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Title: **Education: Teachers' Gender Bias**

Synopsis

I present here two instances where comparisons of teachers' assessments with exam results provide quantitative indications of teacher bias in favour of girls. The methodology is given in the Notes.

[1] Key Stage 2 SATS (age 10/11) display teacher bias which is almost always in favour of girls (positive bias in Figures 1, 2) in reading, writing and mathematics (i.e., all those subjects where both teacher assessments and test results are available for comparison).

[2] This bias ranges up to 6% of the cohort, but is generally around 2% or 3% (Figures 1,2) and persists over time (data for 2007 to 2018).

[3] This bias in KS2 SATS is consistent across English regions (Figure 3). Figure 3 also shows the extent of girls' genuine dominance over boys in reading and writing based on tests alone.

[4] In "Covid lockdown" year, 2020, final A Level awards were based on unmoderated teachers' assessments. This led to huge grade inflation in the top grades, for both sexes but more so for girls than boys, Figures 4,5.

[5] As a result the number of top A*,A,B grades awarded to girls, less the number awarded to boys, increased by roughly 20,000 compared with expectations based on previous years (when awards were based on exams), Figure 6.

[6] Analysis of A Level subjects separately reveals that 29 out of 30 subjects have a bias towards girls in the awarding of top A*/A grades, with an average bias of 3.2% or roughly 10,000 extra top grades to girls, Table 1.

Context: Girls genuinely do better than boys in most subjects throughout their school career, even when measured by test/exam results only. The above biases do not account for the whole gender difference in educational attainment, only a small fraction of it. But the biases are particularly damaging because they add to an existing 'natural' inferior performance of boys.

Cultural / Policy Bias

- The results presented here are not unknown to educationalists. However, they are not normally presented as evidence of bias. Instead, the approved narrative is that "girls under-perform on tests". At best this explanation is without justification. At worst, it is a refusal to acknowledge the obvious simplest explanation. It is clear that teachers' assessments have a greater potential to be biased than test or exam results. Moreover, the claim that "girls under-perform on tests" does not fit well with girls' dominance in test/exam results in most subjects throughout schooling, from infancy to adulthood. This proffered explanation is simply the shoehorning of reality into the shape required by the approved narrative of girls' disadvantage.

- The observed bias does not imply that every teacher displays bias. Nor does it imply that bias is conscious or deliberate. Nor should it be assumed that only one sex of teacher displays bias.

- The dominant cultural narrative on gender – that girls are disadvantaged and boys are privileged – may be the cause of the bias, i.e., as a well-meaning, and probably unconscious, attempt to redress a perceived disadvantage to girls.

- But the empirically undeniable disadvantage in education is to boys, not girls, so the prevailing narrative is profoundly misaligned with reality.

- Political policy is then driven by the narrative, not by empirical fact, such as the 2016 Government White Paper, *Educational Excellence Everywhere*, Ref.[1], which ignores boys and continues to promote the myth of girls' disadvantage.

References

[1] Department for Education, *Educational Excellence Everywhere*, March 2016.

[2] National curriculum assessments: key stage 2, 2015 GOV.UK (www.gov.uk)

[3] National curriculum assessments: key stage 2, 2016 GOV.UK (www.gov.uk)

[4] National curriculum assessments: key stage 2, 2017 GOV.UK (www.gov.uk)

[5] National curriculum assessments: key stage 2, 2018 GOV.UK (www.gov.uk)

[6] Joint Council for Qualifications, *GCE A Level & GCE AS Level Results Summer 2020,* Thursday 10 September 2020, https://www.jcq.org.uk/examination-results/

[7] Student Performance Analysis, National examination figures (bstubbs.co.uk)

Conclusions

For both KS2 SATS in 2007 to 2018 and A Levels in 2020, comparison of test results with teachers' assessments indicate that the latter are biased in favour of girls compared with the former. This adds to the dominance of girls over boys in exam attainment, further exacerbating boys' disadvantage.

Recommendations

This issue joins the broader issue of boys' under-performance in education, for which there is no political will or policy initiatives to address (see submission "Education: The Intersection of Sex and Race"). The starting point must be a political will to address the overarching issue of boys' education.

Notes

Key Stage 2 SATS (Age 10/11)

Data is taken from Department for Education public releases, e.g., Refs.[2,3,4,5] and similar for earlier years. Data relate to England only.

For years 2007 to 2015, inclusive, data is used for attainment Levels 4 (or above) and 5 (or above). These relate roughly to the required attainment level (4 and above) or exceeding the required level (5 and above). In these years the test results and the teachers' assessments were both reported against these grades and may therefore be compared on this basis.

In years 2016, 2017 and 2018 results were published against "achieving the required standard", and these are plotted in the graphs below as "meets standard" or as "Level 4 or above", that being the nearest equivalent. In those years, results were also published for writing at a higher attainment level: "high score" (tests) or "at greater depth" (teachers' assessment). These are taken as comparable for our purposes.

Teachers' assessments of pupils' writing are matched with the test results for "grammar, punctuation and spelling".

In year 2019 results were published using different attainment descriptors, which frustrate comparison between teachers' assessments and test results, and so cannot be used to deduce bias.

For years 2007 to 2018, bias is defined quantitatively as,

$$Bias = (TA_g - Test_g) - (TA_b - Test_b)$$

Where TA refers to Teachers' Assessments and $Test$ to test results, and the subscripts g, b refer to girls and boys. All terms are expressed as percentages of the cohort of the same sex attaining the relevant grade.

It is important to note that we are not concerned here with whether teachers tend to be more lenient, or more harsh, in their assessments than the tests. Zero bias will result from the above definition if teachers are more lenient than test data, provided that the degree of leniency is the same for boys and girls. Ditto, if teachers are more draconian, but equally so, in their assessments.

The bias is defined to be positive when the bias is in favour of girls, and negative if the bias is in favour of boys.

Figure 1 plots the bias against year (2007 to 2018) for reading and writing, and Figure 2 is the equivalent for mathematics.
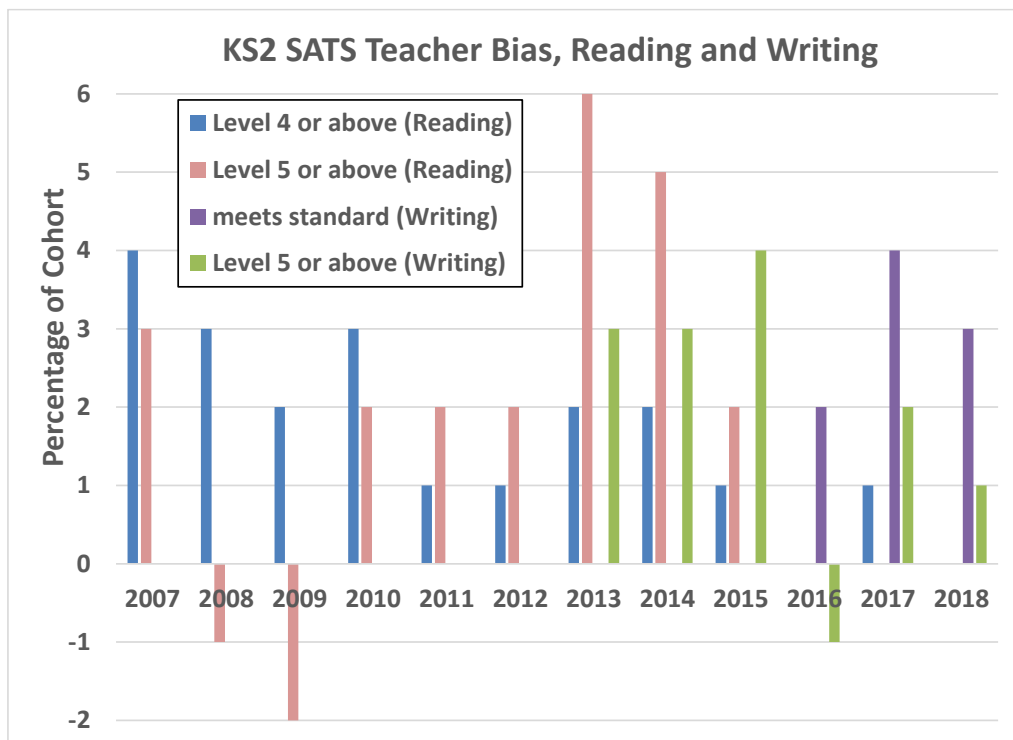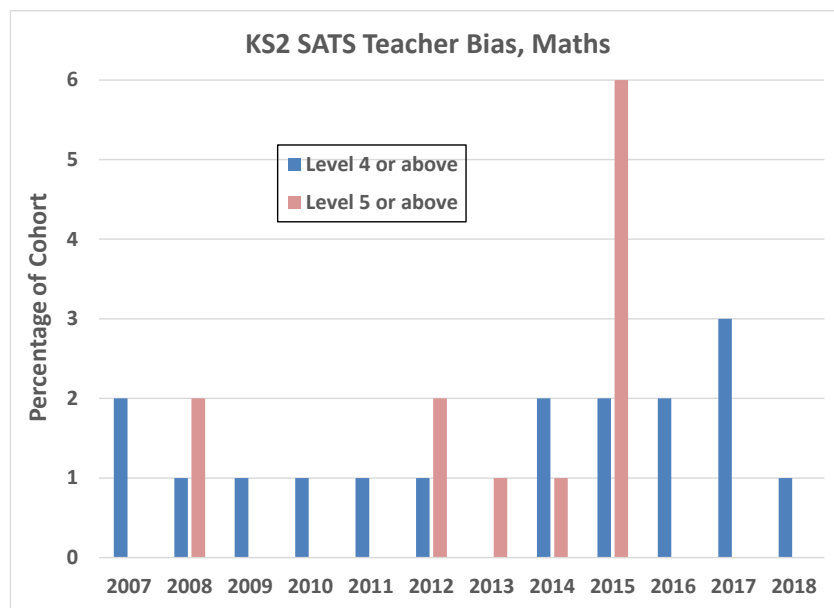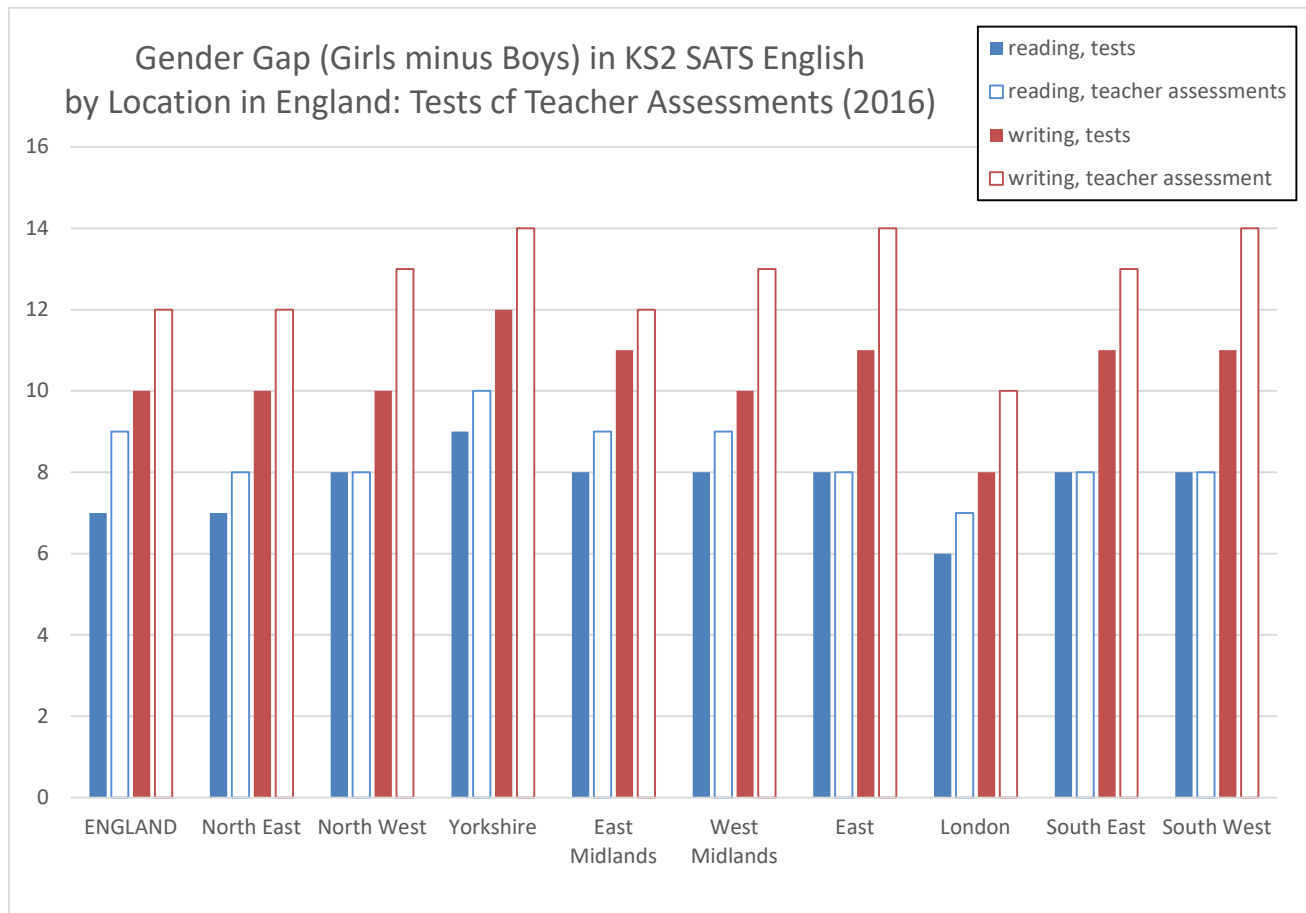
Figure 1

Figure 2

With only a few exceptions, the bias is consistently positive (in favour of girls) across subjects and across time.

The same sources breakdown the SATS results by English region. The amount by which girls outperform boys in reading and writing is shown for each region in Figure 3. Both test results (solid bars) and teachers' assessments (unshaded bars) are plotted, the latter being consistently larger than the former in all regions (except a few where they are equal). In the previous notation the tests results plotted are $(Test_g - Test_b)$ and the teachers' assessments plotted are $(TA_g - TA_b)$. Based on tests alone, girls outperform boys by between 6% and 9% in reading across the regions, and by 10% to 12% in writing.

Figure 3

Gender Gap (Girls minus Boys) in KS2 SATS English by Location in England: Tests cf Teacher Assessments (2016)

A Levels 2020

The final A Level awards in 2020, as published by the Joint Council for Qualifications (JCQ), may be found in Ref.[6]. These final awards were based on the unmoderated assessments of teachers.

Ref.[7] provides a convenient compilation of JCQ published A Level awards in earlier years, based on exam results.

Unsurprisingly, the awards based on the unmoderated teachers' assessments in 2020 displayed huge inflation in the proportion of top A*, A, B grades awarded compared to previous years based on exam results, Figure 4.

This inflation in the top grades occurred for both boys and girls, but the extent of the inflation was greater for girls, e.g., Figure 5 for the percentage A grades awarded by sex (all subjects). The sex disparity based on teachers' assessments in 2020 was double the greatest the disparity had been in the previous ten years.

Figure 6 shows the number of A*, A, B grades awarded to girls, across all subjects, minus the number awarded to boys. For the previous ten years this had been between 51,319 and 61,245, with no upward trend. In 2020, based on teachers' assessments, it leapt to 77,905.

In short, in 2020 girls' dominance over boys was further increased by roughly an additional 20,000 A*,A,B grades simply as a result of the gender bias in teachers' assessments. In the competition for places at the best universities, this will have had a direct bearing on the increased dominance of women entrants in 2020.

The justification for identifying the disparity as bias follows from the analysis of individual subjects, next.
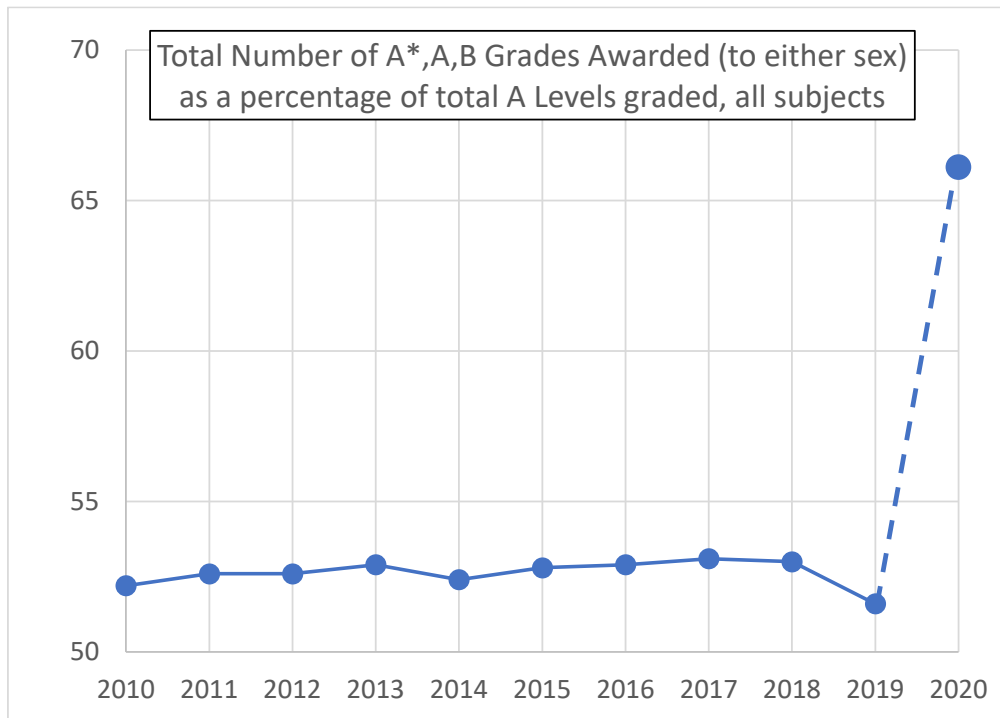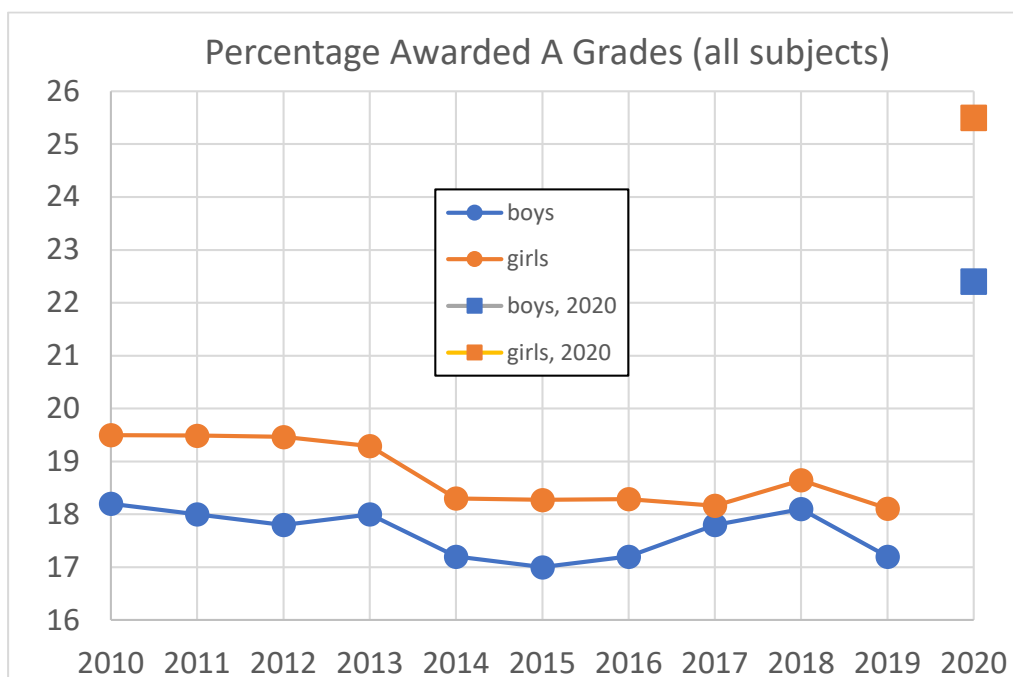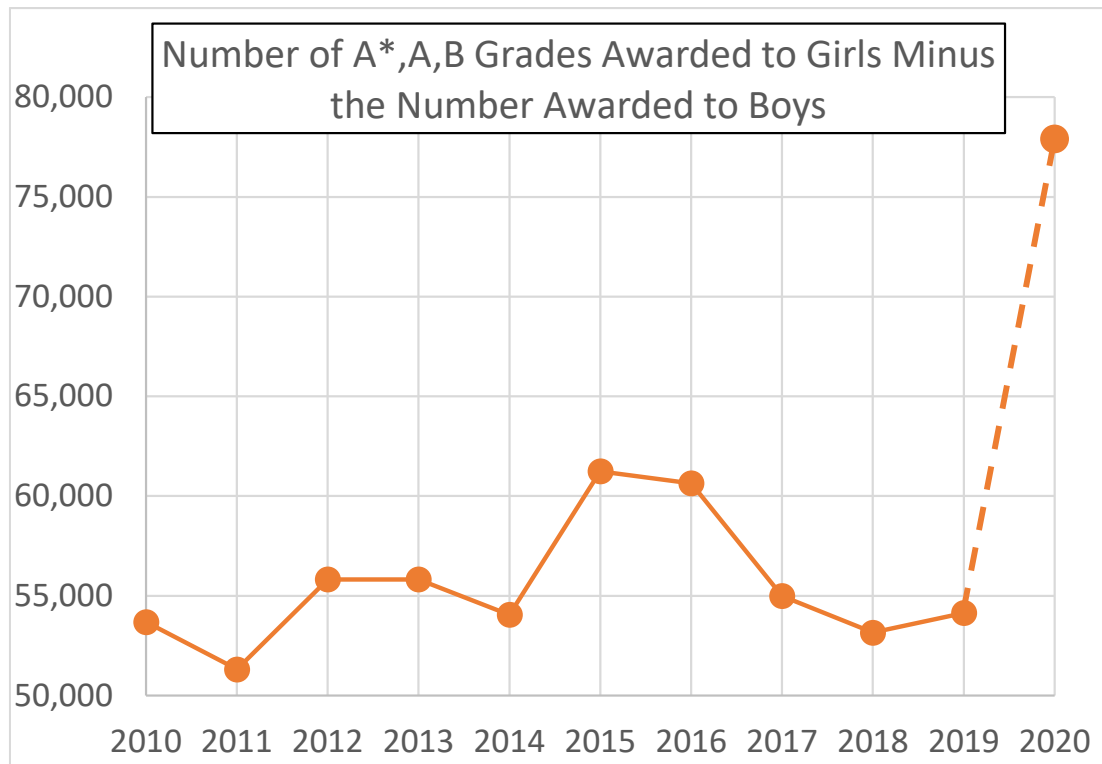
Figure 4

Figure 5

Figure 6

Analysis of Bias in Individual A Level Subjects

Bias is defined in the same way as for SATS, i.e.,

$$Bias = \left(TA_g - Test_g\right) - \left(TA_b - Test_b\right)$$

where the terms in this new context are,

TA_g = based on teachers' assessments in 2020, the number of girls awarded A* or A grades in any given subject as a percentage of the total number of girls graded in that subject;

TA_b = based on teachers' assessments in 2020, the number of boys awarded A* or A grades in any given subject as a percentage of the total number of boys graded in that subject.

$Test_g$ = based on exam-based results in 2019, the number of girls awarded A* or A grades in any given subject as a percentage of the total number of girls graded in that subject;

$Test_b$ = based on exam-based results in 2019, the number of boys awarded A* or A grades in any given subject as a percentage of the total number of boys graded in that subject.

Such a quantity will be subject to some unknown degree of random scatter, so it is not immediately clear if a small value of the bias is statistically significant. One signature of random values with no statistical significance would be if the apparent bias changes sign between subjects and the average over subjects is very small.

Table 1 lists the bias calculated in this manner for all A Level subjects where the total number of candidates in 2020 exceeded 2,500. There are 30 such subjects. (The only subjects rejected based on small statistics, i.e., less than 2,500 candidates, were Welsh, Irish, ICT, Performing Arts and "other science").

Apart from one subject, Other Modern Languages (OML), all the biases are positive, i.e., 29 out of 30 subjects show a teacher bias in favour of girls.

This is the case whether the subject is dominated in terms of numbers of entrants by girls or by boys.

That the bias is systematically positive strongly suggests it is an inherent bias according to sex, not random noise.

Across all A Levels the overall bias in awarding top A*/A grades is 3.2% in favour of girls, or roughly 10,000 extra A*/A awards to girls.

This is comparable with the amount by which the excess of women over men entrants into university increased in 2020.

Table 1

Subject	Bias (%)	Subject	Bias (%)
Art & Design	3.4	History	5.7
Biology	0.8	Law	0.8
Business	2.5	Maths	6.1
Chemistry	1.9	Further Maths	5.0
Classical studies	5.4	Media & film	6.6
Computing	8.4	Music	4.3
Design & Technology	5.2	Physics	4.8
Drama	2.8	PE / Sports	8.4
Economics	4.5	Politics	1.9
English Literature	2.9	Psychology	4.8
English Language	4.3	Religious Studies	2.0
English Lit & Lang	2.7	Sociology	4.1
French	1.0	Spanish	0.8
Geography	6.1	OML	-1.3
German	0.3	Other Subjects	2.3
All Subjects	**3.2**		