Children's COMMISSIONER

Good schools

Findings from focus groups with children and creating a 'Good Schools Index'

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Contents

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Acknowledgements

Background to this work

Children in England regularly highlight the importance of stress associated with school and education. In our [consultation with children for our 2020/21 business plan](#), the children we spoke to told us that less pressure in school and fewer tests and exams would represent the single biggest improvement to their lives. International comparisons also suggest that while the UK's academic performance is on a par with other developed countries, levels of pupil wellbeing and satisfaction are notably lower in the UK, ranking 63rd of 69 countries included in the 2018 PISA results[1]. Only 18% of pupils in the UK were deemed to have **positive wellbeing** according to PISA's index, which accounts for life satisfaction, feelings of isolation at school and propensity to doubt plans when failing. This compares to an average of 32% amongst all OECD countries.

These worryingly low levels of children's wellbeing in school are compounded by a school system showing severe signs of pressure, with many children struggling to access and sustain high quality education. This is evidenced by rising exclusion rates over the last five years (up 60% on 2013/14), repeated concerns around the practice of off-rolling, and the increasingly stubborn gap in attainment between disadvantaged children and their peers.[2]

To attempt to highlight some of these issues in greater depth, this report presents an overview of findings from two strands of research:

1. Focus groups with children exploring the pressures they experience at school, and how they feel their experience of school could be improved.

2. Quantitative research exploring the feasibility of creating a new 'good schools index' for secondary schools in England, based on a range of different measures. This is to see if it is possible to produce a more rounded measure of school quality that goes beyond existing headline attainment measures, and gets closer to the measuring the wellbeing and experiences of pupils. These findings are the result of initial analysis conducted by FFT Education DataLab.

It is important to state that this work was carried out before the COVID-19 pandemic. However, it is likely that these concerns will not have disappeared during COVID-19 and in some cases will likely have been exacerbated, particularly with pupils facing significant stress around exams next year and lost preparation time as well as lack of contact with friends.[3] There have been repeated concerns on the detrimental impact on children's mental health of this lockdown, as evidenced by the large rise in the prevalence of children with a probable mental health disorder[4].

These findings are exploratory and intended to present avenues for further exploration by central government, researchers or the education sector, particularly around how children's school experience can be improved and how schools' inclusivity might be measured in future.

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[1] https://www.oecd.org/pisa/publications/pisa-2018-results.htm
[2] https://epi.org.uk/publications-and-research/education-in-england-annual-report-2020/
[3] https://www.childrenscommissioner.gov.uk/2020/12/07/childrens-thoughts-on-exams-next-year/
[4] https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2020-wave-1-follow-up

Surveys and focus groups with children

The findings below are based on focus groups carried in five different schools in England. Schools were selected to be spread across the country and to cover a variety of different catchment areas and intakes. Findings from these conversations broadly grouped into three key themes highlighted below.

Theme 1: Stress, tests and pressure

Children we spoke to repeatedly highlighted the link between their levels of stress and pressure from schoolwork and exams. For younger children this was the result of large volumes of homework:

> "*And also, a bad thing is, there is too much homework. Last week, **there was too much homework to do and there's no time to do anything**. And if you don't bring your homework in, you get a lunchtime detention.*" – boy, year 7/8*

For older pupils this stress concentrated more on the prospects of upcoming exams:

> "*As soon as you get to year 9 to year 11 they start giving coursework so the pressure increases. [I think that's why] see **so many people after GCSEs with mental health concerns, because of the pressure***" – girl, aged 18*

Those with additional needs, particularly children with pre-existing issues around anxiety and stress, reported being particularly affected by this:

> "*In Year 7 everyone is happy, by Year 8 **everyone is slowly getting depressed**, by year 9 **you realise it's getting worse**. In Year 9 [they are] giving homework 3 times a week for 9 different subjects. **Schools care more about grades then they do about our wellbeing***" – boy with SEND, age 17*

Theme 2: Support within school for mental health and wellbeing

These focus groups also highlighted differences across schools in children's perceptions of the support available to them for their wellbeing. Children wanted to be able to access mental health support in school, yet the perceived availability of provision in school is still highly variable.

> "***They think an assembly's just going to help you**. They'll just tell you something in assembly, say you should care for people and then they'll just be done with it. **It's just annoying**.*" – girl, year 11/12*

Those we spoke to at schools with good provisions and procedures for pupil wellbeing in place – such as free school-based counselling, peer-peer support networks, wellbeing sessions and mentors – felt secure in knowing that support was on offer for those in need.

> "*I've never gone* [*to the school counselling service*] *but **it's nice knowing it's there for others that need it***" – girl, year 9

However, this view was not replicated across all focus groups. Some children did not feel confident or comfortable confiding in any adult in school if they felt sad or stressed, while others reported limited

provision in their school.

> "*Teachers can be too harsh on you if they don't know what's going on with you and I don't think they know how to handle certain situations well.*" – girl, year 11/12*

> "*They just put on an assembly like a slide that's been round hundreds of schools that doesn't mean anything, I feel like they could actually get involved with you a bit more*" – girl, year 11/12*

Theme 3: Freedom, creativity and activity

Children repeatedly highlighted the desire for more choice in what they studied, and for lessons to feel more relevant to them, including more focus on practical life skills.

> "*I just think the education system's stupid because sometimes **they don't teach you the right things and they should teach you more life skills** like how to manage all your bills and stuff or other things that you could go into rather than learn how to plot a graph, **because I don't really know when you're going to need that**" – boy, year 11/12*

Across all ages, children wanted more resources and more time dedicated to creative and practical subjects, with many feeling that time for these activities were being squeezed.

> "*We do DT every other week but it's just sewing nothing else … **there isn't time for anything else.**" – boy, year 10*

Children also reported a wide disparity in the availability of active time (such as time outdoors during break or sports clubs). This is despite all groups discussing the importance of clubs and activities outside school hours. Those at schools with lots on offer commented on how beneficial they found activities for confidence, wellbeing and sense of belonging. Some groups told us that after-school clubs were the single best aspect of their school.

> "***I'm actually really excited [about going to secondary school] because there are more sports to choose from to do after school**. In our school we don't really have much. There's nothing really to do after school.*" – girl, year 6*

Some also report feeling let down by school's provision of these clubs, for example through lack of funds for equipment.

> "*Half the time they're [sports and activities] cancelled … Sometimes you go there and someone will tell you it's not on and you don't know the reason*" – boy, year 7/8*

Some also reported not being able to attend after-school activities due to costs associated with participating.

> "*There's a residential going on in my school. It's in May. I was like, I don't know if I want to go. I'm one of those who will always think about my parents first. I heard the price of it and it was so much money and then I was like, no thanks.*" – girl, year 7/8*

Exploring the feasibility of creating a 'Good Schools Index'

The rationale for devising this index was to see if it is possible to produce a more rounded measure of school quality that goes beyond existing headline attainment measures, and gets closer to the measuring the wellbeing and experiences of pupils.

It is important to state from the outset that this approach is fundamentally limited by the fact that direct measures of pupil wellbeing do not currently exist even at a national level, let alone at a local or school level. This analysis is therefore restricted to exploring more indirect measures that are available from administrative data.

While we cannot observe pupil wellbeing, we instead assume that schools which deliver more 'inclusive' education are more likely to prioritise pupil wellbeing. We also assume that schools which deliver good outcomes for disadvantaged or vulnerable children, even if they have lower headline measures of attainment, are more likely to value 'inclusive' approaches. This allows us to consider schools in terms of:

(a) The extent to which they admit and retain vulnerable or disadvantaged pupils;

(b) The extent to which they achieve good academic outcomes for those pupils.

We therefore collect a basket of indicators which capture (a) and (b). We hereafter refer to indicators that reflect (a) as 'enrolment indicators' and indicators that reflect (b) as 'academic outcome indicators' after taking into account pupil characteristics. There are many potential measures currently collected by local authorities and central government that can be used as proxies for (a) and (b). The aim of this analysis is to identify relevant indicators that are available, and see how well they can be combined into a potential overall index. Our focus for (b) is on attainment at Key Stage 4, which therefore restricts this analysis to secondary schools only.

The technical approach involves three general steps:

1. Collate the available indicators relating to enrolment and academic outcomes for state funded secondary schools in England
2. Explore the feasibility of combining these indicators into an overall index
3. Present exploratory results by headline school categories

We present an overview of the methodology for creating an initial set of more general measures (more technical detail is available in Appendix B), as well as some preliminary analysis of overall index scores by school type, admissions type, and geography.

We also compare scores on this index with schools' overall Ofsted ratings as part of this analysis. The purpose of this is test the validity of index, by assessing whether it is correlated in the expected way with traditional judgements of school quality, as well as highlighting areas of divergence for further investigation as part of the development of this set of measures.

Overview of indicators and methodology

Choice of enrolment and outcome indicators

An initial long list of indicators within each of our two domains was created via conversations between the research team. This initial list was then revised and agreed through two workshops with representatives from the education sector including DfE, Ofsted, education professionals, local authorities and researchers in the field. The resulting list of inclusion measures is presented in Table 1 below.

Table 1: List of indicators categorised by sub-domain and domain

Domain	Sub domain	Indicator	Source dataset	Date
Enrolment	Disadvantage	Disadvantaged[5], %	Revised 2018/19 performance tables, KS4 destinations file	Jan 2019
		Disadvantaged, %, vs local rate	As above and bespoke analysis of the National Pupil Database	Jan 2019
	SEND	SEN with an EHCP, %	Revised 2018/19 performance tables, census file	Jan 2019
		SEN with an EHCP, %, vs local rate	As above and bespoke analysis of the National Pupil Database	Jan 2019
	EAL	EAL, %	Revised 2018/19 performance tables, census file	Jan 2019
		EAL, %, vs local rate	As above and bespoke analysis of the National Pupil Database	Jan 2019
	Joiners	Pupils joining the school roll, %	Revised 2018/19 performance tables, census file	2018/19
	Leavers	Contextualised pupil movements off the school roll, %	Bespoke analysis of the National Pupil Database	2017/18-2018/19
		Elective home education rate	Bespoke data collection from local authorities 2017/18	2017/18

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[5] As defined in DfE Key Stage 4 statistics: eligible for free school meals in the last six years (FSM6), looked after for at least one day, or service child

Domain	Sub domain	Indicator	Source dataset	Date
	Absence and exclusions	Fixed term exclusion rate	Exclusions statistics 2017/18	2017/18
		Permanent exclusion rate	Exclusions statistics 2017/18	2017/18
		FSM pupils who have received a fixed term exclusion, %	Bespoke analysis of the National Pupil Database	2017/18
		Contextualised persistent absence, %	Absence statistics 2017/18	2017/18
Academic outcomes	Contextualised overall attainment	Contextualised overall Attainment 8 score, all pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
		Contextualised overall Attainment 8 score, disadvantaged pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
		Contextualised overall Attainment 8 score, low prior attainment pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
	Contextualised English attainment	Contextualised English Attainment 8 score, all pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
		Contextualised English Attainment 8 score, disadvantaged pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
		Contextualised English Attainment 8 score, low prior attainment pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
	Contextualised maths attainment	Contextualised maths Attainment 8 score, all pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
		Contextualised maths Attainment 8 score, disadvantaged pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
		Contextualised maths Attainment 8 score, low prior attainment pupils	Bespoke analysis of the National Pupil Database	2016/17-2018/19
	Destinations	Contextualised sustained destinations, %	Revised 2018/19 performance tables, KS4 destinations file	2018/19

Some measures were adjusted to take account of the intake and demographic characteristics of the school population (so called 'contextualised' measures listed in Table 1). Schools with a high score on these contextualised measures have better academic outcomes than average once we account for the demographic characteristics of the school (see Appendix B for more detail).[6]

In order to allow different indicators with different scales to be combined, schools were all ranked to be between 0 and 1, with 1 representing the highest level in the data – i.e. the most inclusive enrolment indicator or highest outcome indicator – and 0 representing the lowest level. This technique puts all rates onto a common scale but has the disadvantage of forcing schools to be evenly spread between 0 and 1.

Clearly this ranking also requires the assumption that a higher or lower rate on a particular indictor necessarily indicates a more/less inclusive school. This is a stronger assumption for some indicators than others, particularly around rates of access for disadvantaged and SEN groups in low density population areas. We acknowledge that there may be good reasons why a higher value of, for example, an indicator measuring pupil absence, could actually reflect an inclusive approach. This therefore complications any comparisons between schools and means that a certain amount of caution must be applied when interpreting the resulting index.

Using the rescaled indicators, we then calculated summary scores at three levels for each secondary school in England:

1. Sub-domain scores: Within each domain we group together indicators with the strongest correlations and calculate summary scores of these groupings to form our sub-domain measures. These scores are calculated using a similar method as used in the Indices of Multiple Deprivation.

2. Overall domain scores of enrolment and academic outcomes (hereafter 'Domain scores'): These are calculated as a simple average of a school's sub-domain scores within each of the enrolment and academic outcomes domains.

3. An overall 'good schools index' measure: This is the mean of a school's two overall domain scores.

Correlation between index and Ofsted ratings

Note: This exercise is not meant to imply deficiencies in Ofsted school inspections or their associated ratings but simply intended to demonstrate how well the index correlates against Ofsted ratings. Where there are disparities this is an interesting avenue for further work, and not a judgement about Ofsted ratings themselves.

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[6] A limitation of these measures is that the use of school level demographics (for some elements of the contextualisation process) will not fully account for rates of pupils leaving the roll before year 11 and so may inflate scores amongst schools with relatively high disadvantaged intakes but with high rates of children leaving school rolls. A useful development of these measures may be to contextualise solely based on the characteristics of the school's year 11 cohorts over the previous 3 years.

Overall index scores and overall measures of academic outcomes and enrolment

Figure 1 (right hand pane) demonstrates that there a positive relationship between a school's overall Ofsted rating and its overall 'good schools index' score: schools with a higher Ofsted rate have on average higher scores on this index. This is useful as suggests (at an overall level at least) some broad agreement between this measure and an established school performance metric.

However, there is also wide variation in index scores within each Ofsted rating category. This means that, while schools with better Ofsted ratings tend to have higher index scores (on average), there are some schools with worse Ofsted ratings which have a higher index score, and vice versa.

Figure 1 (left and center panes) also demonstrates the positive relationship is largely driven by the strong correlation between Ofsted ratings and the academic outcomes component of the index. However, there is very little correlation between a school's Ofsted rating and its enrolment score.

Figure 1: Distribution of academic outcome score (left hand pane), enrolment score (middle pane) and overall index score (right hand pane), by school Ofsted rating
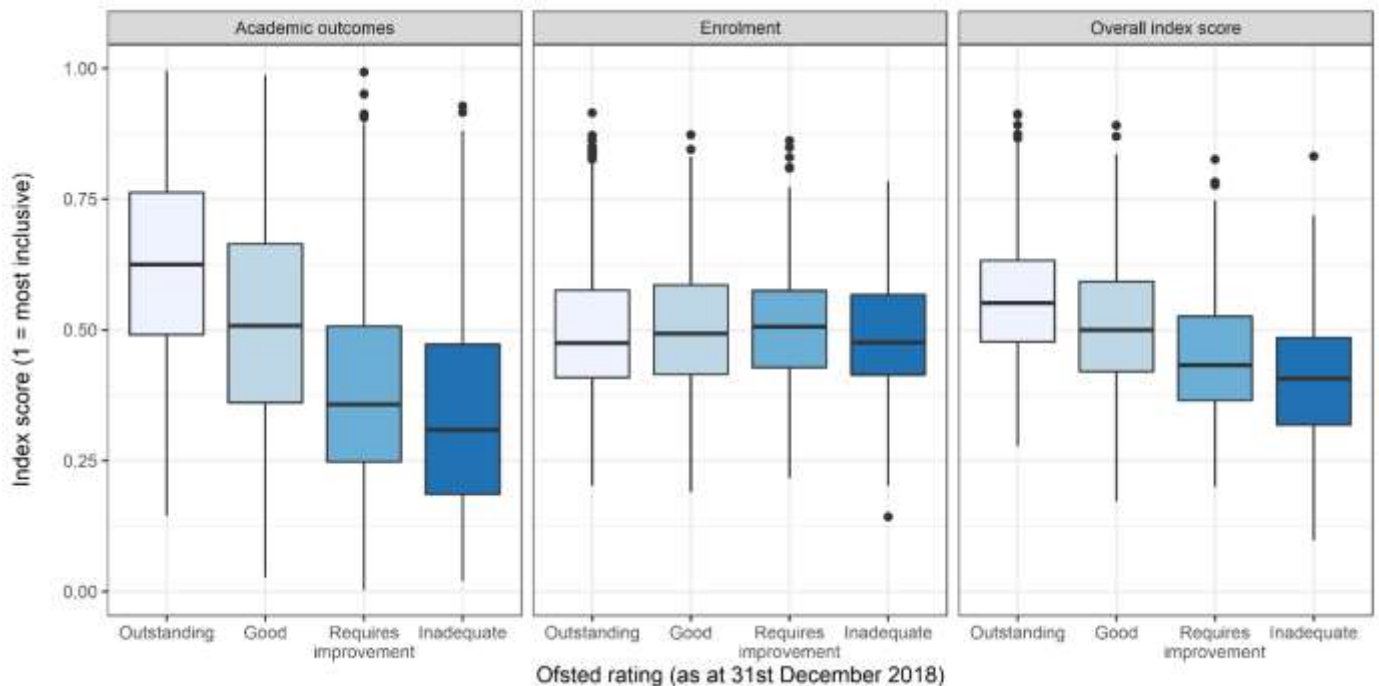
Figure 2, on the following page, explores the enrolment score's relationship with Ofsted ratings – or lack thereof – in more detail by looking at differences by Ofsted for each of the enrolment measures. This shows a very mixed picture of correlations between the included indicators and a school's Ofsted rating:

> Measures relating to absence, exclusion, movements off the school roll (especially withdrawals into home education) are broadly positively correlated with Ofsted ratings. In other words, these measures are more likely to be higher in schools with better Ofsted ratings.

> However, there is a much weaker relationship between other indicators such as SEN and EAL enrolment. Here there is either no clear correlation or (in the case of %s of disadvantaged children in a school) schools rated as 'Requires Improvement' or 'Inadequate' actually score better on average.

> This is in direct contrast to Figure 3 below which demonstrates a broadly similar positive correlation across all academic outcomes measures with the exception of children's destinations post-KS4.

Figure 2: Distribution of included enrolment measures scores by school Ofsted rating
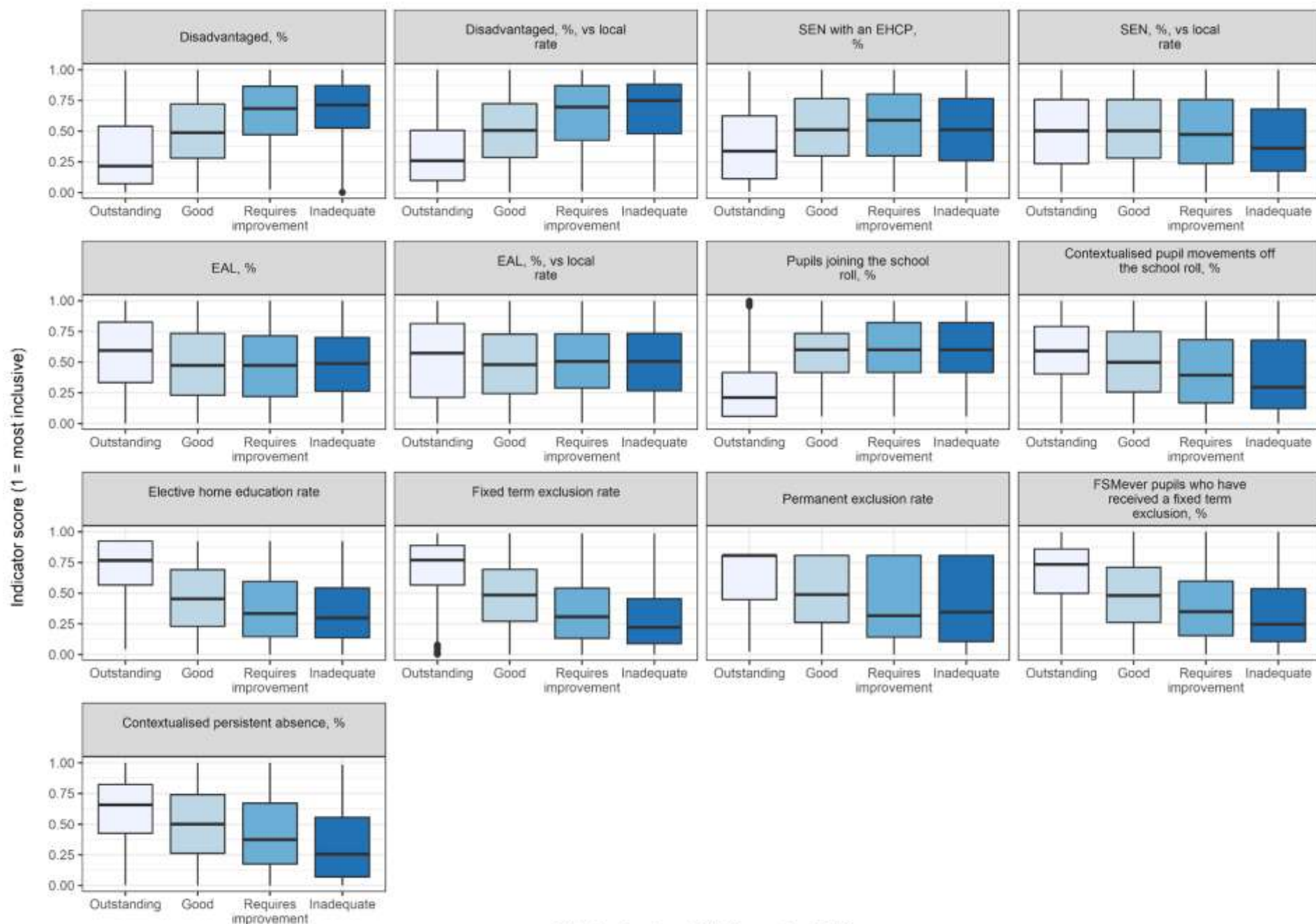
Ofsted rating (as at 31st December 2018)

Figure 3: Distribution of included academic outcomes measures scores by school Ofsted rating
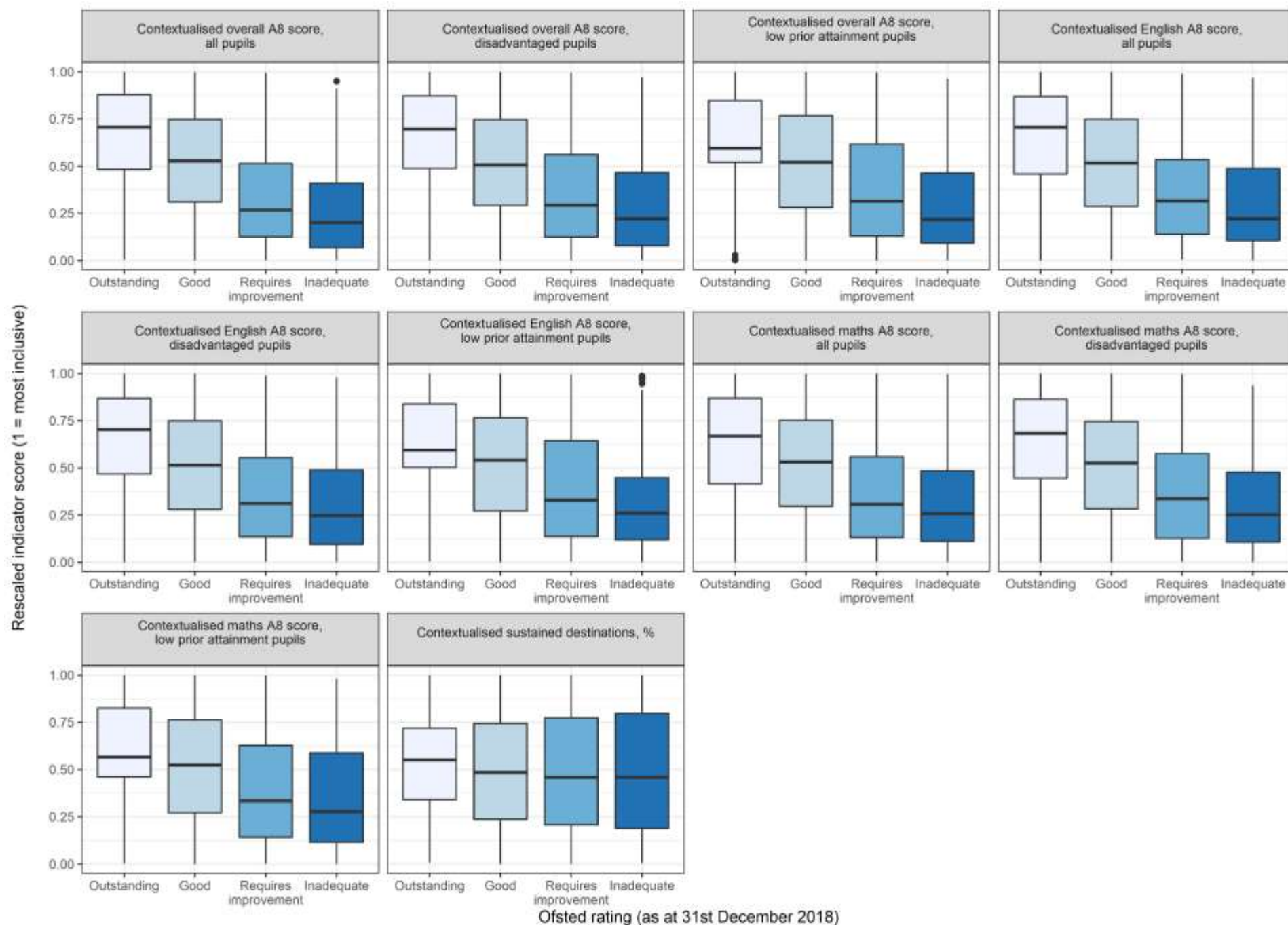
These divergences from this established performance measure are important points of development for this index. It may be that some of this divergence can be accounted for by the indirect nature of the measures used. However, after further validation, this may also point to areas where this index can add value alongside Ofsted inspection ratings.

Descriptive analysis of variation in overall index scores

Geographic variation

Figure 4 demonstrates the distribution of overall index scores by region in England. This suggests there is broad parity between most regions in terms of average overall index scores, with the possible exception of slightly higher average score amongst schools in London. This is a useful avenue for further exploration of these measures, to ensure they are not unfairly favouring schools in these areas or if it reflects genuinely better performance by schools in London.

However, it should also be noted that even within London there is a large amount of variation between schools, shown by the widths of the horizontal lines in the figure below. This suggests differences between regions are actually much smaller than differences within regions.

Figure 4: Distribution of overall index scores by Government Office Region

Overall index score
(1 = most inclusive)
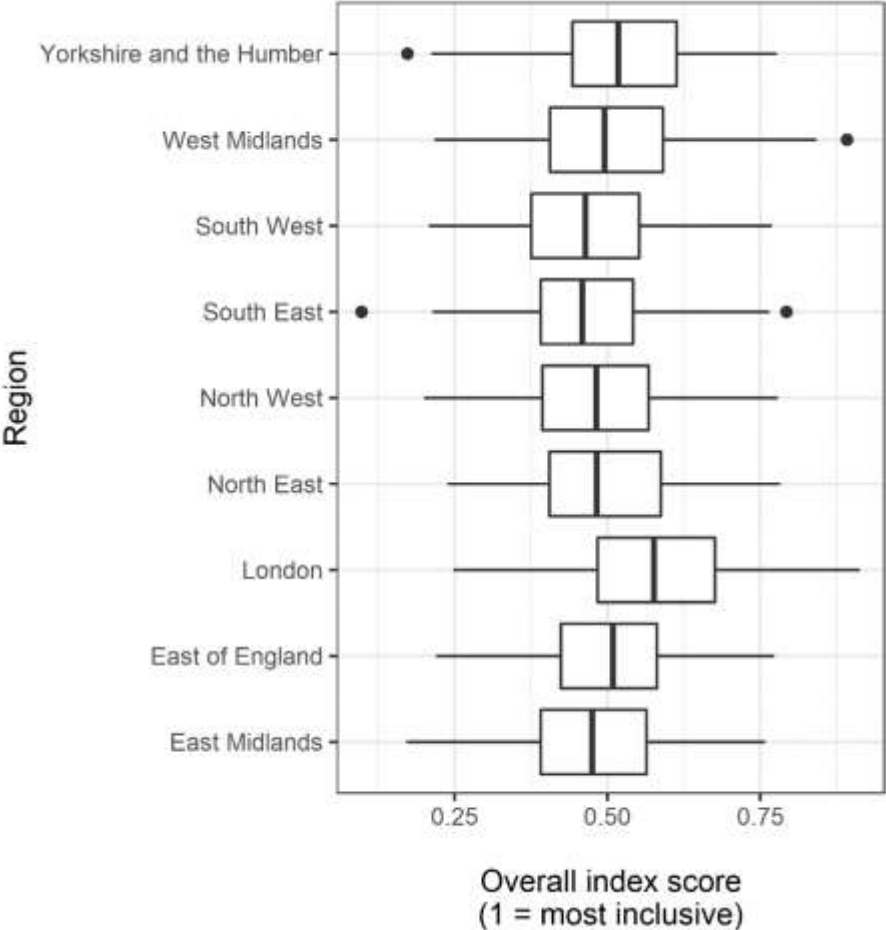
There is a similar pattern at local authority level, where there is significant variation between areas. Average overall index scores range from 0.39 in South Gloucestershire to 0.68 in Islington (Figure 5). However, there is a large amount of variation within local authorities that accounts for notably more of the difference between schools than local authority level differences. We find that 82% of the total variation in this index is within-LA, whereas the remain 18% of variation is between LAs.

*Figure 5: Distribution of average (mean) overall index scores by local authority*
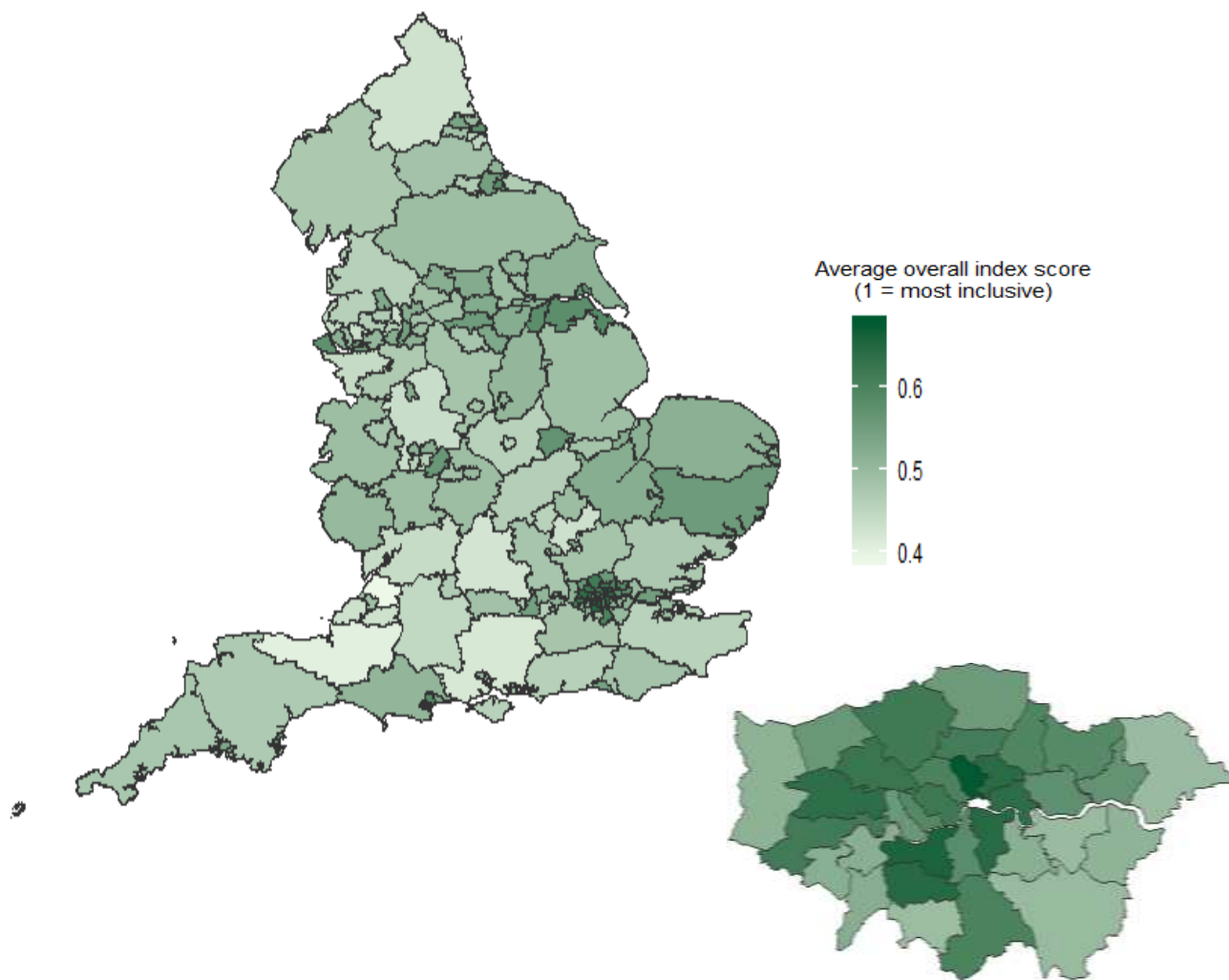
Differences by type of secondary school

Figure 6 demonstrates that there are small differences in average overall index scores by school type, with the exception of notably lower rates amongst university technical colleges and studio schools. This is particularly driven by lower average scores on academic outcomes measures. This is again a useful avenue for further research to explore if these typed of school are unfairly penalised by these measures (potentially due to their focus on technical subjects) or whether this reflects useful insight on school performance.

Furthermore, as with the geographic differences above, most of the variation is within school type rather than between: in fact 97% of the variation is within school types while only 3% accounted for by differences in school type. This means that it is particular individual schools that are responsible for this variation rather than particular establishment types on average.

Figure 6: Distribution of domain scores by school establishment type
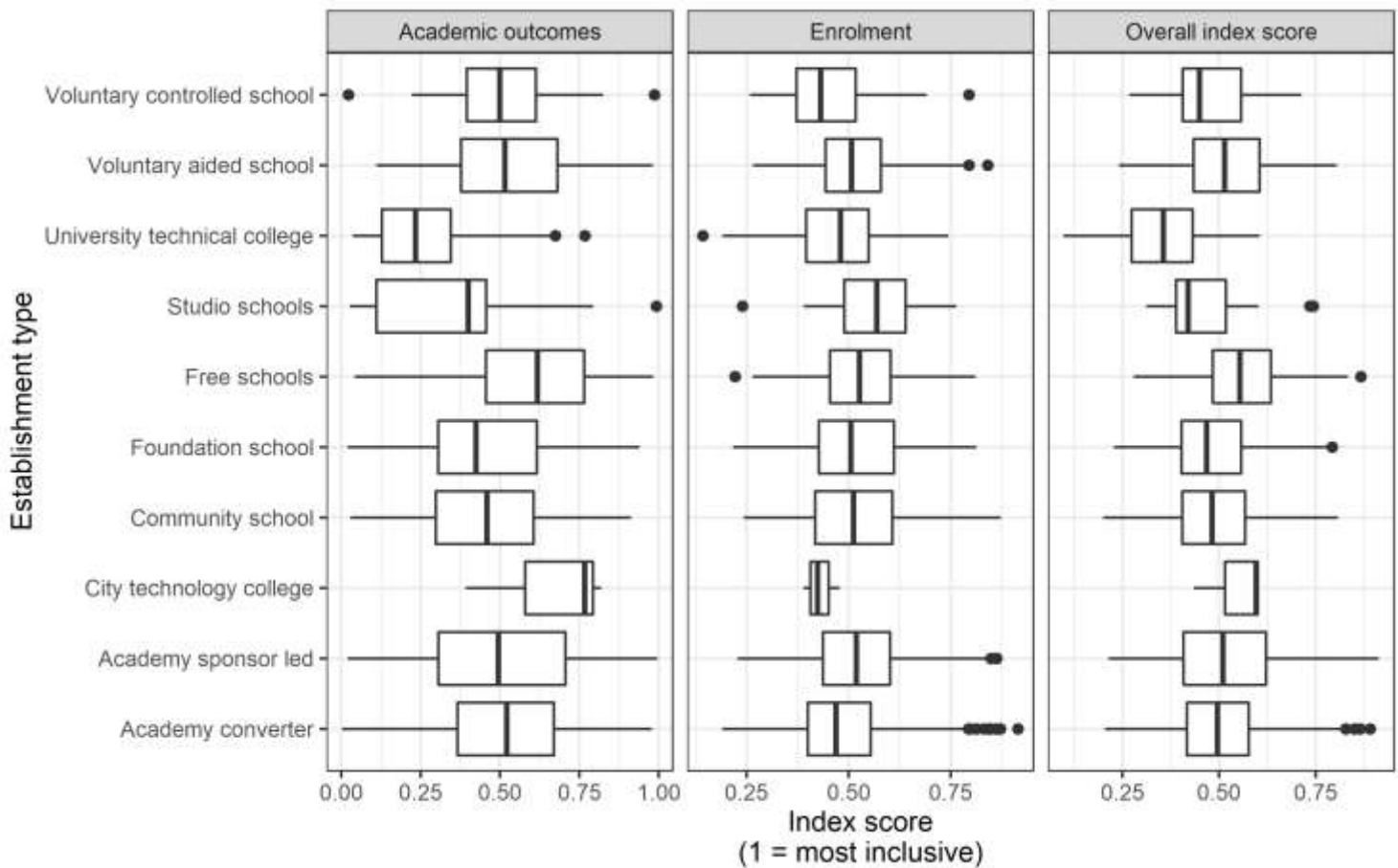
Differences by school admission type

Perhaps unsurprisingly Figure 7 (right hand pane) suggests that selective schools score lower on average on our measure of enrolment, reflecting the fact that selective schools are less likely to have a disadvantaged intake. However, interestingly, selective schools score slightly better on our overall measure of academic outcomes – which has been contextualized to take into account.

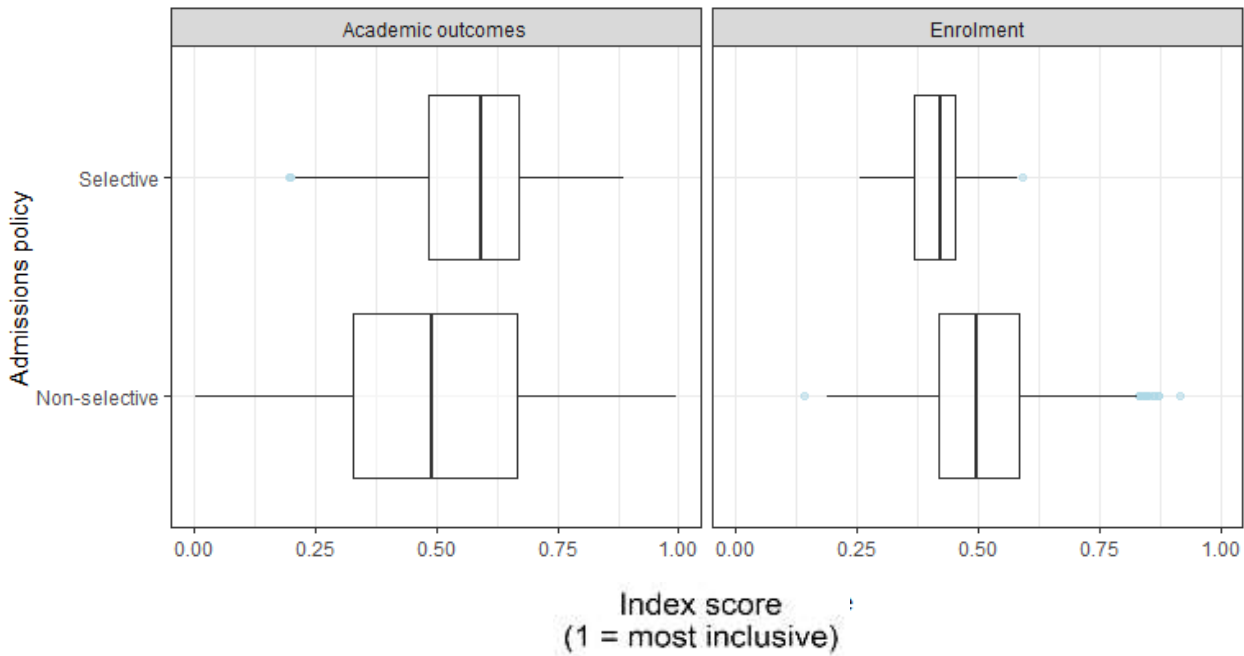*Figure 7: Distribution of domain scores by selective/non-selective admissions policy*

Figure 8 demonstrates that this difference in academic outcomes is primarily driven by slightly higher average scores on contextualised attainment measures relating to disadvantaged children specifically. This is a useful avenue for further development and investigation of these measures. This may simply be an artifact of small numbers of disadvantaged children in these schools as well, as the obvious selection biases that could occur in schools with selective entry. However it may also point to genuinely above-average educational progress made by disadvantaged children who are able to access selective education.

Figure 8: Distribution of academic outcomes indicator scores by selective/non-selective admissions policy
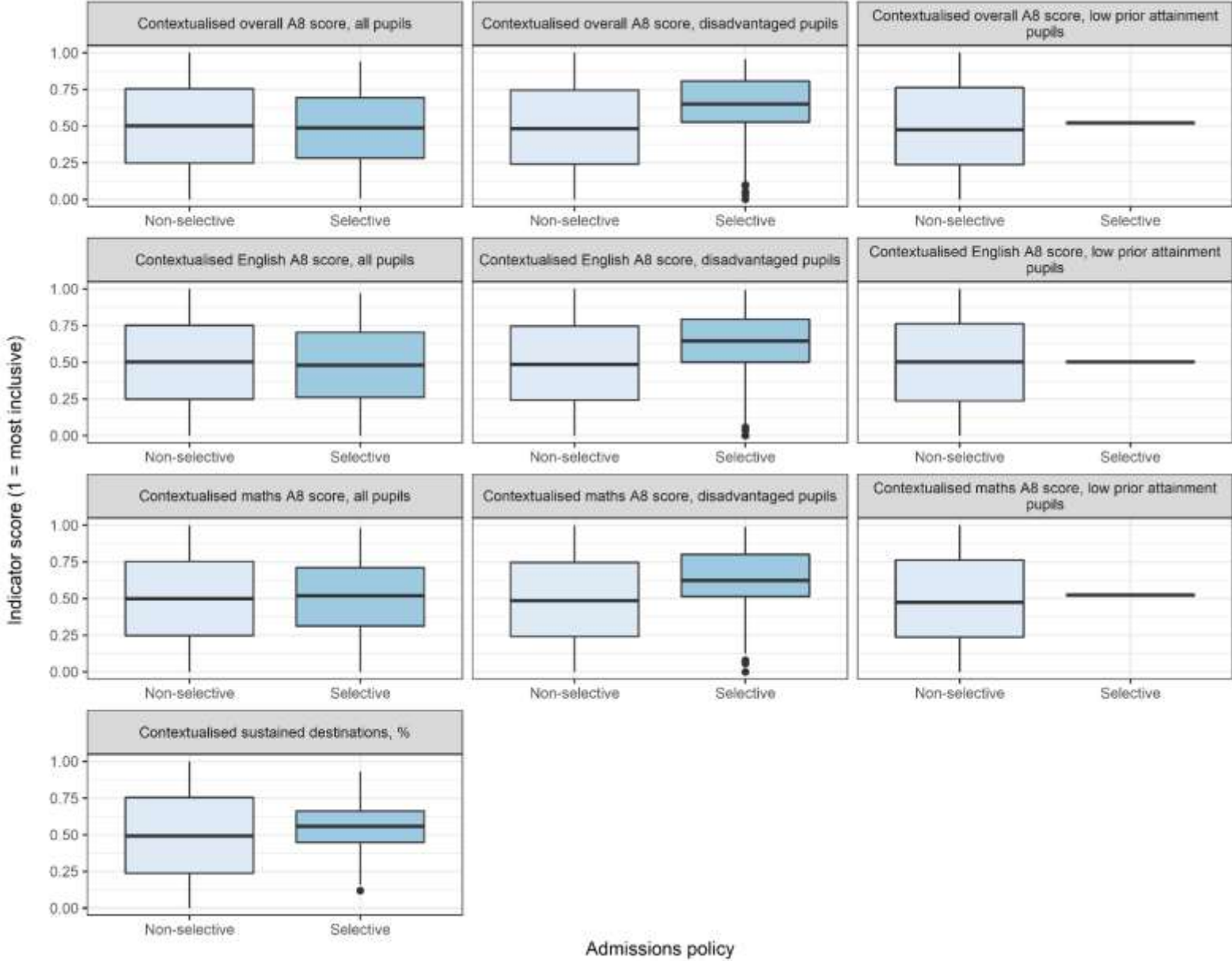
Conclusions and future avenues for research

The technical results presented here are experimental and exploratory. They provide a first step towards the possibility of creating a set of measures of school inclusivity and wider performance, based on available administrative data. This report demonstrates that it is technically feasible to create an index summarising these measures. Furthermore, this report shows that despite the many limitations of this index, it is generally complementary to the current school inspection framework since it correlates well with Ofsted ratings. However the enrolment component of this index is less well correlated with Ofsted ratings.

These measures are clearly in need of further development before they can be applied or implemented. Particularly useful avenues for further work would be:

> Investigating in greater depth the reason for divergence between Ofsted measures and the measures included here relating to disadvantaged children's access rates to higher Ofsted rated schools.

> Examining in greater depth differences between school types. This would confirm if university technical colleges and studio schools are being unfairly penalized by these academic outcome measures or whether this reflects useful information on these school types average performance.

> Developing a better measure of inclusivity for children with English as an Additional Language. Feedback from key stakeholders suggests that the current indicator included captures too broad a range of children for it to be useful in measuring school inclusivity.

> Adding further measures of access for other disadvantaged groups, particularly around children in contact with children's services

> Improving the data that exists on pupil wellbeing and wider satisfaction with school.

At a more technical level there may also be potential ways of strengthening the index creation that it would be useful to explore in further iterations of this index. Key points to be addressed here are:

> Rescaling (rather than ranking) schools so that the distribution of rates is better preserved

> Further developing the contextualisation process for attainment measures to better account for schools with high rates of children leaving the school roll

> Investigating further the better performance on contextualised academic outcomes for selective schools

This work is intended as an initial first step towards creating an overall index of school inclusivity and wider performance. Further contributions from other organisations working in this space, notably the Department for Education and the education research sector, are welcome.

Appendix A: Differences in index scores by school establishment type

Enrolment

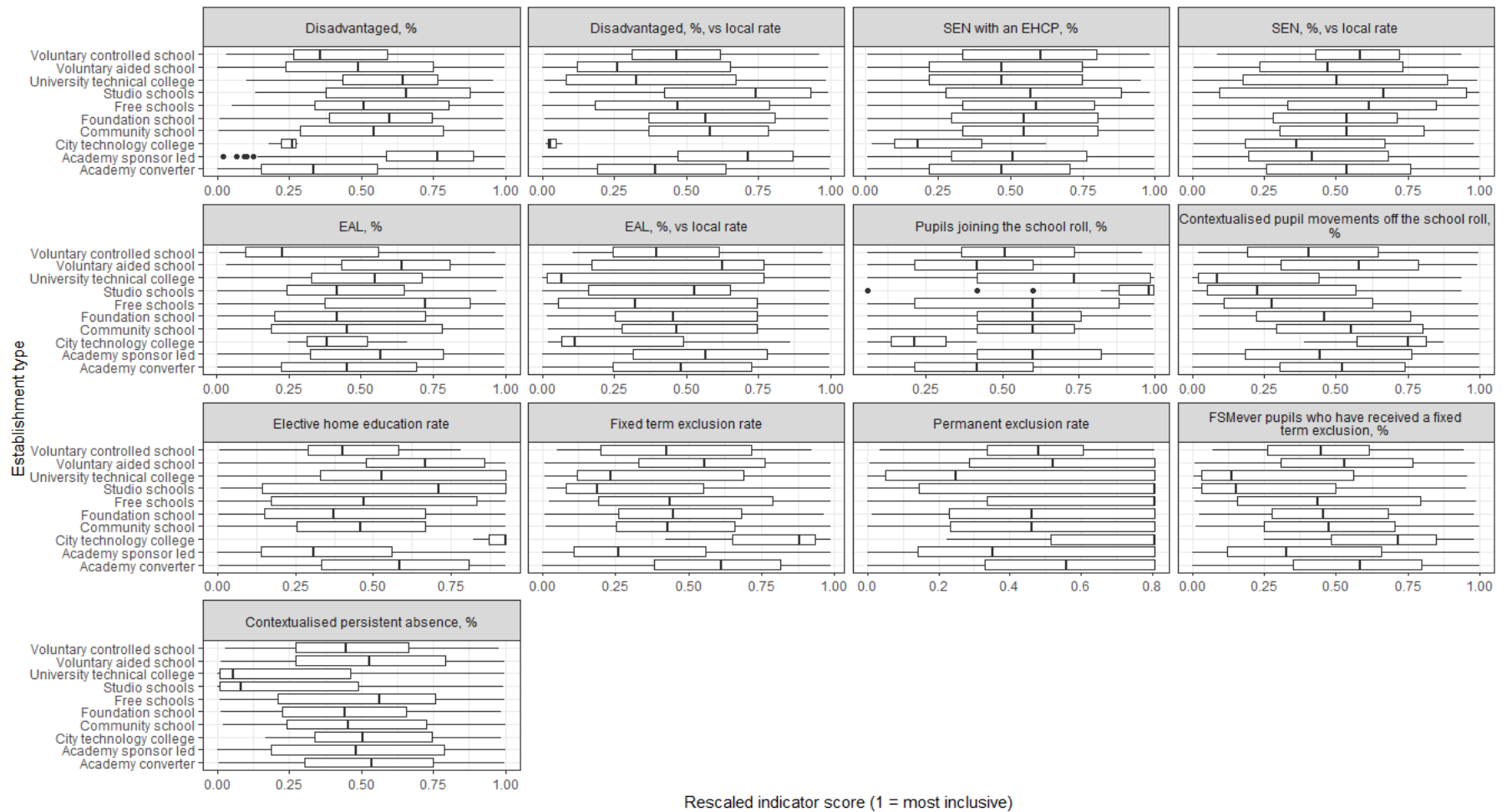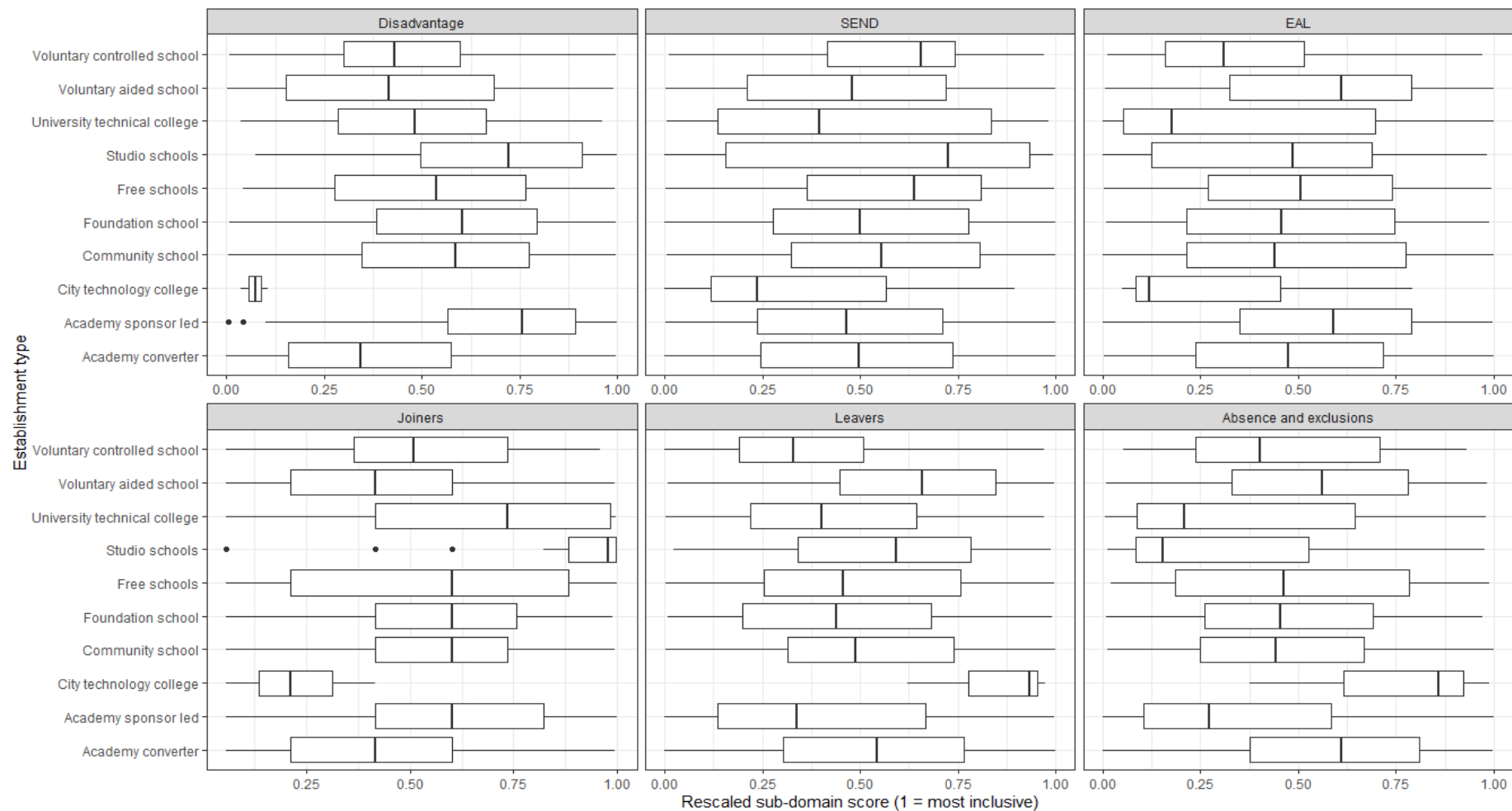*Figure 9: Distribution of enrolment indicator scores by school establishment type*

Figure 10: Distribution of enrolment sub-domain scores by school establishment type

Academic outcomes

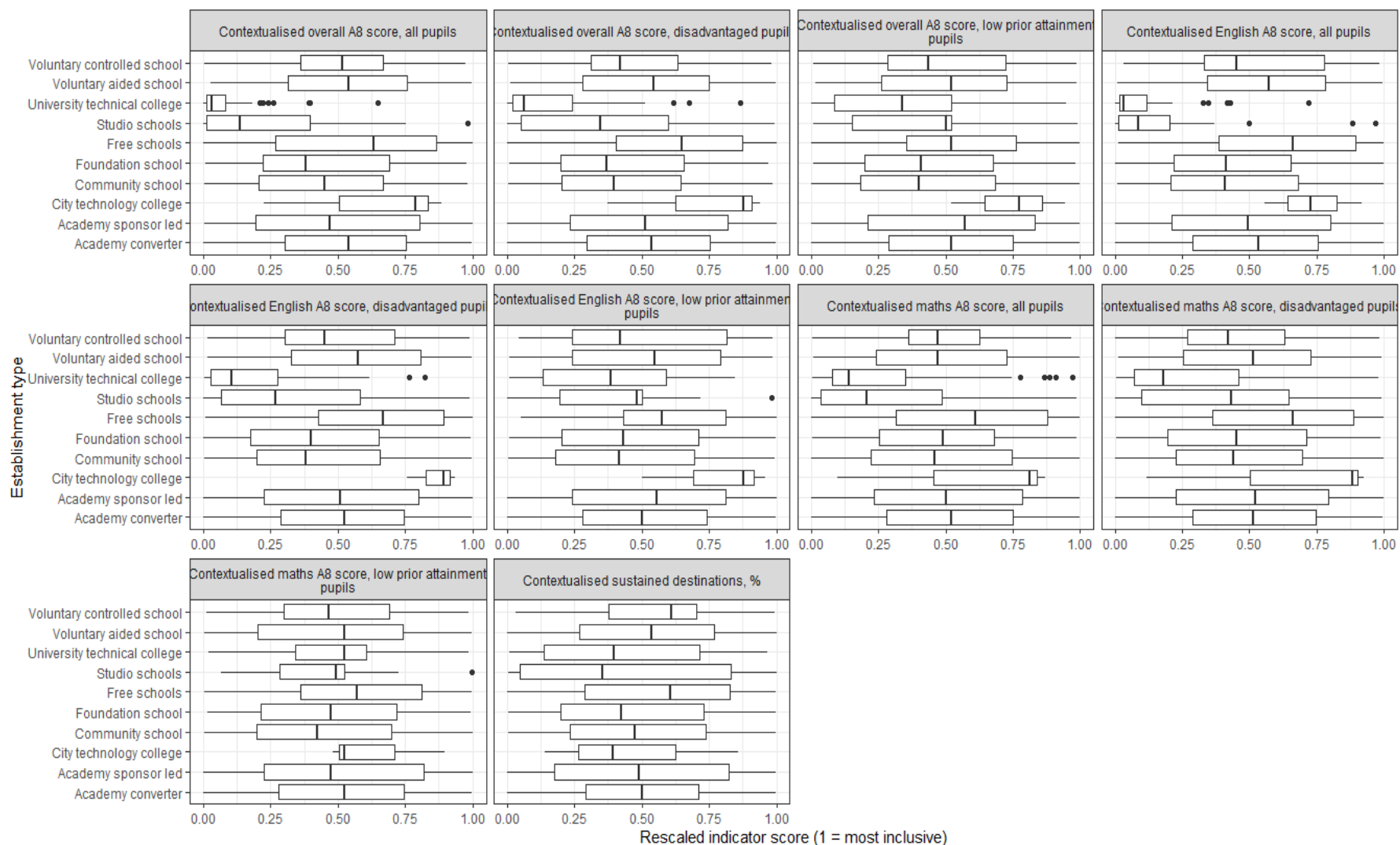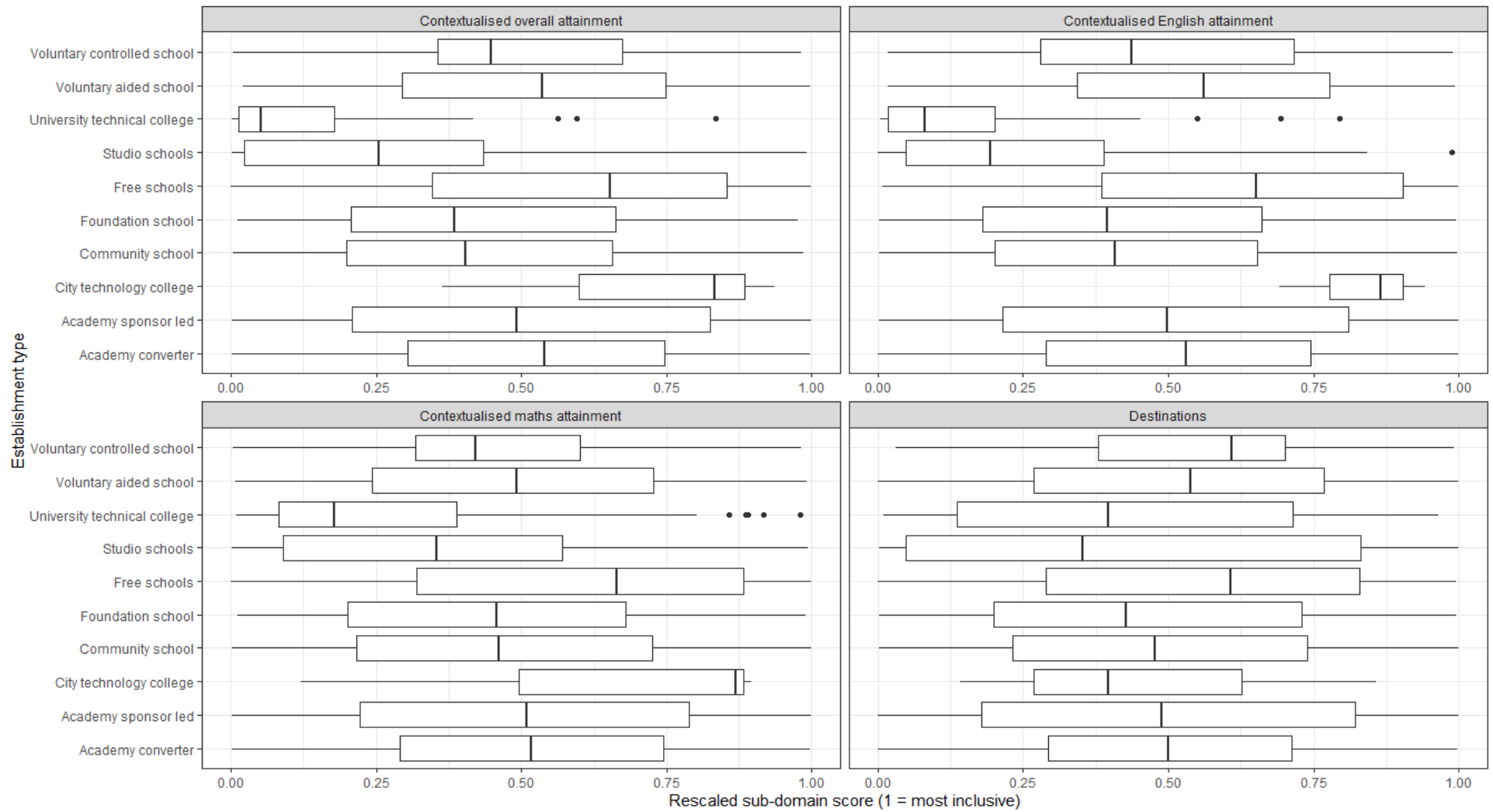*Figure 11: Distribution of academic outcomes indicator scores by school establishment type*

Figure 12: Distribution of academic outcomes sub-domain scores by school establishment type

Appendix B: Detailed methodology

Contextualisation

A number of indicators have been contextualised, to make for fairer comparison between schools in different circumstances.

Three – the percentage of pupils leaving the school's roll between Year 9 and Year 10, or Year 10 and Year 11, the percentage of pupils who are persistent absentees, and sustained destinations – have been contextualised based on school-level factors.[7]

Two school-level indicators were well correlated with the predictors (r^2=0.42 for destinations and r^2=0.36 for persistent absence). The percentage of pupils leaving the school roll was moderately correlated (r^2=0.25). A decision was made to include the contextualised version of this indicator because the resulting sub-domain score for leavers was too highly correlated with disadvantage if the uncontextualised version was used. Other variables (such as leaving the school roll, exclusions, home education) were much less well correlated.

Attainment indicators have been contextualised based on a mixture of school- and pupil-level factors using an adaptation of a model we previously developed[8]. This includes a number of pupil-level background factors known to influence attainment (ethnicity, disadvantage, gender etc.) and interactions between them. We also include school-level factors (mean Key Stage 2, percentage of disadvantaged pupils, percentage EAL pupils). Including mean Key Stage 2 of the cohort corrects for ability bias resulting from measurement error[9].

The consequence of including school-level factors in addition to pupil-level factors is that the resulting scores compare attainment at a school to that of similar pupils in similar schools. This would mean, for example, that schools with cohorts that have high prior attainment will be compared with other schools with cohorts that have high prior attainment, rather than all schools.

It would be possible to improve the models further in future. Due to lack of time we were unable to include number of previous school moves (known to influence attainment) nor test the possible inclusion of a flag for children in need.

Shrinkage

Shrinkage is a statistical technique used when two or more things being compared are based on materially different numbers of observations. To quote from the technical guidance to the English Indices of Deprivation:

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[7] Namely: school gender (boys/girls/mixed); phase of education (secondary/all-through); whether the school has a sixth form; urban/rural classification; percentage of FSMever pupils; percentage of pupils with an education, health and care plan/SEN Statement; percentage of pupils with SEN Support; percentage of EAL pupils; percentage of white British pupils. Use of these factors follows from the availability of this data, and the desire to contextualise on a broad range of factors.

[8] https://ffteducationdatalab.org.uk/2019/10/solutions-to-problems-with-progress-8-part-two-taking-account-of-context/

[9] https://www.tandfonline.com/doi/abs/10.1080/02671522.2018.1424926?journalCode=rred20

3.41 Where a rate or other measure of deprivation for a small area is based on small numbers, the resulting estimate may be unreliable, with an unacceptably high standard error. The technique of shrinkage estimation is used to 'borrow strength' from larger areas to avoid creating unreliable small area data [...]

In the case of the Good Schools Index, this arises, for example, when subgroups of the school cohort (e.g. disadvantaged; low prior attainment) are considered. Shrinkage is a means by which the propensity for small cohorts to exhibit more extreme values is adjusted for.

In practice, this has been applied to 10 indicators: the nine indicators based on Attainment 8 and indicator 4c., which relates to the percentage of pupils who have ever been eligible for free schools meals who have received a fixed term exclusion. In both cases, school scores are shrunken towards the national average based on between and within-school variance.

To calculate shrunken contextualised Attainment 8 scores, we multiply each school's contextualised Attainment 8 score by a shrinkage factor:

$$\frac{\sigma_b}{\sigma_b + \sigma_w/n_s}$$

Where σ_b is the national variance in contextualised Attainment 8 scores between schools, σ_w is the national variance in contextualised Attainment 8 within schools and n_s is the number of pupils at the school.

The rate of fixed-term exclusions for disadvantaged pupils was shrunken using the method presented in Appendix D of the 2019 Indices of Multiple Deprivation technical report[10], with the exception that school rates were shrunken to the national average rather than the local authority average.

We have not applied shrinkage to any measures related to "whole school" indicators. While this would make a difference to some small schools (e.g. UTCs, studio schools), for the vast majority of schools there are sufficient pupils to make shrinkage unnecessary.

Standardisation

Standardisation was completed by calculating percentile ranks for each indicator then transforming the ranks into a standard normal distribution. This step allowed us to combine indicators that used different scales when carrying out factor analysis and calculating scores.

Factor analysis and grouping of indicators into sub-domains

Factor analysis is a technique for combining a large number of indicators into a smaller number of factors. It can also be used to determine how indicators can be grouped together in a meaningful way. In this case, we used factor analysis in two stages.

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[10] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/833951/IoD2019_Technical_Report.pdf

Firstly, the standardised indicators were grouped into the two suggested domains: enrolment and academic outcome. We then carried out a maximum likelihood factor analysis to test whether the indicators in these suggested domains could be grouped further into subdomains, using various techniques. Our analysis did suggest that further grouping would a viable approach, and we created nine sub-domains:

Enrolment	Academic outcomes
1. Disadvantage inclusivity	1. Contextualised overall attainment
2. SEN inclusivity	2. Contextualised attainment in English
3. EAL inclusivity	3. Contextualised attainment in maths
4. Movement and off-rolling	4. Sustained destinations post-KS4
5. Absence and exclusions	

Secondly, where there was more than one indicator in a sub-domain, we used factor analysis to combine them into a single subdomain score.

In order to allow comparison of the score for each subdomain, each subdomain score was then transformed into a percentile rank from 0-1, with 0 being the least inclusive and 1 the most. Subdomain scores were then summed to form domain and overall scores, and schools were ranked according to their overall score.

Correlation between the subdomains is shown in table 2 below. This shows that the correlation between enrolment sub-domains is not particularly high, which suggests that different dimensions of enrolment are being measured. There is relatively high correlation between the three contextualised attainment measures. It may be advisable to combine them into a single sub-domain score.

Table 2: Correlations between subdomain measures of inclusivity

	Enrolment						Academic outcomes			
	Disadvantage	SEND	EAL	Pupil mobility, joiners	Pupil mobility, leavers	Absence and exclusions	Contextualised overall attainment	Contextualised English attainment	Contextualised maths attainment	Contextualised destinations
Disadvantage	n/a									
SEND	0.14	n/a								
EAL	0.32	-0.08	n/a							
Pupil mobility, joiners	0.45	0.10	0.19	n/a						
Pupil mobility, leavers	-0.19	-0.04	0.04	-0.30	n/a					
Absence and exclusions	-0.42	-0.09	0.01	-0.34	0.30	n/a				
Contextualised overall attainment	-0.10	-0.02	-0.02	-0.17	0.17	0.23	n/a			
Contextualised English attainment	-0.10	-0.01	-0.02	-0.14	0.15	0.20	0.84	n/a		
Contextualised maths attainment	-0.09	0.00	-0.02	-0.12	0.13	0.17	0.78	0.63	n/a	
Contextualised destinations	-0.01	0.02	-0.02	-0.06	0.10	0.05	0.07	0.07	0.08	n/a

The correlation between for enrolment and academic outcomes domain scores is 0.05. This confirms that they are measuring fundamentally different things.

Weighting of sub-domains and domains

A default weighting has been applied as follows. The enrolment and academic outcomes domains are calculated as simple averages of the sub-domains which make them up – that is, the six sub-domains that make up the enrolment domain are given equal weighting, and likewise for the four sub-domains which make up the academic outcomes.

In this default weighting, the final Good Schools Index scores are then created as a simple average of the two domains – enrolment and academic outcomes.

The facility for users to set their own weightings has however been included in the Excel workbook containing the Good Schools Index data. This means that users can give greater weight to sub-domains that they consider more important than others.