Uptake of GCSE subjects in 2015, by alternative school type classifications

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Introduction

Since 2005, Cambridge Assessment has produced regular Statistics Reports on patterns and trends of data in the English examinations system. The majority of the reports included a breakdown of the data by school type, using information from the National Centre Number (NCN) database. However, there are now some reasons to believe that using this school type to split the data might not be entirely appropriate.

The first reason is due to the large numbers of schools which have converted to Academy status in recent years. When the Academies programme was initially set up the schools that converted were broadly homogenous: they tended to be poorer performing schools from deprived areas, and as such it made sense to treat them as a separate category. However, since the programme was expanded to allow any schools to convert, many grammar schools (and high performing comprehensives) have converted to academies, meaning it no longer makes sense to treat them as one category. The NCN database only has one category for Academies and may therefore no longer be the best source of data.

The second reason relates to how selective schools actually are, in terms of choosing the students with highest levels of prior attainment in the local area. This idea came from reading a blog by Rebecca Allen of Education Datalab (Allen, 2016), in which she shows that schools within a particular category (e.g. comprehensive, secondary modern) can vary greatly in terms of how selective they actually are. Thus, if we are interested in making the distinction between different school types because of what they say about how selective schools are then perhaps we need a better way of measuring this.

This report explores the possibility of using two methods of categorising schools which are alternatives to the current method (NCN categorisation). These are:

1) Using Edubase[1] categories, which allow academies to be split based on their admissions policies (comprehensive, secondary modern or selective).
2) Categorise schools based on their true level of selectivity.

These new categories are then used to re-produce relevant tables from a statistics report on uptake of GCSE subjects in 2015 (Gill and Williamson, 2016).

Data and methods

The majority of the analysis in this report was undertaken using the National Pupil Database (NPD). This is a database held by the Department for Education, consisting of results for all students in all subjects in schools and colleges in England, as well as pupil and school background characteristics such as age, gender, ethnicity and level of deprivation.

To retrieve the new categorisation using Edubase data, the latest version of the data was downloaded from the Edubase website (http://www.education.gov.uk/edubase/home.xhtml). This includes information on the type of school (e.g. Academy, Community School, Voluntary Aided School etc.) and the admissions policy (e.g. Comprehensive, Modern, Selective). Using this data, each school was classified into one of six different categories: Academy (Comprehensive); Academy (Modern); Academy (Selective); Comprehensive; Secondary

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[1] The Department for Education's register of educational establishments in England and Wales

Modern; Grammar. This was matched to data from the NPD using the schools' URN (Unique Reference Number).

The method used to categorise schools according to their true level of selectivity was taken from the analysis by Rebecca Allen (Allen, 2016). This involved first identifying which neighbourhoods[2] each school recruited pupils from. Then an index was created of the proportion of pupils in a school who achieved a Level 5 (L5) in both English and Maths in their Key Stage 2 (KS2) tests, compared with the proportion of L5 pupils in the neighbourhoods the school recruited from. The higher the index, the more selective the school is. For example, if the proportion of L5 pupils in a school is 0.5 and the proportion of L5 pupils in all the neighbourhoods that they recruit from is 0.3 then the selectivity index would be 1.67 (0.5/0.3). To increase the reliability of the index it was calculated using data from the last five years, and only schools with KS2 results for at least 50 pupils in total across the five years were included. The schools were then classified into quintiles based on their index score.

It should be noted that the extracts of the NPD used in the analysis presented here (all years from 2010/11 to 2014/15) only include pupils who were in year 11 at the time. This means that the selectivity index was based on pupils' performance from five years ago (at the end of KS2) and it may be that some schools have changed their admissions policies and therefore their level of selectivity in that time. However, as we are looking at uptake amongst students who started in the school five years ago it makes sense to use the selectivity data from then, rather than from the most recent year.

For the analysis of uptake at GCSE (including IGCSE) the Key Stage 4 (KS4) extract of the NPD from 2014/15 was used, consisting of all students who were at the end of KS4 in 2015 (i.e. in year 11). Uptake in this report is defined as the percentage of these students taking a GCSE in the subject, and includes exams taken by these students in previous years. Only accredited IGCSEs were counted in this report as non-accredited qualifications are not included in the NPD extract. Independent schools were ignored in the analysis, because very few, if any, will have converted to an academy.

Results

Before looking at uptake levels using the alternative school classifications, it is of interest to compare schools in terms of their 'old' and 'new' classifications. Table 1 presents a comparison by NCN school type and by Edubase school type. It shows the number of schools classified by each NCN school type and the percentage of these in each category of Edubase school type. It should be noted that the NCN classifications are from the 2014 database, whilst the Edubase classifications are from 2016. Therefore, some school classifications may have changed in the intervening period: in particular, some schools will have converted to academies.

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[2] The definition of neighbourhood in this analysis is a Middle Layer Super Output Area (MSOA). These are used in census data and are made up of adjacent postcode areas. The average population size of a MSOA is 7,200. See this link for more details

Table 1: School classifications using NCN and Edubase

School type (NCN, 2014)	Schools	School type (Edubase, 2016)					
		Academy (comp)	Academy (mod.)	Academy (sel.)	Comp.	Sec. Mod.	Grammar
Academy	1,228	87.4	5.1	7.5	0.1	0.0	0.0
Comprehensive	1,327	15.8	0.2	0.0	83.7	0.4	0.0
Secondary modern	77	6.5	11.7	1.3	27.3	53.3	0.0
Grammar	68	0.0	0.0	64.7	0.0	0.0	35.3

Thus, almost all schools classified as academy by NCN were classified the same by Edubase, with most having a comprehensive admissions policy (87.4%). Of those classified as comprehensive by NCN, 15.8% were academies according to Edubase (these are likely to be schools which converted to an academy between 2014 and 2016). Around 20% of those classified as secondary modern by NCN were academies according to Edubase (although not all with a 'modern' admissions policy). Only about 50% were classified as secondary modern in both classifications, with 27.3% classified as secondary modern in NCN and comprehensive in Edubase. Schools with an NCN classification of grammar were mainly academies according to Edubase (64.7%).

This shows that the classification used will make a difference. Although some of the differences will be due to the different years in which the data was compiled, it seems unlikely that schools would have changed from a secondary modern to a comprehensive (21 schools were classified as secondary modern by NCN and as comprehensive by Edubase).

Table 2 compares the NCN classification with the alternative classification by actual level of selectivity. It shows the percentage of each school type in each of the selectivity quintiles (1=lowest selectivity, 5=highest selectivity). Table 3 and Figure 1 summarise the distribution of selectivity within each NCN school type. In Figure 1 the red lines are the boundaries between each selectivity quintile.

Table 2: School classifications using NCN and selectivity ranks

School type (NCN)	Schools	School type (selectivity rank)				
		1	2	3	4	5
Academy	1,228	21.3	16.2	18.5	21.8	22.2
Comprehensive	1,327	16.4	25.4	23.5	20.2	14.5
Secondary modern	77	70.1	7.8	5.2	9.1	7.8
Grammar	68	0.0	0.0	0.0	0.0	100.0

Table 3: Selectivity within each NCN school type

School type (NCN)	Schools	Mean	S.D.	Min	Max
Academy	1,228	1.11	0.74	0.07	4.76
Comprehensive	1,327	0.94	0.32	0.12	2.57
Secondary Modern	77	0.61	0.55	0.13	3.92
Grammar	68	3.13	0.53	1.99	4.47
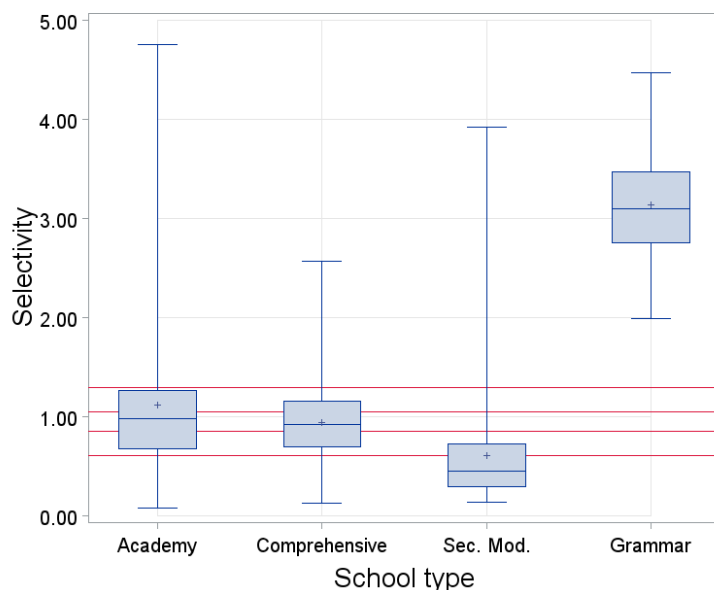
Figure 1: Distribution of selectivity within each school type (NCN)

These tables and figure show that academy and comprehensive schools had a range of levels of selectivity. As expected, grammar schools were by far the most selective, and secondary moderns by far the least selective. It is interesting to note that there were a number of academies which were highly selective (including the most selective school in the list). This is because the some grammar schools converted to academies and the NCN classification did not account for this.

Finally, it is interesting to compare the two alternative classifications: the Edubase classification and the classification by selectivity rank. This is shown in Tables 4 and 5 and Figure 2.

Table 4: School classifications using Edubase and selectivity ranks

| School type (Edubase) | Schools | School type (selectivity rank) | | | | |
		1	2	3	4	5
Academy (comp.)	1302	19.9	18.4	20.5	24.3	16.9
Academy (mod.)	74	78.4	10.8	6.7	4.1	0.0
Academy (sel.)	139	0.0	0.0	0.0	0.0	100.0
Comprehensive	1144	16.3	25.9	24.0	19.7	14.3
Secondary Modern	47	91.5	4.3	0.0	4.3	0.0
Grammar	24	0.0	0.0	0.0	0.0	100.0

Table 5: Selectivity within each Edubase school type

School type (Edubase)	Schools	Mean	S.D.	Min	Max
Academy (comp.)	1302	0.96	0.38	0.07	2.57
Academy (mod.)	74	0.48	0.24	0.16	1.10
Academy (sel.)	139	3.24	0.59	2.11	4.76
Comprehensive	1144	0.93	0.32	0.00	2.57
Secondary Modern	47	0.42	0.20	0.13	1.11
Grammar	24	3.09	0.54	1.99	4.47
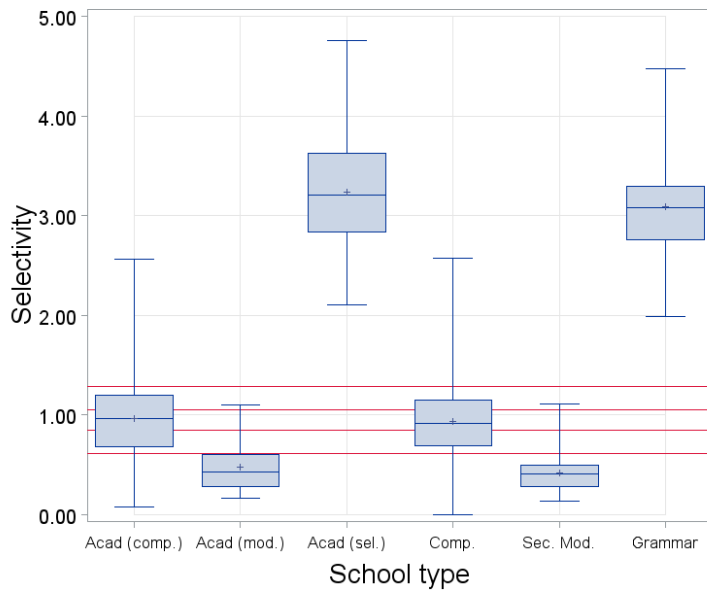
Figure 2: Distribution of selectivity within each school type (Edubase)

Academies (with a comprehensive admissions policy) and comprehensives had a range of levels of selectivity, with very similar distributions. Academies with a selective admissions policy tend to be slightly more selective on average than selective non-academies.

The remainder of this report re-produces the relevant tables from Statistics Report number 107 (Gill and Williamson, 2016), using the alternative school classifications. It should be noted that the new tables are based on fewer students than in the original report because they only include schools where at least 50 students in total had KS2 results across the five years, and also because independent schools were excluded.

Table 6 presents a breakdown of the number of GCSEs taken by the students included in the analyses.

Table 6: Number of GCSEs taken (% of GCSE students)

Number of GCSEs	Percentage
1	0.6
2	0.7
3	1.5
4	2.5
5	4.3
6	6.8
7	10.1
8	14.8
9	21.8
10	22.2
11	11.0
12+	3.6
Mean no. taken	8.5
No. of candidates	496,869

Table 7 presents the number of schools in each selectivity quintile, along with the mean, minimum and maximum selectivity in each quintile.

Table 7: School selectivity

Selectivity group	Number of schools	Mean	Minimum	Maximum
1	546	0.45	0.00	0.61
2	546	0.73	0.61	0.85
3	546	0.95	0.85	1.05
4	545	1.16	1.05	1.29
5	546	2.02	1.29	4.76

Table 8 presents the number of GCSEs taken by students in each Edubase school type. This shows that students in selective schools take by far the most GCSEs on average, particularly those in academies. Table 9 presents the same for students in each selectivity quintile and shows that students in more selective schools were more likely to take a greater number of GCSEs.

Table 8: Number of GCSEs taken by Edubase school type (% of GCSE students)

Number of GCSEs	Academy (comp)	Academy (mod.)	Academy (sel.)	Comp.	Sec. Mod.	Grammar
1	0.7	0.7	0.1	0.7	0.9	0.1
2	0.8	0.8	0.0	0.8	1.0	0.1
3	1.5	1.3	0.1	1.6	1.7	.
4	2.5	2.5	0.1	2.7	3.7	0.1
5	4.4	4.8	0.2	4.6	6.0	0.1
6	7.0	9.0	0.3	7.1	9.1	0.3
7	10.1	12.8	1.0	10.7	14.1	2.5
8	15.0	17.3	2.9	15.6	18.0	4.4
9	21.9	22.5	9.4	23.0	21.5	15.9
10	21.9	18.5	33.3	21.4	14.4	54.8
11	10.6	7.8	37.2	9.2	7.1	12.6
12+	3.4	2.0	15.6	2.7	2.6	9.3
Mean no. taken	8.5	8.2	10.5	8.4	8.0	10.0
No. of candidates	251,866	12,832	19,220	203,056	6,589	3,306

Table 9: Number of GCSEs taken, by school selectivity rank (% of students)

Number of GCSEs	1	2	3	4	5
1	1.1	0.8	0.6	0.5	0.3
2	1.2	0.9	0.7	0.6	0.4
3	2.5	1.9	1.4	1.2	0.6
4	4.2	3.2	2.5	2.0	1.1
5	7.0	5.5	4.4	3.3	2.1
6	10.7	8.9	6.9	5.5	3.2
7	14.2	12.6	10.4	8.8	5.3
8	17.9	16.9	15.8	14.2	10.0
9	19.6	21.8	22.8	23.6	20.7
10	14.4	17.4	21.7	25.0	30.5
11	5.8	7.7	9.1	11.9	19.2
12+	1.6	2.3	3.5	3.5	6.6
Mean no. taken	7.7	8.1	8.5	8.7	9.4
No. of candidates	84,718	94,398	103,256	112,818	101,679

Table 10 presents the uptake of individual subjects, by Edubase school type. Table 11 presents the same by the selectivity quintile. Subjects with an overall uptake level of less than 1% are not included. In each table the subjects are ordered by overall uptake (highest first).

The levels of uptake tend to be very similar within each admissions type. In other words there is little impact of being an academy compared with being a non-academy within the same admissions type. The only significant exception is in sciences where the uptake of Biology, Chemistry and Physics is much higher in selective academies (81%) than in selective non-academies (68%). Conversely uptake of Core and Additional Sciences is much higher in selective non-academies.

Table 11 demonstrates that for many subjects, uptake is highest in schools in the most selective quintile. This is particularly the case in the separate sciences, with uptake around 40% in the highest quintile, compared with 25% in the next highest quintile and around 11-12% in the lowest quintile. A similar pattern is present for Religious Studies, History, Geography and the three main modern foreign languages.

There are a few subjects where uptake is lowest in the most selective schools and highest in the least selective. These include Core Science, Art & Design and English Language and Literature.

Table 10: Uptake of individual subjects by Edubase school type (% of pupils)

Subject	Academy (comp)	Academy (mod)	Academy (sel)	Comp.	Sec. Mod.	Grammar	All
Mathematics	96.6	97.5	93.8	97.5	95.5	99.8	96.9
English Literature	87.5	92.0	98.6	87.2	87.9	99.4	88.0
English Language	87.4	92.2	97.7	87.1	87.6	99.5	87.9
Science (Core)	66.1	74.0	17.6	67.0	75.1	27.0	64.7
Additional Science	55.9	57.3	15.8	56.7	57.9	26.9	54.5
Religious Studies	44.5	40.5	56.0	50.9	41.3	48.7	47.4
History	40.7	37.8	57.9	39.4	33.0	55.7	40.8
Geography	36.4	33.7	54.3	35.2	30.0	56.1	36.6
French	26.5	23.6	42.6	25.7	19.1	46.0	26.8
Biology	22.6	13.5	81.3	20.3	13.8	68.2	23.9
Physics	22.1	13.2	81.2	19.9	12.8	68.2	23.5
Chemistry	22.1	13.2	81.0	19.9	12.8	68.1	23.4
PE/Sports Studies	19.7	18.5	19.1	19.2	17.7	14.8	19.3
ICT	17.4	11.3	14.9	19.4	21.6	13.3	18.0
Spanish	14.4	13.9	32.8	13.7	9.7	27.8	14.9
Art & Design	14.5	14.1	9.3	15.1	18.0	10.8	14.6
Business Studies: Single	14.5	11.2	18.2	12.2	7.5	18.9	13.5
Drama & Theatre Studies	12.2	12.4	13.9	11.8	9.3	11.4	12.1
English Language & Literature	11.8	6.5	1.7	12.1	15.2	0.5	11.4
German	10.1	2.2	28.6	8.3	2.0	24.0	9.9
Media/Film/Tv Studies	10.2	11.5	2.3	9.6	7.1	4.1	9.6
Statistics	9.4	21.8	8.8	8.0	18.4	4.6	9.2
Art & Design (Fine Art)	8.4	7.9	11.9	8.3	5.8	15.5	8.5
D&T Resistant Materials	8.0	8.6	6.8	8.9	10.1	6.7	8.4
Music	7.3	5.8	12.1	7.0	4.8	10.6	7.3
D&T Food Technology	6.8	8.9	7.1	6.9	7.2	3.6	6.9
D&T Product Design	6.9	4.6	8.0	6.4	4.8	9.1	6.7
D&T Graphic Products	5.6	5.3	5.4	6.0	4.3	4.7	5.7
Computer Studies/Computing	6.1	3.2	12.7	4.8	3.7	9.1	5.7
D&T Textiles Technology	4.4	3.0	4.5	4.5	2.7	4.1	4.4
Sociology	4.2	4.0	0.6	4.0	3.6	.	3.9
Art & Design (Photography)	3.9	5.7	0.9	4.0	4.9	0.1	3.9
Social Science: Citizenship	3.7	2.7	0.3	4.2	5.1	4.2	3.8
Home Ec.: Child Dev.	3.3	5.1	0.1	3.4	2.7	.	3.2
Psychology	2.8	5.0	3.4	2.9	5.4	2.1	2.9
Office Technology	2.3	4.3	1.9	2.4	2.1	1.5	2.4
Methods in Mathematics	2.5	1.6	6.1	1.6	4.3	0.0	2.3
Applications of Mathematics	2.5	1.6	6.1	1.6	4.3	0.0	2.2
Dance	2.4	3.2	1.6	2.0	1.5	0.5	2.2
General Studies	1.6	1.3	0.9	1.7	1.4	0.0	1.6
Economics	1.6	0.7	6.8	1.1	0.2	1.7	1.5
Humanities: Single	1.5	2.8	0.0	1.4	0.2	0.1	1.4
D&T Electronic Products	1.5	1.4	3.0	1.2	0.7	2.8	1.4
Home Economics: Food	1.3	1.2	1.5	1.3	2.2	2.8	1.4
Art & Design (Graphics)	1.4	3.1	0.7	1.2	0.5	0.3	1.3
Art & Design (Textiles)	1.3	2.9	0.6	1.2	1.8	0.9	1.3
Health & Social Care	1.3	1.6	0.1	1.4	2.2	0.7	1.3
Film Studies	1.3	1.4	.	1.1	3.6	0.3	1.2
Applied Engineering	1.2	1.6	1.1	1.2	0.6	1.7	1.2
Performing Arts	1.0	1.9	0.3	1.1	4.1	.	1.1

Table 11: Uptake of individual subjects by school selectivity rank (% of pupils)

Subject	1	2	3	4	5	All
Mathematics	97.7	96.6	96.0	97.1	97.0	96.9
English Literature	85.7	86.6	86.2	88.9	92.0	88.0
English Language	85.4	86.0	86.3	89.2	91.9	87.9
Science (Core)	71.0	67.0	67.7	65.5	53.2	64.7
Additional Science	53.7	55.1	58.1	57.3	48.1	54.5
Religious Studies	39.7	43.3	45.2	50.6	56.4	47.4
History	32.7	37.7	39.9	43.7	48.1	40.8
Geography	28.6	31.2	37.5	39.1	44.4	36.6
French	19.1	23.1	27.0	28.2	34.7	26.8
Biology	12.1	17.8	20.7	25.3	40.9	23.9
Physics	11.2	17.5	20.3	24.9	40.8	23.5
Chemistry	11.2	17.5	20.3	24.9	40.7	23.4
Physical Education/Sports Studies	17.0	18.2	19.4	20.8	20.7	19.3
Information & Communications Technology	18.6	19.3	18.8	16.6	17.1	18.0
Spanish	12.0	12.2	12.5	15.7	21.2	14.9
Art & Design	16.2	15.9	14.5	13.6	13.2	14.6
Business Studies:Single	10.5	10.9	13.5	15.0	16.9	13.5
Drama & Theatre Studies	9.9	11.1	12.6	12.9	13.3	12.1
English Language & Literature	13.4	13.0	13.1	10.2	7.7	11.4
German	2.9	5.4	9.8	11.3	18.4	9.9
Media/Film/Tv Studies	10.1	10.9	10.7	9.7	6.6	9.6
Statistics	14.3	10.5	8.5	7.6	6.3	9.2
Art & Design (Fine Art)	7.2	7.3	8.9	9.0	9.8	8.5
D&T Resistant Materials	8.5	8.5	9.3	8.3	7.3	8.4
Music	5.4	6.2	7.2	7.8	9.5	7.3
D&T Food Technology	5.8	6.4	7.1	7.4	7.3	6.9
D&T Product Design	6.0	6.8	6.4	7.2	6.8	6.7
D&T Graphic Products	4.9	5.0	6.1	6.4	6.1	5.7
Computer Studies/Computing	4.4	4.4	5.7	5.8	8.0	5.7
D&T Textiles Technology	2.9	4.1	4.7	4.8	5.0	4.4
Sociology	4.6	3.6	4.1	4.0	3.3	3.9
Art & Design (Photography)	5.1	4.7	3.7	3.4	2.8	3.9
Social Science: Citizenship	4.6	5.1	4.3	3.4	1.8	3.8
Home Economics: Child Development	3.7	3.8	3.4	3.0	2.4	3.2
Psychology	3.5	2.9	2.9	2.8	2.8	2.9
Office Technology	2.7	2.5	2.3	2.3	2.3	2.4
Methods in Mathematics	1.0	1.9	3.2	2.5	2.5	2.3
Applications of Mathematics	0.9	1.9	3.1	2.5	2.5	2.2
Dance	2.1	2.0	2.1	2.5	2.1	2.2
General Studies	1.3	2.9	1.2	1.2	1.3	1.6
Economics	0.9	0.9	1.0	1.4	3.4	1.5
Humanities: Single	1.6	1.1	2.6	1.2	0.6	1.4
D&T Electronic Products	0.6	0.8	1.4	1.6	2.4	1.4
Home Economics: Food	1.2	1.1	1.6	1.3	1.5	1.4
Art & Design (Graphics)	1.6	1.2	1.5	1.2	1.2	1.3
Art & Design (Textiles)	1.9	1.3	1.2	1.3	1.0	1.3
Health & Social Care	1.8	1.8	1.4	1.2	0.6	1.3
Film Studies	2.0	1.7	0.9	1.1	0.5	1.2
Applied Engineering	1.0	1.3	1.1	1.3	1.2	1.2
Performing Arts	1.6	1.1	0.9	0.9	1.0	1.1

References

Allen, R. (2016). When is a comprehensive school actually a secondary modern? [Blog post]. Retrieved from http://educationdatalab.org.uk/2016/11/when-is-a-comprehensive-school-actually-a-secondary-modern/

Gill, T. & Williamson, J. (2016). *Uptake of GCSE subjects 2015. Statistics Report Series No.107.* Cambridge, UK: Cambridge Assessment