



Department
for Education

Factors associated with achievement: key stage 2

Research brief

November 2015

**Alex Sutherland, Sonia Ilie & Anna Vignoles
– RAND Europe & the University of
Cambridge**

Contents

Introduction	3
Key Findings for Key Stage 2	3
Aims	5
Methodology	6
Conclusions	6

Introduction

RAND Europe and the Faculty of Education at the University of Cambridge were commissioned by the Department for Education (DfE) to assess the quality of the current measure of socio-economic deprivation used by DfE. Specifically, the work aimed to assess the relationship between free school meals (FSM) eligibility, pupil achievement and measures that may act as proxies for socio-economic status (SES), to answer three questions:

1. Can FSM histories be improved on as a proxy for social deprivation?
2. What alternative (practical) proxy measures of SES can be used that better capture variation in achievement?
3. Do alternative proxy measures better enable us to identify pupils at risk of low achievement?

Key Findings for Key Stage 2

Deprivation indicators and attainment gaps

- Whether the pupil was **ever eligible for FSM in the last six years** (Ever6FSM)¹ explained 14.9% of the variation in pupil achievement at key stage 2 when entered in a model alongside a set of basic controls.² In practical terms, there was a difference of roughly one-third of a KS2 level between pupils who have ever been FSM eligible in the last six years and those who have not.³ This equates to a difference of 7½ months of progress on average.
- The Ever6FSM measure performs better, in terms of predictive power, than simply using **current (2012)⁴ FSM eligibility** (explaining 14.9% of the variance compared to 13.7%, respectively). For current (2012) FSM eligibility, there was a difference of almost one third of a KS2 level between pupils being eligible for FSM in the final KS2 year and those who were not, equating to 7 months of additional progress.
- The individual **neighbourhood based** proxy measure, Income Deprivation Affecting Children Index (IDACI), did not perform as well as FSM eligibility in terms of predictive power, explaining 12.9% of the variance. The difference between children living in neighbourhoods at the 25th percentile compared with the 75th percentile amounting to about one quarter of a KS2 level, or 6 months of

¹ The Ever6FSM measure used here closely mirrors eligibility for the pupil premium, but is slightly different to that used in the KS4 analysis where Ever5FSM was the closest available measure.

² The basic controls consist of individual demographic measures such as age, gender and ethnicity; area measures relating to region of residence and urban/rural; and school level characteristics such as school size, proportion of pupils with special educational needs statements.

³ At KS2, pupils are expected to make two levels worth of progress over four years.

⁴ Current (2012) FSM eligibility refers to FSM eligibility in the school year KS2 assessment were taken, which in the MCS sample was 2012.

progress. Some combinations of neighbourhood based measures can provide more predictive power than FSM eligibility, but they are difficult to interpret and do not provide data on the individual child. Neighbourhood measures also reflect social sorting that occurs prior to primary school.⁵

- Parental **occupation**, parental **education**, and **other household characteristics** are slightly better predictors of pupil achievement than FSM eligibility (current or Ever6FSM), accounting for 18.9%, 17.7% and 16.5% of the variance, respectively. For example, for household occupational status, there was a difference of around half a KS2 level (12-14 months of progress) on average between children from higher managerial households compared to supervisory, routine or unemployed households. Similarly, in terms of parental education, pupils whose parents had a degree (or equivalent) achieved just over half a KS2 level (14 months of progress) more than those whose parents had a qualification at level 1 or no qualifications. However, these proxies have the problem that at-scale collection of this information is likely to be impractical and costly.
- Parental **income** accounted for 16.1% of the variation in achievement: after controlling for basic pupil and school characteristics. In practical terms, an increase of £10,000 in household income was associated with one tenth of a KS2 level or 2½ months of progress. Income was measured via self-report, which is likely to include a degree of error and thereby reduce the strength of relationship between income and attainment. This finding highlights the difficulties of collecting high quality household income data ‘at scale’ through surveys.
- Overall, **FSM history** is the preferred practical measure of deprivation, measured either as cumulative years of eligibility over the pupil’s school life, or as FSM eligibility ever in the years preceding the outcome of interest.

Prior attainment

- Setting aside the socio-economic circumstances of children, **prior attainment** measured by standardised tests at age three⁶ was found to be the most powerful predictor of primary school attainment. However, this information is not currently available to government at scale and does not represent a practical proxy in primary schools.⁷ Even if such data were collected, other research has found

⁵ Neighbourhood sorting is discussed in detail in the research report that accompanies this research brief.

⁶ The Millennium Cohort Study provides British Ability Scales scores; the age three vocabulary score was used in the analysis because combining scores across scales is not recommended.

⁷ Key stage 1 outcomes (age 7) are the earliest attainment data available at scale, and are measured by teacher assessment rather than by standardised testing. These data could not be used to identify children in reception and years 1 and 2 who are at risk of low attainment because they have not been collected until the end of KS1.

that testing predicts later attainment less accurately for children from poorer backgrounds (see Crawford et al., 2014).⁸ Additionally, the use of prior attainment on its own would not necessarily ensure better representation of socio-economically disadvantaged pupils at higher levels of attainment.

Other factors

- The research tested for **regional** variations in KS2 attainment, but once prior attainment was accounted for no regional differences were found for this cohort of pupils.
- There were some residual differences in attainment when comparing **ethnic** minorities to White British children, even after controlling for socio-economic deprivation proxies that account for much of the underachievement by some minority ethnic groups.⁹ In keeping with previous research, accounting for differences in prior attainment at age 3, most ethnic-minority groups made more progress during primary school than White British pupils, effectively reducing the ethnic differences in attainment by the end of primary school.¹⁰

Aims and objectives

The government currently uses pupils' histories of eligibility for FSM (whether they have been eligible during the last six years) to allocate the pupil premium and other school funding, and to provide accountability for the attainment of disadvantaged children. With changes to the benefits system expected to occur in the next few years affecting the underlying eligibility criteria for FSM, it is timely to reflect on the range of data which might be used as a proxy for deprivation and how it is associated with attainment. This research explores which possible proxies for deprivation are the strongest predictors of achievement at the end of primary school.

The central tasks of this project were to assess the relationship between FSM eligibility, pupil achievement and measures that may act as proxies for socio-economic status (SES). The research is exploratory but pragmatic – a broad range of measures were explored, but with the knowledge that not all of these measures would be available to DfE in the future.

⁸ Crawford, Claire and Macmillan, Lindsey and Vignoles, Anna, Social Mobility and Child Poverty Commission, Centre for Analysis of Youth Transition, (2014) *Progress made by high-attaining children from disadvantaged backgrounds: research report*.

⁹ Detailed findings for individual ethnic groups are not reported here because the sample sizes for some of the ethnic groups are very small and may therefore bias the results.

¹⁰ Similarly, the research found that **younger children within the year group** make more progress than older children, thus reducing the effect of age on attainment by the end of primary school.

The research questions framing the project are:

- 1. Can FSM histories be improved on as a proxy for social deprivation?**
- 2. What alternative (practical) proxy measures of SES can be used that better capture variation in achievement?**
- 3. Do alternative proxy measures better enable us to identify pupils at risk of low achievement?**

Methodology

This study combined survey data on more than 5,000 children from the Millennium Cohort Study (MCS) with administrative data from the National Pupil Database (NPD). The research used multi-level models to assess the relationship between factors used as predictors of achievement. The outcome measure was the average of the English and mathematics fine grade scores from the key stage 2 assessments.

Conclusions

The overall pattern of results for KS2 was very similar to that found for KS4.

The socioeconomic gaps reported are stark and substantial. However, these gaps may have been even larger if there had not been a long-running redistributive and compensatory system aimed at alleviating disadvantage already in place. This highlights why it is crucial to identify poor / disadvantaged pupils at risk of underachievement as early as possible – in order that additional resources can be targeted at this group in particular.

It is noteworthy that the predictive power of neighbourhood data was weaker in primary school versus secondary school. This may be because peer effects are weaker at primary or because the level of school sorting (where particular types of pupils attend particular schools) is greater in the secondary phase than the primary. It was not possible to definitively explain why this may be the case, but it does suggest that alternatives to FSM eligibility based on postcode and neighbourhood census data may be even less desirable at primary school level.

Survey measures of SES such as parental education and occupation perform slightly better than pupils' histories of FSM. However, these measures of parental background are currently not available to government and there are likely to be substantial costs associated with collecting such data at scale. Self-reported parental income explained more of the variation in attainment at key stage 2 than the FSM measures, but less than parental education and occupation.

Stepping aside from data that describe the socio-economic circumstances of children, prior attainment measured by standardised tests at age three is found to be the most powerful predictor of primary school attainment. However, this information is not currently available to government, and therefore does not represent a practical option for primary pupils. Even if such data were collected, testing predicts later attainment less accurately for younger children and children from poorer backgrounds. Additionally, the use of prior attainment alone would not necessarily ensure better representation of socio-economically disadvantaged pupils at higher levels of attainment.

The overall conclusion is that FSM history, measured either as cumulative years of eligibility over the pupil's school life, or as FSM eligibility ever in the years preceding the outcome of interest, performs very well in comparison to other potential measures of SES. Further, that the cost of switching to another measure may outweigh the marginal gains from doing so. The latter is already used by DfE and so for continuity reasons may be preferred at this time. Other options might usefully be explored in future work, such as using data on household income held by other government departments.



Department
for Education

© RAND Europe 2015

Reference: DFE-RB486

ISBN: 978-1-78105-528-1

This research was commissioned under the under the 2010 to 2015 Conservative and Liberal Democrat coalition government. As a result the content may not reflect current Government policy. The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Education.

Any enquiries regarding this publication should be sent to us at:

Jo.Hutchinson@education.gsi.gov.uk or www.education.gov.uk/contactus

This document is available for download at www.gov.uk/government/publications