46	1.39	3.46	1.40	3.88	1.28	3.84	1.29	3.43	1.38
3_SS	3.51	1.42	3.51	1.39	3.96	1.30	3.92	1.31	3.53	1.39
4_UNCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UnknownSEN	3.65	1.40	3.62	1.40	4.07	1.29	4.05	1.30	3.65	1.39

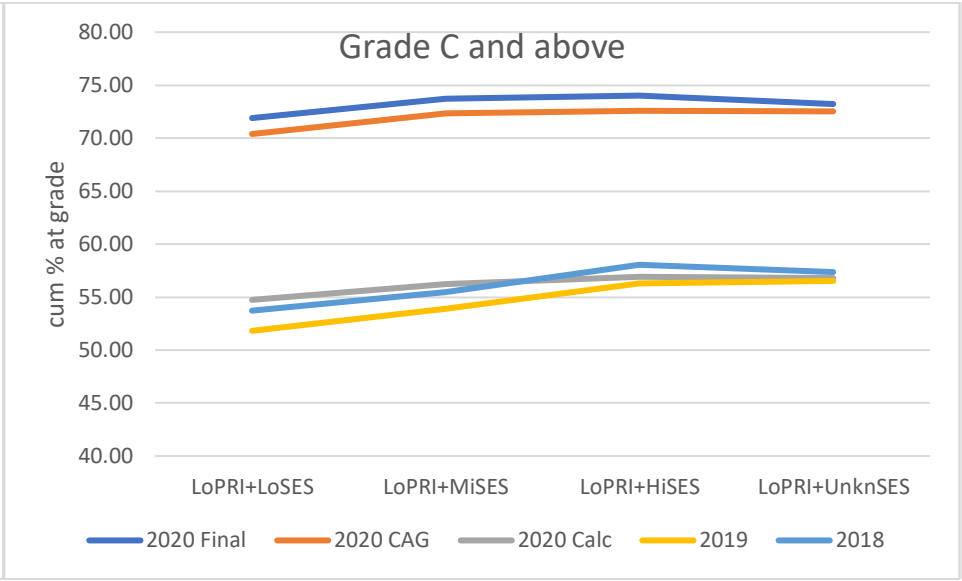
Table 3.11. Breakdown by candidates' FSM eligibility status against percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

FSM	**2018**		**2019**		**2020**					
					Final		***CAG***		***Calculated***	
Grade A & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
0=NO	25.33		24.23		36.82		36.17		25.09	
1=YES	18.58		18.10		28.40		27.79		17.98	
UnknownFSM	28.93		28.13		39.72		39.25		28.73	
Grade C & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
0=NO	78.11		77.11		88.37		87.64		78.34	
1=YES	71.18		70.86		83.98		83.05		71.93	
UnknownFSM	79.34		78.81		88.42		87.97		79.48	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
0=NO	3.55	1.37	3.50	1.38	4.01	1.26	3.98	1.28	3.55	1.36
1=YES	3.25	1.39	3.24	1.37	3.74	1.27	3.70	1.29	3.26	1.35
UnknownFSM	3.65	1.40	3.62	1.40	4.07	1.29	4.05	1.30	3.65	1.39

Table 3.12. Breakdown by candidate's SES against number against percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

SES	2018		2019		2020					
					Final		***CAG***		***Calculated***	
Grade A & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
LoSES	20.97		19.97		31.98		31.35		20.96	
MiSES	25.06		24.01		36.43		35.78		24.63	
HiSES	28.75		27.55		40.38		39.72		28.28	
UnknownSES	28.86		28.05		39.67		39.19		28.66	
Grade C & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
LoSES	74.03		72.64		85.89		85.02		74.60	
MiSES	77.96		77.21		88.42		87.69		78.20	
HiSES	81.12		80.29		89.95		89.30		80.96	
UnknownSES	79.29		78.76		88.40		87.95		79.43	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
LoSES	3.37	1.38	3.31	1.38	3.86	1.27	3.82	1.28	3.38	1.36
MiSES	3.54	1.37	3.50	1.37	4.00	1.26	3.97	1.27	3.54	1.36
HiSES	3.68	1.35	3.64	1.36	4.12	1.25	4.09	1.26	3.67	1.35
UnknownSES	3.65	1.40	3.62	1.40	4.07	1.29	4.05	1.30	3.65	1.39





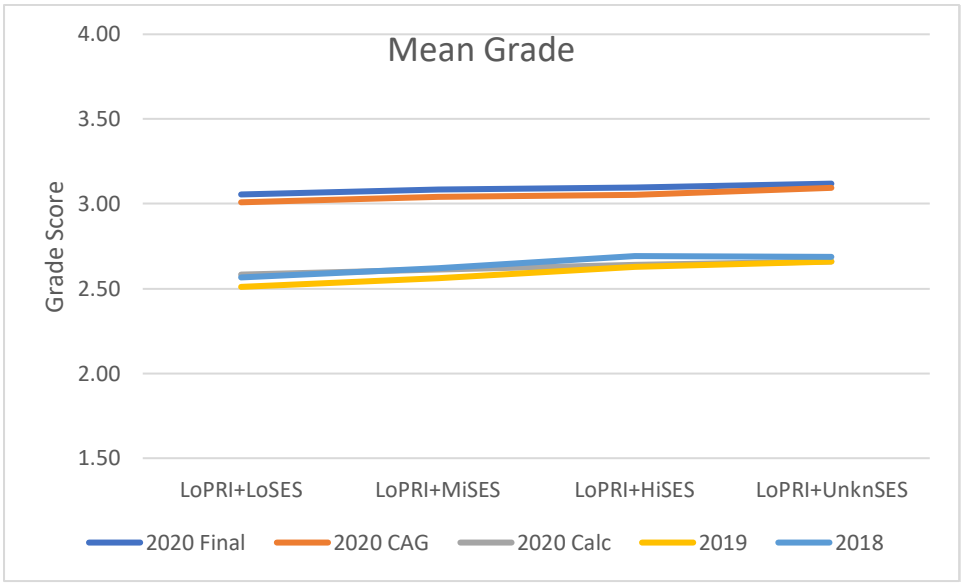
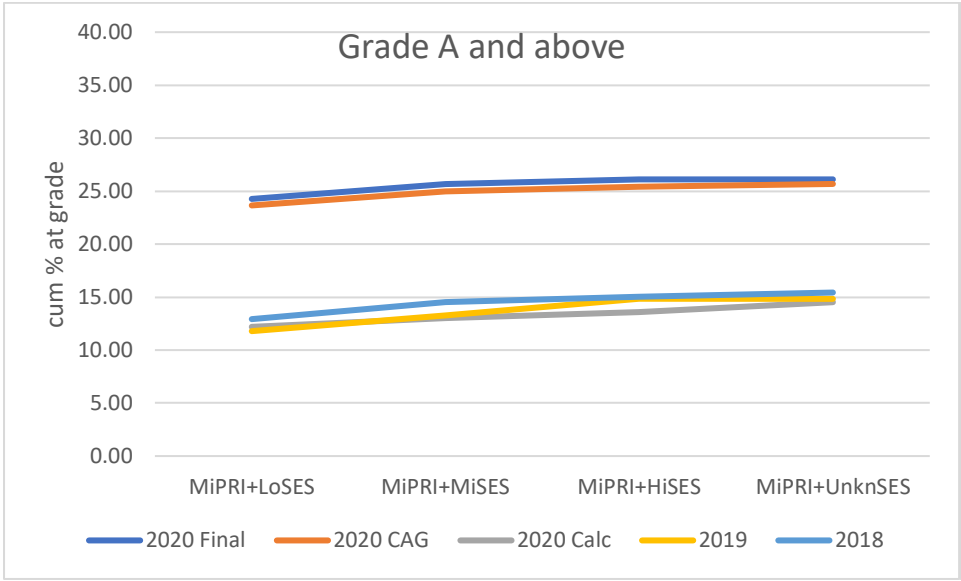
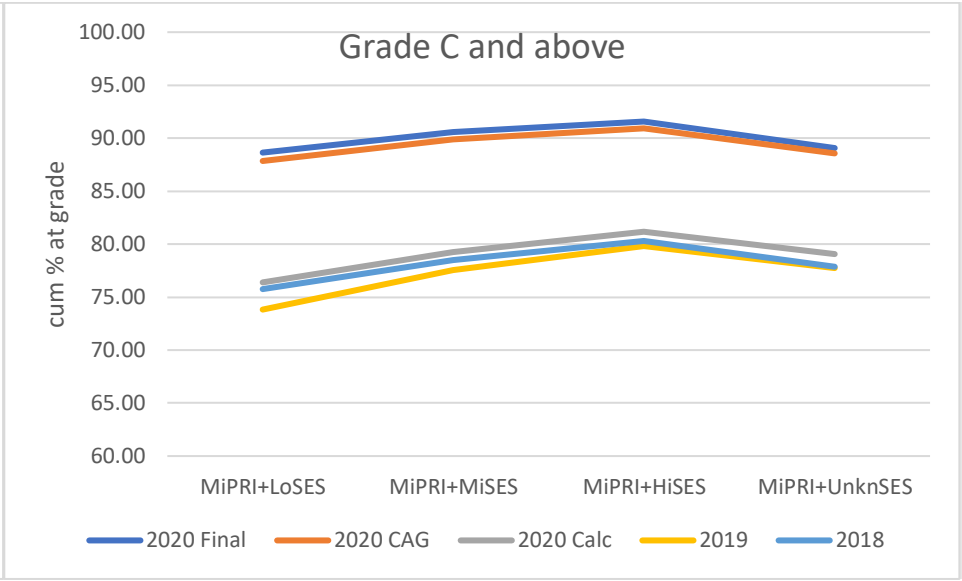


Figure 3.1. A level: Breakdown by SES of candidates with low prior attainment against percentage of grade A and above, percentage of grade C and above and mean grade in 2018 – 2020.





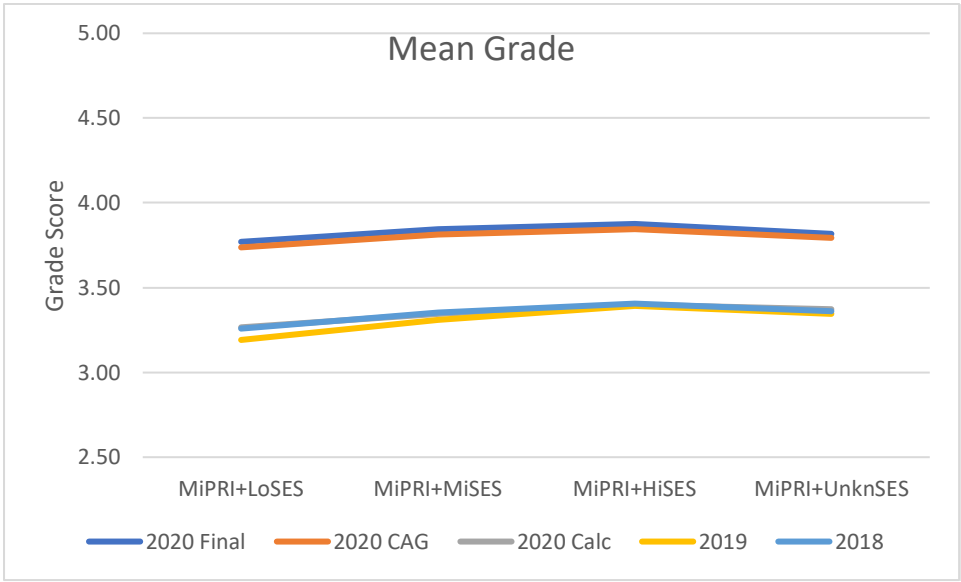
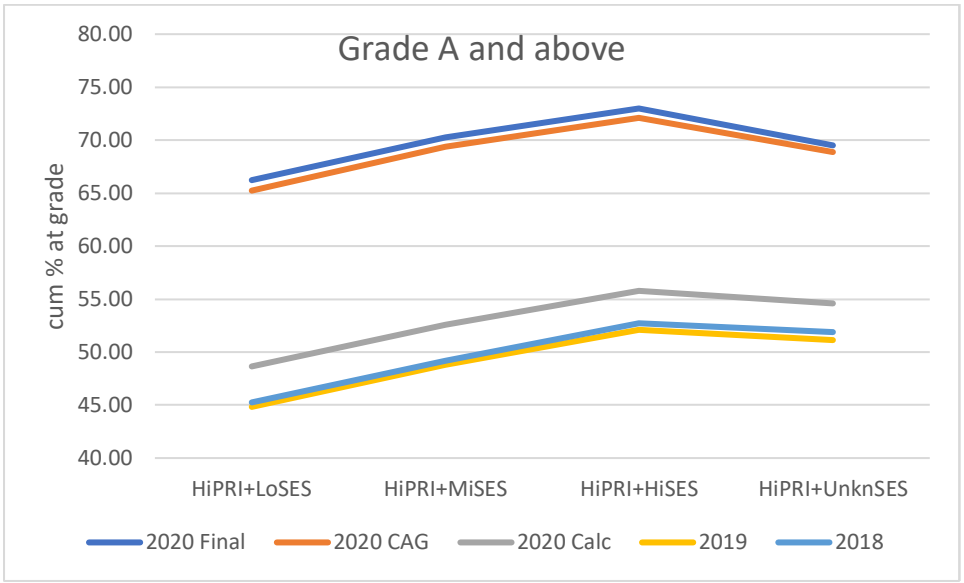
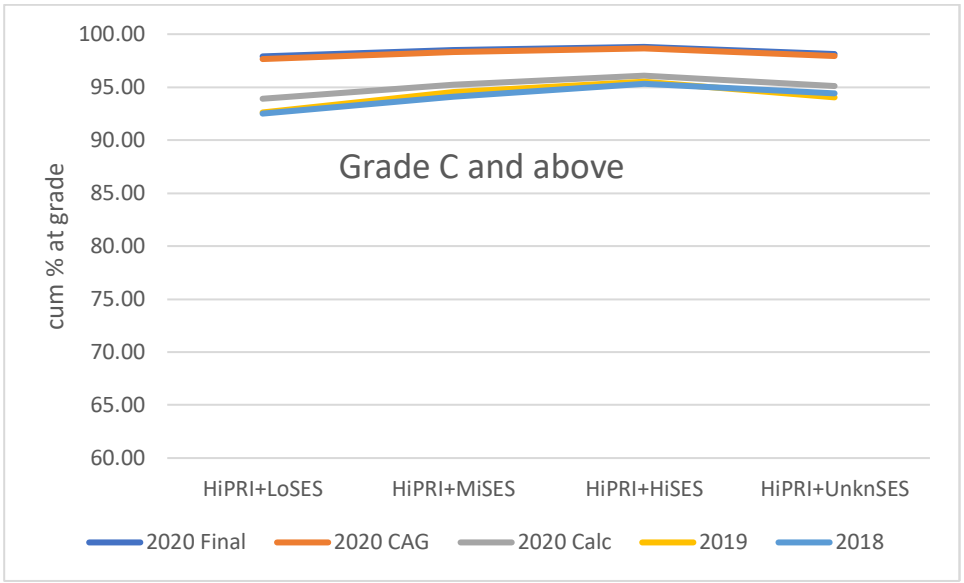


Figure 3.2. A level: Breakdown by SES of candidates with medium prior attainment against percentage of grade A and above, percentage of grade C and above and mean grade in 2018 – 2020.





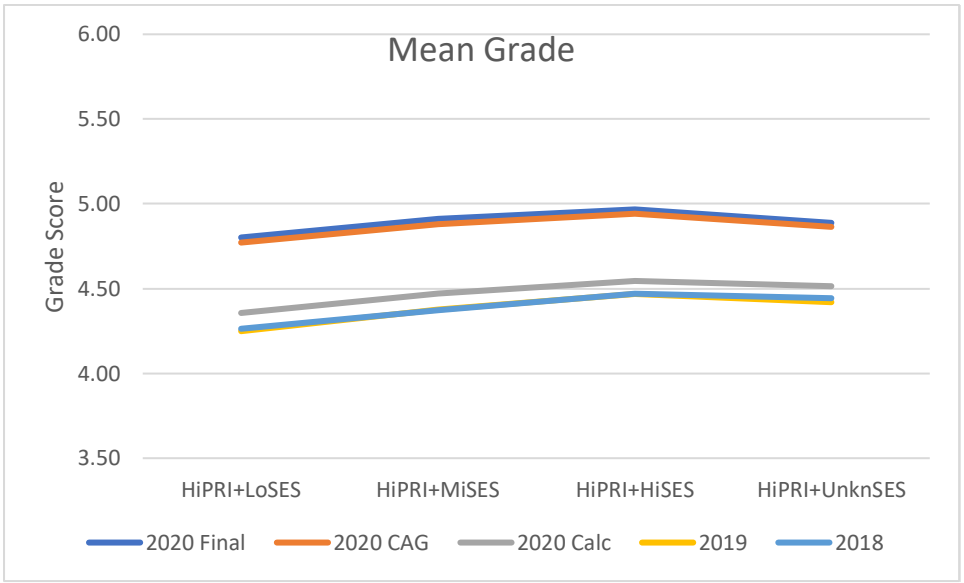


Figure 3.3. A level: Breakdown by SES of candidates with high prior attainment against percentage of grade A and above, percentage of grade C and above and mean grade in 2018 – 2020.

Table 3.13. A level grade A and above: Attainment gaps in 2018 and 2019 outcomes, differences between 2018 and 2019 attainment gaps, attainment gaps in 2020 outcome and differences between 2020 attainment gaps from weighted average attainment gaps of 2018 and 2019.

	2018	2019	2019-18	2020					
				Final Grades		CAGs		Calculated Grades	
	Outcome	Outcome	Difference	Outcome	Difference	Outcome	Difference	Outcome	Difference
GENDER									
Female - Male	1.32	2.08	0.77	5.02	3.31	5.06	3.35	2.83	1.12
ETHNICITY									
WHIT – AOEG	2.31	3.02	0.71	2.95	0.27	3.26	0.58	2.66	-0.02
WHIT – ASIA	2.86	3.50	0.64	4.25	1.05	4.23	1.03	3.48	0.27
WHIT – BLAC	8.40	8.27	-0.14	9.60	1.27	9.64	1.31	7.82	-0.51
WHIT – CHIN	-10.96	-13.61	-2.65	-15.25	-2.90	-15.05	-2.71	-14.23	-1.89
WHIT – MIXD	-0.03	-0.17	-0.14	0.50	0.60	0.49	0.59	0.56	0.66
Known – (unknown+UNCL)	-3.59	-3.94	-0.35	-2.95	0.82	-3.12	0.65	-3.66	0.11
LANGUAGE									
ENG – OTH	3.83	4.21	0.37	3.79	-0.23	3.83	-0.19	3.23	-0.79
Known – (unknown+UNCL)	-3.69	-4.10	-0.41	-3.22	0.68	-3.39	0.52	-3.91	-0.01
SEN									
NON – (SNS+SS)	1.18	0.23	-0.95	3.59	2.89	3.54	2.84	2.13	1.43
Known – (unknown+UNCL)	-3.89	-4.22	-0.33	-3.43	0.63	-3.58	0.48	-4.06	0.00
FSM									
NON – YES	6.75	6.13	-0.62	8.42	1.99	8.39	1.95	7.12	0.68
Known – unknown	-3.89	-4.22	-0.33	-3.40	0.66	-3.58	0.48	-4.06	0.00
SES									
High – Low	7.77	7.59	-0.19	8.40	0.72	8.36	0.68	7.31	-0.37
Known – unknown	-3.82	-4.13	-0.32	-3.35	0.63	-3.52	0.46	-3.99	-0.01

Table 3.14. A level grade C and above: Attainment gaps in 2018 and 2019 outcomes, differences between 2018 and 2019 attainment gaps, attainment gaps in 2020 outcome and differences between 2020 attainment gaps from weighted average attainment gaps of 2018 and 2019.

	2018	2019	2019-18	2020					
				Final Grades		CAGs		Calculated Grades	
	Outcome	Outcome	Difference	Outcome	Difference	Outcome	Difference	Outcome	Difference
GENDER									
Female - Male	3.75	4.29	0.53	4.55	0.52	4.77	0.74	5.91	1.89
ETHNICITY									
WHIT – AOEG	3.60	4.03	0.44	1.34	-2.48	1.70	-2.12	2.49	-1.34
WHIT – ASIA	4.69	5.19	0.50	3.28	-1.68	3.41	-1.55	5.04	0.09
WHIT – BLAC	6.42	7.61	1.19	4.66	-2.39	4.90	-2.14	7.83	0.78
WHIT – CHIN	-4.61	-6.87	-2.27	-4.39	1.40	-4.46	1.33	-6.93	-1.14
WHIT – MIXD	1.09	0.72	-0.37	0.87	-0.02	0.93	0.03	0.90	0.01
Known – (unknown+UNCL)	-1.28	-1.87	-0.59	-0.10	1.48	-0.36	1.23	-1.18	0.40
LANGUAGE									
ENG – OTH	5.03	5.47	0.44	2.53	-2.72	2.72	-2.54	4.23	-1.02
Known – (unknown+UNCL)	-1.39	-2.00	-0.61	-0.23	1.47	-0.51	1.19	-1.36	0.34
SEN									
NON – (SNS+SS)	2.18	0.84	-1.34	1.95	0.46	1.89	0.39	2.07	0.57
Known – (unknown+UNCL)	-1.53	-2.03	-0.50	-0.34	1.44	-0.61	1.18	-1.52	0.26
FSM									
NON – YES	6.93	6.25	-0.68	4.39	-2.20	4.59	-2.00	6.42	-0.17
Known – unknown	-1.53	-2.03	-0.50	-0.31	1.47	-0.61	1.18	-1.52	0.26
SES									
High – Low	7.10	7.65	0.55	4.06	-3.32	4.28	-3.10	6.36	-1.02
Known – unknown	-1.48	-1.97	-0.49	-0.29	1.44	-0.59	1.14	-1.47	0.26

Table 3.15. A level mean grade: Attainment gaps in 2018 and 2019 outcomes, differences between 2018 and 2019 attainment gaps, attainment gaps in 2020 outcome and differences between 2020 attainment gaps from weighted average attainment gaps of 2018 and 2019.

	2018	2019	2019-18	2020					
				Final Grades		CAGs		Calculated Grades	
	Outcome	Outcome	Difference	Outcome	Difference	Outcome	CAG Dif	Outcome	Difference
GENDER									
Female - Male	0.12	0.15	0.03	0.20	0.06	0.20	0.07	0.20	0.06
ETHNICITY									
WHIT – AOEG	0.15	0.16	0.02	0.09	-0.07	0.10	-0.06	0.12	-0.04
WHIT – ASIA	0.17	0.20	0.03	0.16	-0.02	0.17	-0.02	0.19	0.01
WHIT – BLAC	0.32	0.34	0.02	0.30	-0.03	0.31	-0.02	0.34	0.01
WHIT – CHIN	-0.32	-0.43	-0.11	-0.42	-0.04	-0.42	-0.04	-0.45	-0.07
WHIT – MIXD	0.03	0.01	-0.01	0.03	0.01	0.04	0.02	0.04	0.02
Known – (unknown+UNCL)	-0.10	-0.12	-0.02	-0.07	0.05	-0.07	0.04	-0.11	0.01
LANGUAGE									
ENG – OTH	0.19	0.22	0.02	0.13	-0.07	0.14	-0.07	0.16	-0.04
Known – (unknown+UNCL)	-0.11	-0.13	-0.02	-0.07	0.04	-0.08	0.04	-0.12	0.00
SEN									
NON – (SNS+SS)	0.07	0.02	-0.05	0.11	0.06	0.11	0.06	0.09	0.04
Known – (unknown+UNCL)	-0.11	-0.13	-0.02	-0.08	0.04	-0.09	0.03	-0.12	0.00
FSM									
NON – YES	0.30	0.27	-0.03	0.27	-0.01	0.28	0.00	0.29	0.01
Known – unknown	-0.11	-0.13	-0.02	-0.08	0.04	-0.09	0.03	-0.12	0.00
SES									
High – Low	0.32	0.33	0.01	0.26	-0.06	0.27	-0.06	0.29	-0.04
Known – unknown	-0.11	-0.13	-0.02	-0.08	0.04	-0.09	0.03	-0.12	0.00

3.4.2 Multivariate analysis: across subjects

3.4.2.1 General interpretation

Estimates of the parameters of the models for A level final grades, calculated grades, and CAGs are presented in the tables in sections 3.4.2.2, 3.4.2.3, and 3.4.2.4, respectively, excluding estimates of the parameters relating to the *Subject* variable. The *Subject* main effects and interactions with *Year* tell us about inter-subject comparability and any change in inter-subject comparability between years. They are omitted from Table 3.16 to Table 3.24 because they do not address equality issues related to candidate background variables.

The left hand third of the tables present results of the main effects, which tell us about the relationships between background variables and grade in 2019. For the first two tables in each section, the coefficients express the probability of a candidate achieving **grade A and above** and **grade C and above**. For example, in Table 3.16, according to the intercept estimate of the model, a 'reference' candidate taking A level psychology in 2019, who was in the reference category of every background variable (that is, white, female, low SES, not FSM eligible, with English as major language, no SEN, and a low level of prior attainment) has a probability of 0.03 (or 3 per cent) of achieving **grade A and above**.

The regression coefficient of each contrast indicates the additional probability of a candidate (from the same centre), differing from the reference candidate by only one attribute, achieving **grade A and above**. In Table 3.16, for example, a candidate with a high level of prior attainment who was from the same centre as the reference candidate, and who shared with the reference candidate the attributes of being white, female, low SES, not FSM eligible, having English as major language, and no SEN, would have a probability of 0.03+0.46=0.49 (or 49 per cent) of achieving **grade A or higher** in A level psychology in 2019.

For the third table in each section, the coefficients express grade as a point score. Given the conversion used to translate letter grades into point scores, 1 unit can be interpreted as 1 grade. For example, in Table 3.18, a 'reference' candidate taking A level psychology in 2019, who was in the reference category of every background variable (see above) would be awarded a grade of 2.37 (somewhere between grades C and D), as shown by the intercept estimate of the model.

The regression coefficient of each contrast indicates how different the grade received by a candidate (from the same centre) differing from the reference candidate by only one attribute would be from the reference candidate's grade. In Table 3.18, for example, a candidate with a high level of prior attainment who was from the same centre as the reference candidate and who shared with the reference candidate the attributes of being white, female, low SES, not FSM eligible, having English as major language, and no SEN, would receive the grade 2.37+2.12=4.49 (somewhere between grade A and B) in A level psychology in 2019.

The regression coefficient of each contrast indexes the magnitude of the relevant attainment gap in 2019 after controlling for other variables. The t value is obtained by dividing the regression coefficient by its standard error. The t value can be compared to the critical value of 1.96 (for $p<.05$) or 2.54 (for $p<.01$) to determine the statistical significance of the attainment gap indicated by the regression coefficient. However,

this practice is not universally accepted by experts on mixed effects modelling,[23] and there are questions over the value of conventional tests of statistical significance in analyses of large administrative datasets.[24]

To provide a measure of the practical (as opposed to statistical) significance of each contrast, we calculated a standardised effect size: Cohen's d, adapted for the multilevel framework.[25,26] Cohen's original classification of effect sizes of 0.2/0.5/0.8 as small/medium/large is no longer widely considered applicable to every context. In education, given the difficulty in raising academic achievement, it is recognised that measures that have effect sizes smaller than Cohen's small effect are still of educational significance.[27,28] For the present purpose, we set the threshold at the highly cautious level |0.1| for highlighting a statistically significant effect (p<.05) as being of substantive importance; this means marginal effects may be identified.

3.4.2.2 Final grades

3.4.2.2.1 Grade A and above

The effect we are seeing is essentially that centres' estimates are generous, but measuredly so. The CAGs (and, it follows, the final grades) are what those candidates might have achieved on a good day in the exam – except that, when candidates take exams, some of them have bad days. That the probability of achieving high grades falls off with prior attainment shows that centres are not generally wildly overestimating the achievement of medium or low ability (based on prior attainment) candidates. They are pushing all candidates upwards; the majority of those crossing the higher grade threshold are among the most able, while a minority are not.

The first part of Table 3.16 tells us that, after controlling for other variables, the effects of most variables on the probability of achieving **grade A and above** in 2019 were not of a significant size. The ones that were significant are the differences relating to prior attainment and being Chinese rather than white.

It should be remembered that, when we interpret the standardised effect size as meaning the effect of a variable (being X [versus Y]) in the model is important, we are referring to the effect on A level grade that variable has between GCSE and A level, *not* throughout the school career. In the same way, finding that being X [versus Y] between GCSE and A level does not significantly affect a candidate's A level grade does *not* mean that being X [versus Y] throughout a candidate's school career has no significant effect on A level grade. The pre-GCSE effects are included in mean GCSE grade score.

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[23] Bates, D. (2006). lmer, p-values and all that. Internet post accessed on 5 August 2020 at https://stat.ethz.ch/pipermail/r-help/2006-May/094765.html

[24] Connelly, R., Playford, C.J., Gayle, V., & Dibben, C. (2016). The role of administrative data in the big data revolution in social science research. *Social Science Research, 59*, 1-12.

[25] Hedges, L.V. (2007). Effect sizes in cluster-randomized design. *Journal of Educational and Behavioral Statistics, 32*, 341-370.

[26] Westfall, J. (2016). Five different "Cohen's d" statistics for within-subject designs. Blogpost accessed on 5 August 2020 at http://jakewestfall.org/blog/index.php/category/effect-size/

[27] Coe, R. (2002). It's the effect size, stupid. What effect size is and why it is important. Paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, England, 12-14 September 2002.

[28] Hill, C.J., Bloom, H.S., Black, A.R., & Lipsey, M.W. (2008). Empirical benchmarks for interpreting effect sizes in research. *Child Development Perspectives, 2,* 172–177.

The middle part of Table 3.16 presents results of the interactions with the Year: 2018 variable, which tell us about the difference between effects in 2019 (presented in the first part of the table) and effects in 2018. In this case, there were no significant differences between the effects in 2018 and 2019.

The third section of the table is the most informative in relation to whether any new attainment gaps have appeared, or pre-existing attainment gaps have been exacerbated or reduced, in 2020. The interpretation of the statistics is as in the middle part of the table, so the regression coefficient of each contrast indexes the magnitude of the change in gap between 2019 and 2020 after controlling for other variables.

As can be seen from the highlighting in the third part of Table 3.16, four changes between 2019 and 2020 are marked as being of substantive importance. The first is that the reference candidate has a slightly higher probability of achieving **grade A and above** in 2020 (0.03+0.05=0.08). The other significant effects relate to gaps based on candidates' prior attainment: high vs low (0.46+0.20=0.66); medium vs low (0.11+0.09=0.20); and unknown vs low (0.26+0.11=0.37).

Overall, ability groups with the highest probabilities of obtaining **grade A and above** in 2019 saw the greatest increases in those probabilities in 2020 using final grades. The result is a widening of the attainment gap due to prior attainment at **grade A and above**. Importantly, when prior attainment is controlled for, there is no differential impact on candidates according to protected characteristics or socio-economic status.

3.4.2.2.2 Grade C and above

The first part of Table 3.17 shows that the same variables significantly affected the probability of a candidate achieving **grade C and above** as affected their probability of achieving **grade A and above** in Table 3.16: prior attainment and being Chinese rather than white. Again, there are no significant interactions between Year: 2018 and any of the main terms. In 2020, again, the reference candidate has a higher probability of achieving **grade C and above** (0.47+0.22=0.69). The probability of a candidate with high prior attainment achieving **grade C and above** in 2020 is in fact 1 (0.47+0.22+0.5-0.19); for a candidate with medium prior attainment it is 0.9 (0.47+0.22+0.29-0.08).

What we are seeing here is the inverse of the effect at **grade A and above**. Almost all high ability candidates, and the majority of middle ability candidates, achieved **grade C and above** in 2019 and 2018. The CAGs (and final grades) have resulted in the few who would have fallen below the grade C threshold in the exam crossing it in 2020, receiving grade Cs and Bs effectively vacated by higher achieving candidates now receiving As and A*s. As candidates more able than they are have moved up, many more lower ability candidates have crossed the grade C threshold.

The result is a narrowing of the attainment gap due to prior attainment at **grade C and above**. Again, it is key that, when prior attainment is controlled for, there is no differential impact on candidates according to protected characteristics or socio-economic status.

The only effect seen at **grade C and above**, but not **grade A and above**, is a small reduction in probability (-0.04) associated with being male rather than female. This is discussed in more detail in relation to **grade point score** in section 3.4.2.2.3.

3.4.2.2.3 Grade point score

The first part of Table 3.18 tells us that, after controlling for other variables, the effects of most variables on candidates' grades in 2019 were not of a significant size. The ones that were significant are the differences relating to: prior attainment; the higher attainment of male candidates relative to female candidates with comparable background characteristics; and the higher attainment of Chinese candidates relative to white candidates with comparable background characteristics.

The middle part of Table 3.18 presents results of the interactions with the Year: 2018 variable, which tell us about the difference between effects in 2019 (presented in the first part of the table) and effects in 2018. We saw above that the reference candidate would receive grade 2.37 in 2019; the first row in the middle part says that according to the model, in 2018 a reference candidate (who must be a different person to, but shared all attributes with, the 2019 reference candidate) would receive grade 2.37+0.06=2.43. And while the difference in grade between two candidates who differed only in their high versus low level of prior attainment was 2.12 in 2019, the same difference was 0.06 grades lower, that is, 2.12-0.06=2.06 grades in 2018.

So, in the middle part, the regression coefficient of each contrast indexes the magnitude of the change between 2018 and 2019 in the relevant attainment gap after controlling for other variables, and the standardised effect size indexes the substantive importance of the magnitude of the change. As can be seen from the absence of any highlighting in the middle part of the table, no change in attainment gap between 2018 and 2019 is marked as being of substantive importance.

The third section of the table is the most informative in relation to whether any attainment gaps have appeared or been exacerbated in 2020. The interpretation of the statistics is as in the middle part of the table, so the regression coefficient of each contrast indexes the magnitude of the change in gap between 2019 and 2020 after controlling for other variables. As can be seen from the highlighting in the third part of Table 3.18, two changes between 2019 and 2020 are marked as being of substantive importance. The first is that the reference candidate achieves over half a grade higher in 2020: 2.37+0.61=2.98. This is the overall effect of using final grades.

The second change is the disappearance of the higher attainment of male candidates relative to female candidates. The model suggests that male candidates outperformed female candidates with comparable background characteristics by 0.12 grade in 2019, 0.12+0.05=0.17 grade in 2018 (the change is statistically significant, but the effect size is very small), and 0.12-0.14=-0.02 grade in 2020. The change between 2019 and 2020 marked as being of substantive importance can be seen as continuing a change which has already occurred between 2018 and 2019 and does not appear to have resulted from the 2020 awarding process.

We saw in the univariate analysis of A level a growth in gap between the grades of female candidates compared to males between 2018 and 2020. The multivariate modelling suggests that the change can better be understood as a decline of male candidates' attainment relative to that of female candidates with comparable background characteristics. Importantly, this change has already occurred between

2018 and 2019, and so does not appear to be caused by the 2020 awarding process.

*Table 3.16. Parameter estimates of multi-year linear mixed effect model of effects of student background variables on probability of obtaining grade A and above at A Levels [final grades] (Subject main effects and *Subject interactions omitted).*

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.03	0.00	9.47	0.07	0.00	0.00	0.40	0.00	0.05	0.00	13.78	0.13
Prior attainment: High	0.46	0.00	224.07	1.19	0.00	0.00	-0.13	0.00	0.20	0.00	68.77	0.51
Prior attainment: Mid	0.11	0.00	53.66	0.27	0.00	0.00	0.77	0.01	0.09	0.00	33.52	0.24
Prior attainment: Unknown	0.26	0.00	76.93	0.67	0.01	0.00	1.62	0.02	0.11	0.00	23.98	0.29
Gender: Male	0.02	0.00	14.78	0.06	0.01	0.00	4.53	0.03	-0.03	0.00	-11.42	-0.06
Gender: Unknown	-0.06	0.06	-0.87	-0.14	0.28	0.27	1.05	0.72				
FSM: Yes	-0.01	0.00	-2.26	-0.02	0.00	0.01	-0.75	-0.01	-0.01	0.00	-1.01	-0.01
FSM: Unknown	0.04	0.02	1.92	0.09	-0.02	0.03	-0.81	-0.05	-0.04	0.03	-1.44	-0.10
Ethnicity: AOEG	-0.02	0.01	-2.32	-0.04	0.01	0.01	1.29	0.03	0.01	0.01	0.85	0.02
Ethnicity: ASIA	-0.02	0.00	-6.61	-0.05	0.01	0.00	1.80	0.02	-0.01	0.00	-1.24	-0.01
Ethnicity: BLAC	-0.03	0.00	-8.33	-0.09	0.00	0.01	-0.26	0.00	-0.01	0.01	-1.02	-0.01
Ethnicity: CHIN	0.04	0.01	4.16	0.10	0.00	0.01	0.01	0.00	0.00	0.01	0.11	0.00
Ethnicity: MIXD	-0.01	0.00	-2.73	-0.03	0.01	0.01	1.43	0.02	0.00	0.01	-0.68	-0.01
Ethnicity: UNCL	-0.02	0.01	-2.58	-0.05	-0.01	0.01	-0.55	-0.01	-0.01	0.01	-0.83	-0.02
Language: OTH	-0.01	0.00	-2.58	-0.02	-0.01	0.00	-1.69	-0.02	0.01	0.00	1.61	0.02
Language: UNCL	-0.01	0.01	-0.49	-0.02	-0.02	0.02	-0.80	-0.04	0.00	0.02	0.21	0.01

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS		0.00	0.00	0.63	0.01	-0.01	0.01	-1.47	-0.02	-0.03	0.01	-4.88	-0.07
SEN: SS		0.01	0.01	1.26	0.03	0.00	0.01	0.36	0.01	0.00	0.01	0.01	0.00
SES: High		0.02	0.00	10.20	0.06	0.00	0.00	0.59	0.00	-0.01	0.00	-4.16	-0.03
SES: Mid		0.01	0.00	3.92	0.02	0.00	0.00	1.20	0.01	0.00	0.00	-1.01	-0.01
SES: Unknown		-0.03	0.02	-1.51	-0.07	0.02	0.03	0.86	0.06	0.02	0.03	0.70	0.05

N 1,089,482

Random effects:

Student variance	0.056
Centre variance	0.007
Residual variance	0.089

*Table 3.17. Parameter estimates of multi-year linear mixed effect model of effects of student background variables on probability of obtaining grade C and above at A Levels [final grades] (Subject main effects and *Subject interactions omitted).*

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.47	0.00	160.74	1.29	0.02	0.00	6.59	0.06	0.22	0.00	66.70	0.61
Prior attainment: High	0.50	0.00	265.06	1.39	-0.02	0.00	-9.26	-0.07	-0.19	0.00	-73.05	-0.53
Prior attainment: Mid	0.29	0.00	158.14	0.79	-0.01	0.00	-4.92	-0.03	-0.08	0.00	-30.61	-0.21
Prior attainment: Unknown	0.33	0.00	104.61	0.91	-0.01	0.00	-2.74	-0.03	-0.14	0.00	-31.47	-0.37
Gender: Male	0.02	0.00	16.29	0.07	0.01	0.00	4.19	0.02	-0.04	0.00	-20.56	-0.12
Gender: Unknown	-0.03	0.06	-0.49	-0.08	0.24	0.25	0.96	0.66				
FSM: Yes	-0.01	0.00	-3.49	-0.03	-0.01	0.00	-2.31	-0.03	0.00	0.00	-0.47	-0.01
FSM: Unknown	-0.01	0.02	-0.49	-0.02	0.01	0.02	0.33	0.02	0.00	0.02	-0.19	-0.01
Ethnicity: AOEG	0.00	0.01	0.33	0.01	0.00	0.01	0.53	0.01	0.00	0.01	-0.55	-0.01
Ethnicity: ASIA	0.00	0.00	-0.91	-0.01	0.00	0.00	-0.81	-0.01	-0.01	0.00	-3.25	-0.03
Ethnicity: BLAC	-0.01	0.00	-4.00	-0.04	0.00	0.01	0.84	0.01	-0.01	0.00	-1.15	-0.02
Ethnicity: CHIN	0.04	0.01	4.87	0.12	-0.02	0.01	-1.28	-0.05	-0.02	0.01	-1.72	-0.06
Ethnicity: MIXD	-0.01	0.00	-1.86	-0.02	0.00	0.01	-0.09	0.00	0.00	0.00	-0.99	-0.01
Ethnicity: UNCL	-0.01	0.01	-1.20	-0.02	0.00	0.01	-0.09	0.00	0.00	0.01	-0.45	-0.01
Language: OTH	-0.01	0.00	-3.42	-0.02	0.00	0.00	-0.41	0.00	0.01	0.00	3.11	0.03
Language: UNCL	0.00	0.01	0.08	0.00	-0.03	0.02	-1.48	-0.07	-0.01	0.02	-0.72	-0.03

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS		0.01	0.00	1.60	0.02	-0.02	0.01	-3.03	-0.05	-0.02	0.01	-4.33	-0.06
SEN: SS		0.01	0.01	0.79	0.02	-0.01	0.01	-0.84	-0.02	-0.01	0.01	-1.32	-0.04
SES: High		0.03	0.00	12.70	0.07	0.00	0.00	-1.25	-0.01	-0.02	0.00	-7.99	-0.06
SES: Mid		0.02	0.00	7.81	0.04	0.00	0.00	-1.06	-0.01	-0.01	0.00	-3.73	-0.03
SES: Unknown		0.02	0.02	1.02	0.05	-0.01	0.02	-0.44	-0.03	-0.02	0.02	-0.97	-0.06

N 1,089,482

Random effects:

Student variance	0.045
Centre variance	0.007
Residual variance	0.080

*Table 3.18. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level grades [final grades] (Subject main effects and *Subject interactions omitted).*

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	2.37	0.01	235.13	2.11	0.06	0.01	5.39	0.05	0.61	0.01	60.04	0.54
Prior attainment: High	2.12	0.01	350.49	1.88	-0.06	0.01	-7.26	-0.05	-0.07	0.01	-7.84	-0.06
Prior attainment: Mid	0.91	0.01	157.52	0.81	-0.03	0.01	-4.10	-0.03	-0.02	0.01	-2.42	-0.02
Prior attainment: Unknown	1.29	0.01	127.81	1.14	-0.03	0.01	-1.90	-0.02	-0.10	0.01	-7.63	-0.09
Gender: Male	0.12	0.00	24.84	0.10	0.05	0.01	6.89	0.04	-0.14	0.01	-21.66	-0.12
Gender: Unknown	-0.22	0.18	-1.27	-0.20	1.36	0.70	1.95	1.21				
FSM: Yes	-0.04	0.01	-3.61	-0.03	-0.04	0.02	-2.36	-0.03	-0.02	0.01	-1.63	-0.02
FSM: Unknown	0.06	0.06	1.03	0.05	-0.05	0.08	-0.62	-0.04	-0.08	0.08	-1.07	-0.07
Ethnicity: AOEG	-0.01	0.02	-0.59	-0.01	0.03	0.03	0.96	0.02	0.00	0.03	0.15	0.00
Ethnicity: ASIA	-0.04	0.01	-4.11	-0.03	0.01	0.01	0.90	0.01	-0.04	0.01	-3.39	-0.04
Ethnicity: BLAC	-0.09	0.01	-7.70	-0.08	0.00	0.02	-0.04	0.00	-0.03	0.02	-1.89	-0.03
Ethnicity: CHIN	0.20	0.03	7.05	0.18	-0.06	0.04	-1.50	-0.06	-0.05	0.04	-1.19	-0.04
Ethnicity: MIXD	-0.03	0.01	-2.36	-0.02	0.01	0.02	0.44	0.01	-0.03	0.02	-1.58	-0.02
Ethnicity: UNCL	-0.03	0.02	-1.63	-0.03	-0.03	0.03	-0.90	-0.02	-0.03	0.03	-1.09	-0.03
Language: OTH	-0.04	0.01	-4.11	-0.03	-0.01	0.01	-0.97	-0.01	0.04	0.01	3.57	0.04
Language: UNCL	-0.03	0.04	-0.83	-0.03	-0.09	0.06	-1.53	-0.08	0.00	0.05	-0.06	0.00
SEN: SNS	0.02	0.01	1.96	0.02	-0.05	0.02	-3.09	-0.05	-0.10	0.02	-6.06	-0.09

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS		0.03	0.02	1.21	0.03	-0.02	0.03	-0.46	-0.01	-0.03	0.03	-1.02	-0.03
SES: High		0.10	0.01	15.38	0.09	0.00	0.01	-0.40	0.00	-0.08	0.01	-8.93	-0.07
SES: Mid		0.05	0.01	7.94	0.04	0.00	0.01	0.13	0.00	-0.03	0.01	-3.82	-0.03
SES: Unknown		-0.02	0.06	-0.40	-0.02	0.05	0.08	0.62	0.04	-0.02	0.08	-0.29	-0.02

N 1,089,482

Random effects:

Candidate variance	0.675
Centre variance	0.119
Residual variance	0.472

3.4.2.3 Calculated grades

3.4.2.3.1 Grade A and above

The first (2019) and middle (2018) parts of Table 3.19 are essentially the same, and should be read in the same way, as those parts of Table 3.16 (section 3.4.2.2) above. The minor differences between parameter estimates for 2019 and 2018 in Table 3.16 and Table 3.19 are due to the fact that, when all three years are in the model, the parameters for 2018 and 2019 can be influenced by which set of 2020 data is in the model. The same applies to the tables for **grade C and above** and **grade point score**.

The third part of Table 3.19 shows that no parameter estimates changed significantly using calculated grades in 2020, i.e. the likelihood of achieving **grade A and above** did not change significantly based on any of the candidate background characteristics included in the model. The same was true in 2018, shown in the middle of the table.

3.4.2.3.2 Grade C and above

The third part of Table 3.20 shows that no parameter estimates changed significantly using calculated grades in 2020, i.e. the likelihood of achieving **grade C and above** did not change significantly based on any of the candidate background characteristics included in the model. The same was true in 2018.

3.4.2.3.3 Grade point score

The third part of Table 3.21 shows that the only change between 2019 and 2020 marked as being of substantive importance is the disappearance of the higher attainment of male candidates relative to female candidates. The model suggests that male candidates outperformed female candidates with comparable background characteristics by 0.11 grade in 2019, 0.11+0.05=0.16 grade in 2018 (the change is statistically significant, but the effect size is very small), and 0.11-0.12=-0.01 grade in 2020. As noted in 3.4.2.2, this change is perhaps best understood as a decline in male candidates' attainment relative to that of female candidates with comparable background characteristics.

*Table 3.19. Parameter estimates of multi-year linear mixed effect model of effects of student background variables on probability of obtaining grade A and above at A Levels [calculated grades] (Subject main effects and *Subject interactions omitted).*

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.03	0.00	10.00	0.08	0.00	0.00	0.33	0.00	0.00	0.00	0.28	0.00
Prior attainment: High	0.46	0.00	227.94	1.21	0.00	0.00	0.09	0.00	0.03	0.00	11.37	0.08
Prior attainment: Mid	0.10	0.00	54.30	0.27	0.00	0.00	0.87	0.01	0.00	0.00	-1.46	-0.01
Prior attainment: Unknown	0.26	0.00	78.79	0.69	0.01	0.00	1.63	0.02	0.00	0.00	0.34	0.00
Gender: Male	0.02	0.00	14.49	0.06	0.01	0.00	4.67	0.03	-0.02	0.00	-8.69	-0.05
Gender: Unknown	-0.03	0.06	-0.43	-0.07	0.25	0.26	0.96	0.66				
FSM: Yes	-0.01	0.00	-2.10	-0.02	0.00	0.01	-0.77	-0.01	-0.01	0.00	-1.30	-0.02
FSM: Unknown	0.03	0.02	1.55	0.08	-0.02	0.03	-0.72	-0.05	0.00	0.03	-0.16	-0.01
Ethnicity: AOEG	-0.01	0.01	-2.21	-0.04	0.01	0.01	1.31	0.03	0.01	0.01	1.08	0.03
Ethnicity: ASIA	-0.02	0.00	-7.39	-0.06	0.01	0.00	1.92	0.02	0.00	0.00	0.07	0.00
Ethnicity: BLAC	-0.03	0.00	-8.19	-0.08	0.00	0.01	-0.22	0.00	0.00	0.01	0.32	0.00
Ethnicity: CHIN	0.03	0.01	3.71	0.09	0.00	0.01	0.10	0.00	0.01	0.01	0.42	0.01
Ethnicity: MIXD	-0.01	0.00	-2.80	-0.03	0.01	0.01	1.49	0.02	0.00	0.01	-0.45	-0.01
Ethnicity: UNCL	-0.02	0.01	-2.50	-0.05	-0.01	0.01	-0.64	-0.02	0.00	0.01	-0.18	0.00
Language: OTH	-0.01	0.00	-2.00	-0.01	-0.01	0.00	-1.76	-0.02	0.00	0.00	0.23	0.00
Language: UNCL	-0.01	0.01	-0.59	-0.02	-0.01	0.02	-0.55	-0.03	0.01	0.02	0.43	0.02

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS		0.00	0.00	0.29	0.00	-0.01	0.01	-1.41	-0.02	-0.02	0.01	-3.27	-0.05
SEN: SS		0.01	0.01	0.89	0.02	0.00	0.01	0.44	0.01	0.01	0.01	0.73	0.02
SES: High		0.02	0.00	9.79	0.06	0.00	0.00	0.63	0.00	-0.01	0.00	-3.55	-0.03
SES: Mid		0.01	0.00	3.87	0.02	0.00	0.00	1.24	0.01	0.00	0.00	-1.55	-0.01
SES: Unknown		-0.03	0.02	-1.37	-0.07	0.02	0.03	0.78	0.05	0.00	0.03	-0.08	-0.01

N 1,089,482

Random effects:

Student variance	0.054
Centre variance	0.007
Residual variance	0.084

*Table 3.20. Parameter estimates of multi-year linear mixed effect model of effects of student background variables on probability of obtaining grade C and above at A Levels [calculated grades] (Subject main effects and *Subject interactions omitted).*

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.47	0.00	151.74	1.23	0.02	0.00	6.29	0.06	0.03	0.00	8.56	0.08
Prior attainment: High	0.50	0.00	249.35	1.31	-0.02	0.00	-8.78	-0.06	-0.01	0.00	-3.19	-0.02
Prior attainment: Mid	0.28	0.00	149.19	0.74	-0.01	0.00	-4.73	-0.03	0.00	0.00	0.52	0.00
Prior attainment: Unknown	0.32	0.00	97.07	0.84	-0.01	0.00	-2.63	-0.03	-0.01	0.00	-2.30	-0.03
Gender: Male	0.02	0.00	14.58	0.06	0.01	0.00	4.05	0.02	-0.03	0.00	-16.25	-0.09
Gender: Unknown	0.02	0.06	0.27	0.04	0.19	0.26	0.72	0.50				
FSM: Yes	-0.01	0.00	-3.21	-0.03	-0.01	0.01	-2.18	-0.03	-0.01	0.00	-1.77	-0.02
FSM: Unknown	-0.02	0.02	-1.08	-0.05	0.01	0.03	0.50	0.03	0.01	0.03	0.50	0.03
Ethnicity: AOEG	0.00	0.01	0.39	0.01	0.00	0.01	0.48	0.01	0.00	0.01	-0.12	0.00
Ethnicity: ASIA	0.00	0.00	-1.19	-0.01	0.00	0.00	-0.77	-0.01	-0.01	0.00	-2.77	-0.03
Ethnicity: BLAC	-0.01	0.00	-3.62	-0.04	0.00	0.01	0.74	0.01	-0.02	0.01	-3.32	-0.05
Ethnicity: CHIN	0.04	0.01	4.27	0.10	-0.02	0.01	-1.12	-0.04	0.00	0.01	0.17	0.01
Ethnicity: MIXD	-0.01	0.00	-1.81	-0.02	0.00	0.01	0.00	0.00	0.00	0.01	-0.56	-0.01
Ethnicity: UNCL	-0.01	0.01	-0.93	-0.02	0.00	0.01	-0.09	0.00	-0.01	0.01	-0.71	-0.02
Language: OTH	-0.01	0.00	-3.04	-0.02	0.00	0.00	-0.35	0.00	0.01	0.00	2.27	0.02
Language: UNCL	0.00	0.01	-0.16	-0.01	-0.02	0.02	-1.26	-0.06	-0.01	0.02	-0.82	-0.04

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS		0.00	0.00	1.18	0.01	-0.02	0.01	-2.85	-0.04	-0.02	0.01	-3.53	-0.05
SEN: SS		0.00	0.01	0.38	0.01	-0.01	0.01	-0.76	-0.02	0.00	0.01	-0.11	0.00
SES: High		0.02	0.00	11.16	0.06	0.00	0.00	-1.19	-0.01	-0.02	0.00	-5.23	-0.04
SES: Mid		0.01	0.00	7.16	0.04	0.00	0.00	-1.06	-0.01	-0.01	0.00	-3.43	-0.03
SES: Unknown		0.03	0.02	1.37	0.07	-0.02	0.03	-0.61	-0.04	-0.03	0.03	-1.10	-0.07

N 1,089,482

Random effects:

Student variance	0.049
Centre variance	0.008
Residual variance	0.089

*Table 3.21. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level grades [calculated grades] (Subject main effects and *Subject interactions omitted).*

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	2.38	0.01	227.05	2.06	0.06	0.01	5.26	0.05	0.08	0.01	7.54	0.07
Prior attainment: High	2.10	0.01	340.41	1.82	-0.06	0.01	-7.00	-0.05	0.03	0.01	3.06	0.02
Prior attainment: Mid	0.90	0.01	153.04	0.78	-0.03	0.01	-4.00	-0.03	-0.01	0.01	-1.47	-0.01
Prior attainment: Unknown	1.27	0.01	123.76	1.10	-0.03	0.01	-1.95	-0.02	-0.04	0.01	-2.91	-0.04
Gender: Male	0.11	0.00	23.10	0.10	0.05	0.01	6.82	0.04	-0.12	0.01	-17.75	-0.10
Gender: Unknown	-0.11	0.18	-0.60	-0.09	1.24	0.72	1.72	1.07				
FSM: Yes	-0.04	0.01	-3.33	-0.03	-0.04	0.02	-2.29	-0.03	-0.04	0.02	-2.39	-0.03
FSM: Unknown	0.02	0.06	0.27	0.01	-0.03	0.08	-0.41	-0.03	0.01	0.08	0.09	0.01
Ethnicity: AOEG	-0.01	0.02	-0.47	-0.01	0.03	0.03	0.93	0.02	0.00	0.03	0.02	0.00
Ethnicity: ASIA	-0.04	0.01	-4.61	-0.04	0.01	0.01	0.95	0.01	-0.03	0.01	-2.49	-0.03
Ethnicity: BLAC	-0.09	0.01	-7.27	-0.08	0.00	0.02	-0.06	0.00	-0.05	0.02	-2.90	-0.04
Ethnicity: CHIN	0.18	0.03	6.29	0.16	-0.06	0.04	-1.35	-0.05	0.01	0.04	0.20	0.01
Ethnicity: MIXD	-0.03	0.01	-2.38	-0.02	0.01	0.02	0.51	0.01	-0.02	0.02	-1.30	-0.02
Ethnicity: UNCL	-0.03	0.02	-1.50	-0.03	-0.03	0.03	-0.88	-0.02	-0.04	0.03	-1.28	-0.03
Language: OTH	-0.03	0.01	-3.44	-0.03	-0.01	0.01	-0.94	-0.01	0.03	0.01	2.11	0.02
Language: UNCL	-0.04	0.04	-0.93	-0.03	-0.08	0.06	-1.33	-0.07	0.01	0.05	0.24	0.01
SEN: SNS	0.02	0.01	1.45	0.02	-0.05	0.02	-2.99	-0.05	-0.09	0.02	-5.01	-0.07

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS		0.01	0.02	0.61	0.01	-0.01	0.03	-0.38	-0.01	0.02	0.03	0.60	0.02
SES: High		0.09	0.01	13.91	0.08	0.00	0.01	-0.38	0.00	-0.06	0.01	-6.84	-0.05
SES: Mid		0.05	0.01	7.45	0.04	0.00	0.01	0.09	0.00	-0.03	0.01	-3.86	-0.03
SES: Unknown		0.00	0.06	0.01	0.00	0.03	0.08	0.40	0.03	-0.06	0.08	-0.73	-0.05

N 1,089,482

Random effects:

Candidate variance	0.693
Centre variance	0.133
Residual variance	0.505

3.4.2.4 Centre assessment grades – CAGs

3.4.2.4.1 Grade A and above

The change in parameter estimates using CAGs (Table 3.22) are very similar to those observed for final grades in 3.4.2.2.1. The reference candidate has a slightly, but significantly, higher probability (0.03+0.05=0.08) of achieving **grade A and above** than in 2019, while the additional increase in probability for candidates in the higher groups has risen more: medium vs low (0.11+0.09=0.20); high vs low (0.46+0.19=0.65). There is no significant effect of any other candidate characteristic.

3.4.2.4.2 Grade C and above

Again, the effects of using CAGs on a candidate's probability of achieving **grade C and above** in 2020 are very similar to those of using final grades (section 3.4.2.2.2). This includes changes to the relationship between prior attainment and grade outcomes, and the small change to the effect of being male (0.02-0.04=-0.02).

3.4.2.4.3 Grade point score

The third part of Table 3.24 shows two changes between 2019 and 2020 that are of substantive importance. The first is that the reference candidate achieves over half a grade higher in 2020: 2.37+0.58=2.95. This is the overall effect of using CAGs and is marginally smaller than the effect of using final grades. The second is, again, the disappearance of the higher attainment of male candidates relative to female candidates. The model suggests that male candidates outperformed female candidates with comparable background characteristics by 0.12 grade in 2019, 0.12+0.05=0.17 grade in 2018 (the change is statistically significant, but the effect size is very small), and 0.12-0.14=-0.02 grade in 2020.

*Table 3.22. Parameter estimates of multi-year linear mixed effect model of effects of student background variables on probability of obtaining grade A and above at A Levels [CAGs] (Subject main effects and *Subject interactions omitted).*

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		0.03	0.00	9.40	0.07	0.00	0.00	0.39	0.00	0.05	0.00	13.73	0.13
Prior attainment: High		0.46	0.00	224.24	1.19	0.00	0.00	-0.10	0.00	0.19	0.00	67.08	0.49
Prior attainment: Mid		0.11	0.00	53.66	0.27	0.00	0.00	0.78	0.01	0.09	0.00	32.27	0.23
Prior attainment: Unknown		0.26	0.00	77.03	0.67	0.01	0.00	1.61	0.02	0.11	0.00	23.07	0.28
Gender: Male		0.02	0.00	14.75	0.06	0.01	0.00	4.53	0.03	-0.02	0.00	-10.85	-0.06
Gender: Unknown		-0.06	0.06	-0.90	-0.15	0.29	0.27	1.07	0.73				
FSM: Yes		-0.01	0.00	-2.27	-0.02	0.00	0.01	-0.75	-0.01	-0.01	0.00	-1.03	-0.01
FSM: Unknown		0.04	0.02	1.95	0.10	-0.02	0.03	-0.83	-0.06	-0.03	0.03	-1.21	-0.08
Ethnicity: AOEG		-0.02	0.01	-2.35	-0.04	0.01	0.01	1.30	0.03	0.01	0.01	0.64	0.02
Ethnicity: ASIA		-0.02	0.00	-6.74	-0.05	0.01	0.00	1.80	0.02	0.00	0.00	-0.95	-0.01
Ethnicity: BLAC		-0.03	0.00	-8.32	-0.08	0.00	0.01	-0.25	0.00	-0.01	0.01	-1.12	-0.02
Ethnicity: CHIN		0.04	0.01	4.16	0.10	0.00	0.01	0.01	0.00	0.00	0.01	0.35	0.01
Ethnicity: MIXD		-0.01	0.00	-2.74	-0.03	0.01	0.01	1.43	0.02	0.00	0.01	-0.58	-0.01
Ethnicity: UNCL		-0.02	0.01	-2.53	-0.05	-0.01	0.01	-0.57	-0.01	-0.01	0.01	-0.87	-0.02
Language: OTH		-0.01	0.00	-2.58	-0.02	-0.01	0.00	-1.68	-0.02	0.01	0.00	1.60	0.02
Language: UNCL		-0.01	0.01	-0.47	-0.02	-0.02	0.02	-0.83	-0.04	0.00	0.02	0.12	0.01

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS	0.00	0.00	0.66	0.01	-0.01	0.01	-1.47	-0.02	-0.03	0.01	-4.78	-0.07
SEN: SS	0.01	0.01	1.23	0.03	0.00	0.01	0.35	0.01	0.00	0.01	0.08	0.00
SES: High	0.02	0.00	10.24	0.06	0.00	0.00	0.60	0.00	-0.01	0.00	-4.24	-0.03
SES: Mid	0.01	0.00	3.97	0.02	0.00	0.00	1.20	0.01	0.00	0.00	-1.08	-0.01
SES: Unknown	-0.03	0.02	-1.56	-0.08	0.02	0.03	0.88	0.06	0.01	0.03	0.56	0.04

N 1,089,482

Random effects:

Student variance	0.056
Centre variance	0.007
Residual variance	0.089

*Table 3.23. Parameter estimates of multi-year linear mixed effect model of effects of student background variables on probability of obtaining grade C and above at A Levels [CAGs] (Subject main effects and *Subject interactions omitted).*

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		0.47	0.00	160.03	1.28	0.02	0.00	6.56	0.06	0.21	0.00	62.51	0.57
Prior attainment: High		0.50	0.00	263.55	1.38	-0.02	0.00	-9.23	-0.07	-0.18	0.00	-67.44	-0.49
Prior attainment: Mid		0.29	0.00	157.26	0.78	-0.01	0.00	-4.92	-0.04	-0.07	0.00	-27.60	-0.19
Prior attainment: Unknown		0.33	0.00	103.94	0.90	-0.01	0.00	-2.71	-0.03	-0.13	0.00	-29.35	-0.35
Gender: Male		0.02	0.00	16.25	0.07	0.01	0.00	4.14	0.02	-0.04	0.00	-20.60	-0.12
Gender: Unknown		-0.03	0.06	-0.51	-0.08	0.24	0.25	0.97	0.67				
FSM: Yes		-0.01	0.00	-3.49	-0.03	-0.01	0.00	-2.30	-0.03	0.00	0.00	-0.60	-0.01
FSM: Unknown		-0.01	0.02	-0.47	-0.02	0.01	0.02	0.29	0.02	-0.01	0.02	-0.22	-0.02
Ethnicity: AOEG		0.00	0.01	0.33	0.01	0.00	0.01	0.56	0.01	-0.01	0.01	-0.81	-0.02
Ethnicity: ASIA		0.00	0.00	-0.86	-0.01	0.00	0.00	-0.78	-0.01	-0.01	0.00	-3.26	-0.03
Ethnicity: BLAC		-0.01	0.00	-3.94	-0.04	0.00	0.01	0.86	0.01	-0.01	0.01	-1.20	-0.02
Ethnicity: CHIN		0.04	0.01	4.82	0.12	-0.02	0.01	-1.26	-0.04	-0.02	0.01	-1.64	-0.06
Ethnicity: MIXD		-0.01	0.00	-1.82	-0.02	0.00	0.01	-0.10	0.00	0.00	0.00	-0.97	-0.01
Ethnicity: UNCL		-0.01	0.01	-1.21	-0.02	0.00	0.01	-0.09	0.00	-0.01	0.01	-0.65	-0.02
Language: OTH		-0.01	0.00	-3.33	-0.02	0.00	0.00	-0.42	0.00	0.01	0.00	2.77	0.03

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
Language: UNCL	0.00	0.01	0.21	0.01	-0.03	0.02	-1.58	-0.08	-0.01	0.02	-0.88	-0.04
SEN: SNS	0.01	0.00	1.57	0.02	-0.02	0.01	-3.01	-0.05	-0.02	0.01	-4.11	-0.06
SEN: SS	0.01	0.01	0.72	0.01	-0.01	0.01	-0.85	-0.02	-0.01	0.01	-1.11	-0.03
SES: High	0.03	0.00	12.70	0.07	0.00	0.00	-1.23	-0.01	-0.02	0.00	-7.81	-0.06
SES: Mid	0.02	0.00	7.81	0.04	0.00	0.00	-1.04	-0.01	-0.01	0.00	-3.60	-0.03
SES: Unknown	0.02	0.02	0.96	0.05	-0.01	0.02	-0.40	-0.03	-0.02	0.02	-0.80	-0.05

N 1,089,482

Random effects:

Student variance	0.045
Centre variance	0.007
Residual variance	0.081

*Table 3.24. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level grades [CAGs] (Subject main effects and *Subject interactions omitted).*

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		2.37	0.01	234.41	2.10	0.06	0.01	5.35	0.05	0.58	0.01	56.68	0.51
Prior attainment: High		2.11	0.01	349.04	1.87	-0.06	0.01	-7.22	-0.05	-0.04	0.01	-5.27	-0.04
Prior attainment: Mid		0.91	0.01	156.84	0.81	-0.03	0.01	-4.08	-0.03	-0.01	0.01	-0.93	-0.01
Prior attainment: Unknown		1.28	0.01	127.26	1.14	-0.03	0.01	-1.89	-0.02	-0.09	0.01	-6.69	-0.08
Gender: Male		0.12	0.00	24.71	0.10	0.05	0.01	6.85	0.04	-0.14	0.01	-21.28	-0.12
Gender: Unknown		-0.23	0.18	-1.28	-0.20	1.37	0.70	1.95	1.22				
FSM: Yes		-0.04	0.01	-3.61	-0.03	-0.04	0.02	-2.36	-0.03	-0.03	0.01	-1.71	-0.02
FSM: Unknown		0.06	0.06	1.05	0.05	-0.05	0.08	-0.65	-0.04	-0.07	0.08	-0.90	-0.06
Ethnicity: AOEG		-0.01	0.02	-0.61	-0.01	0.03	0.03	0.97	0.02	0.00	0.03	-0.15	0.00
Ethnicity: ASIA		-0.04	0.01	-4.16	-0.03	0.01	0.01	0.91	0.01	-0.04	0.01	-3.21	-0.03
Ethnicity: BLAC		-0.09	0.01	-7.64	-0.08	0.00	0.02	-0.01	0.00	-0.03	0.02	-2.10	-0.03
Ethnicity: CHIN		0.20	0.03	7.01	0.18	-0.06	0.04	-1.48	-0.05	-0.04	0.04	-1.01	-0.04
Ethnicity: MIXD		-0.03	0.01	-2.33	-0.02	0.01	0.02	0.42	0.01	-0.03	0.02	-1.69	-0.02
Ethnicity: UNCL		-0.03	0.02	-1.59	-0.03	-0.03	0.03	-0.90	-0.02	-0.03	0.03	-1.12	-0.03
Language: OTH		-0.03	0.01	-4.03	-0.03	-0.01	0.01	-0.96	-0.01	0.04	0.01	3.29	0.03
Language: UNCL		-0.03	0.04	-0.72	-0.02	-0.09	0.06	-1.63	-0.08	-0.01	0.05	-0.23	-0.01
SEN: SNS		0.02	0.01	1.95	0.02	-0.05	0.02	-3.08	-0.05	-0.10	0.02	-5.90	-0.09
SEN: SS		0.03	0.02	1.12	0.02	-0.02	0.03	-0.46	-0.01	-0.03	0.03	-0.86	-0.03

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: High		0.10	0.01	15.38	0.09	0.00	0.01	-0.38	0.00	-0.08	0.01	-8.75	-0.07
SES: Mid		0.05	0.01	7.95	0.04	0.00	0.01	0.14	0.00	-0.03	0.01	-3.77	-0.03
SES: Unknown		-0.03	0.06	-0.48	-0.02	0.05	0.08	0.65	0.04	-0.02	0.08	-0.31	-0.02

N 1,089,482

Random effects:

Candidate variance	0.679
Centre variance	0.119
Residual variance	0.477

3.4.3 Multivariate analyses: specific subjects

3.4.3.1 General interpretation

The following multivariate analyses focus on four A level subjects: mathematics, music, German, and Latin. The effects are modelled in the same way as the cross-subject analyses (except candidates are not modelled as random effects because they have only one entry in the datasets) and the tables can be interpreted in the same way as those in section 3.3.2. Year: 2019 is the reference against which effects in 2018 and 2020 are contrasted; 2020 outcomes are, again, modelled using final grades, calculated grades, and CAGs.

3.4.3.2 Final grades

Table 3.25 shows the estimates of the parameters of the model for A level mathematics using final grades in 2020. In 2019, in addition to the effects seen in the cross-subject analysis for final grades (Table 3.18), there are small effects of being Asian vs white (-0.13) or black vs white (-0.21), having SEN with a statement vs having no SEN (0.15), and having high vs low socio-economic status (0.18). In 2018, there are potentially significant changes to two of the effects seen in 2019; however, in 2018, the cohort for mathematics was unusual. Exams in the reformed specifications were available primarily for 17-year-olds studying for mathematics and further mathematics and the 18-year-old cohort was small and probably unrepresentative.[29] Because we are comparing an unusual, primarily 17-year-old cohort (2018) with a typical predominantly 18-year-old cohort (2019), it is best not to overinterpret these changes.

If we contrast 2020 with 2019, we see the expected increase in grade for the reference candidate (0.79), a small decrease in the advantage of having high vs low prior attainment (-0.20), and a decrease in the attainment gap between male and female (-0.25). As discussed above, the meaning of unknown gender here is uncertain[8] and relates to too few candidates to interpret meaningfully.

Table 3.26 shows the estimates of the parameters of the model for A level music using final grades in 2020. There are three potentially significant effects in 2020, indicating: an increase in grade for the reference candidate (0.79); the closing of the male vs female gap (-0.20); and attainment gaps between the unclassified ethnicity group and white candidates (-0.61). The first two changes follow patterns seen in the cross-subject analysis, while the third relates to a very small number of candidates (a little over 1% of the overall A level cohort). The figures for 2018 suggest that there is year to year fluctuation in the latter attainment gap; in this context, the change in 2020 does not suggest that using final grades has adversely affected the attainment gap.

Table 3.27 shows the parameter estimates for A level German using final grades in 2020. It is noteworthy that the reference candidate gained almost an entire grade (0.98) in 2020: considerably greater than the cross-subject gain of 0.61 (Table 3.18). The shrinking of the male-female attainment gap (-0.16) is in line with a greater overall trend at A level. There is a small but significant decrease in the sizeable gap between candidates of unknown free school meals status and those known to be ineligible (1.73-0.30=1.43) in 2020. The change in 2018, although not statistically

[29] A level maths: Maintenance of Standards Investigation: Technical Report

significant, was considerably larger, suggesting that outcomes for this group – who most likely belong in the ineligible category – are prone to fluctuation.

The parameter estimates for Latin (Table 3.28) show that, unlike the other subjects, there is no significant change in the grade of the reference candidate or the male-female gender gap. One significant change appears to be a reversal of the gap between black vs white candidates (-0.58+0.79=0.21); however, the Latin entry is small, so the number of candidates affected is likely to be very small. Lastly, there is a significant change to the effect of having a statement of special educational needs of almost one grade (-0.96). Candidates with a SEN statement account for 1.7 per cent of all A level entries in 2020, so the number of candidates affected in Latin is likely to be very small, and the parameter estimates quite variable. The large, but non-significant, effects in 2018 and 2019 suggest this is the case.

Table 3.25. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Maths final grades.

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	1.89	0.02	88.74	1.40	-0.12	0.18	-0.67	-0.09	0.79	0.03	29.83	0.59
Prior attainment: High	2.18	0.02	135.68	1.61	0.45	0.16	2.85	0.33	-0.20	0.02	-9.00	-0.15
Prior attainment: Mid	0.80	0.02	48.03	0.59	0.20	0.17	1.17	0.15	-0.06	0.02	-2.53	-0.04
Prior attainment: Unknown	1.58	0.02	78.65	1.17	0.29	0.17	1.74	0.22	-0.10	0.03	-3.64	-0.07
Gender: Male	0.41	0.01	40.58	0.30	-0.10	0.07	-1.54	-0.08	-0.25	0.01	-19.27	-0.19
Gender: Unknown	-0.96	0.30	-3.24	-0.71					1.50	0.37	4.04	1.11
FSM: Yes	-0.09	0.02	-3.65	-0.07	0.12	0.21	0.55	0.09	0.01	0.03	0.45	0.01
FSM: Unknown	0.01	0.13	0.09	0.01	0.53	0.93	0.57	0.39	0.11	0.17	0.66	0.08
Ethnicity: AOEG	-0.11	0.04	-2.92	-0.08	-0.09	0.27	-0.32	-0.06	0.07	0.05	1.42	0.05
Ethnicity: ASIA	-0.13	0.02	-7.43	-0.10	-0.06	0.12	-0.52	-0.05	0.02	0.02	1.01	0.02
Ethnicity: BLAC	-0.21	0.03	-8.31	-0.16	-0.57	0.21	-2.69	-0.42	0.04	0.03	1.16	0.03
Ethnicity: CHIN	0.30	0.04	6.94	0.22	-0.33	0.21	-1.55	-0.25	-0.09	0.06	-1.49	-0.07
Ethnicity: MIXD	-0.03	0.02	-1.19	-0.02	0.18	0.17	1.05	0.13	-0.01	0.03	-0.17	0.00
Ethnicity: UNCL	-0.12	0.04	-2.69	-0.09	-0.14	0.37	-0.37	-0.10	0.01	0.06	0.14	0.01
Language: OTH	-0.01	0.02	-0.45	-0.01	0.17	0.11	1.52	0.13	0.07	0.02	2.98	0.05
Language: UNCL	-0.09	0.08	-1.22	-0.07	0.03	0.62	0.04	0.02	0.03	0.10	0.34	0.02
SEN: SNS	0.09	0.03	3.41	0.07	0.11	0.18	0.64	0.08	-0.12	0.04	-3.21	-0.09
SEN: SS	0.15	0.05	3.04	0.11	-0.44	0.31	-1.43	-0.33	-0.10	0.07	-1.45	-0.07
SES: High	0.18	0.01	12.19	0.13	0.09	0.10	0.94	0.07	-0.12	0.02	-6.44	-0.09

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Mid		0.08	0.01	6.17	0.06	-0.07	0.10	-0.69	-0.05	-0.07	0.02	-3.90	-0.05
SES: Unknown		-0.05	0.13	-0.37	-0.03	-0.68	0.93	-0.73	-0.51	-0.06	0.17	-0.37	-0.05

N 167,668

Random effects:

Centre variance	0.202
Residual variance	1.622

Table 3.26. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Music final grades.

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		2.46	0.07	36.75	2.34	0.12	0.09	1.32	0.11	0.79	0.09	8.83	0.75
Prior attainment: High		1.57	0.05	29.97	1.49	0.00	0.07	-0.05	0.00	0.06	0.07	0.82	0.06
Prior attainment: Mid		0.66	0.06	11.86	0.63	0.03	0.08	0.35	0.03	0.06	0.08	0.78	0.06
Prior attainment: Unknown		1.10	0.08	13.91	1.05	0.03	0.11	0.26	0.03	0.02	0.12	0.19	0.02
Gender: Male		0.29	0.04	7.76	0.28	-0.09	0.05	-1.65	-0.08	-0.20	0.05	-3.80	-0.19
Gender: Unknown		-1.17	1.01	-1.16	-1.12								
FSM: Yes		-0.02	0.12	-0.14	-0.02	-0.37	0.17	-2.19	-0.35	-0.03	0.16	-0.19	-0.03
FSM: Unknown		0.13	0.70	0.19	0.13	0.13	0.76	0.18	0.13	0.64	0.81	0.78	0.60
Ethnicity: AOEG		-0.04	0.28	-0.14	-0.04	0.58	0.39	1.51	0.55	-0.16	0.40	-0.41	-0.16
Ethnicity: ASIA		-0.48	0.18	-2.65	-0.45	0.58	0.25	2.31	0.55	0.29	0.25	1.18	0.28
Ethnicity: BLAC		-0.33	0.15	-2.16	-0.31	0.37	0.20	1.85	0.35	0.23	0.20	1.15	0.22
Ethnicity: CHIN		0.34	0.22	1.58	0.33	-0.35	0.30	-1.18	-0.34	-0.29	0.30	-0.97	-0.28
Ethnicity: MIXD		0.11	0.09	1.25	0.11	-0.14	0.13	-1.13	-0.14	-0.11	0.13	-0.88	-0.10
Ethnicity: UNCL		0.46	0.22	2.10	0.44	-0.46	0.28	-1.65	-0.44	-0.61	0.28	-2.17	-0.58
Language: OTH		-0.17	0.12	-1.47	-0.16	-0.12	0.17	-0.71	-0.12	0.18	0.16	1.15	0.17
Language: UNCL		-0.71	0.33	-2.14	-0.67	0.19	0.56	0.35	0.18	0.72	0.51	1.42	0.68
SEN: SNS		-0.01	0.09	-0.08	-0.01	-0.14	0.13	-1.05	-0.13	-0.20	0.12	-1.59	-0.19
SEN: SS		-0.12	0.19	-0.62	-0.11	0.07	0.26	0.27	0.07	0.01	0.26	0.03	0.01
SES: High		0.12	0.06	2.16	0.11	-0.11	0.08	-1.39	-0.10	-0.04	0.08	-0.47	-0.03

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Mid		0.00	0.06	0.03	0.00	0.02	0.08	0.25	0.02	0.04	0.08	0.48	0.04
SES: Unknown		0.00	0.70	0.00	0.00	-0.37	0.76	-0.48	-0.35	-0.72	0.81	-0.89	-0.69

N 8,598

Random effects:

Centre variance	0.200
Residual variance	0.905

Table 3.27. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level German final grades.

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		2.57	0.11	24.25	2.32	-0.14	0.15	-0.95	-0.13	0.98	0.15	6.51	0.88
Prior attainment: High		1.59	0.09	18.21	1.43	0.09	0.13	0.70	0.08	-0.16	0.13	-1.27	-0.15
Prior attainment: Mid		0.49	0.10	5.19	0.45	0.01	0.14	0.07	0.01	-0.18	0.14	-1.32	-0.17
Prior attainment: Unknown		1.40	0.11	12.61	1.26	0.16	0.16	1.00	0.14	-0.27	0.17	-1.61	-0.24
Gender: Male		0.15	0.05	2.81	0.13	0.05	0.07	0.74	0.05	-0.16	0.07	-2.18	-0.14
FSM: Yes		0.13	0.17	0.80	0.12	-0.65	0.25	-2.63	-0.59	-0.42	0.23	-1.83	-0.38
FSM: Unknown		1.73	0.62	2.79	1.56	-1.34	1.25	-1.07	-1.20	-0.30	0.13	-2.39	-0.27
Ethnicity: AOEG		-0.17	0.38	-0.45	-0.15	-0.04	0.51	-0.08	-0.04	0.38	0.53	0.71	0.34
Ethnicity: ASIA		-0.29	0.13	-2.22	-0.26	0.23	0.20	1.20	0.21	0.22	0.18	1.21	0.19
Ethnicity: BLAC		-0.12	0.20	-0.58	-0.10	0.15	0.29	0.52	0.13	-0.16	0.29	-0.56	-0.15
Ethnicity: CHIN		0.20	0.44	0.45	0.18	-0.44	0.62	-0.70	-0.39	0.12	0.54	0.23	0.11
Ethnicity: MIXD		0.09	0.12	0.75	0.08	-0.04	0.19	-0.22	-0.04	-0.02	0.17	-0.13	-0.02
Ethnicity: UNCL		0.50	0.23	2.21	0.45	-0.42	0.35	-1.19	-0.38	-0.44	0.33	-1.31	-0.39
Language: OTH		0.44	0.10	4.52	0.39	0.02	0.14	0.17	0.02	-0.07	0.14	-0.51	-0.06
Language: UNCL		1.55	1.09	1.42	1.39	-1.72	1.20	-1.43	-1.54	-1.73	1.16	-1.49	-1.56
SEN: SNS		-0.18	0.14	-1.26	-0.16	0.21	0.20	1.03	0.19	-0.07	0.19	-0.35	-0.06
SEN: SS		0.15	0.22	0.69	0.13	0.23	0.33	0.69	0.21	0.22	0.39	0.55	0.19
SES: High		0.10	0.08	1.30	0.09	0.02	0.11	0.14	0.01	-0.17	0.11	-1.56	-0.15
SES: Mid		0.07	0.08	0.88	0.06	-0.06	0.11	-0.50	-0.05	-0.09	0.11	-0.82	-0.08

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Unknown		-1.31	0.62	-2.11	-1.18	1.17	1.25	0.94	1.06				

N 5,369

Random effects:

Centre variance	0.157
Residual variance	1.076

Table 3.28. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Latin final grades.

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		2.02	0.63	3.19	2.22	-0.27	0.75	-0.36	-0.30	0.85	1.13	0.75	0.93
Prior attainment: High		2.89	0.63	4.62	3.17	0.26	0.75	0.35	0.29	-0.32	1.12	-0.29	-0.35
Prior attainment: Mid		1.14	0.64	1.77	1.25	0.53	0.77	0.69	0.59	0.40	1.14	0.36	0.44
Prior attainment: Unknown		2.83	0.63	4.50	3.10	0.29	0.75	0.39	0.32	-0.40	1.12	-0.36	-0.44
Gender: Male		-0.06	0.07	-0.86	-0.07	0.08	0.09	0.89	0.09	0.04	0.09	0.45	0.05
FSM: Yes		0.24	0.18	1.39	0.27	-0.28	0.26	-1.08	-0.31	-0.27	0.28	-0.94	-0.29
FSM: Unknown		-0.23	0.62	-0.37	-0.25	0.02	0.14	0.14	0.02	-0.08	1.07	-0.07	-0.08
Ethnicity: AOEG		-0.22	0.29	-0.77	-0.24	-0.18	0.52	-0.34	-0.19	-0.06	0.59	-0.10	-0.07
Ethnicity: ASIA		-0.24	0.18	-1.32	-0.26	0.10	0.25	0.38	0.10	0.43	0.29	1.49	0.47
Ethnicity: BLAC		-0.58	0.25	-2.35	-0.64	0.02	0.35	0.07	0.03	0.79	0.35	2.28	0.86
Ethnicity: CHIN		-0.52	0.34	-1.56	-0.57	0.93	0.56	1.67	1.02	0.35	0.44	0.78	0.38
Ethnicity: MIXD		0.12	0.17	0.73	0.13	-0.19	0.26	-0.74	-0.21	0.01	0.25	0.03	0.01
Ethnicity: UNCL		0.19	0.51	0.37	0.21	-0.12	0.58	-0.20	-0.13	-0.45	0.60	-0.76	-0.50
Language: OTH		0.20	0.17	1.17	0.22	-0.30	0.25	-1.24	-0.33	-0.24	0.24	-1.01	-0.26
Language: UNCL		-0.29	0.67	-0.43	-0.31	0.37	0.86	0.43	0.41	0.70	1.12	0.63	0.77
SEN: SNS		0.13	0.21	0.62	0.14	-0.29	0.25	-1.14	-0.31	-0.03	0.30	-0.11	-0.04
SEN: SS		0.52	0.31	1.68	0.57	-0.62	0.41	-1.50	-0.68	-0.96	0.42	-2.29	-1.06
SES: High		-0.04	0.10	-0.40	-0.05	0.11	0.14	0.78	0.12	0.10	0.15	0.69	0.11
SES: Mid		-0.12	0.10	-1.23	-0.13	0.02	0.14	0.17	0.03	0.19	0.15	1.29	0.21

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Unknown		0.22	0.62	0.35	0.24					0.09	1.07	0.09	0.10

N 2,426

Random effects:

Centre variance	0.109
Residual variance	0.722

3.4.3.3 Calculated grades

Table 3.29 shows the estimates of the parameters of the model for A level mathematics using calculated grades in 2020. As before, the most informative comparison for mathematics is between 2020 and 2019. The 2020 parameter estimates using calculated grades exhibit a few minor differences to 2019, in much the same way as do those for final grades (section 3.4.3.2). A notable difference is that the increase in grade for the reference candidate is much smaller (0.14) and of borderline significance in terms of effect size.

In the case of music, Table 3.30 shows that the grade of the reference candidate has increased by around half a grade (0.52). This is quite a contrast with the change of 0.08 in the cross-subject analysis (Table 3.21) and most likely speaks to the fact that the standardisation model is less effective – or, rather, applied less – in subjects with a high proportion of small centre entries. Importantly, this does not appear to have impacted candidates along lines of protected characteristics or socio-economic status, with the exception of the male vs female gap, which almost closed (0.29-0.23=0.06).

However, this change appears widespread – it is seen in the cross-subject analysis and in other separate subjects – and may be understood as a general decline of male candidates' attainment relative to that of female candidates with comparable background characteristics. The only other notable changes include the high prior attainment group having gained slightly relative to the low prior attainment group (0.18), and a shift from positive to negative of the gap between candidates with unclassified ethnicity and those classified as white (0.47-0.65=-0.18).

Table 3.31 shows that the grade of the reference German candidate increased by almost two thirds of a grade (0.63). As with music, this most likely speaks to the fact that the standardisation model is less effective in subjects with a high proportion of small centre entries. Other than this, the only change of significance was to the attainment gap between the unknown versus no free school meal groups (-0.41), as seen under final grades (section 3.4.2.2).

Table 3.32 shows that in Latin the attainment gap between black vs white candidates was reversed using calculated grades (-0.61+0.79=0.18); however, the number of candidates affected is likely to be small considering the overall entry size, so we should not draw any strong conclusion from this shift.

Table 3.29. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Maths calculated grades.

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	1.91	0.02	84.96	1.34	-0.16	0.19	-0.82	-0.11	0.14	0.03	5.12	0.10
Prior attainment: High	2.15	0.02	127.06	1.51	0.45	0.17	2.69	0.31	0.02	0.02	0.94	0.02
Prior attainment: Mid	0.79	0.02	44.80	0.55	0.21	0.18	1.14	0.15	-0.01	0.02	-0.42	-0.01
Prior attainment: Unknown	1.56	0.02	73.76	1.10	0.29	0.18	1.65	0.20	0.06	0.03	2.09	0.04
Gender: Male	0.40	0.01	37.72	0.28	-0.09	0.07	-1.28	-0.06	-0.22	0.01	-15.46	-0.15
Gender: Unknown	-1.04	0.31	-3.32	-0.73					1.35	0.39	3.44	0.95
FSM: Yes	-0.08	0.03	-3.11	-0.06	0.14	0.22	0.62	0.10	-0.01	0.03	-0.17	0.00
FSM: Unknown	-0.04	0.13	-0.30	-0.03	0.67	0.98	0.68	0.47	0.14	0.18	0.77	0.09
Ethnicity: AOEG	-0.12	0.04	-3.03	-0.08	-0.04	0.28	-0.13	-0.03	0.06	0.05	1.19	0.05
Ethnicity: ASIA	-0.15	0.02	-7.80	-0.10	-0.08	0.12	-0.68	-0.06	0.03	0.02	1.15	0.02
Ethnicity: BLAC	-0.22	0.03	-7.91	-0.15	-0.54	0.22	-2.40	-0.38	-0.01	0.04	-0.22	-0.01
Ethnicity: CHIN	0.27	0.04	6.00	0.19	-0.33	0.23	-1.44	-0.23	-0.07	0.06	-1.14	-0.05
Ethnicity: MIXD	-0.04	0.03	-1.36	-0.02	0.17	0.18	0.96	0.12	-0.01	0.04	-0.42	-0.01
Ethnicity: UNCL	-0.14	0.05	-2.93	-0.10	-0.10	0.39	-0.26	-0.07	0.00	0.06	0.00	0.00
Language: OTH	0.00	0.02	-0.06	0.00	0.18	0.12	1.46	0.12	0.06	0.02	2.49	0.04
Language: UNCL	-0.07	0.08	-0.82	-0.05	-0.01	0.65	-0.01	-0.01	0.01	0.10	0.11	0.01
SEN: SNS	0.09	0.03	3.16	0.06	0.10	0.19	0.55	0.07	-0.14	0.04	-3.59	-0.10
SEN: SS	0.14	0.05	2.67	0.10	-0.41	0.33	-1.25	-0.28	-0.05	0.07	-0.71	-0.03
SES: High	0.16	0.02	10.39	0.11	0.09	0.11	0.86	0.06	-0.09	0.02	-4.48	-0.06

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Mid		0.07	0.01	5.05	0.05	-0.05	0.10	-0.45	-0.03	-0.05	0.02	-2.74	-0.04
SES: Unknown		-0.02	0.13	-0.14	-0.01	-0.81	0.98	-0.83	-0.57	-0.06	0.18	-0.35	-0.04

N 167,668

Random effects:

Centre variance	0.231
Residual variance	1.804

Table 3.30. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Music calculated grades.

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		2.49	0.07	35.98	2.29	0.12	0.09	1.35	0.11	0.52	0.09	5.59	0.48
Prior attainment: High		1.56	0.05	28.72	1.43	-0.01	0.08	-0.10	-0.01	0.18	0.08	2.41	0.17
Prior attainment: Mid		0.66	0.06	11.49	0.61	0.02	0.08	0.24	0.02	0.11	0.08	1.42	0.11
Prior attainment: Unknown		1.08	0.08	13.19	0.99	0.03	0.11	0.29	0.03	0.17	0.12	1.39	0.15
Gender: Male		0.29	0.04	7.45	0.27	-0.09	0.05	-1.58	-0.08	-0.23	0.05	-4.21	-0.21
Gender: Unknown		-0.96	1.04	-0.93	-0.89								
FSM: Yes		-0.01	0.13	-0.10	-0.01	-0.38	0.18	-2.14	-0.35	-0.07	0.17	-0.39	-0.06
FSM: Unknown		0.18	0.72	0.25	0.17	0.12	0.78	0.15	0.11	0.30	0.84	0.36	0.27
Ethnicity: AOEG		-0.07	0.29	-0.23	-0.06	0.61	0.40	1.52	0.56	-0.26	0.42	-0.62	-0.24
Ethnicity: ASIA		-0.50	0.19	-2.69	-0.46	0.57	0.26	2.22	0.53	0.34	0.26	1.34	0.32
Ethnicity: BLAC		-0.32	0.16	-2.03	-0.29	0.36	0.21	1.76	0.33	0.26	0.21	1.23	0.24
Ethnicity: CHIN		0.34	0.22	1.53	0.32	-0.39	0.31	-1.26	-0.36	-0.42	0.31	-1.38	-0.39
Ethnicity: MIXD		0.11	0.09	1.15	0.10	-0.13	0.13	-0.98	-0.12	-0.14	0.13	-1.10	-0.13
Ethnicity: UNCL		0.47	0.23	2.11	0.44	-0.44	0.29	-1.51	-0.40	-0.65	0.29	-2.23	-0.60
Language: OTH		-0.17	0.12	-1.37	-0.15	-0.13	0.18	-0.71	-0.12	0.23	0.16	1.40	0.21
Language: UNCL		-0.69	0.34	-2.01	-0.63	0.12	0.58	0.21	0.11	0.85	0.52	1.61	0.78
SEN: SNS		-0.01	0.09	-0.13	-0.01	-0.14	0.14	-1.05	-0.13	-0.20	0.13	-1.60	-0.19
SEN: SS		-0.12	0.20	-0.62	-0.11	0.12	0.27	0.43	0.11	-0.05	0.27	-0.20	-0.05
SES: High		0.12	0.06	2.03	0.11	-0.10	0.08	-1.28	-0.09	-0.08	0.08	-1.00	-0.07

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Mid		0.00	0.06	0.07	0.00	0.01	0.08	0.17	0.01	-0.02	0.08	-0.22	-0.02
SES: Unknown		-0.03	0.72	-0.04	-0.02	-0.35	0.78	-0.44	-0.32	-0.50	0.84	-0.60	-0.46

N 8,598

Random effects:

Centre variance	0.211
Residual variance	0.970

Table 3.31. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level German calculated grades.

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		2.59	0.11	23.59	2.26	-0.15	0.16	-0.93	-0.13	0.63	0.16	4.06	0.55
Prior attainment: High		1.60	0.09	17.74	1.39	0.09	0.13	0.68	0.08	0.00	0.13	0.03	0.00
Prior attainment: Mid		0.50	0.10	5.08	0.44	0.02	0.15	0.11	0.01	-0.15	0.14	-1.06	-0.13
Prior attainment: Unknown		1.39	0.11	12.06	1.21	0.17	0.16	1.02	0.14	-0.01	0.17	-0.05	-0.01
Gender: Male		0.15	0.05	2.80	0.13	0.06	0.08	0.73	0.05	-0.09	0.08	-1.22	-0.08
FSM: Yes		0.12	0.17	0.72	0.11	-0.64	0.26	-2.52	-0.56	-0.41	0.24	-1.72	-0.36
FSM: Unknown		1.74	0.64	2.71	1.52	-1.29	1.29	-1.00	-1.13	-0.41	0.13	-3.10	-0.36
Ethnicity: AOEG		-0.16	0.39	-0.40	-0.14	-0.03	0.53	-0.07	-0.03	0.46	0.54	0.84	0.40
Ethnicity: ASIA		-0.27	0.13	-2.04	-0.24	0.22	0.20	1.10	0.19	0.11	0.18	0.61	0.10
Ethnicity: BLAC		-0.14	0.21	-0.67	-0.12	0.15	0.30	0.51	0.13	0.01	0.30	0.02	0.01
Ethnicity: CHIN		0.19	0.46	0.42	0.17	-0.45	0.64	-0.71	-0.40	0.24	0.56	0.42	0.21
Ethnicity: MIXD		0.10	0.13	0.80	0.09	-0.06	0.19	-0.32	-0.05	-0.04	0.18	-0.24	-0.04
Ethnicity: UNCL		0.49	0.23	2.12	0.43	-0.43	0.36	-1.19	-0.38	-0.49	0.34	-1.43	-0.43
Language: OTH		0.44	0.10	4.42	0.39	0.02	0.15	0.16	0.02	-0.09	0.14	-0.61	-0.08
Language: UNCL		1.72	1.13	1.52	1.50	-1.88	1.24	-1.51	-1.64	-1.81	1.20	-1.51	-1.58
SEN: SNS		-0.18	0.15	-1.24	-0.16	0.20	0.21	0.97	0.18	-0.05	0.19	-0.27	-0.05
SEN: SS		0.16	0.22	0.70	0.14	0.25	0.34	0.71	0.21	-0.17	0.40	-0.43	-0.15

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: High		0.09	0.08	1.09	0.07	0.02	0.11	0.17	0.02	-0.17	0.11	-1.52	-0.15
SES: Mid		0.05	0.08	0.69	0.05	-0.04	0.11	-0.38	-0.04	-0.11	0.11	-0.97	-0.09
SES: Unknown		-1.30	0.64	-2.03	-1.13	1.13	1.29	0.88	0.99				

N 5,369

Random effects:

Centre variance	0.165
Residual variance	1.152

Table 3.32. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Latin calculated grades.

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		1.99	0.67	2.98	2.08	-0.24	0.80	-0.30	-0.25	-0.25	1.19	-0.21	-0.26
Prior attainment: High		2.93	0.66	4.43	3.05	0.23	0.79	0.29	0.24	0.55	1.18	0.47	0.57
Prior attainment: Mid		1.17	0.68	1.73	1.22	0.50	0.81	0.61	0.52	1.27	1.20	1.06	1.32
Prior attainment: Unknown		2.86	0.66	4.32	2.98	0.25	0.79	0.32	0.26	0.53	1.18	0.45	0.55
Gender: Male		-0.05	0.07	-0.65	-0.05	0.08	0.09	0.80	0.08	-0.03	0.10	-0.27	-0.03
FSM: Yes		0.24	0.19	1.30	0.25	-0.25	0.27	-0.93	-0.26	-0.25	0.30	-0.84	-0.26
FSM: Unknown		-0.26	0.66	-0.40	-0.27	0.03	0.14	0.19	0.03	-0.37	1.13	-0.33	-0.38
Ethnicity: AOEG		-0.25	0.30	-0.82	-0.26	-0.14	0.55	-0.26	-0.15	-0.17	0.62	-0.27	-0.17
Ethnicity: ASIA		-0.24	0.19	-1.25	-0.25	0.07	0.27	0.26	0.07	0.49	0.30	1.60	0.51
Ethnicity: BLAC		-0.61	0.26	-2.31	-0.64	0.04	0.37	0.11	0.04	0.79	0.37	2.17	0.83
Ethnicity: CHIN		-0.54	0.35	-1.52	-0.56	0.92	0.59	1.56	0.96	0.42	0.47	0.90	0.44
Ethnicity: MIXD		0.11	0.18	0.64	0.12	-0.19	0.28	-0.69	-0.20	0.15	0.26	0.58	0.16
Ethnicity: UNCL		0.19	0.54	0.36	0.20	-0.11	0.61	-0.18	-0.11	-0.73	0.63	-1.15	-0.76
Language: OTH		0.19	0.18	1.03	0.19	-0.27	0.26	-1.06	-0.29	-0.23	0.25	-0.92	-0.24
Language: UNCL		-0.26	0.71	-0.37	-0.28	0.37	0.91	0.41	0.39	0.96	1.18	0.81	1.00
SEN: SNS		0.13	0.22	0.59	0.13	-0.28	0.27	-1.07	-0.30	0.17	0.31	0.55	0.18
SEN: SS		0.54	0.33	1.65	0.56	-0.65	0.44	-1.49	-0.67	-0.71	0.45	-1.59	-0.74
SES: High		-0.04	0.11	-0.36	-0.04	0.11	0.15	0.73	0.11	0.09	0.16	0.58	0.09
SES: Mid		-0.13	0.10	-1.24	-0.13	0.03	0.15	0.20	0.03	0.17	0.15	1.10	0.18

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Unknown		0.25	0.66	0.38	0.26					0.38	1.13	0.33	0.39

N 2,426

Random effects:

Centre variance	0.114
Residual variance	0.806

3.4.3.4 Centre assessment grades – CAGs

Table 3.33 to Table 3.36 show the estimates of the parameters of the model for A level mathematics, music, German, and Latin using calculated grades in 2020. Comparison with the equivalent tables for final grades in 3.4.3.2 shows that there are no substantial differences between outcomes using CAGs and final grades from an equalities perspective. This is expected, as the CAGs account for the majority of final grades.

For all but Latin, the reference candidate received a marginally higher grade using final grades than CAGs, as would be expected. The difference for Latin is most likely caused by the paucity of candidates in the (low) prior attainment reference group affecting the stability of the estimate of the intercept.

Table 3.33. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Maths CAGs.

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	1.89	0.02	88.19	1.39	-0.13	0.18	-0.73	-0.10	0.75	0.03	28.00	0.55
Prior attainment: High	2.18	0.02	135.05	1.61	0.45	0.16	2.84	0.33	-0.19	0.02	-8.45	-0.14
Prior attainment: Mid	0.80	0.02	47.75	0.59	0.20	0.17	1.16	0.15	-0.06	0.02	-2.44	-0.04
Prior attainment: Unknown	1.58	0.02	78.53	1.17	0.29	0.17	1.74	0.22	-0.09	0.03	-3.45	-0.07
Gender: Male	0.41	0.01	40.62	0.30	-0.11	0.07	-1.56	-0.08	-0.25	0.01	-19.17	-0.19
Gender: Unknown	-0.94	0.30	-3.15	-0.69					1.42	0.37	3.80	1.04
FSM: Yes	-0.09	0.02	-3.60	-0.07	0.11	0.21	0.52	0.08	0.01	0.03	0.21	0.01
FSM: Unknown	0.01	0.13	0.08	0.01	0.54	0.94	0.57	0.40	0.13	0.17	0.78	0.10
Ethnicity: AOEG	-0.11	0.04	-2.93	-0.08	-0.09	0.27	-0.33	-0.06	0.08	0.05	1.63	0.06
Ethnicity: ASIA	-0.14	0.02	-7.62	-0.10	-0.05	0.12	-0.47	-0.04	0.03	0.02	1.40	0.02
Ethnicity: BLAC	-0.22	0.03	-8.41	-0.16	-0.57	0.21	-2.67	-0.42	0.05	0.03	1.46	0.04
Ethnicity: CHIN	0.29	0.04	6.89	0.22	-0.33	0.21	-1.54	-0.24	-0.08	0.06	-1.24	-0.06
Ethnicity: MIXD	-0.03	0.02	-1.23	-0.02	0.18	0.17	1.07	0.13	-0.01	0.03	-0.24	-0.01
Ethnicity: UNCL	-0.12	0.04	-2.60	-0.09	-0.14	0.37	-0.39	-0.11	0.00	0.06	0.03	0.00
Language: OTH	-0.01	0.02	-0.42	-0.01	0.17	0.11	1.51	0.13	0.07	0.02	2.95	0.05
Language: UNCL	-0.09	0.08	-1.16	-0.06	0.01	0.62	0.02	0.01	0.01	0.10	0.07	0.01
SEN: SNS	0.09	0.03	3.37	0.07	0.11	0.18	0.63	0.08	-0.11	0.04	-3.08	-0.08
SEN: SS	0.15	0.05	2.95	0.11	-0.44	0.31	-1.42	-0.32	-0.09	0.07	-1.31	-0.06

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: High		0.18	0.01	12.15	0.13	0.10	0.10	1.03	0.08	-0.12	0.02	-6.25	-0.09
SES: Mid		0.08	0.01	6.11	0.06	-0.06	0.10	-0.67	-0.05	-0.07	0.02	-3.79	-0.05
SES: Unknown		-0.05	0.13	-0.39	-0.04	-0.68	0.94	-0.73	-0.50	-0.07	0.17	-0.44	-0.05

N 167,668

Random effects:

Centre variance	0.206
Residual variance	1.634

Table 3.34. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Music CAGs.

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	2.46	0.07	36.75	2.34	0.12	0.09	1.31	0.11	0.77	0.09	8.63	0.73
Prior attainment: High	1.57	0.05	29.91	1.49	0.00	0.07	-0.04	0.00	0.07	0.07	0.92	0.06
Prior attainment: Mid	0.66	0.06	11.83	0.63	0.03	0.08	0.37	0.03	0.06	0.08	0.78	0.06
Prior attainment: Unknown	1.10	0.08	13.87	1.04	0.03	0.11	0.28	0.03	0.04	0.12	0.32	0.04
Gender: Male	0.29	0.04	7.74	0.28	-0.09	0.05	-1.65	-0.08	-0.20	0.05	-3.80	-0.19
Gender: Unknown	-1.17	1.01	-1.16	-1.11								
FSM: Yes	-0.02	0.12	-0.14	-0.02	-0.37	0.17	-2.20	-0.36	-0.02	0.16	-0.11	-0.02
FSM: Unknown	0.13	0.70	0.19	0.13	0.14	0.76	0.18	0.13	0.62	0.81	0.77	0.59
Ethnicity: AOEG	-0.04	0.28	-0.15	-0.04	0.59	0.39	1.52	0.56	-0.15	0.40	-0.38	-0.15
Ethnicity: ASIA	-0.48	0.18	-2.66	-0.46	0.58	0.25	2.31	0.55	0.30	0.25	1.23	0.29
Ethnicity: BLAC	-0.33	0.15	-2.16	-0.31	0.37	0.20	1.84	0.35	0.22	0.20	1.10	0.21
Ethnicity: CHIN	0.34	0.22	1.56	0.32	-0.35	0.30	-1.16	-0.33	-0.27	0.30	-0.92	-0.26
Ethnicity: MIXD	0.11	0.09	1.23	0.10	-0.14	0.13	-1.11	-0.13	-0.09	0.13	-0.75	-0.09
Ethnicity: UNCL	0.46	0.22	2.09	0.43	-0.46	0.28	-1.64	-0.44	-0.61	0.28	-2.17	-0.58
Language: OTH	-0.17	0.12	-1.45	-0.16	-0.12	0.17	-0.72	-0.12	0.17	0.16	1.10	0.16
Language: UNCL	-0.70	0.33	-2.13	-0.67	0.20	0.56	0.36	0.19	0.60	0.51	1.18	0.57
SEN: SNS	-0.01	0.09	-0.07	-0.01	-0.14	0.13	-1.04	-0.13	-0.19	0.12	-1.51	-0.18

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS		-0.12	0.19	-0.63	-0.12	0.07	0.26	0.28	0.07	-0.01	0.26	-0.05	-0.01
SES: High		0.12	0.06	2.14	0.11	-0.11	0.08	-1.39	-0.10	-0.03	0.08	-0.44	-0.03
SES: Mid		0.00	0.06	0.02	0.00	0.02	0.08	0.26	0.02	0.04	0.08	0.50	0.04
SES: Unknown		0.00	0.70	0.00	0.00	-0.37	0.76	-0.48	-0.35	-0.71	0.81	-0.87	-0.68

N 8,598

Random effects:

Centre variance	0.200
Residual variance	0.907

Table 3.35. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level German CAGs.

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		2.57	0.11	24.27	2.32	-0.14	0.15	-0.92	-0.13	0.96	0.15	6.43	0.87
Prior attainment: High		1.59	0.09	18.23	1.43	0.09	0.13	0.68	0.08	-0.17	0.13	-1.33	-0.15
Prior attainment: Mid		0.50	0.10	5.20	0.45	0.01	0.14	0.06	0.01	-0.19	0.14	-1.35	-0.17
Prior attainment: Unknown		1.40	0.11	12.61	1.26	0.16	0.16	1.00	0.14	-0.25	0.17	-1.52	-0.23
Gender: Male		0.15	0.05	2.84	0.13	0.05	0.07	0.73	0.05	-0.16	0.07	-2.21	-0.15
FSM: Yes		0.14	0.17	0.82	0.12	-0.65	0.25	-2.64	-0.59	-0.42	0.23	-1.81	-0.38
FSM: Unknown		1.73	0.62	2.80	1.56	-1.34	1.25	-1.07	-1.20	-0.31	0.13	-2.46	-0.28
Ethnicity: AOEG		-0.17	0.38	-0.45	-0.15	-0.04	0.51	-0.08	-0.04	0.38	0.53	0.72	0.34
Ethnicity: ASIA		-0.29	0.13	-2.22	-0.26	0.23	0.20	1.19	0.21	0.23	0.18	1.28	0.20
Ethnicity: BLAC		-0.12	0.20	-0.60	-0.11	0.15	0.29	0.53	0.14	-0.15	0.29	-0.51	-0.14
Ethnicity: CHIN		0.20	0.44	0.45	0.18	-0.44	0.62	-0.71	-0.39	0.14	0.54	0.25	0.12
Ethnicity: MIXD		0.09	0.12	0.77	0.08	-0.04	0.19	-0.24	-0.04	-0.02	0.17	-0.14	-0.02
Ethnicity: UNCL		0.50	0.22	2.21	0.45	-0.42	0.35	-1.20	-0.38	-0.42	0.33	-1.28	-0.38
Language: OTH		0.44	0.10	4.53	0.39	0.02	0.14	0.17	0.02	-0.07	0.14	-0.51	-0.06
Language: UNCL		1.54	1.09	1.41	1.39	-1.71	1.20	-1.42	-1.54	-1.72	1.16	-1.49	-1.55
SEN: SNS		-0.18	0.14	-1.27	-0.16	0.21	0.20	1.05	0.19	-0.06	0.19	-0.30	-0.05
SEN: SS		0.15	0.22	0.69	0.14	0.23	0.33	0.71	0.21	0.23	0.39	0.58	0.20
SES: High		0.10	0.08	1.31	0.09	0.01	0.11	0.13	0.01	-0.16	0.11	-1.51	-0.14
SES: Mid		0.07	0.08	0.88	0.06	-0.06	0.11	-0.52	-0.05	-0.07	0.11	-0.69	-0.07

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Unknown		-1.31	0.62	-2.11	-1.18	1.17	1.25	0.94	1.06				

N 5,369

Random effects:

Centre variance	0.157
Residual variance	1.074

Table 3.36. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on A Level Latin CAGs.

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)		2.00	0.64	3.12	2.17	-0.27	0.76	-0.35	-0.29	0.93	1.14	0.81	1.01
Prior attainment: High		2.91	0.63	4.59	3.16	0.25	0.76	0.33	0.27	-0.53	1.13	-0.47	-0.58
Prior attainment: Mid		1.15	0.65	1.77	1.25	0.54	0.78	0.69	0.58	0.09	1.15	0.08	0.10
Prior attainment: Unknown		2.85	0.64	4.47	3.09	0.29	0.76	0.38	0.31	-0.62	1.13	-0.55	-0.67
Gender: Male		-0.06	0.07	-0.84	-0.06	0.08	0.09	0.94	0.09	0.04	0.09	0.48	0.05
FSM: Yes		0.24	0.18	1.36	0.26	-0.27	0.26	-1.04	-0.30	-0.21	0.29	-0.75	-0.23
FSM: Unknown		-0.24	0.63	-0.39	-0.26	0.01	0.14	0.11	0.02	-0.11	1.08	-0.11	-0.12
Ethnicity: AOEG		-0.21	0.29	-0.74	-0.23	-0.17	0.53	-0.32	-0.18	0.09	0.59	0.15	0.10
Ethnicity: ASIA		-0.23	0.18	-1.28	-0.25	0.08	0.26	0.33	0.09	0.34	0.29	1.16	0.37
Ethnicity: BLAC		-0.57	0.25	-2.27	-0.62	0.03	0.35	0.10	0.04	0.89	0.35	2.54	0.97
Ethnicity: CHIN		-0.52	0.34	-1.53	-0.56	0.93	0.57	1.64	1.01	0.37	0.45	0.83	0.41
Ethnicity: MIXD		0.11	0.17	0.68	0.12	-0.18	0.27	-0.67	-0.19	-0.04	0.25	-0.18	-0.05
Ethnicity: UNCL		0.19	0.52	0.37	0.21	-0.12	0.59	-0.20	-0.13	-0.37	0.60	-0.60	-0.40
Language: OTH		0.20	0.17	1.14	0.21	-0.30	0.25	-1.22	-0.33	-0.29	0.24	-1.22	-0.32
Language: UNCL		-0.31	0.68	-0.45	-0.33	0.39	0.87	0.44	0.42	0.80	1.13	0.70	0.86
SEN: SNS		0.16	0.21	0.75	0.17	-0.31	0.26	-1.22	-0.34	-0.22	0.30	-0.71	-0.23
SEN: SS		0.53	0.32	1.67	0.57	-0.61	0.42	-1.47	-0.67	-0.99	0.43	-2.31	-1.07
SES: High		-0.04	0.10	-0.41	-0.05	0.11	0.14	0.79	0.12	0.17	0.15	1.15	0.19
SES: Mid		-0.12	0.10	-1.17	-0.13	0.01	0.14	0.10	0.02	0.23	0.15	1.53	0.25

		Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
		Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: Unknown		0.23	0.63	0.37	0.25					0.18	1.08	0.17	0.19

N 2,426

Random effects:

Centre variance	0.109
Residual variance	0.742

3.5 GCSE

3.5.1 Univariate analysis

This section follows the same format as section 3.4.1. Table 3.37 to Table 3.42 show: percentage at **grade 7 and above**; percentage at **grade 4 and above**; and **mean grade** for outcomes in 2018 and 2019, plus 2020 outcomes based on final grades, CAGs, and calculated grades, broken down by: candidate's gender, ethnicity, major language, SEN provision status, FSM eligibility status, and socio-economic status. The corresponding entry numbers and prior attainment data for each group are reported in appendix 5.3.1.

In view of concerns about centre assessment of high-attaining low-SES candidates, further breakdowns by SES are provided separately for candidates with low, medium, and high levels of prior attainment in Figure 3.4 to Figure 3.6 (and Table 5.16 to Table 5.18 in the appendix).

Table 3.43 to Table 3.45 summarise the attainment gaps on each attainment measure. These are calculated from Table 3.37 to Table 3.42, and can be read as described in section 3.4.1.[22]

It is worth noting that at GCSE – and at **grade 7 and above** particularly – the candidates in most of the Unknown categories achieve very high outcomes. We know that these data are not missing at random (see section 3.2.3) and that these entries are largely from independent centres. However, as section 3.5.2 below shows, the multivariate analyses do not suggest that being in these categories particularly improves a candidate's grade.

As with A level, the '19-18 Difference' columns in Table 3.43 to Table 3.45 show that attainment gaps tend to vary from year-to-year. The differences between grading methods appear to be greater at GCSE – at **grade 7 and above** (Table 3.43), especially – than they were at A level. Again, the calculated grades would have most closely reproduced the differences observed in 2018-19. Final grades (which were similar to CAGs) may have slightly favoured females over males, non-SEN over SEN, non-FSM over FSM, and High over Low SES. Some of the largest increases are notably the Unknowns against the Knowns in all characteristics.[30]

At **grade 4 and above** (Table 3.44), again, the calculated grades would have most closely reproduced patterns established in 2018-19, while the final grades produced the greatest differences. The effects are less pronounced at **grade 4 and above** than at 7 and above. Some of the most notable changes are again between Known and Unknown groups within characteristics, although they are reversed; here, the proportion of entries from candidates of known characteristics crossing the grade threshold has increased. It is possible that the final grades approach has moved more Knowns across the grade 4 threshold, whereas Unknowns were already above it using other methods, but have now crossed the grade 7 threshold in greater numbers.

For **mean grade (0 to 9)** (Table 3.45), as with A level, the changes to the between group differences within characteristics are small with any grading method. The

[30] We do not report Unknown vs Known for gender because the number of Unknowns is very small.

largest differences are gains by Unknowns using final grades, but the largest is 0.13 grades.

Figure 3.4 to Figure 3.6 (Table 5.16 to Table 5.18) show the descriptive statistics for candidates from different socio-economic backgrounds split by prior attainment (low, medium, and high). Among candidates with low levels of prior attainment (Figure 3.4, Table 5.16), there are small differences in **mean grade** between levels of socio-economic status in 2018 and 2019. The differences are largely as expected, with **mean grade** increasing with socio-economic status. In 2020, CAGs and final grades raise attainment at all SES levels, though the differences across the known SES groups remain consistent with previous years. For candidates of Unknown SES, CAGs and final grades appear to increase the outcomes by between a quarter and a third of a grade relative to High SES candidates. The same is broadly true when looking at the proportions of entries receiving **grade 7 and above** and **grade 4 above**; all groups have benefited – especially at **grade 4 and above** – but the Unknown group has pulled ahead most.

Considering that the unknown SES group are mostly entries by students at independent schools (see section 3.2.3, in particular Table 3.4), the pulling ahead of the Unknown SES group suggests that some of the low prior attainers at independent schools might have received disproportionately overestimated grades. It is worth noting that the multivariate analyses reported below do not find the full Unknown SES group (that is, with all levels of prior attainment combined) to have disproportionately higher results than the full Low SES group in 2020, compared to 2019. This suggests that even if the 6,329 entries by low prior attainers with unknown SES, which make up less than 10% of the full Unknown SES group (see Table 5.15 and Table 5.16 for the relevant numbers), have received disproportionately overestimated grades, they have minimal impact on the results of the full Unknown SES group.31 Calculated grades outcomes are overall most like 2018 and 2019 outcomes.

Among candidates with medium levels of prior attainment (Figure 3.5, Table 5.17), the picture is similar to that above. Using CAGs and final grades, there are gains for candidates of all SES levels across the grade range, as evidenced by increasing **mean grade**. The overall increases are most marked at **grade 4 and above**, while candidates of Unknown SES make the greatest gains at **grade 7 and above**.

Among candidates with high levels of prior attainment (Figure 3.6, Table 5.18), CAGs and final grades produced the greatest overall increases, and these were seen largely at **grade 7 and above**. The gains may be fractionally greater the lower a candidate's SES, but there is no strong differential effect on candidates with high prior attainment depending on their socio-economic status.

31 It is not unreasonable to consider the full Unknown SES group a proxy for independent schools. It is worth noting, however, that the majority of the independent schools' entries are not in the full Unknown SES group because they do have known SES (see Table 3.3).

Table 3.37. Breakdown by candidates' gender against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

GENDER	**2018**		**2019**		**2020**					
					Final		***CAG***		***Calculated***	
Grade 7 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
Female	25.45		25.73		31.69		30.78		25.61	
Male	19.19		19.26		23.72		23.01		18.92	
Neither or UnknownGender	37.17		15.38		11.11		11.11		6.67	
Grade 4 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
Female	75.72		75.76		83.26		82.93		76.04	
Male	67.07		67.26		75.70		75.28		67.14	
Neither or UnknownGender	72.57		49.11		60.74		60.00		56.30	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Female	5.06	2.06	5.07	2.07	5.47	1.99	5.42	1.99	5.07	2.06
Male	4.58	2.11	4.59	2.11	4.99	2.03	4.94	2.03	4.58	2.09
Neither or UnknownGender	5.26	2.53	3.83	2.23	4.15	1.94	4.05	2.00	3.75	1.89

Table 3.38. Breakdown by candidates' ethnicity against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

ETHNICITY	2018		2019		2020					
					Final		***CAG***		***Calculated***	
Grade 7 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
AOEG	24.10		23.96		29.25		28.36		23.35	
ASIA	27.36		28.86		34.14		33.21		28.21	
BLAC	18.54		18.41		22.98		22.10		17.67	
CHIN	50.25		50.99		59.29		58.53		51.69	
MIXD	24.06		24.19		28.94		28.15		23.56	
UNCL	21.24		21.80		25.51		24.77		20.64	
WHIT	21.16		21.16		26.35		25.57		21.05	
UnknownEthnicity	48.40		47.27		58.38		57.32		48.70	
Grade 4 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
AOEG	71.66		71.54		78.88		78.46		71.26	
ASIA	75.39		76.14		83.02		82.68		76.15	
BLAC	67.95		67.31		77.15		76.71		67.79	
CHIN	90.60		90.97		94.80		94.63		91.07	
MIXD	71.70		71.84		79.32		78.94		71.59	
UNCL	68.16		68.88		76.25		75.81		67.93	
WHIT	70.76		70.83		78.95		78.57		70.94	
UnknownEthnicity	87.79		87.56		93.28		92.95		88.58	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
AOEG	4.88	2.16	4.86	2.16	5.26	2.10	5.20	2.11	4.83	2.15
ASIA	5.11	2.13	5.18	2.14	5.55	2.05	5.50	2.05	5.16	2.12
BLAC	4.60	2.03	4.57	2.04	5.01	1.94	4.95	1.94	4.57	1.99
CHIN	6.35	1.98	6.38	1.98	6.77	1.85	6.73	1.86	6.40	1.97
MIXD	4.87	2.15	4.89	2.15	5.27	2.06	5.22	2.07	4.87	2.13

Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
UNCL	4.68	2.15	4.71	2.15	5.06	2.08	5.01	2.08	4.66	2.13
WHIT	4.76	2.08	4.76	2.08	5.17	2.01	5.12	2.01	4.76	2.07
UnknownEthnicity	6.18	2.14	6.14	2.16	6.68	1.95	6.62	1.97	6.21	2.11

Table 3.39. Breakdown by candidates' major language against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

MAJOR LANGUAGE	2018		2019		2020					
					Final		***CAG***		***Calculated***	
Grade 7 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
1_ENG	21.77		21.88		27.08		26.29		21.72	
2_OTH	23.07		23.64		28.52		27.64		22.97	
3_UNCL	21.87		21.57		23.62		22.87		19.69	
UnknownLanguage	48.40		47.27		58.38		57.32		48.70	
Grade 4 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
1_ENG	71.31		71.42		79.56		79.18		71.61	
2_OTH	70.72		70.85		78.23		77.84		70.41	
3_UNCL	69.00		69.39		72.38		71.92		64.06	
UnknownLanguage	87.79		87.56		93.28		92.95		88.58	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
1_ENG	4.80	2.08	4.81	2.09	5.21	2.00	5.16	2.01	4.81	2.07
2_OTH	4.81	2.14	4.84	2.17	5.22	2.09	5.16	2.09	4.80	2.15
3_UNCL	4.72	2.17	4.73	2.14	4.88	2.13	4.81	2.15	4.49	2.20
UnknownLanguage	6.18	2.14	6.14	2.16	6.68	1.95	6.62	1.97	6.21	2.11

Table 3.40. Breakdown by candidates' SEN provision status against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

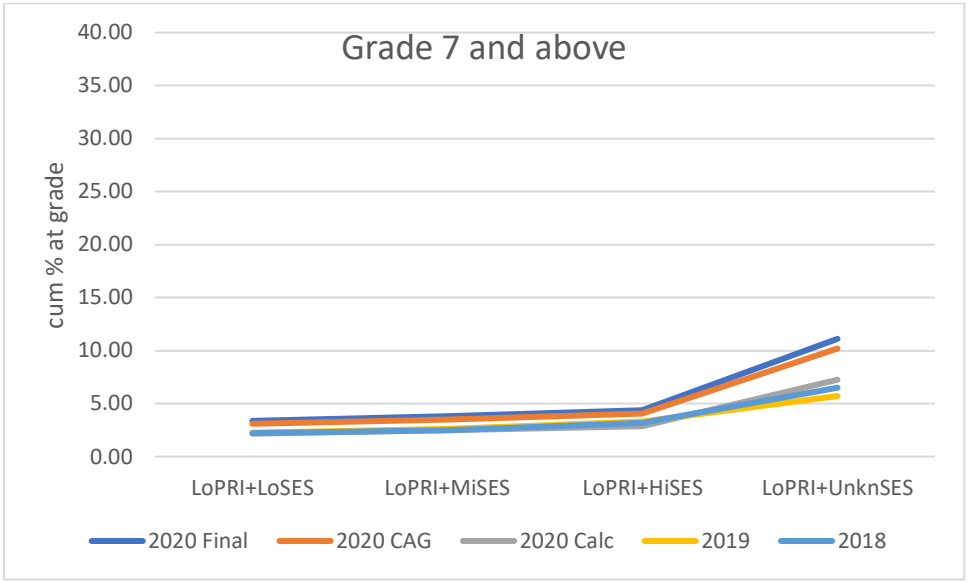
SEN	2018		2019		2020					
					Final		*CAG*		*Calculated*	
Grade 7 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
1_NON	23.65		23.84		29.48		28.63		23.70	
2_SNS	8.67		8.94		11.07		10.65		8.62	
3_SS	7.70		8.54		9.67		9.29		7.69	
4_UNCL	0.00		0.00		0.00		0.00		0.00	
UnknownSEN	48.40		47.27		58.38		57.32		48.70	
Grade 4 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
1_NON	74.88		74.97		83.00		82.65		75.29	
2_SNS	42.60		43.50		53.04		52.46		43.32	
3_SS	36.04		37.60		43.55		42.89		35.07	
4_UNCL	0.00		0.00		0.00		0.00		0.00	
UnknownSEN	87.79		87.56		93.28		92.95		88.58	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
1_NON	4.97	2.03	4.98	2.04	5.39	1.95	5.34	1.95	4.99	2.02
2_SNS	3.45	2.01	3.49	2.02	3.90	1.95	3.84	1.96	3.48	1.99
3_SS	3.15	2.04	3.22	2.09	3.52	2.01	3.44	2.03	3.11	2.03
4_UNCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UnknownSEN	6.18	2.14	6.14	2.16	6.68	1.95	6.62	1.97	6.21	2.11

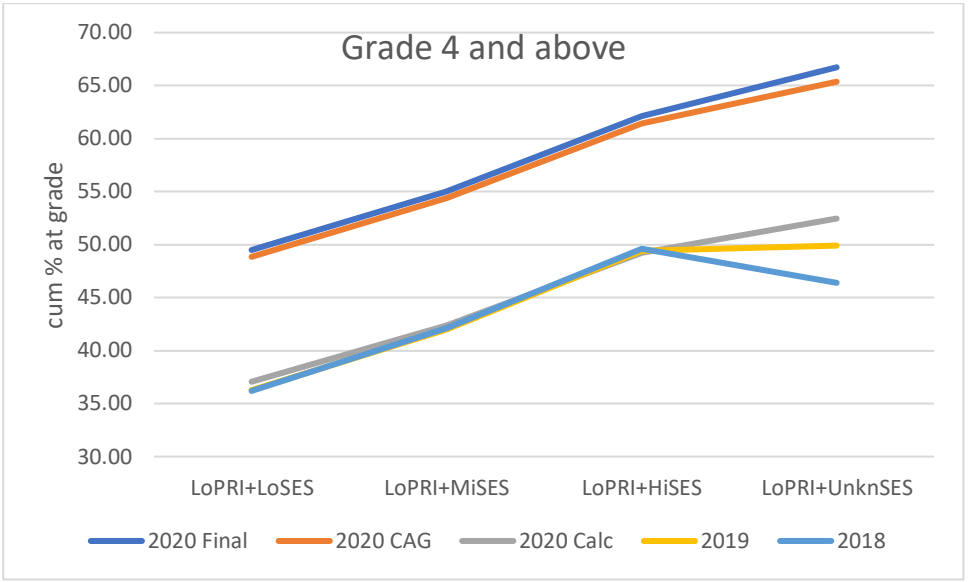
Table 3.41. Breakdown by candidates' FSM eligibility status against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

FSM	**2018**		**2019**		**2020**					
					Final		***CAG***		***Calculated***	
Grade 7 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
0=NO	23.43		23.77		29.54		28.70		23.83	
1=YES	10.23		10.59		13.52		12.94		10.16	
UnknownFSM	48.40		47.27		58.38		57.32		48.70	
Grade 4 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
0=NO	73.63		73.98		82.17		81.82		74.54	
1=YES	51.63		52.30		61.84		61.29		52.03	
UnknownFSM	87.79		87.56		93.28		92.95		88.58	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
0=NO	4.92	2.07	4.95	2.07	5.37	1.98	5.32	1.98	4.97	2.05
1=YES	3.79	2.00	3.82	2.01	4.22	1.96	4.16	1.97	3.80	1.99
UnknownFSM	6.18	2.14	6.14	2.16	6.68	1.95	6.62	1.97	6.21	2.11

Table 3.42. Breakdown by candidates' SES against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

SES	2018		2019		2020					
					Final		***CAG***		***Calculated***	
Grade 7 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
LoSES	14.79		15.13		19.72		18.97		15.10	
MiSES	21.04		21.21		26.53		25.73		21.17	
HiSES	29.35		29.40		35.01		34.16		28.91	
UnknownSES	45.22		44.56		55.34		54.30		46.10	
Grade 4 & above	*% of group*		*% of group*		*% of group*		*% of group*		*% of group*	
LoSES	61.07		61.38		71.16		70.70		61.82	
MiSES	71.05		71.04		79.27		78.89		71.21	
HiSES	80.49		80.56		86.89		86.60		80.41	
UnknownSES	85.36		85.46		91.64		91.30		86.44	
Mean Grade	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
LoSES	4.25	2.05	4.27	2.07	4.71	2.01	4.66	2.02	4.28	2.05
MiSES	4.77	2.06	4.77	2.07	5.19	2.00	5.14	2.00	4.78	2.05
HiSES	5.33	2.02	5.33	2.03	5.70	1.93	5.65	1.93	5.31	2.01
UnknownSES	6.00	2.20	5.98	2.21	6.53	2.01	6.47	2.04	6.06	2.17





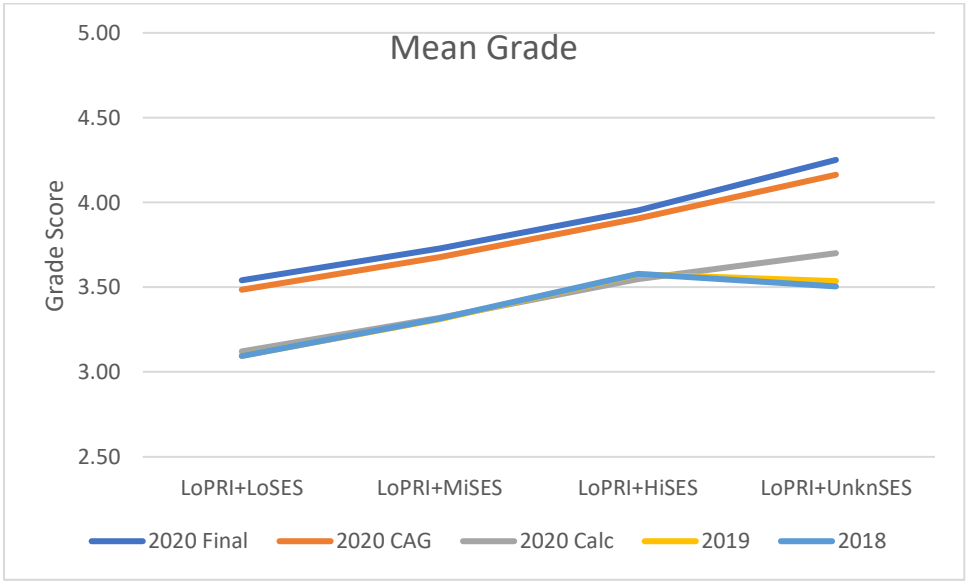
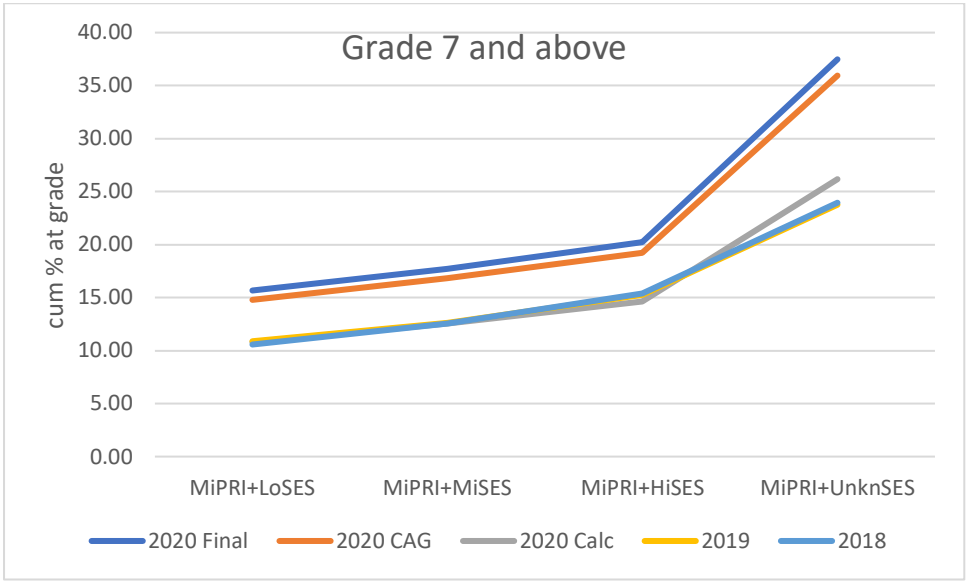
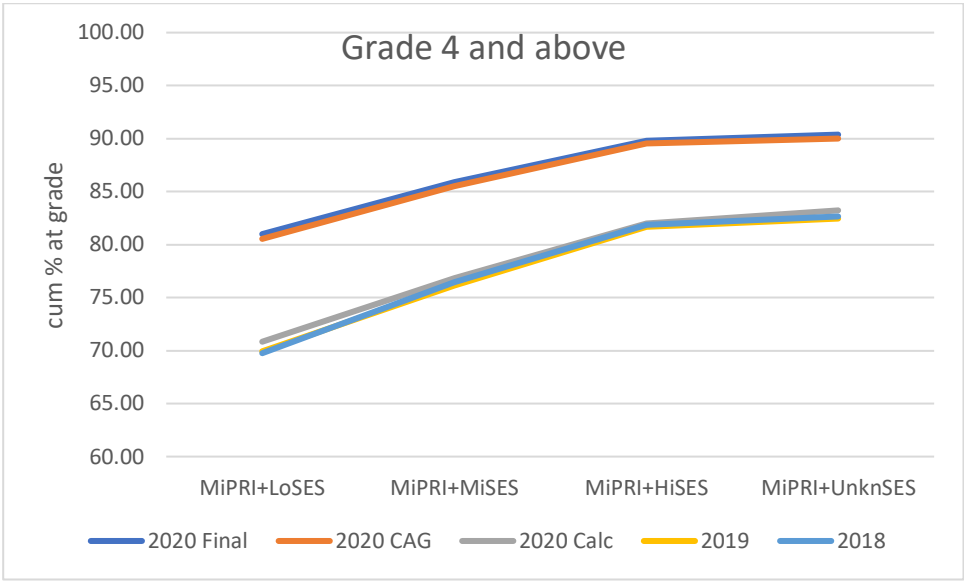


Figure 3.4. GCSE: Breakdown by SES of candidates with low prior attainment against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018 – 2020.





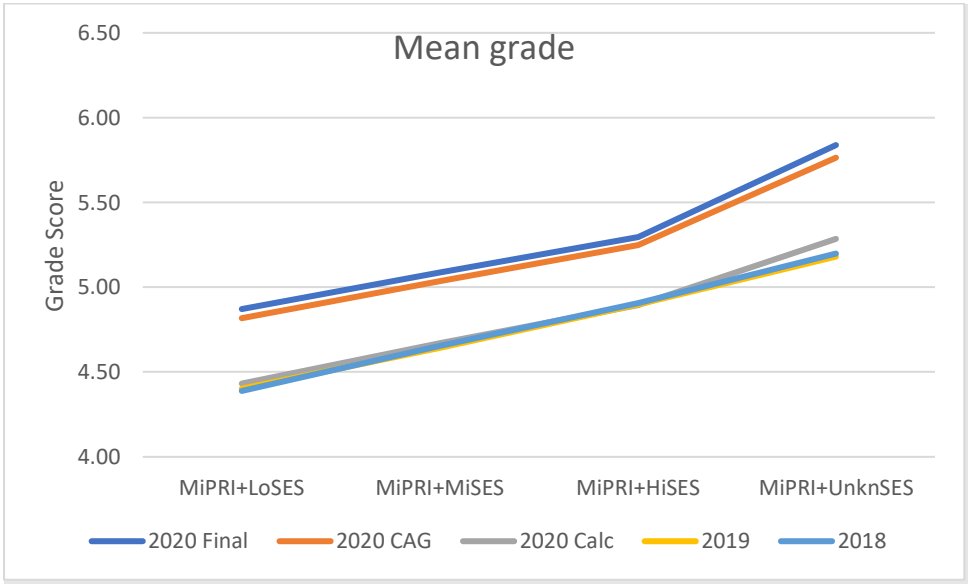
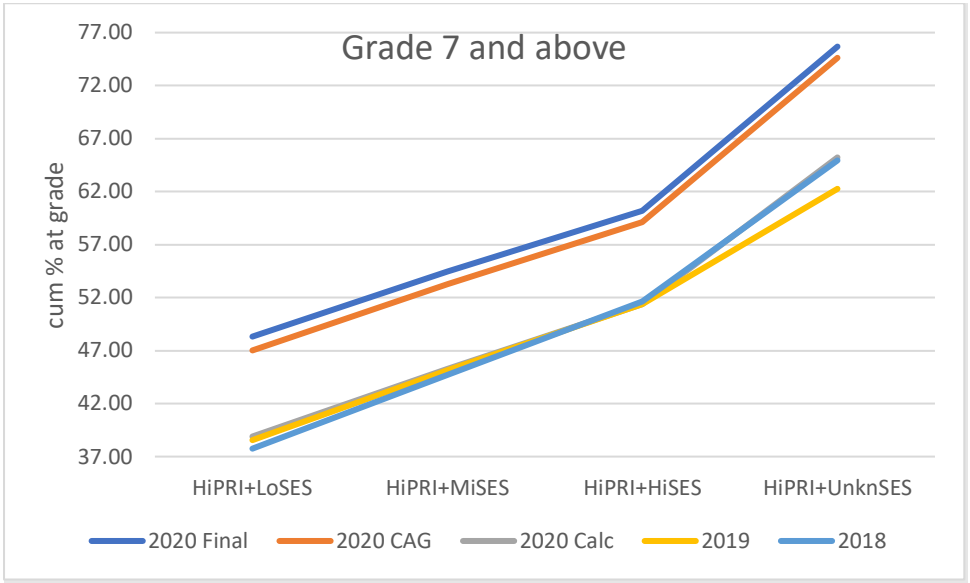
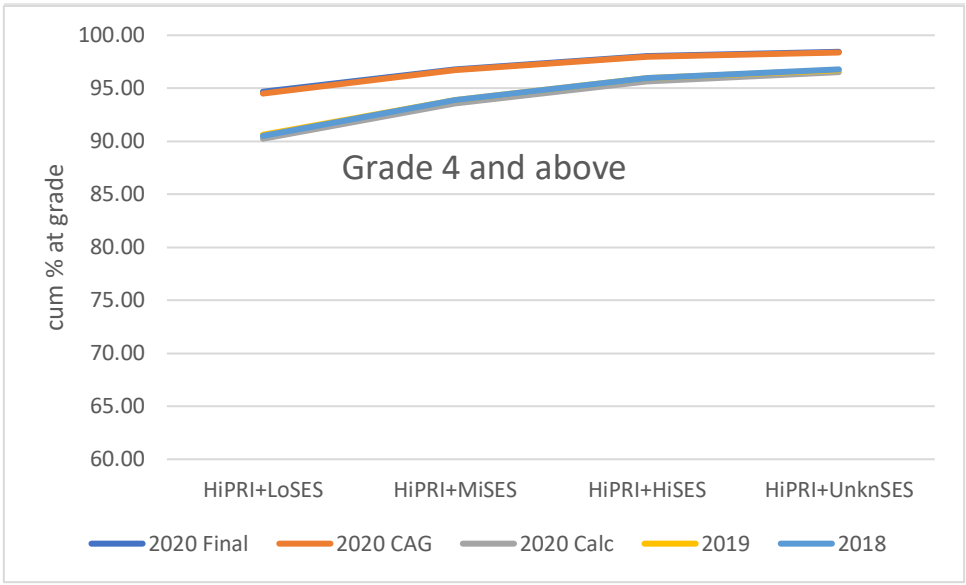


Figure 3.5. GCSE: Breakdown by SES of candidates with medium prior attainment against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018 – 2020.





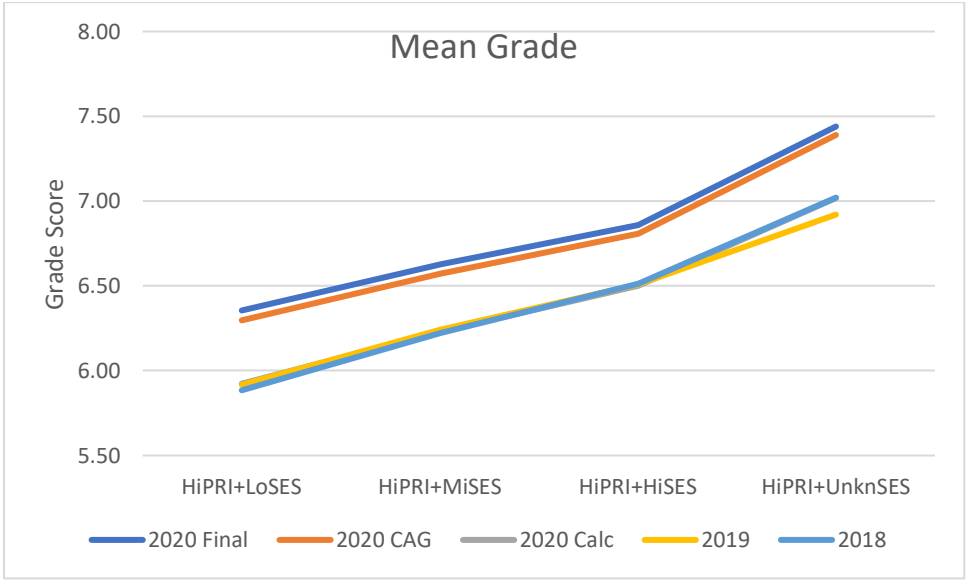


Figure 3.6. GCSE: Breakdown by SES of candidates with high prior attainment against percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018 – 2020.

Table 3.43. GCSE grade 7 and above: Attainment gaps in 2018 and 2019 outcomes, differences between 2018 and 2019 attainment gaps, attainment gaps in 2020 outcome and differences between 2020 attainment gaps from weighted average attainment gaps of 2018 and 2019.

	2018	2019	2019-18	2020					
				Final Grades		CAGs		Calculated Grades	
	Outcome	Outcome	Difference	Outcome	Difference	Outcome	Difference	Outcome	Difference
GENDER									
Female - Male	6.26	6.47	0.21	7.97	1.61	7.77	1.41	6.69	0.33
ETHNICITY									
WHIT – AOEG	-2.94	-2.81	0.14	-2.90	-0.03	-2.79	0.08	-2.30	0.57
WHIT – ASIA	-6.20	-7.70	-1.50	-7.79	-0.83	-7.64	-0.68	-7.16	-0.19
WHIT – BLAC	2.62	2.75	0.13	3.37	0.68	3.47	0.78	3.38	0.69
WHIT – CHIN	-29.09	-29.83	-0.75	-32.94	-3.47	-32.96	-3.49	-30.63	-1.16
WHIT – MIXD	-2.90	-3.03	-0.13	-2.59	0.38	-2.58	0.39	-2.51	0.46
Known – (unknown+UNCL)	-14.72	-13.77	0.96	-15.63	-1.39	-15.52	-1.29	-13.59	0.64
LANGUAGE									
ENG – OTH	-1.29	-1.76	-0.46	-1.45	0.08	-1.35	0.18	-1.25	0.28
Known – (unknown+UNCL)	-23.97	-21.76	2.21	-27.13	-4.28	-26.91	-4.06	-23.48	-0.63
SEN									
NON – (SNS+SS)	15.12	14.96	-0.16	18.62	3.58	18.18	3.14	15.22	0.18
Known – (unknown+UNCL)	-26.42	-25.11	1.31	-31.12	-5.36	-30.82	-5.07	-26.78	-1.02
FSM									
NON – YES	13.20	13.19	-0.01	16.02	2.82	15.76	2.57	13.66	0.47
Known – unknown	-26.42	-25.11	1.31	-31.08	-5.32	-30.82	-5.07	-26.78	-1.02
SES									
High – Low	14.57	14.27	-0.29	15.30	0.88	15.18	0.76	13.81	-0.61
Known – unknown	-23.24	-22.40	0.84	-28.03	-5.22	-27.79	-4.98	-24.17	-1.36

Table 3.44. GCSE grade 4 and above: Attainment gaps in 2018 and 2019 outcomes, differences between 2018 and 2019 attainment gaps, attainment gaps in 2020 outcome and differences between 2020 attainment gaps from weighted average attainment gaps of 2018 and 2019.

	2018	2019	2019-18	2020					
				Final Grades		CAGs		Calculated Grades	
	Outcome	Outcome	Difference	Outcome	Difference	Outcome	Difference	Outcome	Difference
GENDER									
Female - Male	8.64	8.49	-0.15	7.56	-1.01	7.66	-0.91	8.90	0.33
ETHNICITY									
WHIT – AOEG	-0.90	-0.71	0.18	0.06	0.86	0.11	0.91	-0.32	0.48
WHIT – ASIA	-4.63	-5.32	-0.69	-4.07	0.90	-4.12	0.86	-5.21	-0.23
WHIT – BLAC	2.81	3.51	0.70	1.80	-1.37	1.86	-1.31	3.15	-0.02
WHIT – CHIN	-19.84	-20.14	-0.30	-15.86	4.14	-16.06	3.94	-20.13	-0.14
WHIT – MIXD	-0.94	-1.01	-0.08	-0.38	0.60	-0.37	0.61	-0.65	0.33
Known – (unknown+UNCL)	-8.09	-7.89	0.20	-5.92	2.08	-5.91	2.08	-7.44	0.55
LANGUAGE									
ENG – OTH	0.59	0.57	-0.02	1.32	0.75	1.35	0.77	1.20	0.62
Known – (unknown+UNCL)	-14.84	-13.86	0.98	-11.57	2.78	-11.60	2.74	-14.38	-0.04
SEN									
NON – (SNS+SS)	33.25	32.34	-0.91	31.36	-1.43	31.60	-1.19	33.18	0.39
Known – (unknown+UNCL)	-16.58	-16.23	0.34	-14.01	2.39	-14.00	2.40	-17.18	-0.77
FSM									
NON – YES	22.00	21.68	-0.32	20.33	-1.51	20.53	-1.31	22.51	0.68
Known – unknown	-16.58	-16.23	0.34	-13.95	2.45	-14.00	2.40	-17.18	-0.77
SES									
High – Low	19.42	19.18	-0.25	15.73	-3.57	15.90	-3.40	18.59	-0.71
Known – unknown	-14.14	-14.13	0.02	-12.30	1.84	-12.34	1.80	-15.03	-0.90

Table 3.45. GCSE mean grade: Attainment gaps in 2018 and 2019 outcomes, differences between 2018 and 2019 attainment gaps, attainment gaps in 2020 outcome and differences between 2020 attainment gaps from weighted average attainment gaps of 2018 and 2019.

	2018	2019	2019-18	2020					
				Final Grades		CAGs		Calculated Grades	
	Outcome	Outcome	Difference	Outcome	Difference	Outcome	Difference	Outcome	Difference
GENDER									
Female - Male	0.48	0.48	0.00	0.49	0.01	0.49	0.00	0.49	0.01
ETHNICITY									
WHIT – AOEG	-0.12	-0.10	0.02	-0.09	0.02	-0.08	0.02	-0.07	0.03
WHIT – ASIA	-0.35	-0.42	-0.07	-0.39	0.00	-0.38	0.00	-0.40	-0.01
WHIT – BLAC	0.16	0.19	0.03	0.16	-0.02	0.16	-0.01	0.19	0.02
WHIT – CHIN	-1.59	-1.62	-0.03	-1.60	0.00	-1.61	0.00	-1.64	-0.03
WHIT – MIXD	-0.12	-0.13	-0.01	-0.10	0.02	-0.10	0.02	-0.10	0.02
Known – (unknown+UNCL)	-0.73	-0.69	0.04	-0.71	0.01	-0.70	0.01	-0.68	0.04
LANGUAGE									
ENG – OTH	-0.02	-0.03	-0.01	-0.01	0.02	0.00	0.02	0.00	0.03
Known – (unknown+UNCL)	-1.25	-1.14	0.10	-1.26	-0.07	-1.26	-0.06	-1.21	-0.01
SEN									
NON – (SNS+SS)	1.57	1.53	-0.03	1.55	0.01	1.56	0.02	1.56	0.01
Known – (unknown+UNCL)	-1.38	-1.33	0.06	-1.47	-0.12	-1.46	-0.11	-1.41	-0.05
FSM									
NON – YES	1.13	1.12	-0.01	1.15	0.02	1.16	0.03	1.16	0.04
Known – unknown	-1.38	-1.33	0.06	-1.47	-0.11	-1.46	-0.11	-1.41	-0.05
SES									
High – Low	1.08	1.07	-0.02	0.99	-0.09	0.99	-0.08	1.03	-0.04
Known – unknown	-1.20	-1.17	0.03	-1.31	-0.13	-1.31	-0.12	-1.25	-0.07

3.5.2 Multivariate analysis: across subjects

3.5.2.1 General interpretation

The modelling exercise presented below was conducted using data from a range of GCSE subjects: art & design, biology, chemistry, citizenship studies, classical Greek, computing, dance, drama, food preparation & nutrition, French, German, geography, Latin, music, physical education, physics, religious studies, and Spanish. The tables in sections 3.5.2.2 (final grades), 3.5.2.3 (calculated grades), and 3.5.2.4 (CAGs) provide estimates of the attainment gaps between candidates based on protected characteristics and socio-economic status for each year.

In contrast to the models used for A level (sections 3.4.2 & 3.4.3) and GCSE separate subjects (section 3.5.3) analyses – all of which include the interaction between each term and Year for 2018 and 2020 – the GCSE cross-subject analyses were conducted separately for 2018, 2019, and 2020. This was necessary due to limitations in computing power. The statistics reported for each year are the same as those reported for 2019 in the A level and GCSE separate subject analyses, i.e. parameter estimates for each year, rather than the interaction between each term and Year. These can be interpreted as described in section 3.4.2.1.

It is notable that more parameter estimates are significant in the GCSE models than in the A level models. This is most likely explained by the longer time that elapses between Key Stage 2 assessments and GCSE compared with that between GCSE and A level. The effects of other background characteristics refer to the period between the candidate taking the measure of prior attainment and the current exam. Effects predating the measure of prior attainment are rolled up in the effect of prior attainment.

3.5.2.2 Final grades

3.5.2.2.1 Grade 7 and above

Table 3.46 shows that most significant effects are present across 2018, 2019, and 2020 (using final grades). There are some small, borderline significant effects relating to FSM eligibility and Any Other Ethnic Group vs white present in 2019, but not 2018 – and vice versa. More importantly, the effects are very consistent between 2019 and 2020. For most effects, the regression coefficients change by nought to three hundredths (0 to 3 per cent). The largest changes are to the effect of prior attainment on a candidate's probability of achieving **grade 7 and above**. The reference candidate (low prior attainment) increased by 0.04, the candidate with medium vs low attainment by more (0.04+0.04=0.08), and the candidates with high vs low attainment the most (0.04+0.08=0.12). The effect of high vs low socio-economic status did not change between 2019 and 2020, suggesting the increase in outcomes is related primarily to prior attainment, not socio-economic status.

3.5.2.2.2 Grade 4 and above

The picture at **grade 4 and above** is very similar to that at **grade 7 and above**: one of stability across 2018, 2019, and 2020, with the exception of increases in the probability of achieving **grade 4 and above** for candidates of all prior attainment levels. As was the case with A level (3.4.2.2), the likelihood of crossing the higher grade threshold (A/7) increased most for candidates with high prior attainment, whereas the likelihood of crossing the lower grade threshold (C/4) increased most for

those with low and medium prior attainment. Again, there are no substantial changes to the effect of socio-economic status on attainment.

3.5.2.2.3 Grade point score

Table 3.48 shows that the reference candidate in 2020 achieves between two thirds and three quarters of a grade higher than the reference candidates in 2018 and 2019, respectively. This is broadly in line with the effect of using final grades that is seen at A level (Table 3.18).

In 2020 the estimate of the coefficient for male candidates is -0.56, meaning that, once other factors are controlled for, males tend to achieve approximately half a grade less than females. This is in line with the findings for 2019 and 2018, when the gap was -0.54 in both years. It is notable that the gender gap is unaltered by using final grades at GCSE. This further supports the idea that the effect seen at A level – the narrowing of a gender gap that previously favoured males over females – reflects a genuine shift in males' and females' relative attainment rather than bias in the 2020 awarding processes.

Besides the change in the attainment of the reference candidate in 2020, the parameter estimates across the three years are all very similar. The only effect not significant in 2020 that was significant in 2018 and 2019 was medium vs low SES; however, the parameter estimates and effects sizes are actually very similar. Overall, the analyses suggest that no significant gaps in attainment based on candidate characteristics have been created or exacerbated by the use of Final grades in 2020.

Table 3.46. Parameter estimates of each year's linear mixed effect model of effects of student background variables on probability of obtaining grade 7 and above at GCSEs (Subject effects omitted).

	2018 actual				2019 actual				2020 final grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.09	0.00	32.85	0.22	0.10	0.00	36.33	0.25	0.14	0.00	49.26	0.33
Prior attainment: High	0.34	0.00	276.31	0.83	0.35	0.00	281.63	0.84	0.43	0.00	330.30	0.98
Prior attainment: Mid	0.08	0.00	69.18	0.20	0.09	0.00	70.56	0.21	0.13	0.00	100.67	0.29
Prior attainment: Unknown	0.16	0.00	100.97	0.38	0.16	0.00	101.40	0.38	0.19	0.00	115.75	0.45
Gender: Male	-0.07	0.00	-73.03	-0.16	-0.07	0.00	-76.26	-0.17	-0.09	0.00	-97.92	-0.22
Gender: Unknown	0.12	0.09	1.44	0.30	-0.07	0.07	-1.01	-0.16	-0.07	0.08	-0.86	-0.17
FSM: Yes	-0.04	0.00	-25.77	-0.09	-0.04	0.00	-29.19	-0.10	-0.06	0.00	-40.49	-0.13
FSM: Unknown	0.06	0.01	4.93	0.14	0.03	0.01	2.68	0.08	0.04	0.01	2.83	0.08
Ethnicity: AOEG	0.04	0.00	11.29	0.10	0.04	0.00	10.32	0.09	0.04	0.00	10.43	0.09
Ethnicity: ASIA	0.04	0.00	22.63	0.10	0.05	0.00	27.13	0.12	0.05	0.00	26.65	0.12
Ethnicity: BLAC	0.00	0.00	1.56	0.01	0.01	0.00	3.32	0.02	0.00	0.00	1.45	0.01
Ethnicity: CHIN	0.12	0.01	17.78	0.29	0.12	0.01	18.92	0.30	0.15	0.01	21.96	0.35
Ethnicity: MIXD	0.02	0.00	9.65	0.05	0.02	0.00	12.35	0.06	0.02	0.00	9.81	0.05
Ethnicity: UNCL	0.01	0.00	1.35	0.01	0.00	0.00	0.28	0.00	0.00	0.00	-0.27	0.00
Language: OTH	0.03	0.00	21.64	0.08	0.03	0.00	21.64	0.08	0.04	0.00	23.70	0.09
Language: UNCL	0.01	0.01	1.09	0.03	0.01	0.01	0.98	0.02	-0.01	0.01	-1.18	-0.03
SEN: SNS	-0.05	0.00	-31.26	-0.12	-0.05	0.00	-29.91	-0.11	-0.06	0.00	-39.04	-0.15

	2018 actual				2019 actual				2020 final grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.06	0.00	-16.51	-0.15	-0.06	0.00	-16.98	-0.15	-0.08	0.00	-20.26	-0.18
SES: High	0.06	0.00	45.72	0.15	0.06	0.00	44.27	0.14	0.06	0.00	41.57	0.13
SES: Mid	0.02	0.00	20.34	0.06	0.02	0.00	20.33	0.06	0.03	0.00	19.95	0.06
SES: Unknown	0.01	0.01	1.04	0.03	0.02	0.01	2.06	0.06	0.02	0.01	2.02	0.06
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Student variance	0.052				0.052				0.058			
Centre variance	0.023				0.022				0.023			
Residual variance	0.097				0.098				0.106			

Table 3.47. Parameter estimates of each year's linear mixed effect model of effects of student background variables on probability of obtaining grade 4 and above at GCSEs (Subject effects omitted).

	2018 actual				2019 actual				2020 final grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.42	0.00	152.23	1.05	0.43	0.00	157.48	1.08	0.61	0.00	267.39	1.77
Prior attainment: High	0.44	0.00	351.92	1.10	0.44	0.00	354.28	1.10	0.32	0.00	288.73	0.92
Prior attainment: Mid	0.27	0.00	218.82	0.67	0.26	0.00	217.09	0.66	0.22	0.00	209.70	0.65
Prior attainment: Unknown	0.20	0.00	131.58	0.51	0.20	0.00	131.35	0.51	0.14	0.00	98.53	0.40
Gender: Male	-0.10	0.00	-106.95	-0.25	-0.10	0.00	-108.83	-0.25	-0.09	0.00	-103.65	-0.25
Gender: Unknown	-0.05	0.09	-0.53	-0.11	-0.02	0.06	-0.37	-0.06	-0.01	0.07	-0.13	-0.03
FSM: Yes	-0.08	0.00	-54.50	-0.20	-0.08	0.00	-58.70	-0.21	-0.09	0.00	-73.77	-0.26
FSM: Unknown	0.04	0.01	3.12	0.09	0.02	0.01	1.43	0.04	0.01	0.01	0.60	0.02
Ethnicity: AOEG	0.05	0.00	14.17	0.13	0.04	0.00	10.97	0.10	0.03	0.00	10.37	0.09
Ethnicity: ASIA	0.06	0.00	31.27	0.15	0.06	0.00	32.69	0.16	0.05	0.00	29.98	0.14
Ethnicity: BLAC	0.03	0.00	13.44	0.07	0.03	0.00	12.51	0.07	0.03	0.00	17.57	0.10
Ethnicity: CHIN	0.08	0.01	12.41	0.21	0.09	0.01	13.32	0.22	0.07	0.01	11.65	0.20
Ethnicity: MIXD	0.02	0.00	9.58	0.05	0.02	0.00	11.24	0.06	0.01	0.00	8.31	0.04
Ethnicity: UNCL	0.00	0.00	-0.46	-0.01	0.00	0.00	-1.18	-0.01	0.00	0.00	-0.24	0.00
Language: OTH	0.04	0.00	22.73	0.09	0.03	0.00	20.40	0.08	0.02	0.00	11.08	0.04
Language: UNCL	0.02	0.01	1.90	0.06	0.01	0.01	0.79	0.02	-0.03	0.01	-3.60	-0.10
SEN: SNS	-0.14	0.00	-87.23	-0.35	-0.13	0.00	-84.86	-0.34	-0.14	0.00	-100.36	-0.40

	2018 actual				2019 actual				2020 final grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.16	0.00	-44.63	-0.41	-0.16	0.00	-45.88	-0.41	-0.19	0.00	-59.69	-0.55
SES: High	0.08	0.00	59.96	0.20	0.08	0.00	57.28	0.19	0.06	0.00	47.80	0.17
SES: Mid	0.04	0.00	33.39	0.10	0.04	0.00	29.53	0.09	0.03	0.00	26.77	0.08
SES: Unknown	0.01	0.01	0.64	0.02	0.02	0.01	1.80	0.05	0.01	0.01	1.32	0.04
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Student variance	0.062				0.062				0.052			
Centre variance	0.021				0.021				0.014			
Residual variance	0.075				0.075				0.053			

Table 3.48. Parameter estimates of each year's linear mixed effect model of effects of candidate background variables on GCSE grades (Subject effects omitted).

	2018 actual				2019 actual				2020 final grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.52	0.02	214.74	1.85	3.60	0.02	221.61	1.89	4.25	0.01	285.68	2.39
Prior attainment: High	2.40	0.01	414.35	1.26	2.40	0.01	417.74	1.26	2.31	0.01	426.18	1.30
Prior attainment: Mid	1.08	0.01	191.64	0.57	1.07	0.01	190.63	0.56	1.06	0.01	201.81	0.60
Prior attainment: Unknown	1.03	0.01	144.18	0.54	1.04	0.01	143.07	0.54	0.98	0.01	140.05	0.55
Gender: Male	-0.54	0.00	-123.24	-0.28	-0.54	0.00	-125.77	-0.29	-0.56	0.00	-137.74	-0.32
Gender: Unknown	0.15	0.40	0.38	0.08	-0.06	0.27	-0.22	-0.03	-0.25	0.31	-0.79	-0.14
FSM: Yes	-0.40	0.01	-57.43	-0.21	-0.41	0.01	-62.35	-0.22	-0.45	0.01	-76.49	-0.25
FSM: Unknown	0.26	0.05	4.88	0.14	0.15	0.06	2.67	0.08	0.08	0.05	1.45	0.04
Ethnicity: AOEG	0.30	0.02	16.98	0.16	0.24	0.02	14.26	0.13	0.22	0.02	14.35	0.13
Ethnicity: ASIA	0.33	0.01	36.55	0.18	0.36	0.01	40.84	0.19	0.32	0.01	38.24	0.18
Ethnicity: BLAC	0.13	0.01	12.44	0.07	0.14	0.01	13.32	0.07	0.13	0.01	13.21	0.07
Ethnicity: CHIN	0.69	0.03	21.22	0.36	0.69	0.03	21.83	0.36	0.74	0.03	24.43	0.41
Ethnicity: MIXD	0.12	0.01	12.46	0.06	0.16	0.01	16.62	0.08	0.12	0.01	13.29	0.07
Ethnicity: UNCL	0.01	0.02	0.27	0.00	-0.03	0.02	-1.32	-0.01	-0.01	0.02	-0.66	-0.01
Language: OTH	0.22	0.01	29.88	0.12	0.21	0.01	28.20	0.11	0.18	0.01	26.69	0.10
Language: UNCL	0.11	0.05	1.97	0.06	0.05	0.05	1.07	0.03	-0.11	0.05	-2.39	-0.06
SEN: SNS	-0.66	0.01	-88.66	-0.34	-0.63	0.01	-85.90	-0.33	-0.63	0.01	-92.40	-0.35
SEN: SS	-0.77	0.02	-44.64	-0.40	-0.77	0.02	-46.18	-0.40	-0.82	0.02	-51.99	-0.46

	2018 actual				2019 actual				2020 final grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: High	0.44	0.01	69.86	0.23	0.43	0.01	68.15	0.22	0.36	0.01	60.68	0.20
SES: Mid	0.21	0.01	36.04	0.11	0.19	0.01	34.19	0.10	0.17	0.01	31.40	0.09
SES: Unknown	0.02	0.05	0.40	0.01	0.10	0.05	1.89	0.05	0.14	0.05	2.63	0.08
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Candidate variance	1.564				1.544				1.387			
Centre variance	0.913				0.893				0.738			
Residual variance	1.167				1.191				1.035			

3.5.2.3 Calculated grades

3.5.2.3.1 Grade 7 and above

The significant effects in 2020 using calculated grades (Table 3.49) are the same as those in 2019, and the parameter estimates are very similar. This includes the outcome for the reference candidate and the estimates for high vs low and medium vs low prior attainment groups. In short, the probability of any candidate achieving **grade 7 and above** using calculated grades in 2020 would have been very similar for a candidate with the same characteristics in 2019.

3.5.2.3.2 Grade 4 and above

Table 3.50 shows the parameter estimates for the probability of a candidate achieving **grade 4 and above** in 2018, 2019, and 2020 (using calculated grades). As was the case for **grade 7 and above**, the significant effects in 2020 are the same as those in 2019, and the parameter estimates are very similar. The probability of any candidate achieving **grade 4 and above** using calculated grades in 2020 would have been very similar for a candidate with the same characteristics in 2019.

3.5.2.3.3 Grade point score

Table 3.51 shows that the reference candidate in 2020 achieves no greater than one fifth of a grade more than the reference candidates in 2018 and 2019. This is a larger increase than observed for calculated grades at A level, but notably smaller than the increase seen for final grades at GCSE (Table 3.48). Other than this difference, the parameter estimates for calculated grades in 2020 are remarkably similar to those in 2018 and 2019. There is no evidence that they would have introduced or exacerbated any attainment gaps between groups of candidates based on protected characteristics or socio-economic status.

Table 3.49. Parameter estimates of each year's linear mixed effect model of effects of student background variables on probability of obtaining grade 7 and above at GCSEs (Subject effects omitted).

	2018 actual				2019 actual				2020 calculated grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.09	0.00	32.85	0.22	0.10	0.00	36.33	0.25	0.11	0.00	41.78	0.28
Prior attainment: High	0.34	0.00	276.31	0.83	0.35	0.00	281.63	0.84	0.34	0.00	281.69	0.83
Prior attainment: Mid	0.08	0.00	69.18	0.20	0.09	0.00	70.56	0.21	0.08	0.00	70.37	0.20
Prior attainment: Unknown	0.16	0.00	100.97	0.38	0.16	0.00	101.40	0.38	0.16	0.00	99.02	0.38
Gender: Male	-0.07	0.00	-73.03	-0.16	-0.07	0.00	-76.26	-0.17	-0.08	0.00	-83.36	-0.18
Gender: Unknown	0.12	0.09	1.44	0.30	-0.07	0.07	-1.01	-0.16	-0.15	0.08	-1.87	-0.36
FSM: Yes	-0.04	0.00	-25.77	-0.09	-0.04	0.00	-29.19	-0.10	-0.04	0.00	-32.69	-0.11
FSM: Unknown	0.06	0.01	4.93	0.14	0.03	0.01	2.68	0.08	0.03	0.01	2.56	0.07
Ethnicity: AOEG	0.04	0.00	11.29	0.10	0.04	0.00	10.32	0.09	0.03	0.00	8.46	0.07
Ethnicity: ASIA	0.04	0.00	22.63	0.10	0.05	0.00	27.13	0.12	0.04	0.00	22.78	0.10
Ethnicity: BLAC	0.00	0.00	1.56	0.01	0.01	0.00	3.32	0.02	0.00	0.00	-0.21	0.00
Ethnicity: CHIN	0.12	0.01	17.78	0.29	0.12	0.01	18.92	0.30	0.14	0.01	20.95	0.33
Ethnicity: MIXD	0.02	0.00	9.65	0.05	0.02	0.00	12.35	0.06	0.02	0.00	9.06	0.04
Ethnicity: UNCL	0.01	0.00	1.35	0.01	0.00	0.00	0.28	0.00	0.00	0.00	0.83	0.01
Language: OTH	0.03	0.00	21.64	0.08	0.03	0.00	21.64	0.08	0.03	0.00	21.81	0.08
Language: UNCL	0.01	0.01	1.09	0.03	0.01	0.01	0.98	0.02	0.00	0.01	-0.39	-0.01
SEN: SNS	-0.05	0.00	-31.26	-0.12	-0.05	0.00	-29.91	-0.11	-0.05	0.00	-30.88	-0.11

	2018 actual				2019 actual				2020 calculated grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.06	0.00	-16.51	-0.15	-0.06	0.00	-16.98	-0.15	-0.05	0.00	-14.63	-0.13
SES: High	0.06	0.00	45.72	0.15	0.06	0.00	44.27	0.14	0.05	0.00	36.50	0.12
SES: Mid	0.02	0.00	20.34	0.06	0.02	0.00	20.33	0.06	0.02	0.00	17.36	0.05
SES: Unknown	0.01	0.01	1.04	0.03	0.02	0.01	2.06	0.06	0.03	0.01	2.31	0.06
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Student variance	0.052				0.052				0.049			
Centre variance	0.023				0.022				0.021			
Residual variance	0.097				0.098				0.104			

Table 3.50. Parameter estimates of each year's linear mixed effect model of effects of student background variables on probability of obtaining grade 4 and above at GCSEs (Subject effects omitted).

	2018 actual				2019 actual				2020 calculated grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.42	0.00	152.23	1.05	0.43	0.00	157.48	1.08	0.45	0.00	173.80	1.15
Prior attainment: High	0.44	0.00	351.92	1.10	0.44	0.00	354.28	1.10	0.42	0.00	349.48	1.07
Prior attainment: Mid	0.27	0.00	218.82	0.67	0.26	0.00	217.09	0.66	0.26	0.00	219.37	0.66
Prior attainment: Unknown	0.20	0.00	131.58	0.51	0.20	0.00	131.35	0.51	0.20	0.00	127.91	0.51
Gender: Male	-0.10	0.00	-106.95	-0.25	-0.10	0.00	-108.83	-0.25	-0.10	0.00	-113.96	-0.26
Gender: Unknown	-0.05	0.09	-0.53	-0.11	-0.02	0.06	-0.37	-0.06	0.01	0.08	0.16	0.03
FSM: Yes	-0.08	0.00	-54.50	-0.20	-0.08	0.00	-58.70	-0.21	-0.09	0.00	-68.29	-0.23
FSM: Unknown	0.04	0.01	3.12	0.09	0.02	0.01	1.43	0.04	0.03	0.01	2.21	0.07
Ethnicity: AOEG	0.05	0.00	14.17	0.13	0.04	0.00	10.97	0.10	0.04	0.00	11.35	0.10
Ethnicity: ASIA	0.06	0.00	31.27	0.15	0.06	0.00	32.69	0.16	0.06	0.00	31.01	0.14
Ethnicity: BLAC	0.03	0.00	13.44	0.07	0.03	0.00	12.51	0.07	0.03	0.00	12.75	0.07
Ethnicity: CHIN	0.08	0.01	12.41	0.21	0.09	0.01	13.32	0.22	0.09	0.01	14.36	0.24
Ethnicity: MIXD	0.02	0.00	9.58	0.05	0.02	0.00	11.24	0.06	0.02	0.00	9.02	0.04
Ethnicity: UNCL	0.00	0.00	-0.46	-0.01	0.00	0.00	-1.18	-0.01	-0.01	0.00	-2.00	-0.02
Language: OTH	0.04	0.00	22.73	0.09	0.03	0.00	20.40	0.08	0.02	0.00	16.45	0.06
Language: UNCL	0.02	0.01	1.90	0.06	0.01	0.01	0.79	0.02	-0.03	0.01	-2.56	-0.06
SEN: SNS	-0.14	0.00	-87.23	-0.35	-0.13	0.00	-84.86	-0.34	-0.13	0.00	-87.18	-0.34

	2018 actual				2019 actual				2020 calculated grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.16	0.00	-44.63	-0.41	-0.16	0.00	-45.88	-0.41	-0.17	0.00	-49.51	-0.44
SES: High	0.08	0.00	59.96	0.20	0.08	0.00	57.28	0.19	0.07	0.00	51.59	0.17
SES: Mid	0.04	0.00	33.39	0.10	0.04	0.00	29.53	0.09	0.03	0.00	27.42	0.08
SES: Unknown	0.01	0.01	0.64	0.02	0.02	0.01	1.80	0.05	0.01	0.01	0.61	0.02
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Student variance	0.062				0.062				0.056			
Centre variance	0.021				0.021				0.018			
Residual variance	0.075				0.075				0.082			

Table 3.51. Parameter estimates of each year's linear mixed effect model of effects of candidate background variables on GCSE grades (Subject effects omitted).

	2018 actual				2019 actual				2020 calculated grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.52	0.02	214.74	1.85	3.60	0.02	221.61	1.89	3.72	0.02	236.76	1.96
Prior attainment: High	2.40	0.01	414.35	1.26	2.40	0.01	417.74	1.26	2.36	0.01	413.96	1.24
Prior attainment: Mid	1.08	0.01	191.64	0.57	1.07	0.01	190.63	0.56	1.06	0.01	191.33	0.56
Prior attainment: Unknown	1.03	0.01	144.18	0.54	1.04	0.01	143.07	0.54	1.02	0.01	138.27	0.54
Gender: Male	-0.54	0.00	-123.24	-0.28	-0.54	0.00	-125.77	-0.29	-0.56	0.00	-131.19	-0.30
Gender: Unknown	0.15	0.40	0.38	0.08	-0.06	0.27	-0.22	-0.03	-0.39	0.34	-1.16	-0.21
FSM: Yes	-0.40	0.01	-57.43	-0.21	-0.41	0.01	-62.35	-0.22	-0.44	0.01	-71.12	-0.23
FSM: Unknown	0.26	0.05	4.88	0.14	0.15	0.06	2.67	0.08	0.10	0.06	1.72	0.05
Ethnicity: AOEG	0.30	0.02	16.98	0.16	0.24	0.02	14.26	0.13	0.22	0.02	13.23	0.11
Ethnicity: ASIA	0.33	0.01	36.55	0.18	0.36	0.01	40.84	0.19	0.31	0.01	36.13	0.17
Ethnicity: BLAC	0.13	0.01	12.44	0.07	0.14	0.01	13.32	0.07	0.11	0.01	10.91	0.06
Ethnicity: CHIN	0.69	0.03	21.22	0.36	0.69	0.03	21.83	0.36	0.76	0.03	24.14	0.40
Ethnicity: MIXD	0.12	0.01	12.46	0.06	0.16	0.01	16.62	0.08	0.12	0.01	12.47	0.06
Ethnicity: UNCL	0.01	0.02	0.27	0.00	-0.03	0.02	-1.32	-0.01	-0.01	0.02	-0.76	-0.01
Language: OTH	0.22	0.01	29.88	0.12	0.21	0.01	28.20	0.11	0.18	0.01	25.96	0.10
Language: UNCL	0.11	0.05	1.97	0.06	0.05	0.05	1.07	0.03	-0.09	0.05	-1.82	-0.05
SEN: SNS	-0.66	0.01	-88.66	-0.34	-0.63	0.01	-85.90	-0.33	-0.62	0.01	-86.59	-0.33

	2018 actual				2019 actual				2020 calculated grades			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.77	0.02	-44.64	-0.40	-0.77	0.02	-46.18	-0.40	-0.79	0.02	-47.50	-0.42
SES: High	0.44	0.01	69.86	0.23	0.43	0.01	68.15	0.22	0.36	0.01	58.61	0.19
SES: Mid	0.21	0.01	36.04	0.11	0.19	0.01	34.19	0.10	0.17	0.01	30.10	0.09
SES: Unknown	0.02	0.05	0.40	0.01	0.10	0.05	1.89	0.05	0.13	0.05	2.47	0.07
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Candidate variance	1.564				1.544				1.452			
Centre variance	0.913				0.893				0.820			
Residual variance	1.167				1.191				1.313			

3.5.2.4 Centre assessment grades – CAGs

3.5.2.4.1 Grade 7 and above

The changes in parameter estimates using CAGs (Table 3.52) are very similar to those observed for final grades in 3.5.2.2. The reference candidate has a slightly higher probability (+0.04) of achieving **grade 7 and above** than in 2019, while the probabilities for candidates in the higher groups have risen more: medium vs low (0.04+0.3=0.7); high vs low (0.4+0.07=0.11). The effect of high vs low socio-economic status did not change between 2019 and 2020, suggesting the increase in outcomes is related primarily to prior attainment, not socio-economic status.

3.5.2.4.2 Grade 4 and above

Again, the effects of using CAGs on a candidate's probability of achieving **grade 4 and above** in 2020 are very similar to those of using final grades (section 3.5.2.2). The reference candidate (low prior attainment) increased by 0.17, the candidate with medium vs low attainment by a little less (0.17-0.03=0.14), and the candidates with high vs low attainment the least (0.17-0.12=0.05). Again, the effect of high vs low socio-economic status did not change between 2019 and 2020, suggesting the increase in outcomes is related primarily to prior attainment, not socio-economic status.

3.5.2.4.3 Grade point score

The parameter estimates for CAGs in Table 3.54 are very similar to those for final grades in Table 3.48. As expected, the reference candidate in 2020 achieves almost the same grade: 4.21 for CAGs compared with 4.25 for final grades. The difference is similar to that seen at A level: 2.95 for CAGs compared with 2.98 for final grades (Table 3.18 & Table 3.24). Regarding the effect of medium vs low SES present in 2018 and 2019 but not in 2020, the comments made in section 3.5.2.2 also apply here; the parameter estimates and effects sizes are actually very similar across the years. Overall, the analyses suggest that no significant gaps in attainment based on candidate characteristics have been created or exacerbated by the use of CAGs in 2020.

Table 3.52. Parameter estimates of each year's linear mixed effect model of effects of student background variables on probability of obtaining grade 7 and above at GCSEs (Subject effects omitted).

	2018 actual				2019 actual				2020 CAGs			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.09	0.00	32.85	0.22	0.10	0.00	36.33	0.25	0.14	0.00	47.84	0.32
Prior attainment: High	0.34	0.00	276.31	0.83	0.35	0.00	281.63	0.84	0.42	0.00	325.80	0.97
Prior attainment: Mid	0.08	0.00	69.18	0.20	0.09	0.00	70.56	0.21	0.12	0.00	96.46	0.28
Prior attainment: Unknown	0.16	0.00	100.97	0.38	0.16	0.00	101.40	0.38	0.19	0.00	113.87	0.44
Gender: Male	-0.07	0.00	-73.03	-0.16	-0.07	0.00	-76.26	-0.17	-0.09	0.00	-95.37	-0.21
Gender: Unknown	0.12	0.09	1.44	0.30	-0.07	0.07	-1.01	-0.16	-0.06	0.08	-0.75	-0.15
FSM: Yes	-0.04	0.00	-25.77	-0.09	-0.04	0.00	-29.19	-0.10	-0.06	0.00	-39.45	-0.13
FSM: Unknown	0.06	0.01	4.93	0.14	0.03	0.01	2.68	0.08	0.04	0.01	3.24	0.09
Ethnicity: AOEG	0.04	0.00	11.29	0.10	0.04	0.00	10.32	0.09	0.04	0.00	10.05	0.08
Ethnicity: ASIA	0.04	0.00	22.63	0.10	0.05	0.00	27.13	0.12	0.05	0.00	25.85	0.12
Ethnicity: BLAC	0.00	0.00	1.56	0.01	0.01	0.00	3.32	0.02	0.00	0.00	0.72	0.00
Ethnicity: CHIN	0.12	0.01	17.78	0.29	0.12	0.01	18.92	0.30	0.15	0.01	21.93	0.35
Ethnicity: MIXD	0.02	0.00	9.65	0.05	0.02	0.00	12.35	0.06	0.02	0.00	9.88	0.05
Ethnicity: UNCL	0.01	0.00	1.35	0.01	0.00	0.00	0.28	0.00	0.00	0.00	-0.62	-0.01
Language: OTH	0.03	0.00	21.64	0.08	0.03	0.00	21.64	0.08	0.04	0.00	23.74	0.09
Language: UNCL	0.01	0.01	1.09	0.03	0.01	0.01	0.98	0.02	-0.01	0.01	-1.09	-0.03
SEN: SNS	-0.05	0.00	-31.26	-0.12	-0.05	0.00	-29.91	-0.11	-0.06	0.00	-37.85	-0.14

	2018 actual				2019 actual				2020 CAGs			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.06	0.00	-16.51	-0.15	-0.06	0.00	-16.98	-0.15	-0.07	0.00	-19.80	-0.17
SES: High	0.06	0.00	45.72	0.15	0.06	0.00	44.27	0.14	0.06	0.00	41.16	0.13
SES: Mid	0.02	0.00	20.34	0.06	0.02	0.00	20.33	0.06	0.02	0.00	19.89	0.06
SES: Unknown	0.01	0.01	1.04	0.03	0.02	0.01	2.06	0.06	0.02	0.01	1.52	0.04
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Student variance	0.052				0.052				0.057			
Centre variance	0.023				0.022				0.024			
Residual variance	0.097				0.098				0.105			

Table 3.53. Parameter estimates of each year's linear mixed effect model of effects of student background variables on probability of obtaining grade 4 and above at GCSEs (Subject effects omitted).

	2018 actual				2019 actual				2020 CAGs			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	0.42	0.00	152.23	1.05	0.43	0.00	157.48	1.08	0.60	0.00	259.79	1.74
Prior attainment: High	0.44	0.00	351.92	1.10	0.44	0.00	354.28	1.10	0.32	0.00	291.09	0.92
Prior attainment: Mid	0.27	0.00	218.82	0.67	0.26	0.00	217.09	0.66	0.23	0.00	210.58	0.65
Prior attainment: Unknown	0.20	0.00	131.58	0.51	0.20	0.00	131.35	0.51	0.14	0.00	98.59	0.40
Gender: Male	-0.10	0.00	-106.95	-0.25	-0.10	0.00	-108.83	-0.25	-0.09	0.00	-104.74	-0.25
Gender: Unknown	-0.05	0.09	-0.53	-0.11	-0.02	0.06	-0.37	-0.06	0.00	0.07	-0.06	-0.01
FSM: Yes	-0.08	0.00	-54.50	-0.20	-0.08	0.00	-58.70	-0.21	-0.09	0.00	-74.35	-0.26
FSM: Unknown	0.04	0.01	3.12	0.09	0.02	0.01	1.43	0.04	0.00	0.01	0.28	0.01
Ethnicity: AOEG	0.05	0.00	14.17	0.13	0.04	0.00	10.97	0.10	0.03	0.00	10.17	0.09
Ethnicity: ASIA	0.06	0.00	31.27	0.15	0.06	0.00	32.69	0.16	0.05	0.00	30.14	0.15
Ethnicity: BLAC	0.03	0.00	13.44	0.07	0.03	0.00	12.51	0.07	0.03	0.00	17.28	0.10
Ethnicity: CHIN	0.08	0.01	12.41	0.21	0.09	0.01	13.32	0.22	0.07	0.01	11.64	0.20
Ethnicity: MIXD	0.02	0.00	9.58	0.05	0.02	0.00	11.24	0.06	0.01	0.00	8.31	0.04
Ethnicity: UNCL	0.00	0.00	-0.46	-0.01	0.00	0.00	-1.18	-0.01	0.00	0.00	-0.44	0.00
Language: OTH	0.04	0.00	22.73	0.09	0.03	0.00	20.40	0.08	0.02	0.00	11.37	0.05
Language: UNCL	0.02	0.01	1.90	0.06	0.01	0.01	0.79	0.02	-0.03	0.01	-3.23	-0.09
SEN: SNS	-0.14	0.00	-87.23	-0.35	-0.13	0.00	-84.86	-0.34	-0.14	0.00	-101.04	-0.40

	2018 actual				2019 actual				2020 CAGs			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.16	0.00	-44.63	-0.41	-0.16	0.00	-45.88	-0.41	-0.19	0.00	-60.06	-0.55
SES: High	0.08	0.00	59.96	0.20	0.08	0.00	57.28	0.19	0.06	0.00	48.18	0.17
SES: Mid	0.04	0.00	33.39	0.10	0.04	0.00	29.53	0.09	0.03	0.00	26.92	0.08
SES: Unknown	0.01	0.01	0.64	0.02	0.02	0.01	1.80	0.05	0.02	0.01	1.59	0.05
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Student variance	0.062				0.062				0.053			
Centre variance	0.021				0.021				0.014			
Residual variance	0.075				0.075				0.053			

Table 3.54. Parameter estimates of each year's linear mixed effect model of effects of candidate background variables on GCSE grades (Subject effects omitted).

	2018 actual				2019 actual				2020 CAGs			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.52	0.02	214.74	1.85	3.60	0.02	221.61	1.89	4.21	0.02	276.62	2.35
Prior attainment: High	2.40	0.01	414.35	1.26	2.40	0.01	417.74	1.26	2.30	0.01	424.21	1.29
Prior attainment: Mid	1.08	0.01	191.64	0.57	1.07	0.01	190.63	0.56	1.06	0.01	201.57	0.59
Prior attainment: Unknown	1.03	0.01	144.18	0.54	1.04	0.01	143.07	0.54	0.97	0.01	138.04	0.54
Gender: Male	-0.54	0.00	-123.24	-0.28	-0.54	0.00	-125.77	-0.29	-0.56	0.00	-137.16	-0.31
Gender: Unknown	0.15	0.40	0.38	0.08	-0.06	0.27	-0.22	-0.03	-0.20	0.31	-0.65	-0.11
FSM: Yes	-0.40	0.01	-57.43	-0.21	-0.41	0.01	-62.35	-0.22	-0.46	0.01	-77.44	-0.26
FSM: Unknown	0.26	0.05	4.88	0.14	0.15	0.06	2.67	0.08	0.08	0.05	1.57	0.05
Ethnicity: AOEG	0.30	0.02	16.98	0.16	0.24	0.02	14.26	0.13	0.22	0.02	14.19	0.12
Ethnicity: ASIA	0.33	0.01	36.55	0.18	0.36	0.01	40.84	0.19	0.32	0.01	38.41	0.18
Ethnicity: BLAC	0.13	0.01	12.44	0.07	0.14	0.01	13.32	0.07	0.13	0.01	13.34	0.07
Ethnicity: CHIN	0.69	0.03	21.22	0.36	0.69	0.03	21.83	0.36	0.74	0.03	24.49	0.41
Ethnicity: MIXD	0.12	0.01	12.46	0.06	0.16	0.01	16.62	0.08	0.12	0.01	13.27	0.07
Ethnicity: UNCL	0.01	0.02	0.27	0.00	-0.03	0.02	-1.32	-0.01	-0.02	0.02	-0.97	-0.01
Language: OTH	0.22	0.01	29.88	0.12	0.21	0.01	28.20	0.11	0.18	0.01	26.54	0.10
Language: UNCL	0.11	0.05	1.97	0.06	0.05	0.05	1.07	0.03	-0.12	0.05	-2.55	-0.06
SEN: SNS	-0.66	0.01	-88.66	-0.34	-0.63	0.01	-85.90	-0.33	-0.64	0.01	-93.95	-0.36
SEN: SS	-0.77	0.02	-44.64	-0.40	-0.77	0.02	-46.18	-0.40	-0.84	0.02	-53.19	-0.47

	2018 actual				2019 actual				2020 CAGs			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SES: High	0.44	0.01	69.86	0.23	0.43	0.01	68.15	0.22	0.36	0.01	61.17	0.20
SES: Mid	0.21	0.01	36.04	0.11	0.19	0.01	34.19	0.10	0.17	0.01	31.74	0.09
SES: Unknown	0.02	0.05	0.40	0.01	0.10	0.05	1.89	0.05	0.12	0.05	2.35	0.07
N entries	1,533,248				1,561,984				1,567,688			
Random effects:												
Candidate variance	1.564				1.544				1.399			
Centre variance	0.913				0.893				0.782			
Residual variance	1.167				1.191				1.019			

3.5.3 Multivariate analysis: specific subjects

3.5.3.1 General interpretation

The analyses presented below model the relationships between the protected characteristics and socio-economic status of entries and their grade outcomes separately for GCSEs in: mathematics, English language, English literature, combined science, and history. The tables in this section follow the format of those in 3.4.2, and should be read in the way described there.

The highlighted effect sizes for 2019 in Table 3.55 to Table 3.59 (final grades), Table 3.60 to Table 3.64 (calculated grades), and Table 3.65 to Table 3.69 (CAGs) show that, after controlling for other variables, the effects of many variables were of a magnitude of substantive importance. As discussed in 3.4.2.2, these are effects that occur in between the measure of prior attainment – in this case Key Stage 2 – and the current exam. Any effect prior to that is included in the prior attainment measure. Likewise, the absence of an effect between Key Stage 2 and GCSE does not mean it had no effect prior to Key Stage 2.

As can be seen from the highlighting in the middle section of the tables, the overall picture is of stability between 2018 and 2019. Sections 3.5.3.2, 3.5.3.3, and 3.5.3.4 consider any changes between 2019 and 2020 for final grades, calculated grades, and CAGs, respectively.

3.5.3.2 Final grades

The third sections of Table 3.55 to Table 3.59 show whether any existing attainment gaps changed using final grades in 2020. The regression coefficient of each contrast indexes the magnitude of the change in gap between 2019 and 2020 after controlling for other variables.

In 2020, the intercept differed significantly from 2019 in each subject, i.e. the reference candidate did better in each subject by a third (e.g. English literature, Table 3.57) to two thirds of a grade (e.g. history, Table 3.59), depending on subject. Very few other effects changed significantly from the 2019 model.

Unclassified Language had small (approximately 1/5th grade) negative effects in three subjects, bordering on significance in history. Overall, it accounts for 0.15 per cent of entries in 2020 (Table 3.39). The effect is not present in maths. As maths tends to require less written language than the other subjects, one might speculate that teachers have slightly underestimated[32] the grades of entries in the other subjects on the basis of English being the candidates' second language. However, there is no overall effect of having English as an additional language for GCSE entries in 2020 (Table 3.48), despite more subjects requiring extensive written English than not. The effect is probably best explained by the kind of volatility expected for small groups.

[32] Strictly speaking, teachers overestimated English native speakers' grades more than EAL candidates' grades. That is, neither group was underestimated, and they received different degrees of overestimation.

Table 3.55. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE maths grades and changes thereof between years (actual grades in 2018 and 2019, final grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.04	0.01	235.59	1.87	-0.03	0.01	-3.56	-0.02	0.43	0.01	54.28	0.27
Prior attainment: High	2.93	0.01	536.29	1.80	0.00	0.01	-0.28	0.00	-0.08	0.01	-10.26	-0.05
Prior attainment: Mid	1.37	0.01	260.09	0.84	0.00	0.01	0.65	0.00	-0.04	0.01	-4.88	-0.02
Prior attainment: Unknown	0.85	0.01	122.07	0.52	-0.03	0.01	-3.54	-0.02	-0.02	0.01	-1.69	-0.01
Gender: Male	0.09	0.00	23.39	0.06	0.02	0.01	3.31	0.01	-0.07	0.01	-11.79	-0.04
Gender: Unknown	-0.31	0.21	-1.51	-0.19	0.35	0.68	0.52	0.22	0.31	0.33	0.93	0.19
FSM: Yes	-0.40	0.01	-66.34	-0.25	0.00	0.01	-0.53	0.00	-0.02	0.01	-2.83	-0.01
FSM: Unknown	-0.09	0.05	-1.60	-0.05	0.03	0.07	0.35	0.02	0.16	0.08	2.17	0.10
Ethnicity: AOEG	0.22	0.02	13.28	0.13	0.01	0.02	0.36	0.01	0.08	0.02	3.41	0.05
Ethnicity: ASIA	0.48	0.01	59.13	0.30	-0.05	0.01	-4.60	-0.03	0.02	0.01	2.08	0.01
Ethnicity: BLAC	0.02	0.01	2.56	0.01	0.01	0.01	0.56	0.00	0.10	0.01	7.54	0.06
Ethnicity: CHIN	1.24	0.03	37.22	0.76	0.03	0.05	0.69	0.02	-0.02	0.05	-0.53	-0.02
Ethnicity: MIXD	0.05	0.01	5.35	0.03	-0.04	0.01	-3.00	-0.02	0.00	0.01	0.19	0.00
Ethnicity: UNCL	-0.06	0.02	-3.38	-0.04	0.01	0.03	0.50	0.01	0.03	0.03	1.29	0.02
Language: OTH	0.14	0.01	20.49	0.09	0.02	0.01	2.16	0.01	0.03	0.01	3.10	0.02
Language: UNCL	0.02	0.04	0.42	0.01	-0.02	0.07	-0.30	-0.01	-0.10	0.06	-1.59	-0.06

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS	-0.79	0.01	-118.53	-0.49	-0.03	0.01	-2.80	-0.02	0.03	0.01	3.43	0.02
SEN: SS	-1.24	0.01	-85.63	-0.76	-0.01	0.02	-0.46	-0.01	0.09	0.02	4.61	0.06
SES: High	0.40	0.01	70.60	0.24	0.02	0.01	2.51	0.01	-0.08	0.01	-10.83	-0.05
SES: Mid	0.18	0.01	35.12	0.11	0.01	0.01	1.64	0.01	-0.04	0.01	-5.90	-0.03
SES: Unknown	0.10	0.05	1.91	0.06	-0.02	0.07	-0.29	-0.01	0.02	0.07	0.34	0.01
N entries	1,609,255											
Random effects: Centre variance	0.552											
Residual variance	2.084											

Table 3.56. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE English language grades and changes thereof between years (actual grades in 2018 and 2019, final grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.93	0.01	316.00	2.53	-0.03	0.01	-3.66	-0.02	0.46	0.01	59.74	0.30
Prior attainment: High	2.15	0.01	409.21	1.38	-0.01	0.01	-0.70	0.00	0.04	0.01	6.12	0.03
Prior attainment: Mid	1.01	0.01	197.83	0.65	-0.01	0.01	-0.92	0.00	0.02	0.01	3.50	0.02
Prior attainment: Unknown	0.55	0.01	82.54	0.35	-0.02	0.01	-1.83	-0.01	-0.01	0.01	-0.81	0.00
Gender: Male	-0.71	0.00	-182.89	-0.46	0.03	0.01	5.41	0.02	0.00	0.01	0.83	0.00
Gender: Unknown	-0.78	0.27	-2.92	-0.50	0.54	0.43	1.26	0.35	0.33	0.39	0.85	0.21
FSM: Yes	-0.37	0.01	-62.16	-0.24	0.00	0.01	0.49	0.00	-0.04	0.01	-4.91	-0.03
FSM: Unknown	-0.13	0.05	-2.53	-0.09	0.02	0.07	0.21	0.01	0.09	0.07	1.22	0.06
Ethnicity: AOEG	0.12	0.02	7.26	0.07	0.03	0.02	1.15	0.02	-0.01	0.02	-0.60	-0.01
Ethnicity: ASIA	0.37	0.01	47.23	0.24	-0.03	0.01	-3.05	-0.02	-0.07	0.01	-6.81	-0.05
Ethnicity: BLAC	0.14	0.01	15.39	0.09	0.01	0.01	0.66	0.01	-0.01	0.01	-0.98	-0.01
Ethnicity: CHIN	0.45	0.03	14.25	0.29	-0.04	0.05	-0.77	-0.02	0.06	0.05	1.44	0.04
Ethnicity: MIXD	0.15	0.01	17.23	0.10	-0.03	0.01	-2.13	-0.02	-0.05	0.01	-3.86	-0.03
Ethnicity: UNCL	-0.05	0.02	-2.68	-0.03	0.05	0.03	2.08	0.03	0.01	0.02	0.61	0.01
Language: OTH	-0.07	0.01	-9.71	-0.04	0.02	0.01	2.24	0.01	0.00	0.01	0.48	0.00
Language: UNCL	-0.07	0.04	-1.77	-0.05	0.08	0.06	1.25	0.05	-0.18	0.06	-3.05	-0.12
SEN: SNS	-0.72	0.01	-112.26	-0.47	-0.04	0.01	-4.91	-0.03	-0.04	0.01	-4.06	-0.02

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.97	0.01	-68.68	-0.62	-0.03	0.02	-1.36	-0.02	-0.08	0.02	-3.95	-0.05
SES: High	0.40	0.01	73.08	0.25	0.02	0.01	3.10	0.01	-0.10	0.01	-14.46	-0.07
SES: Mid	0.19	0.01	38.02	0.12	0.02	0.01	2.36	0.01	-0.04	0.01	-6.19	-0.03
SES: Unknown	0.08	0.05	1.51	0.05	0.01	0.07	0.08	0.00	0.00	0.07	0.06	0.00
N entries	1,591,315											
Random effects: Centre variance	0.508											
Residual variance	1.907											

Table 3.57. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE English literature grades and changes thereof between years (actual grades in 2018 and 2019, final grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	4.09	0.01	304.35	2.47	-0.05	0.01	-6.09	-0.03	0.34	0.01	40.07	0.21
Prior attainment: High	2.12	0.01	364.53	1.28	0.01	0.01	1.23	0.01	0.09	0.01	11.16	0.05
Prior attainment: Mid	1.03	0.01	182.21	0.62	0.01	0.01	1.49	0.01	0.02	0.01	2.09	0.01
Prior attainment: Unknown	0.59	0.01	79.96	0.36	-0.01	0.01	-1.18	-0.01	0.00	0.01	-0.47	0.00
Gender: Male	-0.79	0.00	-183.28	-0.48	0.00	0.01	-0.75	0.00	0.02	0.01	3.68	0.01
Gender: Unknown	-0.62	0.34	-1.82	-0.38	1.03	0.55	1.89	0.63	0.31	0.49	0.64	0.19
FSM: Yes	-0.41	0.01	-62.80	-0.25	-0.01	0.01	-1.05	-0.01	-0.03	0.01	-3.07	-0.02
FSM: Unknown	-0.14	0.06	-2.37	-0.08	0.17	0.08	2.04	0.10	0.20	0.08	2.36	0.12
Ethnicity: AOEG	0.25	0.02	14.36	0.15	0.02	0.03	0.64	0.01	-0.10	0.02	-4.21	-0.06
Ethnicity: ASIA	0.50	0.01	58.28	0.30	-0.02	0.01	-1.72	-0.01	-0.14	0.01	-12.44	-0.09
Ethnicity: BLAC	0.29	0.01	29.07	0.18	0.03	0.01	2.05	0.02	-0.10	0.01	-7.41	-0.06
Ethnicity: CHIN	0.60	0.04	17.07	0.36	0.00	0.05	0.02	0.00	0.02	0.05	0.43	0.01
Ethnicity: MIXD	0.22	0.01	22.34	0.13	-0.03	0.01	-1.91	-0.02	-0.09	0.01	-6.93	-0.06
Ethnicity: UNCL	0.01	0.02	0.51	0.01	0.01	0.03	0.43	0.01	-0.05	0.03	-1.80	-0.03
Language: OTH	0.02	0.01	2.47	0.01	0.02	0.01	2.09	0.01	-0.04	0.01	-3.77	-0.02
Language: UNCL	-0.02	0.05	-0.37	-0.01	0.15	0.07	2.07	0.09	-0.23	0.07	-3.45	-0.14
SEN: SNS	-0.81	0.01	-112.04	-0.49	-0.03	0.01	-3.27	-0.02	0.02	0.01	1.80	0.01

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-1.07	0.02	-64.14	-0.65	0.00	0.02	0.20	0.00	-0.02	0.02	-0.79	-0.01
SES: High	0.43	0.01	70.81	0.26	0.02	0.01	2.91	0.01	-0.09	0.01	-11.89	-0.06
SES: Mid	0.20	0.01	35.98	0.12	0.02	0.01	3.01	0.01	-0.04	0.01	-5.61	-0.03
SES: Unknown	0.17	0.06	3.00	0.10	-0.07	0.08	-0.94	-0.04	-0.09	0.08	-1.21	-0.06
N entries	1,511,536											
Random effects:												
Centre variance	0.522											
Residual variance	2.212											

Table 3.58. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE combined science grades and changes thereof between years (actual grades in 2018 and 2019, final grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.37	0.01	254.89	2.23	0.03	0.01	3.38	0.02	0.43	0.01	52.52	0.29
Prior attainment: High	2.22	0.01	337.78	1.47	-0.02	0.01	-2.45	-0.02	-0.07	0.01	-7.38	-0.04
Prior attainment: Mid	1.06	0.01	196.39	0.70	-0.01	0.01	-0.96	0.00	-0.01	0.01	-0.92	0.00
Prior attainment: Unknown	0.42	0.01	58.55	0.28	-0.03	0.01	-3.27	-0.02	-0.02	0.01	-2.12	-0.01
Gender: Male	-0.15	0.00	-33.15	-0.10	-0.01	0.01	-1.59	-0.01	-0.05	0.01	-8.44	-0.03
Gender: Unknown	-0.68	0.45	-1.51	-0.45	-0.77	0.75	-1.02	-0.51	0.95	0.62	1.53	0.63
FSM: Yes	-0.33	0.01	-52.24	-0.22	0.00	0.01	-0.44	0.00	-0.03	0.01	-4.00	-0.02
FSM: Unknown	0.00	0.06	-0.01	0.00	0.09	0.08	1.16	0.06	0.03	0.08	0.36	0.02
Ethnicity: AOEG	0.18	0.02	10.09	0.12	-0.03	0.03	-1.11	-0.02	0.03	0.02	1.28	0.02
Ethnicity: ASIA	0.37	0.01	39.71	0.25	-0.03	0.01	-2.01	-0.02	0.02	0.01	1.64	0.01
Ethnicity: BLAC	0.14	0.01	14.13	0.10	-0.01	0.01	-0.60	-0.01	0.05	0.01	3.39	0.03
Ethnicity: CHIN	0.94	0.05	20.08	0.62	0.09	0.07	1.38	0.06	0.12	0.07	1.78	0.08
Ethnicity: MIXD	0.06	0.01	5.82	0.04	-0.02	0.01	-1.39	-0.01	0.00	0.01	-0.12	0.00
Ethnicity: UNCL	-0.08	0.02	-3.94	-0.05	0.09	0.03	3.01	0.06	0.02	0.03	0.63	0.01
Language: OTH	0.13	0.01	16.61	0.08	0.00	0.01	-0.30	0.00	-0.01	0.01	-1.06	-0.01
Language: UNCL	0.12	0.05	2.66	0.08	-0.14	0.07	-1.90	-0.09	-0.22	0.07	-3.20	-0.14
SEN: SNS	-0.60	0.01	-86.14	-0.40	-0.03	0.01	-2.67	-0.02	-0.02	0.01	-2.00	-0.01

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.78	0.02	-50.74	-0.52	-0.01	0.02	-0.62	-0.01	-0.07	0.02	-3.19	-0.04
SES: High	0.36	0.01	58.06	0.24	0.00	0.01	0.45	0.00	-0.09	0.01	-11.27	-0.06
SES: Mid	0.16	0.01	29.10	0.11	0.01	0.01	1.92	0.01	-0.04	0.01	-5.24	-0.03
SES: Unknown	0.03	0.05	0.51	0.02	0.00	0.08	0.06	0.00	0.05	0.08	0.67	0.03
N entries	1,123,359											
Random effects: Centre variance	0.489											
Residual variance	1.788											

Table 3.59. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE history grades and changes thereof between years (actual grades in 2018 and 2019, final grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.22	0.02	191.33	1.69	-0.07	0.01	-4.58	-0.03	0.67	0.01	47.29	0.35
Prior attainment: High	2.83	0.01	298.33	1.49	0.00	0.01	0.17	0.00	-0.11	0.01	-8.35	-0.06
Prior attainment: Mid	1.29	0.01	137.50	0.68	0.00	0.01	0.19	0.00	0.00	0.01	-0.24	0.00
Prior attainment: Unknown	1.20	0.01	92.57	0.63	0.01	0.02	0.59	0.01	-0.11	0.02	-6.04	-0.06
Gender: Male	-0.48	0.01	-67.26	-0.25	0.05	0.01	5.28	0.03	0.02	0.01	2.02	0.01
Gender: Unknown	0.03	1.00	0.03	0.02	1.20	1.20	1.00	0.63	-1.07	1.15	-0.94	-0.56
FSM: Yes	-0.48	0.01	-43.58	-0.25	0.01	0.02	0.41	0.00	-0.02	0.02	-1.21	-0.01
FSM: Unknown	0.04	0.10	0.36	0.02	0.31	0.14	2.26	0.16	0.00	0.14	-0.02	0.00
Ethnicity: AOEG	0.19	0.03	6.16	0.10	0.06	0.04	1.47	0.03	-0.06	0.04	-1.46	-0.03
Ethnicity: ASIA	0.39	0.01	26.60	0.20	-0.01	0.02	-0.33	0.00	-0.12	0.02	-5.99	-0.06
Ethnicity: BLAC	0.14	0.02	8.42	0.07	0.00	0.02	0.12	0.00	-0.09	0.02	-4.00	-0.05
Ethnicity: CHIN	0.70	0.06	11.47	0.37	0.10	0.09	1.17	0.05	-0.07	0.09	-0.75	-0.03
Ethnicity: MIXD	0.13	0.02	7.91	0.07	-0.02	0.02	-0.71	-0.01	-0.10	0.02	-4.29	-0.05
Ethnicity: UNCL	-0.09	0.03	-2.88	-0.05	0.04	0.05	0.93	0.02	-0.04	0.04	-0.96	-0.02
Language: OTH	0.17	0.01	13.83	0.09	0.02	0.02	1.29	0.01	-0.03	0.02	-1.73	-0.02
Language: UNCL	0.00	0.08	-0.06	0.00	0.28	0.12	2.36	0.15	-0.21	0.11	-1.90	-0.11

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS	-0.58	0.01	-44.76	-0.30	-0.04	0.02	-2.05	-0.02	-0.10	0.02	-5.37	-0.05
SEN: SS	-0.50	0.03	-15.15	-0.26	0.02	0.05	0.35	0.01	-0.14	0.05	-3.14	-0.08
SES: High	0.57	0.01	57.44	0.30	0.05	0.01	3.51	0.02	-0.16	0.01	-12.60	-0.09
SES: Mid	0.26	0.01	28.59	0.14	0.02	0.01	1.81	0.01	-0.06	0.01	-4.69	-0.03
SES: Unknown	0.20	0.09	2.18	0.11	-0.18	0.13	-1.43	-0.10	-0.02	0.13	-0.13	-0.01
N entries	757,354											
Random effects:												
Centre variance	0.606											
Residual variance	3.011											

3.5.3.3 Calculated grades

For calculated grades, there was no significant change to the reference candidate's outcome in any of the subjects modelled (Table 3.60 to Table 3.64). The change in the gap between candidates with an unclassified major language and candidates with English as the major language is significant in three of the subjects. There were few candidates with an unclassified major language (see Table 5.12) and, for such a small group, year-on-year volatility in results is not unexpected. In one subject – English Literature (Table 3.62) – there was a very small increase (0.17) in the effect of having high prior attainment – the strongest predictor of grade already.

Table 3.60. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE maths grades and changes thereof between years (actual grades in 2018 and 2019, calculated grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.03	0.01	232.61	1.85	-0.03	0.01	-3.56	-0.02	0.12	0.01	15.39	0.08
Prior attainment: High	2.92	0.01	533.62	1.79	0.00	0.01	-0.26	0.00	-0.04	0.01	-4.74	-0.02
Prior attainment: Mid	1.37	0.01	259.12	0.84	0.01	0.01	0.69	0.00	-0.02	0.01	-2.36	-0.01
Prior attainment: Unknown	0.85	0.01	122.43	0.52	-0.03	0.01	-3.46	-0.02	-0.02	0.01	-2.04	-0.01
Gender: Male	0.09	0.00	22.95	0.06	0.02	0.01	3.26	0.01	-0.05	0.01	-9.80	-0.03
Gender: Unknown	-0.30	0.21	-1.44	-0.18	0.44	0.69	0.64	0.27	0.33	0.33	1.01	0.20
FSM: Yes	-0.40	0.01	-65.46	-0.25	0.00	0.01	-0.37	0.00	-0.04	0.01	-4.23	-0.02
FSM: Unknown	-0.04	0.05	-0.82	-0.03	0.03	0.07	0.34	0.02	0.03	0.08	0.38	0.02
Ethnicity: AOEG	0.22	0.02	13.57	0.14	0.01	0.02	0.38	0.01	0.06	0.02	2.45	0.03
Ethnicity: ASIA	0.48	0.01	59.11	0.30	-0.05	0.01	-4.47	-0.03	0.02	0.01	1.87	0.01
Ethnicity: BLAC	0.03	0.01	3.62	0.02	0.01	0.01	0.54	0.00	0.06	0.01	4.70	0.04
Ethnicity: CHIN	1.23	0.03	36.71	0.75	0.04	0.05	0.73	0.02	0.02	0.05	0.41	0.01
Ethnicity: MIXD	0.05	0.01	5.56	0.03	-0.04	0.01	-2.96	-0.02	-0.01	0.01	-0.54	0.00
Ethnicity: UNCL	-0.06	0.02	-3.28	-0.04	0.02	0.03	0.70	0.01	0.03	0.03	1.11	0.02
Language: OTH	0.15	0.01	21.40	0.09	0.02	0.01	1.99	0.01	0.01	0.01	1.54	0.01
Language: UNCL	0.03	0.04	0.67	0.02	-0.03	0.07	-0.39	-0.02	-0.09	0.06	-1.50	-0.06
SEN: SNS	-0.78	0.01	-117.14	-0.48	-0.03	0.01	-2.71	-0.02	0.01	0.01	0.81	0.00

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-1.23	0.01	-84.73	-0.75	-0.01	0.02	-0.49	-0.01	0.05	0.02	2.57	0.03
SES: High	0.38	0.01	67.14	0.23	0.02	0.01	2.46	0.01	-0.03	0.01	-3.99	-0.02
SES: Mid	0.17	0.01	32.91	0.10	0.01	0.01	1.65	0.01	-0.01	0.01	-1.79	-0.01
SES: Unknown	0.11	0.05	2.09	0.06	-0.02	0.07	-0.27	-0.01	-0.02	0.07	-0.26	-0.01
N entries	1,609,255											
Random effects: Centre variance	0.564											
Residual variance	2.102											

Table 3.61. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE English language grades and changes thereof between years (actual grades in 2018 and 2019, calculated grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.93	0.01	314.42	2.53	-0.03	0.01	-3.69	-0.02	0.04	0.01	5.19	0.03
Prior attainment: High	2.15	0.01	408.37	1.38	-0.01	0.01	-0.79	0.00	0.07	0.01	9.25	0.04
Prior attainment: Mid	1.01	0.01	197.78	0.65	-0.01	0.01	-1.05	0.00	0.02	0.01	3.03	0.01
Prior attainment: Unknown	0.55	0.01	83.59	0.36	-0.02	0.01	-1.96	-0.01	-0.01	0.01	-0.92	-0.01
Gender: Male	-0.71	0.00	-182.01	-0.46	0.03	0.01	5.44	0.02	0.00	0.01	-0.34	0.00
Gender: Unknown	-0.72	0.27	-2.70	-0.47	0.48	0.43	1.11	0.31	0.35	0.39	0.91	0.23
FSM: Yes	-0.36	0.01	-61.49	-0.23	0.00	0.01	0.57	0.00	-0.04	0.01	-5.34	-0.03
FSM: Unknown	-0.11	0.05	-2.03	-0.07	0.02	0.07	0.21	0.01	-0.01	0.07	-0.17	-0.01
Ethnicity: AOEG	0.11	0.02	6.92	0.07	0.03	0.02	1.24	0.02	0.00	0.02	-0.22	0.00
Ethnicity: ASIA	0.36	0.01	46.16	0.23	-0.03	0.01	-3.08	-0.02	-0.05	0.01	-5.13	-0.03
Ethnicity: BLAC	0.14	0.01	15.18	0.09	0.01	0.01	0.69	0.01	-0.02	0.01	-1.50	-0.01
Ethnicity: CHIN	0.44	0.03	13.88	0.28	-0.03	0.05	-0.72	-0.02	0.10	0.05	2.30	0.07
Ethnicity: MIXD	0.15	0.01	16.82	0.10	-0.03	0.01	-2.11	-0.02	-0.04	0.01	-3.26	-0.03
Ethnicity: UNCL	-0.05	0.02	-2.68	-0.03	0.06	0.03	2.23	0.04	0.02	0.02	0.67	0.01
Language: OTH	-0.06	0.01	-9.30	-0.04	0.02	0.01	2.17	0.01	0.00	0.01	-0.24	0.00
Language: UNCL	-0.07	0.04	-1.81	-0.05	0.08	0.06	1.30	0.05	-0.18	0.06	-3.01	-0.11

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS	-0.72	0.01	-111.93	-0.46	-0.04	0.01	-4.77	-0.03	-0.04	0.01	-4.04	-0.02
SEN: SS	-0.96	0.01	-68.50	-0.62	-0.03	0.02	-1.34	-0.02	-0.08	0.02	-3.93	-0.05
SES: High	0.38	0.01	69.41	0.24	0.02	0.01	3.14	0.01	-0.05	0.01	-6.34	-0.03
SES: Mid	0.18	0.01	36.24	0.12	0.02	0.01	2.31	0.01	-0.02	0.01	-3.20	-0.01
SES: Unknown	0.08	0.05	1.56	0.05	0.01	0.07	0.07	0.00	0.01	0.07	0.08	0.00
N entries	1,591,315											
Random effects:												
Centre variance	0.514											
Residual variance	1.908											

Table 3.62. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE English literature grades and changes thereof between years (actual grades in 2018 and 2019, calculated grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	4.08	0.01	298.33	2.44	-0.05	0.01	-5.72	-0.03	-0.03	0.01	-3.45	-0.02
Prior attainment: High	2.12	0.01	359.94	1.26	0.01	0.01	1.04	0.01	0.17	0.01	21.47	0.10
Prior attainment: Mid	1.03	0.01	180.05	0.61	0.01	0.01	1.35	0.01	0.07	0.01	8.22	0.04
Prior attainment: Unknown	0.60	0.01	79.51	0.36	-0.01	0.01	-1.19	-0.01	0.01	0.01	1.13	0.01
Gender: Male	-0.79	0.00	-180.18	-0.47	0.00	0.01	-0.72	0.00	-0.01	0.01	-2.15	-0.01
Gender: Unknown	-0.62	0.35	-1.80	-0.37	1.05	0.55	1.90	0.63	0.44	0.49	0.88	0.26
FSM: Yes	-0.41	0.01	-61.84	-0.25	-0.01	0.01	-0.93	-0.01	-0.05	0.01	-5.45	-0.03
FSM: Unknown	-0.12	0.06	-2.05	-0.07	0.15	0.08	1.78	0.09	0.12	0.08	1.45	0.07
Ethnicity: AOEG	0.24	0.02	13.39	0.14	0.02	0.03	0.67	0.01	-0.06	0.02	-2.28	-0.03
Ethnicity: ASIA	0.49	0.01	55.82	0.29	-0.02	0.01	-1.81	-0.01	-0.08	0.01	-7.16	-0.05
Ethnicity: BLAC	0.28	0.01	27.79	0.17	0.03	0.01	1.87	0.02	-0.07	0.01	-5.11	-0.04
Ethnicity: CHIN	0.59	0.04	16.63	0.35	0.00	0.05	0.05	0.00	0.09	0.05	1.75	0.05
Ethnicity: MIXD	0.21	0.01	21.26	0.13	-0.03	0.01	-1.90	-0.02	-0.07	0.01	-4.88	-0.04
Ethnicity: UNCL	0.01	0.02	0.41	0.00	0.01	0.03	0.42	0.01	-0.04	0.03	-1.40	-0.02
Language: OTH	0.02	0.01	2.16	0.01	0.02	0.01	1.94	0.01	-0.03	0.01	-2.87	-0.02
Language: UNCL	-0.02	0.05	-0.39	-0.01	0.15	0.07	2.01	0.09	-0.21	0.07	-3.13	-0.13

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS	-0.81	0.01	-110.48	-0.48	-0.03	0.01	-3.09	-0.02	-0.03	0.01	-3.35	-0.02
SEN: SS	-1.07	0.02	-63.27	-0.64	0.01	0.02	0.26	0.00	-0.09	0.02	-4.06	-0.06
SES: High	0.42	0.01	68.90	0.25	0.02	0.01	2.74	0.01	-0.06	0.01	-7.74	-0.04
SES: Mid	0.20	0.01	34.92	0.12	0.02	0.01	2.83	0.01	-0.03	0.01	-3.60	-0.02
SES: Unknown	0.17	0.06	2.95	0.10	-0.05	0.08	-0.67	-0.03	-0.11	0.08	-1.37	-0.06
N entries	1,511,536											
Random effects: Centre variance	0.543											
Residual variance	2.268											

Table 3.63. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE combined science grades and changes thereof between years (actual grades in 2018 and 2019, calculated grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.37	0.01	253.05	2.23	0.03	0.01	3.30	0.02	0.14	0.01	17.18	0.09
Prior attainment: High	2.22	0.01	338.22	1.47	-0.02	0.01	-2.52	-0.02	-0.10	0.01	-11.45	-0.07
Prior attainment: Mid	1.06	0.01	196.78	0.70	-0.01	0.01	-0.97	0.00	-0.02	0.01	-3.14	-0.02
Prior attainment: Unknown	0.43	0.01	59.27	0.28	-0.03	0.01	-3.38	-0.02	-0.04	0.01	-4.05	-0.03
Gender: Male	-0.15	0.00	-32.88	-0.10	-0.01	0.01	-1.55	-0.01	-0.05	0.01	-8.04	-0.03
Gender: Unknown	-0.69	0.45	-1.55	-0.46	-0.82	0.75	-1.09	-0.54	1.00	0.62	1.63	0.66
FSM: Yes	-0.33	0.01	-51.72	-0.22	0.00	0.01	-0.34	0.00	-0.04	0.01	-4.30	-0.02
FSM: Unknown	0.02	0.06	0.28	0.01	0.10	0.08	1.21	0.06	-0.05	0.08	-0.63	-0.03
Ethnicity: AOEG	0.19	0.02	10.48	0.12	-0.03	0.03	-1.18	-0.02	0.01	0.02	0.27	0.00
Ethnicity: ASIA	0.38	0.01	40.26	0.25	-0.03	0.01	-2.19	-0.02	0.00	0.01	0.20	0.00
Ethnicity: BLAC	0.15	0.01	15.23	0.10	-0.01	0.01	-0.67	-0.01	0.01	0.01	0.48	0.00
Ethnicity: CHIN	0.94	0.05	20.11	0.62	0.09	0.07	1.30	0.06	0.09	0.07	1.31	0.06
Ethnicity: MIXD	0.06	0.01	5.99	0.04	-0.02	0.01	-1.35	-0.01	-0.01	0.01	-0.82	-0.01
Ethnicity: UNCL	-0.08	0.02	-4.00	-0.05	0.09	0.03	3.15	0.06	0.02	0.03	0.70	0.01
Language: OTH	0.13	0.01	17.39	0.09	0.00	0.01	-0.26	0.00	-0.03	0.01	-2.85	-0.02
Language: UNCL	0.12	0.05	2.61	0.08	-0.14	0.07	-1.90	-0.09	-0.23	0.07	-3.38	-0.15

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS	-0.59	0.01	-85.80	-0.39	-0.03	0.01	-2.60	-0.02	-0.03	0.01	-3.10	-0.02
SEN: SS	-0.78	0.02	-50.66	-0.51	-0.01	0.02	-0.58	-0.01	-0.08	0.02	-3.74	-0.05
SES: High	0.34	0.01	55.28	0.23	0.00	0.01	0.47	0.00	-0.05	0.01	-5.54	-0.03
SES: Mid	0.15	0.01	27.53	0.10	0.01	0.01	1.89	0.01	-0.02	0.01	-2.10	-0.01
SES: Unknown	0.03	0.05	0.62	0.02	0.01	0.08	0.09	0.00	0.03	0.08	0.42	0.02
N entries	1,123,359											
Random effects:												
Centre variance	0.498											
Residual variance	1.784											

Table 3.64. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE history grades and changes thereof between years (actual grades in 2018 and 2019, calculated grades in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.23	0.02	185.09	1.66	-0.06	0.01	-4.20	-0.03	0.02	0.01	1.20	0.01
Prior attainment: High	2.82	0.01	292.50	1.45	0.00	0.01	-0.03	0.00	0.08	0.01	6.00	0.04
Prior attainment: Mid	1.29	0.01	135.17	0.66	0.00	0.01	0.02	0.00	0.06	0.01	4.88	0.03
Prior attainment: Unknown	1.19	0.01	90.79	0.61	0.01	0.02	0.53	0.01	-0.03	0.02	-1.45	-0.01
Gender: Male	-0.48	0.01	-65.66	-0.24	0.05	0.01	5.11	0.03	0.00	0.01	-0.50	0.00
Gender: Unknown	0.06	1.02	0.06	0.03	1.10	1.22	0.90	0.57	-1.00	1.16	-0.86	-0.52
FSM: Yes	-0.48	0.01	-42.35	-0.25	0.01	0.02	0.35	0.00	-0.04	0.02	-2.49	-0.02
FSM: Unknown	0.04	0.10	0.39	0.02	0.31	0.14	2.22	0.16	-0.05	0.14	-0.36	-0.03
Ethnicity: AOEG	0.17	0.03	5.46	0.09	0.07	0.04	1.51	0.03	-0.02	0.04	-0.42	-0.01
Ethnicity: ASIA	0.37	0.01	25.04	0.19	-0.01	0.02	-0.27	0.00	-0.05	0.02	-2.50	-0.03
Ethnicity: BLAC	0.13	0.02	7.62	0.07	0.00	0.02	0.04	0.00	-0.08	0.02	-3.45	-0.04
Ethnicity: CHIN	0.68	0.06	10.93	0.35	0.11	0.09	1.20	0.06	0.02	0.09	0.28	0.01
Ethnicity: MIXD	0.12	0.02	7.15	0.06	-0.02	0.02	-0.64	-0.01	-0.06	0.02	-2.72	-0.03
Ethnicity: UNCL	-0.10	0.03	-3.07	-0.05	0.05	0.05	1.03	0.03	-0.01	0.05	-0.32	-0.01
Language: OTH	0.17	0.01	13.53	0.09	0.02	0.02	1.22	0.01	-0.03	0.02	-1.61	-0.01
Language: UNCL	-0.03	0.08	-0.33	-0.01	0.31	0.12	2.57	0.16	-0.22	0.11	-1.92	-0.11
SEN: SNS	-0.58	0.01	-43.89	-0.30	-0.04	0.02	-1.85	-0.02	-0.11	0.02	-5.99	-0.06

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.49	0.03	-14.79	-0.25	0.02	0.05	0.37	0.01	-0.15	0.05	-3.13	-0.07
SES: High	0.54	0.01	54.10	0.28	0.04	0.01	3.28	0.02	-0.07	0.01	-5.51	-0.04
SES: Mid	0.25	0.01	26.91	0.13	0.02	0.01	1.69	0.01	-0.02	0.01	-1.22	-0.01
SES: Unknown	0.20	0.09	2.11	0.10	-0.18	0.13	-1.41	-0.09	0.03	0.13	0.21	0.01
N entries	757,354											
Random effects: Centre variance	0.667											
Residual variance	3.111											

3.5.3.4 Centre assessment grades – CAGs

Table 3.65 to Table 3.69 show the estimates of the parameters of the models for GCSE mathematics, English language, English literature, combined science, and history using CAGs in 2020. Comparison with the equivalent tables for final grades in 3.5.3.2 shows that there are no substantial differences between outcomes using CAGs and final grades from an equalities perspective. This is expected, as the CAGs account for the majority of final grades. For all subjects, the reference candidate received a marginally higher grade using final grades than CAGs, as would be expected.

Table 3.65. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE maths grades and changes thereof between years (actual grades in 2018 and 2019, CAGs in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.03	0.01	234.16	1.87	-0.03	0.01	-3.58	-0.02	0.40	0.01	50.12	0.25
Prior attainment: High	2.92	0.01	535.82	1.80	0.00	0.01	-0.26	0.00	-0.09	0.01	-12.00	-0.06
Prior attainment: Mid	1.37	0.01	259.93	0.84	0.00	0.01	0.64	0.00	-0.04	0.01	-5.10	-0.02
Prior attainment: Unknown	0.84	0.01	121.95	0.52	-0.03	0.01	-3.51	-0.02	-0.02	0.01	-2.47	-0.01
Gender: Male	0.10	0.00	23.55	0.06	0.02	0.01	3.33	0.01	-0.07	0.01	-12.22	-0.04
Gender: Unknown	-0.29	0.21	-1.40	-0.18	0.33	0.68	0.48	0.20	0.27	0.33	0.82	0.17
FSM: Yes	-0.40	0.01	-66.12	-0.25	-0.01	0.01	-0.58	0.00	-0.03	0.01	-3.47	-0.02
FSM: Unknown	-0.08	0.05	-1.53	-0.05	0.03	0.07	0.35	0.02	0.14	0.08	1.91	0.09
Ethnicity: AOEG	0.22	0.02	13.15	0.13	0.01	0.02	0.40	0.01	0.08	0.02	3.61	0.05
Ethnicity: ASIA	0.48	0.01	58.92	0.29	-0.05	0.01	-4.62	-0.03	0.03	0.01	2.38	0.02
Ethnicity: BLAC	0.02	0.01	2.32	0.01	0.01	0.01	0.56	0.00	0.10	0.01	7.83	0.06
Ethnicity: CHIN	1.24	0.03	37.18	0.76	0.03	0.05	0.69	0.02	-0.01	0.05	-0.30	-0.01
Ethnicity: MIXD	0.05	0.01	5.25	0.03	-0.04	0.01	-3.02	-0.02	0.00	0.01	0.37	0.00
Ethnicity: UNCL	-0.06	0.02	-3.44	-0.04	0.01	0.03	0.46	0.01	0.03	0.03	1.37	0.02
Language: OTH	0.14	0.01	20.37	0.09	0.02	0.01	2.19	0.01	0.03	0.01	3.18	0.02
Language: UNCL	0.02	0.04	0.38	0.01	-0.02	0.07	-0.29	-0.01	-0.10	0.06	-1.69	-0.06

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS	-0.79	0.01	-118.44	-0.49	-0.03	0.01	-2.82	-0.02	0.02	0.01	2.63	0.01
SEN: SS	-1.24	0.01	-85.31	-0.76	-0.01	0.02	-0.48	-0.01	0.06	0.02	3.28	0.04
SES: High	0.40	0.01	70.35	0.24	0.02	0.01	2.54	0.01	-0.08	0.01	-10.06	-0.05
SES: Mid	0.18	0.01	35.02	0.11	0.01	0.01	1.64	0.01	-0.04	0.01	-5.52	-0.02
SES: Unknown	0.09	0.05	1.87	0.06	-0.02	0.07	-0.29	-0.01	0.03	0.07	0.47	0.02
N entries	1,609,255											
Random effects:												
Centre variance	0.558											
Residual variance	2.084											

Table 3.66. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE English language grades and changes thereof between years (actual grades in 2018 and 2019, CAGs in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.93	0.01	313.08	2.52	-0.03	0.01	-3.66	-0.02	0.44	0.01	56.54	0.28
Prior attainment: High	2.15	0.01	408.02	1.38	-0.01	0.01	-0.69	0.00	0.05	0.01	6.24	0.03
Prior attainment: Mid	1.01	0.01	197.28	0.64	-0.01	0.01	-0.91	0.00	0.03	0.01	3.93	0.02
Prior attainment: Unknown	0.54	0.01	82.18	0.35	-0.02	0.01	-1.78	-0.01	-0.01	0.01	-1.44	-0.01
Gender: Male	-0.71	0.00	-182.54	-0.46	0.03	0.01	5.41	0.02	0.00	0.01	0.48	0.00
Gender: Unknown	-0.78	0.27	-2.90	-0.50	0.55	0.43	1.27	0.35	0.15	0.39	0.38	0.10
FSM: Yes	-0.37	0.01	-61.90	-0.23	0.00	0.01	0.49	0.00	-0.05	0.01	-5.85	-0.03
FSM: Unknown	-0.13	0.05	-2.47	-0.08	0.01	0.07	0.19	0.01	0.07	0.07	0.90	0.04
Ethnicity: AOEG	0.11	0.02	7.16	0.07	0.03	0.02	1.15	0.02	-0.01	0.02	-0.35	0.00
Ethnicity: ASIA	0.37	0.01	47.07	0.24	-0.03	0.01	-3.04	-0.02	-0.07	0.01	-6.26	-0.04
Ethnicity: BLAC	0.14	0.01	15.27	0.09	0.01	0.01	0.64	0.01	0.00	0.01	-0.34	0.00
Ethnicity: CHIN	0.45	0.03	14.17	0.29	-0.03	0.05	-0.76	-0.02	0.08	0.05	1.71	0.05
Ethnicity: MIXD	0.15	0.01	17.17	0.10	-0.03	0.01	-2.13	-0.02	-0.05	0.01	-3.83	-0.03
Ethnicity: UNCL	-0.05	0.02	-2.69	-0.03	0.05	0.03	2.06	0.03	0.01	0.02	0.53	0.01
Language: OTH	-0.07	0.01	-9.75	-0.04	0.02	0.01	2.24	0.01	0.00	0.01	0.35	0.00
Language: UNCL	-0.07	0.04	-1.77	-0.05	0.08	0.06	1.24	0.05	-0.18	0.06	-3.11	-0.12
SEN: SNS	-0.72	0.01	-111.84	-0.46	-0.05	0.01	-4.93	-0.03	-0.05	0.01	-5.62	-0.03

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.96	0.01	-68.28	-0.62	-0.03	0.02	-1.36	-0.02	-0.11	0.02	-5.89	-0.07
SES: High	0.39	0.01	72.61	0.25	0.02	0.01	3.09	0.01	-0.10	0.01	-13.70	-0.06
SES: Mid	0.19	0.01	37.73	0.12	0.02	0.01	2.34	0.01	-0.04	0.01	-5.62	-0.02
SES: Unknown	0.08	0.05	1.52	0.05	0.00	0.07	0.07	0.00	0.01	0.07	0.13	0.01
N entries	1,591,315											
Random effects:												
Centre variance	0.518											
Residual variance	1.915											

Table 3.67. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE English literature grades and changes thereof between years (actual grades in 2018 and 2019, CAGs in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	4.09	0.01	302.46	2.47	-0.05	0.01	-6.12	-0.03	0.30	0.01	35.38	0.18
Prior attainment: High	2.11	0.01	364.19	1.28	0.01	0.01	1.29	0.01	0.08	0.01	9.99	0.05
Prior attainment: Mid	1.03	0.01	182.16	0.62	0.01	0.01	1.52	0.01	0.01	0.01	1.51	0.01
Prior attainment: Unknown	0.59	0.01	79.83	0.36	-0.01	0.01	-1.17	-0.01	-0.01	0.01	-1.14	-0.01
Gender: Male	-0.79	0.00	-183.48	-0.48	0.00	0.01	-0.75	0.00	0.03	0.01	4.48	0.02
Gender: Unknown	-0.62	0.34	-1.81	-0.37	1.03	0.55	1.87	0.62	0.36	0.49	0.74	0.22
FSM: Yes	-0.41	0.01	-62.60	-0.25	-0.01	0.01	-1.07	-0.01	-0.03	0.01	-3.48	-0.02
FSM: Unknown	-0.14	0.06	-2.34	-0.08	0.16	0.08	2.01	0.10	0.18	0.08	2.18	0.11
Ethnicity: AOEG	0.25	0.02	14.53	0.15	0.02	0.03	0.67	0.01	-0.11	0.02	-4.62	-0.07
Ethnicity: ASIA	0.50	0.01	58.43	0.30	-0.02	0.01	-1.74	-0.01	-0.15	0.01	-12.74	-0.09
Ethnicity: BLAC	0.29	0.01	29.30	0.18	0.03	0.01	2.06	0.02	-0.11	0.01	-7.77	-0.06
Ethnicity: CHIN	0.60	0.04	16.99	0.36	0.00	0.05	0.02	0.00	0.02	0.05	0.39	0.01
Ethnicity: MIXD	0.22	0.01	22.42	0.13	-0.03	0.01	-1.91	-0.02	-0.10	0.01	-7.06	-0.06
Ethnicity: UNCL	0.01	0.02	0.48	0.01	0.01	0.03	0.41	0.01	-0.05	0.03	-1.81	-0.03
Language: OTH	0.02	0.01	2.77	0.01	0.02	0.01	2.07	0.01	-0.04	0.01	-4.42	-0.03
Language: UNCL	-0.02	0.05	-0.37	-0.01	0.16	0.07	2.21	0.10	-0.24	0.07	-3.65	-0.15

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SNS	-0.81	0.01	-112.02	-0.49	-0.03	0.01	-3.32	-0.02	0.02	0.01	1.69	0.01
SEN: SS	-1.07	0.02	-64.14	-0.65	0.00	0.02	0.20	0.00	-0.03	0.02	-1.19	-0.02
SES: High	0.42	0.01	70.14	0.25	0.02	0.01	2.93	0.01	-0.08	0.01	-10.68	-0.05
SES: Mid	0.20	0.01	35.67	0.12	0.02	0.01	3.03	0.01	-0.04	0.01	-5.12	-0.02
SES: Unknown	0.17	0.06	2.98	0.10	-0.07	0.08	-0.92	-0.04	-0.09	0.08	-1.11	-0.05
N entries	1,511,536											
Random effects: Centre variance	0.529											
Residual variance	2.210											

Table 3.68. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE combined science grades and changes thereof between years (actual grades in 2018 and 2019, CAGs in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.37	0.01	254.54	2.23	0.03	0.01	3.35	0.02	0.38	0.01	45.72	0.25
Prior attainment: High	2.22	0.01	337.70	1.47	-0.02	0.01	-2.32	-0.01	-0.09	0.01	-9.59	-0.06
Prior attainment: Mid	1.06	0.01	196.32	0.70	-0.01	0.01	-0.90	0.00	-0.01	0.01	-1.25	-0.01
Prior attainment: Unknown	0.42	0.01	58.61	0.28	-0.03	0.01	-3.24	-0.02	-0.04	0.01	-3.57	-0.02
Gender: Male	-0.15	0.00	-33.09	-0.10	-0.01	0.01	-1.57	-0.01	-0.05	0.01	-8.59	-0.04
Gender: Unknown	-0.67	0.45	-1.49	-0.44	-0.75	0.75	-1.01	-0.50	0.87	0.62	1.41	0.57
FSM: Yes	-0.33	0.01	-52.22	-0.22	0.00	0.01	-0.41	0.00	-0.04	0.01	-4.74	-0.03
FSM: Unknown	0.01	0.06	0.21	0.01	0.09	0.08	1.11	0.06	-0.01	0.08	-0.15	-0.01
Ethnicity: AOEG	0.18	0.02	10.00	0.12	-0.03	0.03	-1.09	-0.02	0.04	0.02	1.44	0.02
Ethnicity: ASIA	0.37	0.01	39.65	0.25	-0.03	0.01	-2.03	-0.02	0.02	0.01	1.77	0.01
Ethnicity: BLAC	0.14	0.01	14.05	0.09	-0.01	0.01	-0.59	-0.01	0.05	0.01	3.71	0.03
Ethnicity: CHIN	0.94	0.05	20.05	0.62	0.09	0.07	1.41	0.06	0.12	0.07	1.80	0.08
Ethnicity: MIXD	0.06	0.01	5.84	0.04	-0.02	0.01	-1.44	-0.01	0.00	0.01	-0.28	0.00
Ethnicity: UNCL	-0.08	0.02	-4.01	-0.05	0.09	0.03	2.99	0.06	0.02	0.03	0.70	0.01
Language: OTH	0.13	0.01	16.53	0.08	0.00	0.01	-0.31	0.00	-0.01	0.01	-1.29	-0.01
Language: UNCL	0.13	0.05	2.87	0.09	-0.15	0.07	-2.01	-0.10	-0.23	0.07	-3.43	-0.16
SEN: SNS	-0.60	0.01	-86.15	-0.40	-0.03	0.01	-2.67	-0.02	-0.03	0.01	-3.32	-0.02

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.78	0.02	-50.59	-0.52	-0.02	0.02	-0.70	-0.01	-0.09	0.02	-4.46	-0.06
SES: High	0.36	0.01	58.34	0.24	0.00	0.01	0.49	0.00	-0.10	0.01	-11.71	-0.06
SES: Mid	0.16	0.01	29.24	0.11	0.01	0.01	1.93	0.01	-0.04	0.01	-5.62	-0.03
SES: Unknown	0.02	0.05	0.45	0.02	0.01	0.08	0.07	0.00	0.06	0.08	0.76	0.04
N entries	1,123,359											
Random effects: Centre variance	0.489											
Residual variance	1.785											

Table 3.69. Parameter estimates of multi-year linear mixed effect model of effects of candidate background variables on GCSE history grades and changes thereof between years (actual grades in 2018 and 2019, CAGs in 2020).

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
(Intercept)	3.21	0.02	191.60	1.69	-0.07	0.01	-4.63	-0.04	0.63	0.01	44.71	0.33
Prior attainment: High	2.83	0.01	298.45	1.49	0.00	0.01	0.19	0.00	-0.13	0.01	-9.73	-0.07
Prior attainment: Mid	1.29	0.01	137.59	0.68	0.00	0.01	0.19	0.00	-0.01	0.01	-1.14	-0.01
Prior attainment: Unknown	1.20	0.01	92.60	0.63	0.01	0.02	0.64	0.01	-0.12	0.02	-6.50	-0.06
Gender: Male	-0.48	0.01	-67.47	-0.25	0.05	0.01	5.32	0.03	0.03	0.01	2.63	0.01
Gender: Unknown	0.03	1.00	0.03	0.02	1.19	1.20	0.99	0.63	-1.02	1.14	-0.89	-0.54
FSM: Yes	-0.48	0.01	-43.60	-0.25	0.01	0.02	0.40	0.00	-0.02	0.02	-1.16	-0.01
FSM: Unknown	0.05	0.10	0.46	0.02	0.31	0.14	2.25	0.16	-0.03	0.14	-0.20	-0.01
Ethnicity: AOEG	0.19	0.03	6.14	0.10	0.07	0.04	1.49	0.03	-0.06	0.04	-1.47	-0.03
Ethnicity: ASIA	0.39	0.01	26.67	0.20	-0.01	0.02	-0.34	0.00	-0.12	0.02	-6.26	-0.06
Ethnicity: BLAC	0.14	0.02	8.46	0.07	0.00	0.02	0.15	0.00	-0.09	0.02	-4.13	-0.05
Ethnicity: CHIN	0.70	0.06	11.45	0.37	0.10	0.09	1.16	0.05	-0.06	0.09	-0.70	-0.03
Ethnicity: MIXD	0.13	0.02	7.92	0.07	-0.02	0.02	-0.72	-0.01	-0.10	0.02	-4.44	-0.05
Ethnicity: UNCL	-0.10	0.03	-2.90	-0.05	0.05	0.05	0.95	0.02	-0.05	0.04	-1.03	-0.02
Language: OTH	0.17	0.01	13.93	0.09	0.02	0.02	1.32	0.01	-0.04	0.02	-2.12	-0.02
Language: UNCL	-0.01	0.08	-0.07	0.00	0.28	0.12	2.38	0.15	-0.23	0.11	-2.10	-0.12
SEN: SNS	-0.58	0.01	-44.80	-0.30	-0.04	0.02	-2.14	-0.02	-0.09	0.02	-5.33	-0.05

	Effects in 2019				Effects in 2018: interaction between each term and Year: 2018				Effects in 2020: interaction between each term and Year: 2020			
	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size	Regression coefficient	Std. Error	t value	Standardised effect size
SEN: SS	-0.50	0.03	-15.16	-0.26	0.02	0.05	0.34	0.01	-0.15	0.05	-3.24	-0.08
SES: High	0.56	0.01	57.33	0.30	0.05	0.01	3.53	0.02	-0.16	0.01	-12.52	-0.09
SES: Mid	0.26	0.01	28.54	0.14	0.02	0.01	1.82	0.01	-0.06	0.01	-4.63	-0.03
SES: Unknown	0.20	0.09	2.15	0.10	-0.18	0.13	-1.44	-0.10	-0.02	0.13	-0.12	-0.01
N entries	757,354											
Random effects: Centre variance	0.603											
Residual variance	3.005											

4 Conclusions

The aim of this report was to examine whether the process of awarding grades to candidates in summer 2020 introduced bias in outcomes that can be attributed to their known protected characteristics or socio-economic status. When it was decided in March 2020 that candidates would be awarded calculated grades based on centre estimates which were to be standardised, Ofqual reviewed the literature on bias in teacher assessment, and issued guidance to help teachers avoid unconscious bias when producing their CAGs.

The purpose of standardising CAGs was twofold, to:

i) align the standards applied by centres this year
ii) maintain national subject grade distributions that were comparable with those of previous years.

The model for doing this was subject to technical review and an equalities impact analysis prior to implementation.

As was anticipated from reviewing historical predicted grades, many CAGs were overly optimistic; for many candidates, they represented grades they were unlikely to have achieved in the exam. We know that people generally accept receiving a lower-than-anticipated grade based on their performance in an exam. With hindsight, we found that it proved harder to gain such acceptance in the absence of an examination.

The final grades received by candidates were the highest of a candidate's CAG or calculated grade. The effect of this was that no candidate received a grade lower than the one their teacher estimated, but a candidate whose centre had proposed a CAG that was lower than the calculated grade[33] received a higher grade. Given that it was already known that neither the CAGs nor the standardisation model had introduced systematic bias along the lines of protected characteristics or socio-economic status, the final grades approach was very unlikely to do so.

This report brought together the equalities analyses for the CAGs, the calculated grades, and the final grades for GCSEs and A levels. The questions we asked concerned whether:

- bias was introduced at either stage of the original process:
  i) the production of CAGs, and
  ii) their statistical adjustment to produce calculated grades
- the use of final grades introduced any biases.

Explaining the effects of pupils' protected characteristics and socio-economic status on their progress in education and examination outcomes in normal years is outside the scope of this report. Our analyses focused on comparing the effects seen using the different approaches to grading this year with the effects observed in previous years' examinations. Where examination performances and the 2020 processes both

[33] Previous studies suggest the proportion of entries for which the calculated grade would be higher than the CAG could be around 1/6; however, the proportion of CAGs that increased following standardisation suggests in fact a much smaller proportion of CAGs were underestimated. For GCSEs, 5.3% of CAGs increased following standardisation; for the GCSE combined science double awards it was 11.7%; and for A levels the proportion was 2.2%.

reflect candidates' progress in a subject, they should result in similar differences (if any) between groups. Our concern was where group differences may have changed in 2020 compared with 2018 and 2019.

Missing data was an issue for both the GCSE and A level analyses. For GCSE, it was clear that most entries with missing data were from independent schools, and the missing categories could effectively be treated as independent school entries. For A level, it was less easy to define the missing groups. Nonetheless, for the purposes of evaluating the equalities impact of the summer 2020 awarding processes, the relative between-group differences across years are most relevant, rather than the absolute between-group differences within a given year. As such, it was important that the pattern of missing data was stable across the three years we analysed. This was the case, so we can be confident that any changes in the effect of the demographic or socio-economic variables was not caused by a change in the completeness of that data from year to year.

For both GCSEs and A levels, the univariate analyses suggested that calculated grades would have more closely maintained the relationships between candidate characteristics and outcomes than do either CAGs or final grades. Nonetheless, the changes seen by using final grades are small and do not suggest that any groups of candidates who share a protected characteristic or socio-economic status were systematically disadvantaged. There was some limited evidence that a small proportion of independent schools may have disproportionately overestimated grades for their least able GCSE candidates. This effect was noticeable in results using CAGs, calculated grades, and final grades. There is no evidence that this changed the overall effect of socio-economic status in 2020 compared with previous years.

The multivariate analyses are clear that, at both GCSE and A level, the most consistent and significant effect is an uplift in outcomes for all entries using CAGs and final grades, but not using calculated grades. At A level, we saw further narrowing of the attainment gap that had previously seen males outperform females (when prior attainment, protected characteristics, and socio-economic status are accounted for), such that there was no real effect of gender this year. This was true for CAGs, calculated grades, and final grades. That an equivalent change was absent from the GCSE data – it is not obvious why such a bias would be present only at A level – is further assurance that at A level it genuinely reflects attainment and is not the result of bias in favour of female candidates.

In conclusion, there is no evidence that either the calculated grades or the final grades awarded this year were systematically biased against candidates with protected characteristics or from disadvantaged backgrounds.

5 Appendices

5.1 Multivariate models

5.1.1 Multi-year, multi-subject model

$y_{ij} = \alpha + \beta x_{ij} + \gamma t_{ij} + \delta(x \cdot t)_{ij} + u_i + u_j + e_{ij}$

y_{ij} = [in mean grade analysis] numeric grade obtained by student i in centre j for an exam entry; [in grade percentage analysis] the exam entry being awarded the target grade or not (1 or 0)

x_{ij} = a set of background variables about the student taking the exam entry (prior attainment, FSM eligibility status, Ethnicity, Major language, SEN provision status, SES) and the Subject variable for the exam entry

t_{ij} = year of the exam entry by student i in centre j

u_j = random intercept of centre j

u_i = random intercept of student i

e_{ij} = entry level residual

5.1.2 Multi-year, single-subject model

$y_{ij} = \alpha + \beta x_{ij} + \gamma t_{ij} + \delta(x \cdot t)_{ij} + u_j + e_{ij}$

y_{ij} = numeric grade obtained by student i in centre j for an exam entry

x_{ij} = a set of background variables about the student taking the exam entry (prior attainment, FSM eligibility status, Ethnicity, Major language, SEN provision status, SES)

t_{ij} = year of the exam entry by student i in centre j

u_j = random intercept of centre j

e_{ij} = entry level residual

5.1.3 Single-year, multi-subject model

$y_{ij} = \alpha + \beta x_{ij} + + u_i + u_j + e_{ij}$

y_{ij} = [in mean grade analysis] numeric grade obtained by student i in centre j for an exam entry; [in grade percentage analysis] the exam entry being awarded the target grade or not (1 or 0)

x_{ij} = a set of background variables about the student taking the exam entry (prior attainment, FSM eligibility status, Ethnicity, Major language, SEN provision status, SES) and the Subject variable for the exam entry

u_j = random intercept of centre j

u_i = random intercept of student i

e_{ij} = entry level residual

5.2 A level

5.2.1 Univariate analyses: entry and prior attainment data

Table 5.1. Breakdown by candidates' gender against number of entries and candidates' prior attainment in 2018-2020 A level outcomes.

GENDER	2018			2019			2020		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
Female	270,690	59.17		280,013	58.91		279,076	59.22	
Male	186,771	40.83		195,224	41.07		192,150	40.78	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
Female	94.51	64.81	10.95	94.44	64.87	10.95	94.98	64.49	11.10
Male	91.49	63.04	10.69	91.75	63.01	10.58	92.51	63.45	10.81

Table 5.2. Breakdown by candidates' ethnicity against number of entries and candidates' prior attainment in 2018-2020 A level outcomes.

ETHNICITY	**2018**			**2019**			**2020**		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
AOEG	5,502	1.20		6,045	1.27		6,202	1.32	
ASIA	39,704	8.68		45,178	9.51		48,641	10.32	
BLAC	16,763	3.66		18,731	3.94		20,222	4.29	
CHIN	2,369	0.52		2,590	0.54		2,494	0.53	
MIXD	17,022	3.72		18,680	3.93		19,712	4.18	
UNCL	4,817	1.05		5,479	1.15		5,884	1.25	
WHIT	298,212	65.19		300,717	63.27		291,327	61.82	
UnknownEthnicity	73,075	15.97		77,876	16.38		76,747	16.29	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
AOEG	94.44	63.79	10.89	93.70	63.66	10.78	94.58	63.36	10.60
ASIA	94.96	64.56	10.99	95.59	64.46	10.96	95.88	64.52	11.23
BLAC	93.99	61.63	10.06	94.09	61.66	10.04	94.35	61.72	10.26
CHIN	91.14	69.22	11.43	90.35	69.85	11.82	92.18	69.76	12.09
MIXD	94.70	64.14	10.95	94.61	64.40	11.12	94.87	64.39	11.08
UNCL	93.75	63.64	10.97	93.89	64.23	10.85	93.80	63.26	11.13
WHIT	95.25	64.07	10.76	95.49	64.06	10.70	96.01	64.01	10.85
UnknownEthnicity	83.76	64.48	11.40	83.20	64.55	11.34	84.71	64.54	11.46

Table 5.3. Breakdown by candidates' major language against number of entries and candidates' prior attainment in 2018-2020 A level outcomes.

MAJOR LANGUAGE	2018			2019			2020		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
1_ENG	337,911	73.87		344,061	72.39		337,349	71.59	
2_OTH	45,182	9.88		51,647	10.87		55,032	11.68	
3_UNCL	1,296	0.28		1,712	0.36		2,101	0.45	
UnknownLanguage	73,075	15.97		77,876	16.38		76,747	16.29	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
1_ENG	95.17	64.12	10.78	95.37	64.15	10.76	95.87	64.07	10.90
2_OTH	94.55	63.47	10.90	94.96	63.34	10.72	95.34	63.56	10.99
3_UNCL	92.59	61.77	10.21	93.52	64.42	10.36	92.34	62.52	10.89
UnknownLanguage	83.76	64.48	11.40	83.20	64.55	11.34	84.71	64.54	11.46

Table 5.4. Breakdown by candidates' SEN provision status against number of entries and candidates' prior attainment in 2018-2020 A level outcomes.

SEN	2018			2019			2020		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
1_NON	365,668	79.93		377,414	79.41		372,853	79.12	
2_SNS	15,028	3.29		16,010	3.37		17,411	3.69	
3_SS	3,693	0.81		3,996	0.84		4,218	0.90	
4_UNCL	0	0.00		0	0.00		0	0.00	
UnknownSEN	73,075	15.97		77,876	16.38		76,747	16.29	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
1_NON	95.16	64.13	10.78	95.41	64.13	10.74	95.87	64.08	10.89
2_SNS	94.27	62.20	10.73	94.10	62.21	10.91	95.04	62.27	11.03
3_SS	91.06	62.30	11.40	90.47	62.79	11.09	89.92	62.73	11.29
4_UNCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UnknownSEN	83.76	64.48	11.40	83.20	64.55	11.34	84.71	64.54	11.46

Table 5.5. Breakdown by candidates' FSM eligibility status against number of entries and candidates' prior attainment in 2018-2020 A level outcomes.

FSM	**2018**			**2019**			**2020**		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
0=NO	367,330	80.30		376,370	79.19		370,649	78.66	
1=YES	17,059	3.73		21,050	4.43		23,833	5.06	
UnknownFSM	73,075	15.97		77,876	16.38		76,747	16.29	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
0=NO	95.13	64.16	10.79	95.34	64.18	10.76	95.80	64.17	10.92
1=YES	94.08	61.37	10.49	94.85	61.65	10.34	95.36	61.13	10.35
UnknownFSM	83.76	64.48	11.40	83.20	64.55	11.34	84.71	64.54	11.46

Table 5.6. Breakdown by candidate's SES against number against entries and candidates' prior attainment in 2018-2020 A level outcomes.

SES	**2018**			**2019**			**2020**		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
LoSES	120,979	26.45		127,219	26.77		128,826	27.34	
MiSES	130,427	28.51		134,985	28.40		131,277	27.86	
HiSES	132,181	28.89		134,479	28.29		133,647	28.36	
UnknownSES	73,877	16.15		78,613	16.54		77,479	16.44	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
LoSES	94.96	62.66	10.59	95.08	62.75	10.50	95.55	62.68	10.65
MiSES	95.17	64.05	10.72	95.28	64.10	10.73	96.04	63.99	10.86
HiSES	95.11	65.29	10.90	95.55	65.21	10.87	95.76	65.25	11.06
UnknownSES	83.90	64.45	11.40	83.32	64.53	11.33	84.76	64.53	11.45

5.2.2 Prior attainment by SES tables

Table 5.7. A level: Breakdown by SES of candidates with low prior attainment against number of entries, candidates' prior attainment, percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

Low Prior by SES	2018			2019			2020							
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*						
LoPRI+LoSES	38,233	8.36		40,634	8.55		42,159	8.95						
LoPRI+MiSES	35,745	7.81		37,403	7.87		37,882	8.04						
LoPRI+HiSES	32,165	7.03		33,151	6.97		33,629	7.14						
LoPRI+UnknownSES	18,531	4.05		19,187	4.04		19,440	4.13						
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*					
LoPRI+LoSES	100.00	51.50	4.78	100.00	51.75	4.45	100.00	51.79	4.51					
LoPRI+MiSES	100.00	51.87	4.52	100.00	51.98	4.26	100.00	52.12	4.29					
LoPRI+HiSES	100.00	52.18	4.26	100.00	52.27	4.11	100.00	52.37	4.14					
LoPRI+UnknownSES	100.00	51.80	4.45	100.00	51.95	4.21	100.00	51.98	4.21					
							Final			***CAG***			***Calculated***	
Grade A & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
LoPRI+LoSES	4.25			3.66			7.66			7.35			3.71	
LoPRI+MiSES	4.34			3.63			7.52			7.22			3.58	
LoPRI+HiSES	4.87			4.17			7.62			7.34			3.69	
LoPRI+UnknownSES	5.67			5.29			9.14			8.94			4.58	
Grade C & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
LoPRI+LoSES	53.72			51.82			71.89			70.39			54.74	
LoPRI+MiSES	55.45			53.92			73.70			72.31			56.25	
LoPRI+HiSES	58.05			56.28			74.01			72.58			56.92	
LoPRI+UnknownSES	57.37			56.53			73.25			72.52			56.77	
Mean Grade	*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*
LoPRI+LoSES	2.57	1.20		2.51	1.20		3.06	1.06		3.01	1.08		2.58	1.16
LoPRI+MiSES	2.62	1.18		2.56	1.18		3.08	1.04		3.04	1.05		2.61	1.13
LoPRI+HiSES	2.69	1.17		2.63	1.18		3.10	1.04		3.05	1.05		2.64	1.12
Mean Grade	*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*
LoPRI+UnknownSES	2.69	1.22		2.66	1.22		3.12	1.10		3.09	1.11		2.66	1.17

Table 5.8. A level: Breakdown by SES of candidates with medium prior attainment against number of entries, candidates' prior attainment, percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

Med Prior by SES	2018			2019			2020							
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*						
MiPRI+LoSES	40,066	8.76		42,426	8.93		43,021	9.13						
MiPRI+MiSES	42,781	9.35		44,591	9.38		43,797	9.29						
MiPRI+HiSES	41,501	9.07		43,929	9.24		43,539	9.24						
MiPRI+UnknownSES	19,611	4.29		21,906	4.61		21,799	4.63						
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*					
MiPRI+LoSES	100.00	62.17	2.73	100.00	62.28	2.74	100.00	62.27	2.71					
MiPRI+MiSES	100.00	62.21	2.74	100.00	62.32	2.73	100.00	62.31	2.71					
MiPRI+HiSES	100.00	62.28	2.73	100.00	62.37	2.72	100.00	62.42	2.69					
MiPRI+UnknownSES	100.00	62.17	2.71	100.00	62.31	2.72	100.00	62.33	2.71					
							Final			***CAG***			***Calculated***	
Grade A & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
MiPRI+LoSES	12.92			11.79			24.26			23.65			12.19	
MiPRI+MiSES	14.54			13.25			25.69			24.99			13.01	
MiPRI+HiSES	15.01			14.81			26.09			25.40			13.57	
MiPRI+UnknownSES	15.43			14.83			26.11			25.68			14.52	
Grade C & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
MiPRI+LoSES	75.76			73.82			88.64			87.84			76.39	
MiPRI+MiSES	78.46			77.53			90.59			89.86			79.23	
MiPRI+HiSES	80.30			79.82			91.57			90.92			81.17	
MiPRI+UnknownSES	77.85			77.77			89.06			88.56			79.08	
Mean Grade	*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*
MiPRI+LoSES	3.26	1.19		3.19	1.20		3.77	1.08		3.74	1.09		3.27	1.17
MiPRI+MiSES	3.35	1.17		3.31	1.16		3.84	1.04		3.81	1.05		3.35	1.14
MiPRI+HiSES	3.41	1.14		3.39	1.15		3.88	1.03		3.84	1.04		3.40	1.11
MiPRI+UnknownSES	3.36	1.20		3.35	1.19		3.82	1.09		3.79	1.10		3.37	1.16

Table 5.9. A level: Breakdown by SES of candidates with high prior attainment against number of entries, candidates' prior attainment, percentage of grade A and above, percentage of grade C and above and mean grade in 2018-2020 A level outcomes.

High Prior by SES	2018			2019			2020							
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*						
HiPRI+LoSES	36,582	8.00		37,904	7.97		37,915	8.05						
HiPRI+MiSES	45,598	9.97		46,626	9.81		44,398	9.42						
HiPRI+HiSES	52,054	11.38		51,417	10.82		50,811	10.78						
HiPRI+UnknownSES	23,842	5.21		24,405	5.13		24,435	5.19						
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*					
HiPRI+LoSES	100.00	74.88	6.38	100.00	75.05	6.39	100.00	75.26	6.85					
HiPRI+MiSES	100.00	75.33	6.56	100.00	75.54	6.67	100.00	75.77	7.09					
HiPRI+HiSES	100.00	75.79	6.78	100.00	75.98	6.88	100.00	76.20	7.33					
HiPRI+UnknownSES	100.00	76.17	7.09	100.00	76.40	7.38	100.00	76.46	7.75					
							Final			***CAG***			***Calculated***	
Grade A & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
HiPRI+LoSES	45.25			44.83			66.22			65.24			48.65	
HiPRI+MiSES	49.19			48.79			70.28			69.39			52.61	
HiPRI+HiSES	52.72			52.10			72.99			72.10			55.78	
HiPRI+UnknownSES	51.87			51.12			69.49			68.91			54.57	
Grade C & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
HiPRI+LoSES	92.50			92.61			97.90			97.65			93.91	
HiPRI+MiSES	94.09			94.56			98.48			98.30			95.24	
HiPRI+HiSES	95.32			95.51			98.80			98.66			96.08	
HiPRI+UnknownSES	94.40			94.05			98.13			97.95			95.13	
Mean Grade	*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*
HiPRI+LoSES	4.26	1.17		4.25	1.15		4.80	1.00		4.77	1.01		4.36	1.13
HiPRI+MiSES	4.37	1.13		4.38	1.11		4.91	0.96		4.88	0.97		4.47	1.09
HiPRI+HiSES	4.47	1.09		4.47	1.08		4.97	0.93		4.94	0.94		4.55	1.06
HiPRI+UnknownSES	4.44	1.13		4.42	1.14		4.89	0.99		4.86	1.00		4.51	1.12

5.3 GCSE

5.3.1 Univariate analyses: Entry and Prior Attainment Data

Table 5.10. Breakdown by candidates' gender against number of entries and candidates' prior attainment in 2018-2020 GCSE outcomes.

GENDER	2018			2019			2020		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
Female	2,030,147	50.64		2,092,171	50.67		2,142,285	50.69	
Male	1,978,678	49.36		2,036,894	49.33		2,083,576	49.30	
Neither or UnknownGender	113	0.00		169	0.00		135	0.00	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
Female	86.82	51.80	16.29	87.34	51.75	16.27	88.12	51.52	16.19
Male	85.86	51.71	16.34	86.41	51.89	16.39	87.21	51.87	16.50
Neither or UnknownGender	0.00	0.00	0.00	0.00	0.00	0.00	21.48	44.24	16.30

Table 5.11. Breakdown by candidates' ethnicity against number of entries and candidates' prior attainment in 2018-2020 GCSE outcomes.

ETHNICITY	2018			2019			2020		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
AOEG	61,543	1.54		67,465	1.63		73,327	1.74	
ASIA	421,949	10.53		437,180	10.59		450,261	10.65	
BLAC	214,611	5.35		224,932	5.45		236,698	5.60	
CHIN	15,169	0.38		16,297	0.39		16,126	0.38	
MIXD	187,817	4.68		203,100	4.92		217,796	5.15	
UNCL	43,820	1.09		49,740	1.20		54,431	1.29	
WHIT	3,006,057	74.98		3,068,536	74.31		3,115,798	73.73	
UnknownEthnicity	57,972	1.45		61,984	1.50		61,559	1.46	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
AOEG	68.94	49.88	16.13	70.85	50.21	16.39	71.62	49.81	16.49
ASIA	80.94	50.87	16.61	82.35	51.40	16.72	82.68	51.37	16.71
BLAC	76.19	48.56	15.60	76.85	48.15	15.47	79.23	48.23	15.35
CHIN	76.48	61.35	16.22	78.87	62.75	16.71	82.03	60.51	17.01
MIXD	84.84	52.34	16.49	85.67	52.23	16.43	86.58	52.09	16.50
UNCL	80.52	51.22	16.50	81.90	51.13	16.37	82.27	50.75	16.56
WHIT	89.33	51.97	16.26	89.77	52.01	16.26	90.54	51.90	16.29
UnknownEthnicity	38.54	58.00	16.52	39.51	57.44	16.31	40.74	57.30	16.39

Table 5.12. Breakdown by candidates' major language against number of entries and candidates' prior attainment in 2018-2020 GCSE outcomes.

MAJOR LANGUAGE	2018			2019			2020		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
1_ENG	3,318,799	82.78		3,410,107	82.58		3,485,455	82.48	
2_OTH	626,263	15.62		647,861	15.69		671,104	15.88	
3_UNCL	5,904	0.15		9,282	0.22		7,878	0.19	
UnknownLanguage	57,972	1.45		61,984	1.50		61,559	1.46	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
1_ENG	90.04	52.10	16.25	90.44	52.14	16.25	91.16	52.06	16.26
2_OTH	71.29	49.17	16.47	72.79	49.43	16.58	74.06	49.06	16.59
3_UNCL	74.59	50.37	15.83	77.52	50.58	15.57	71.13	50.24	16.87
UnknownLanguage	38.54	58.00	16.52	39.51	57.44	16.31	40.74	57.30	16.39

Table 5.13. Breakdown by candidates' SEN provision status against number of entries and candidates' prior attainment in 2018-2020 GCSE outcomes.

SEN	2018			2019			2020		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
1_NON	3,514,179	87.66		3,608,733	87.39		3,676,921	87.01	
2_SNS	372,656	9.30		390,699	9.46		415,865	9.84	
3_SS	64,131	1.60		67,818	1.64		71,651	1.70	
4_UNCL	0	0.00		0	0.00		0	0.00	
UnknownSEN	57,972	1.45		61,984	1.50		61,559	1.46	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
1_NON	87.91	53.16	15.55	88.29	53.28	15.51	88.98	53.21	15.51
2_SNS	82.92	39.21	17.11	85.00	39.31	17.28	86.20	39.57	17.21
3_SS	63.65	36.89	18.10	65.54	37.25	18.75	69.36	36.54	18.47
4_UNCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UnknownSEN	38.54	58.00	16.52	39.51	57.44	16.31	40.74	57.30	16.39

Table 5.14. Breakdown by candidates' FSM eligibility status against number of entries and candidates' prior attainment in 2018-2020 GCSE outcomes.

FSM	**2018**			**2019**			**2020**		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
0=NO	3,515,903	87.70		3,568,942	86.43		3,583,244	84.79	
1=YES	435,063	10.85		498,308	12.07		581,193	13.75	
UnknownFSM	57,972	1.45		61,984	1.50		61,559	1.46	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
0=NO	87.48	52.58	16.16	88.02	52.75	16.16	88.79	52.77	16.16
1=YES	83.48	44.36	15.70	84.60	44.56	15.68	85.71	44.50	15.60
UnknownFSM	38.54	58.00	16.52	39.51	57.44	16.31	40.74	57.30	16.39

Table 5.15. Breakdown by candidates' SES against number of entries and candidates' prior attainment in 2018-2020 GCSE outcomes.

SES	**2018**			**2019**			**2020**		
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*	
LoSES	1,241,057	30.96		1,279,508	30.99		1,324,558	31.34	
MiSES	1,319,886	32.92		1,359,470	32.92		1,389,550	32.88	
HiSES	1,383,489	34.51		1,422,039	34.44		1,444,331	34.18	
UnknownSES	64,506	1.61		68,217	1.65		67,557	1.60	
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*
LoSES	83.55	47.89	15.93	84.28	47.86	15.92	85.72	47.86	15.94
MiSES	87.58	51.40	16.21	88.24	51.43	16.22	88.68	51.38	16.24
HiSES	89.77	55.22	15.95	90.07	55.41	15.94	90.58	55.21	15.98
UnknownSES	41.23	56.40	16.81	41.89	56.10	16.59	42.72	56.18	16.58

5.3.2 Prior attainment by SES tables

Table 5.16. GCSE: Breakdown by SES of candidates with low prior attainment against number of entries, candidates' prior attainment, percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

Low Prior by SES	2018			2019			2020							
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*						
LoPRI+LoSES	403,542	10.07		420,112	10.17		441,932	10.46						
LoPRI+MiSES	358,400	8.94		370,438	8.97		382,924	9.06						
LoPRI+HiSES	282,420	7.04		287,581	6.96		298,295	7.06						
LoPRI+UnknownSES	5,709	0.14		6,300	0.15		6,329	0.15						
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*					
LoPRI+LoSES	100.00	32.27	8.86	100.00	32.22	8.86	100.00	32.21	8.85					
LoPRI+MiSES	100.00	32.82	8.45	100.00	32.84	8.46	100.00	32.84	8.44					
LoPRI+HiSES	100.00	33.68	7.96	100.00	33.82	7.85	100.00	33.69	7.91					
LoPRI+UnknownSES	100.00	33.08	8.79	100.00	33.31	8.11	100.00	33.57	8.03					
							Final			***CAG***			***Calculated***	
Grade 7 & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
LoPRI+LoSES	2.21			2.26			3.37			3.10			2.17	
LoPRI+MiSES	2.47			2.61			3.78			3.47			2.51	
LoPRI+HiSES	3.16			3.32			4.35			4.03			2.86	
LoPRI+UnknownSES	6.50			5.71			11.11			10.19			7.25	
Grade 4 & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
LoPRI+LoSES	36.20			36.27			49.49			48.84			37.06	
LoPRI+MiSES	42.10			41.96			55.03			54.36			42.35	
LoPRI+HiSES	49.61			49.44			62.12			61.44			49.19	
LoPRI+UnknownSES	46.40			49.90			66.72			65.37			52.46	
Mean Grade	*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*
LoPRI+LoSES	3.09	1.55		3.10	1.56		3.54	1.51		3.49	1.53		3.12	1.53
LoPRI+MiSES	3.31	1.52		3.31	1.53		3.73	1.47		3.68	1.48		3.32	1.51
LoPRI+HiSES	3.58	1.51		3.58	1.52		3.95	1.43		3.91	1.43		3.55	1.48
Mean Grade	*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*
LoPRI+UnknownSES	3.50	1.85		3.54	1.82		4.25	1.82		4.16	1.83		3.70	1.85

Table 5.17. GCSE: Breakdown by SES of candidates with medium prior attainment against number of entries, candidates' prior attainment, percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

Med Prior by SES	2018			2019			2020							
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*						
MiPRI+LoSES	354,404	8.84		368,206	8.92		387,832	9.18						
MiPRI+MiSES	387,466	9.67		404,454	9.79		414,588	9.81						
MiPRI+HiSES	400,270	9.98		412,266	9.98		422,140	9.99						
MiPRI+UnknownSES	8,025	0.20		8,788	0.21		8,872	0.21						
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*					
MiPRI+LoSES	100.00	50.28	4.04	100.00	50.31	4.04	100.00	50.28	4.04					
MiPRI+MiSES	100.00	50.59	4.05	100.00	50.58	4.05	100.00	50.57	4.05					
MiPRI+HiSES	100.00	50.86	4.03	100.00	50.85	4.04	100.00	50.83	4.05					
MiPRI+UnknownSES	100.00	50.81	3.99	100.00	50.95	3.98	100.00	50.76	3.99					
							Final			***CAG***			***Calculated***	
Grade 7 & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
MiPRI+LoSES	10.57			10.88			15.67			14.79			10.80	
MiPRI+MiSES	12.56			12.62			17.70			16.81			12.54	
MiPRI+HiSES	15.36			15.27			20.20			19.24			14.63	
MiPRI+UnknownSES	23.95			23.76			37.48			35.94			26.17	
Grade 4 & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
MiPRI+LoSES	69.75			69.93			80.99			80.54			70.84	
MiPRI+MiSES	76.48			76.14			85.92			85.54			76.82	
MiPRI+HiSES	81.89			81.69			89.82			89.52			81.97	
MiPRI+UnknownSES	82.65			82.45			90.37			90.00			83.23	
Mean Grade	*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*
MiPRI+LoSES	4.39	1.69		4.40	1.71		4.87	1.65		4.82	1.65		4.43	1.69
MiPRI+MiSES	4.65	1.63		4.64	1.65		5.09	1.57		5.04	1.56		4.67	1.62
MiPRI+HiSES	4.91	1.59		4.90	1.60		5.30	1.50		5.25	1.49		4.90	1.57
MiPRI+UnknownSES	5.20	1.82		5.18	1.84		5.84	1.77		5.76	1.77		5.29	1.86

Table 5.18. GCSE: Breakdown by SES of candidates with high prior attainment against number of entries, candidates' prior attainment, percentage of grade 7 and above, percentage of grade 4 and above and mean grade in 2018-2020 GCSE outcomes.

High Prior by SES	2018			2019			2020							
Entries	*Number*	*% of all*		*Number*	*% of all*		*Number*	*% of all*						
HiPRI+LoSES	278,954	6.96		290,052	7.02		305,661	7.23						
HiPRI+MiSES	410,079	10.23		424,685	10.28		434,781	10.29						
HiPRI+HiSES	559,287	13.95		580,960	14.07		587,892	13.91						
HiPRI+UnknownSES	12,864	0.32		13,490	0.33		13,656	0.32						
Prior Attainment	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*	*%known*	*Mean*	*SD*					
HiPRI+LoSES	100.00	67.45	8.10	100.00	67.40	8.01	100.00	67.43	8.08					
HiPRI+MiSES	100.00	68.39	8.44	100.00	68.46	8.53	100.00	68.48	8.57					
HiPRI+HiSES	100.00	69.23	8.79	100.00	69.34	8.88	100.00	69.28	8.85					
HiPRI+UnknownSES	100.00	70.24	9.38	100.00	70.11	9.27	100.00	70.18	9.41					
							Final			***CAG***			***Calculated***	
Grade 7 & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
HiPRI+LoSES	37.75			38.55			48.32			47.02			38.89	
HiPRI+MiSES	44.73			45.16			54.48			53.28			45.25	
HiPRI+HiSES	51.61			51.39			60.20			59.13			51.38	
HiPRI+UnknownSES	64.94			62.26			75.68			74.62			65.22	
Grade 4 & above	*% of group*			*% of group*			*% of group*			*% of group*			*% of group*	
HiPRI+LoSES	90.51			90.61			94.67			94.50			90.24	
HiPRI+MiSES	93.88			93.89			96.80			96.68			93.55	
HiPRI+HiSES	95.96			95.98			98.04			97.96			95.66	
HiPRI+UnknownSES	96.78			96.71			98.44			98.37			96.52	
Mean Grade	*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*		*Mean*	*SD*
HiPRI+LoSES	5.88	1.80		5.92	1.82		6.36	1.73		6.30	1.73		5.92	1.82
HiPRI+MiSES	6.22	1.73		6.24	1.74		6.63	1.63		6.57	1.63		6.23	1.74
HiPRI+HiSES	6.51	1.66		6.51	1.67		6.86	1.55		6.81	1.55		6.50	1.67
HiPRI+UnknownSES	7.02	1.70		6.92	1.71		7.44	1.50		7.39	1.53		7.02	1.70

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