



The determinants of non-cognitive and cognitive schooling outcomes

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Every Child Matters initiative aims to

- Strength the accountability of schools for the educational achievement of *every* child
- Broaden the outcomes that schools focus on, to include well being and other non cognitive skills
 - well being, engagement, safety, etc.

This research

- is *not* a formal evaluation of ECM
- rather, it aims to inform policy-makers about the likely impact from ECM by adding to the limited evidence base on *the role of schools in producing non-academic outcomes*
- Addresses the extent to which schools, as key policy levers for DCSF, can currently influence non cognitive outcomes

ECM Outcomes

- Be healthy (*self-rated health*)
- Stay safe (*experience of bullying*)
- Enjoy and achieve (*key stage test results; school engagement; truancy*)
- Make a positive contribution (*extra-curriculum activities*)
- Achieve economic well-being

Research questions

- What is the role of school in explaining differences in ECM outcomes across children?
- What are the potential complementarities and trade-offs between different ECM outcomes?
 - At school and pupil level
- We focus on variety of ECM outcomes with strongest emphasis on:
 - **Academic achievement; School engagement; Bullying experience**

Data

- Longitudinal Study of Young People in England (LSYPE)
- Longitudinal survey of about 15,000 people who were 14 in 2004 and followed for 4 waves
- Provides detailed information on individuals
 - personal characteristics, family background, parent's socio-economic status and employment attitudes, experiences and behaviours

matched with

- Pupil Level Annual School Census/ National Pupil Database (**NPD/PLASC**)
- Administrative data on pupils' record of achievement and pupil-level background characteristics
- **Edubase and LEASIS**: school level characteristics

Key outcomes of interest

- **Academic achievement:** results at KS4
 - standardised capped average GCSE point score
- **School engagement:** scale based on 12 attitudinal questions relating to how pupils feel about school
 - e.g. *I am happy when I am at school; School is a waste of time for me; I am bored in lessons, etc.*
- **Experience of bullying:** index summing the occurrence of different types of bullying

ECM Outcomes – raw correlation

- A child's attitude to school and their academic achievement is highly positive correlated
- Those with higher levels of academic achievement and with greater levels of enjoyment of school are less likely to have experienced bullying
- But do not take account of other characteristics e.g. FSM or school

Model (I)

- *Value Added* approach
 - Pupil outcomes modelled as function of pupil characteristics, family inputs and school
 - Inclusion of lagged measure of outcomes
 - Focus on the change in pupil outcomes over secondary school
 - All outcomes measured in wave 3 (year 11) and prior measures are taken from wave 1 (year 9)

Model (II)

- 3 separate equations for the 3 key outcomes
- Study the inter-relationship between different cognitive and non cognitive outcomes
 - model the impact of each outcome (lagged) on all
- Focus on the role of schools and school characteristics using a variety of methods

Estimating equation (1)

$$O_{ijt} = \alpha_i + \beta O_{ijt-1} + \gamma_k \sum_k X_{ijkkt} + \varphi_k \sum_k F_{ijkkt} + u_{ij}$$

- i, j, t = pupil, school and period

- O_t = measure of outcomes (age 16)

- O_{t-1} = prior measures of outcomes (age 14)

- X_k and F_k = set of k pupil characteristics and k family inputs

- u_{it} = error term

→ Error term decomposed in two components: $u_{it} = \vartheta_i + \varepsilon_{ij}$

ϑ_i = school effect: specific to each school and constant across pupils in the same school

Estimating equation (2)

We use two approaches to account for school effects

Random Effects

- Comparable to the existing literature
- Allows us to calculate the variance of school effects and the intra class correlation (measure the size of the school effect)

$$\rho = \frac{\sigma_{\theta}^2}{\sigma_{\theta}^2 + \sigma_{\varepsilon}^2}$$

Fixed Effects

- Relax the assumption of strict exogeneity (i.e. that school effects are unrelated to other covariates)
 - Allows us to extract estimates of school effects and explore whether these effects differ systematically across different types of school
- 2nd stage regression: school FE on school characteristics

Results: pupil characteristics (1)

- Pupils with higher levels of school enjoyment have slightly higher levels of academic achievement
- Children who had higher academic achievement at 14 seem to have higher levels of enjoyment at age 16

Results : pupil characteristics (2)

- Pupils who experience bullying have subsequently lower levels of academic achievement and lower levels of enjoyment of school.
- The reverse is not true. Pupils with lower levels of academic achievement at age 14 are not more likely to experience bullying at age 16.

Results : pupil characteristics (3)

- Pupils' health was also found to be positively correlated with academic achievement and enjoyment.
- Pupils with health problems at age 14 or who had Special Educational Needs were significantly more likely to report being bullied at age 16.

Results : pupil characteristics (4)

- Extra curricular activities, including tuition, were positively related to academic achievement.
- Pupils who worked more hours in paid employment had lower levels of enjoyment of school.

Results : pupil characteristics (5)

- Strong negative link between unauthorised absence in the previous period and subsequent academic achievement
- Even stronger negative link with school enjoyment.
- Unauthorised absence is a marker for subsequent poor achievement and lower pupil well being.

Summary of pupil results

	Achievement	Engagement	Experience of bullying
KS2 prior achievement	0.521	0.351	/
Prior school engagement	0.015	0.566	/
Prior experience of bullying	-0.029	-0.313	0.188
Unauthorised absences	-0.025	-0.161	/
Extra curric. courses	0.087	/	/
Tuition	0.063	/	/
Self rated health	0.089	1.137	-0.075

Results: the role of schools (1)

- Measure the relative importance of differences between schools (the policy lever) compared to the differences between pupils
- Around 27% of the variation in pupil achievement is attributable to differences across schools
- Variation across schools in the other non cognitive outcomes is much less
 - for enjoyment of school, only around 3% of the variation across pupils was attributable to differences across schools, even less for bullying.

Results: the role of schools (2)

- Do certain types of schools have higher achievement and engagement?
- Foundation, VA and CTC schools have higher value added achievement
- Higher pupil teacher ratio associated with less value added in pupil engagement

Results: the role of schools (3)

- Do certain types of schools have less bullying?
- Firstly not much difference in bullying rates between schools allowing for pupil characteristics
- Schools don't matter much

Results: the role of schools (4)

- Schools with more FSM children have lower increase in bullying over secondary phase
- Schools with higher achieving intakes (KS2) have lower increase in bullying over secondary phase
- A higher pupil teacher ratio and larger school associated with lower increase in bullying over secondary phase

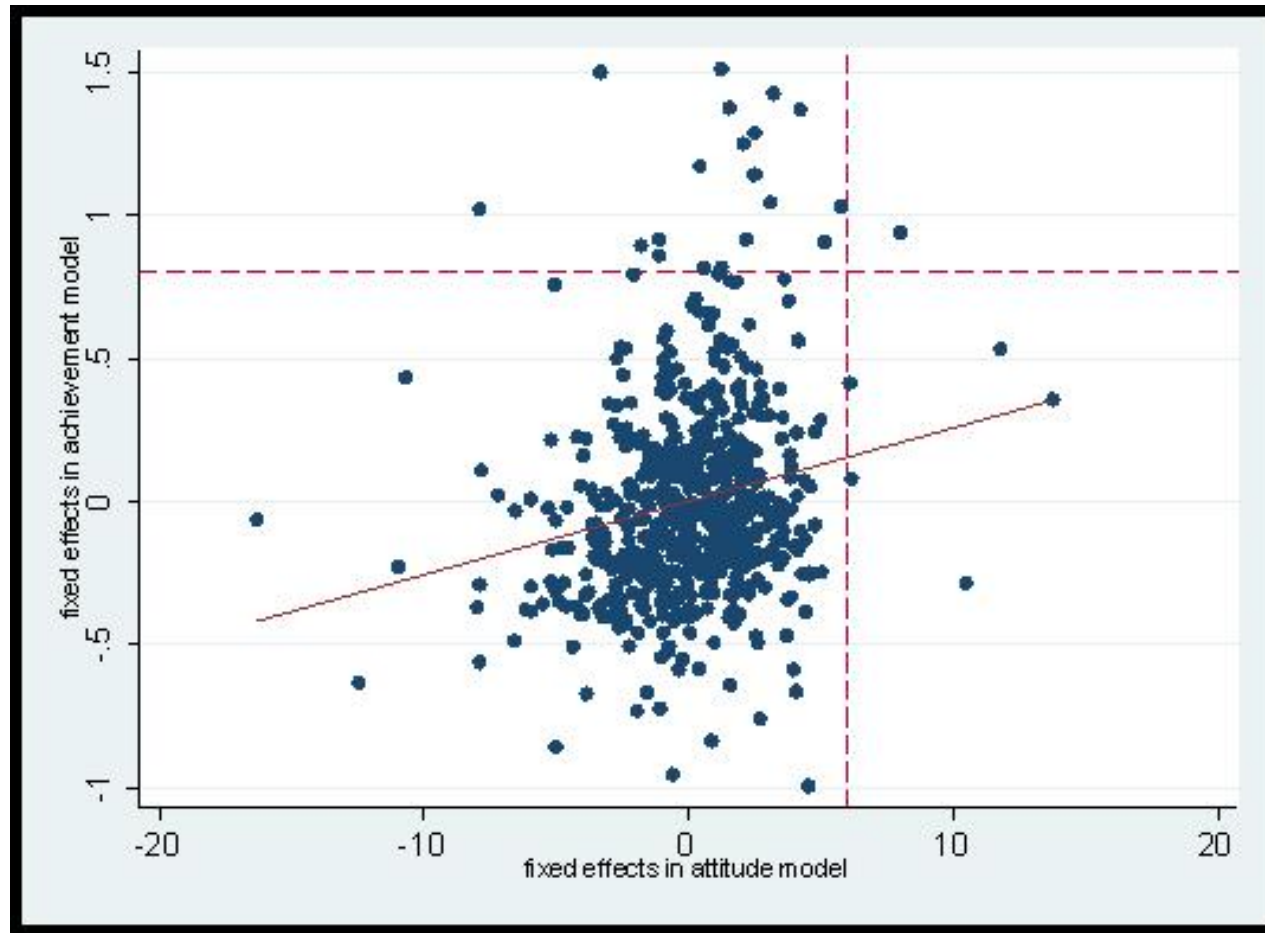
Summary of school results

	School effects on achievement	School effects on engagement	School effects on bullying
% FSM	/	/	-0.252
Average score in KS2	/	/	-0.073
Pupil Teacher Ratio	/	/	-0.0178
Single Sex school	/	/	/
Proportion non- white British	/	/	/
School size	/	/	-0.000079
Voluntary Controlled	/	/	/
Foundation, VA, CTC	0.131	/	0.441

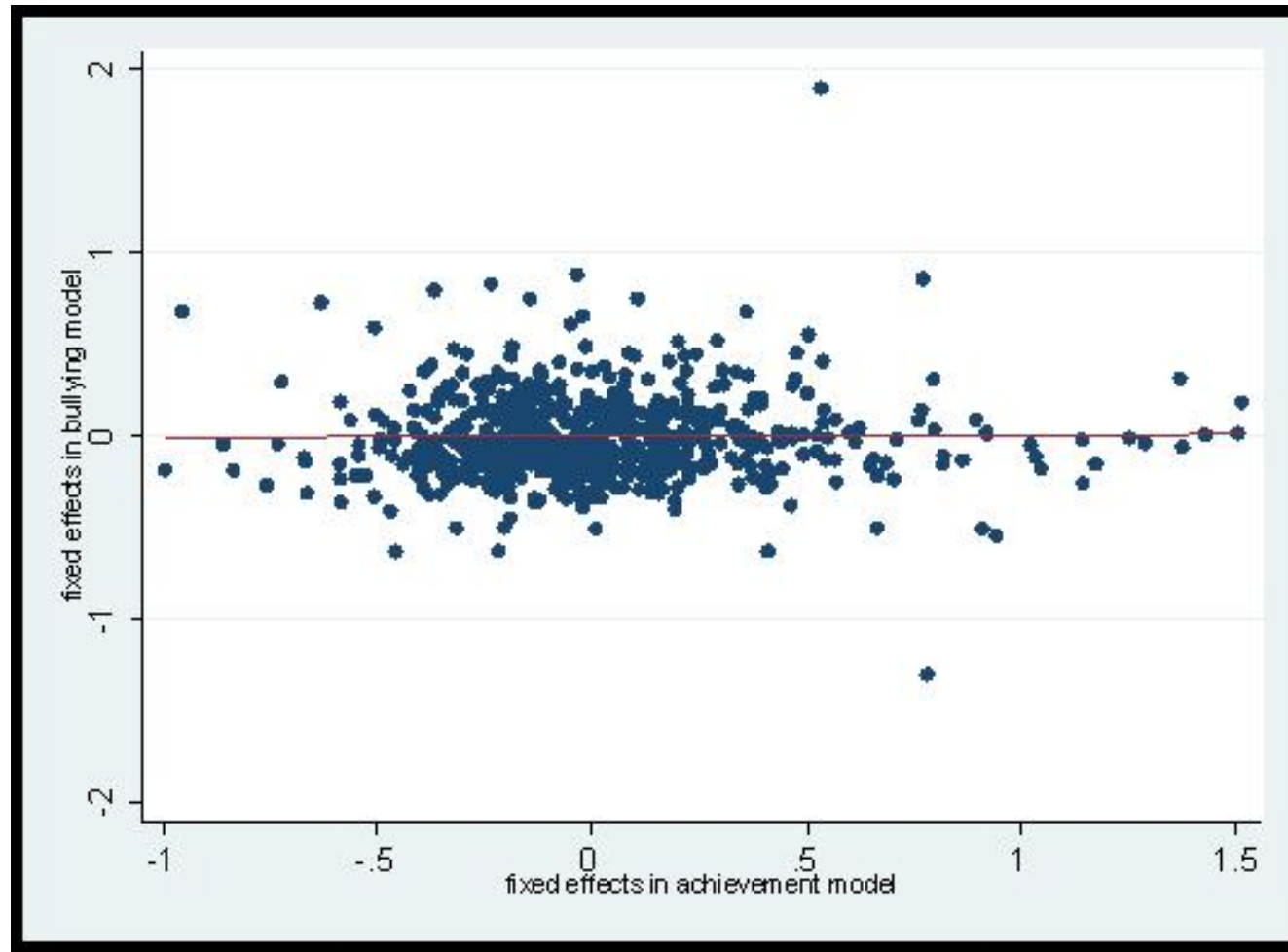
Results

- At school level - schools with higher value added in achievement also have higher value added in school engagement
- Other outcomes not correlated

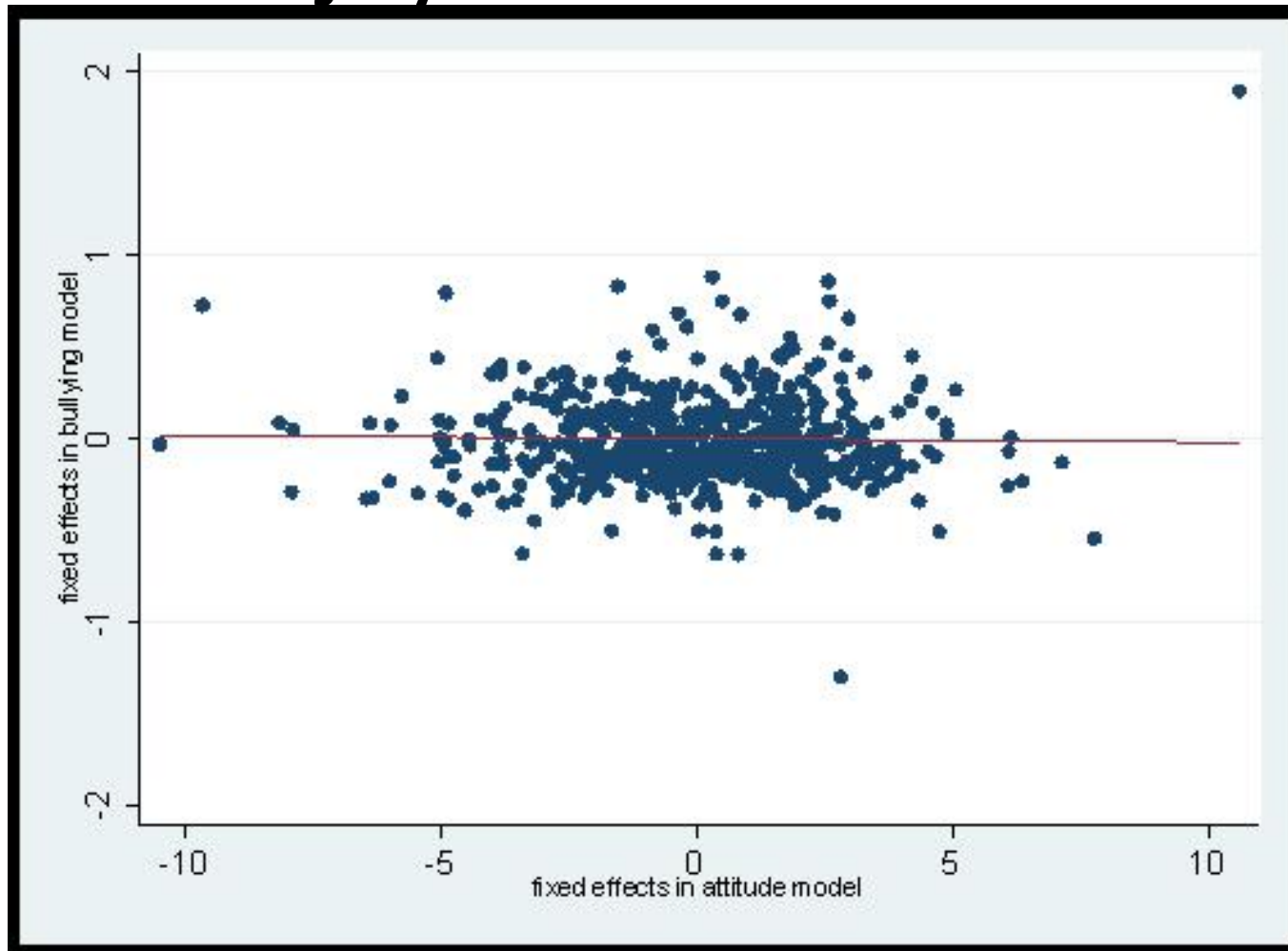
School effects: achievement and enjoyment of school



School effects: achievement and bullying



School effects: bullying and enjoyment of school



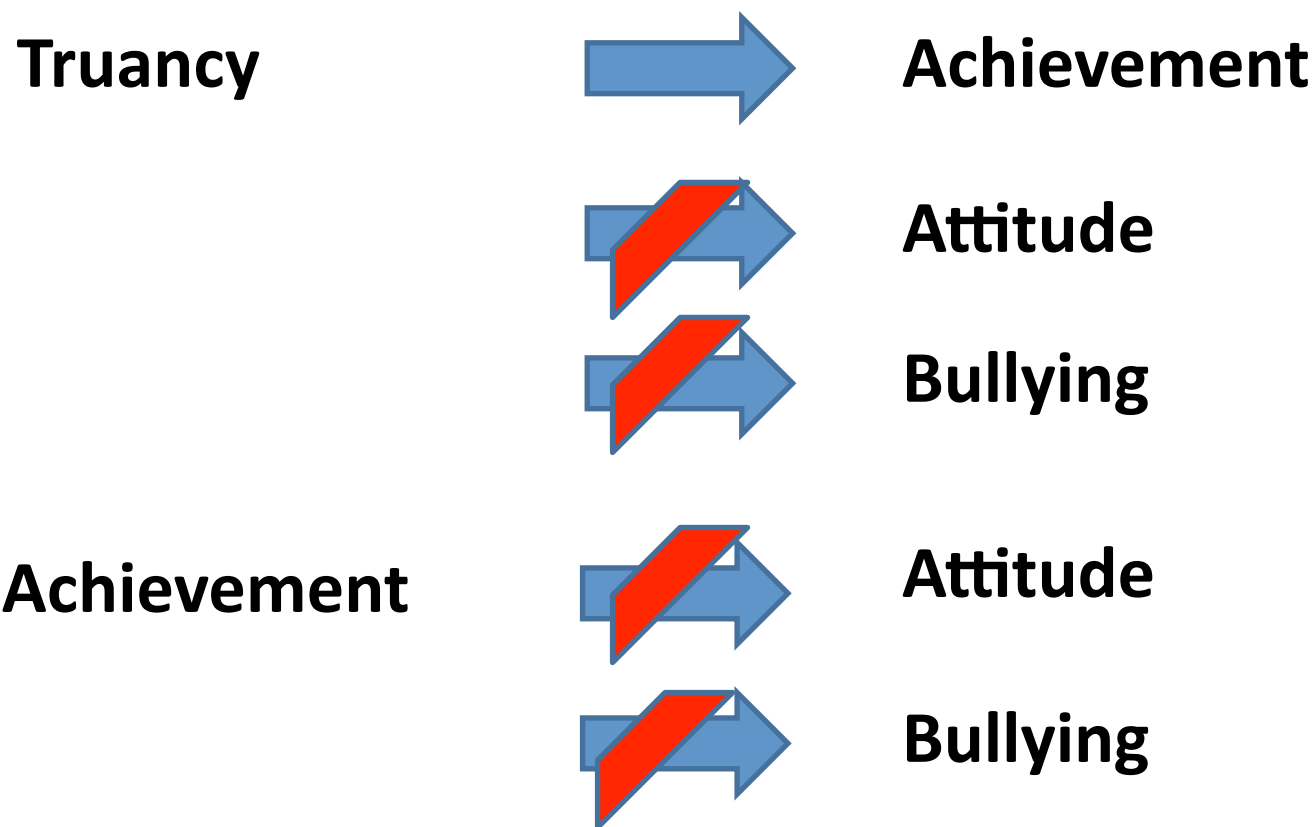
Uncovering causality using IV

- **Instrument for achievement:** quarter of birth (see work by Dearden on month of birth and its impact on achievement)
- **Instrument for truancy:** *change* in the average absence rate at the LEA level (to reflect different LEA policies towards truancy)
- Not found a suitable instrument for the other ECM variables

IV Results

	Achievement	Attitude toward school	Bullying
Instruments used	<i>Absences instrumented with differences in abs at LEA level</i>	<i>Both achievement and absences instrumented</i>	<i>Both achievement and absences instrumented</i>
Prior achievement (KS2)	0.421***	0.863	0.011
Unauthorized absences	-0.216***	0.370	0.017
F First stage	6.30***	69.51***	68.70***

IV estimates: summary of results



It seem the direction of causation goes from non-cognitive to non-cognitive and not vice versa

Conclusions (1)

- Schools clearly play an important role in determining pupil achievement but less variation across schools in the other non cognitive outcomes
- Schools are an obvious and important policy lever to raise pupil achievement
- Schools are not playing as large a role in determining pupils' enjoyment or whether or not pupils get bullied

Conclusions (2)

- Does not mean that schools cannot exert a greater impact on non cognitive outcomes but rather that this does not happen currently.

Conclusions (3)

- At school level little evidence of trade off in outcomes e.g. achievement and bullying
- However, preliminary pupil level analysis suggests that schools that improve their value added have pupils who experience a fall in their levels of engagement
- So process of *change* at school level to improve VA may cause loss of well being particularly for pupils near to key thresholds.

Conclusions

- Some non-cognitive indicators can be potentially used pro-actively to target pupils at risk of future cognitive and non cognitive difficulties
 - high levels of unauthorised absence warn of lower levels of academic achievement and school enjoyment
 - those with poor health (especially with Special Educational Needs) go on to have worse academic and non cognitive outcomes

VARIABLES IN THE ANALYSIS

Key outcomes' measures

KS4 total point score
Attitude to school scale at age 16
Bullying scale at age 16

Administrative covariates (from PLASC)

Gender
Statement of special education needs
Ethnic group
English as a first language
Free school meals eligibility
LEA identifier

School-level covariates

Institution type
Whether single sex school
Pupil-teacher ratio
Average score in KS2
Proportion of pupils receiving FSM
Proportion of non-white British pupils
School size (total number of pupils enrolled)

Prior outcomes' measures

KS2 total point score
Attitude to school scale at age 14
Bullying scale at age 14

Socio-demographic covariates (From LSYPE)

Main parent's social class
Whether main parent is unemployed
Mother's highest education qualification
Father's highest education qualification
Financial difficulties (whether parents receive means tested benefits)
Number of hours worked per week during term time

Other ECM variables

Self rated health
Whether takes extra-curriculum courses (in supplementary subjects)
Whether takes extra-curriculum courses (in subjects they also do at school)
Number of (unauthorised) absences
