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Parental social class and school GCSE outcomes: two decades of evidence from UK household panel surveys

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ABSTRACT

This paper investigates social class inequalities in English school qualifications. The analytical focus is pupils' outcomes in General Certificates of Secondary Education (GCSEs). The original aspect of this paper is the operationalisation of data from the British Household Panel Survey (BHPS) and the UK Household Longitudinal Study (UKHLS), which facilitates analyses from 1991 to 2013. We observe a general trend of improved educational outcomes in more recent cohorts of school pupils, which is consistent with national results. The central empirical finding is that there is a persistent social class gradient. Pupils growing up in families in less advantaged social classes have less favourable school GCSE outcomes. This is especially concerning, because having fewer good GCSEs is likely to limit children's participation in more advanced education and restrict their options in the labour market. Changes in the structure and content of GCSEs lead us to conjecture that sociological analyses of social class inequalities in school qualifications will continue to be important. We highlight the limitations of using administrative educational data, and we outline the data resources that would better facilitate the study of social class inequalities.

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Education; inequality; social class; General Certificate of Secondary Education (GCSE)

Introduction

Examining the relationship between parental social class and children's school outcomes is a long-standing area of sociological inquiry. The overall message has been that children living in families in less advantaged social classes generally have less favourable educational outcomes (see Corrigan, 1979; Douglas, 1964; Halsey, Heath, & Ridge, 1980; Hargreaves, 1967; Lacey, 1971; Wedge & Prosser, 1973; Willis, 1977). The qualifications that English children gain at school are important because they are strongly related to participation in post-compulsory education (Payne, 2000), youth unemployment (Rice, 1999) and future labour market experiences (Babb, 2005; Jones, Joyce, & Thomas, 2003; Murray, 2011).

This paper investigates social class inequalities in English school qualifications. The majority of pupils in England attend state schools that provide free education (Walford, 2003). English secondary schools provide compulsory education for pupils between the

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ages of 11 and 16. The majority of English secondary schools abandoned selection through academic testing several decades ago and have since provided all pupils with access to a comprehensive curriculum (Lowe, 1997).

The analytical focus of this paper is the General Certificate of Secondary Education (GCSE). GCSEs are standard qualifications undertaken by English pupils at the age of 15 or 16, at the end of school year 11 (Department for Education, 1985). Young people in England study for a portfolio of subjects, usually about nine (Carroll & Gill, 2017). Pupils' outcomes in school GCSEs have steadily improved since their introduction in the late 1980s (Department for Education and Skills, 2007).[1] There is, however, substantial evidence of persistent social class inequalities in school GCSE outcomes. Pupils from families in more advantaged social classes, for example those characterised by managerial, administrative and professional occupations, have more favourable GCSE outcomes than pupils from families in less advantaged social classes (Connelly, Murray, & Gayle, 2013; Connolly, 2006; Demack, Drew, & Grimsley, 2000; Gayle, Murray, & Connelly, 2016; Playford & Gayle, 2016; Strand, 2014; Sullivan, 2001).

There are three substantial obstacles that restrict studying the relationship between parental social class and recent school GCSE outcomes. The first is that there is a lack of suitable large scale, nationally representative youth data. This is partially due to the discontinuation of the Youth Cohort Study of England and Wales (YCS), which was a specialist survey of young people and collected detailed information on young people and their families, qualifications, and their experiences at school (see Croxford, Iannelli, & Shapira, 2007). The Longitudinal Study of Young People in England (LSYPE) provided nationally representative youth and educational data, but this was restricted to a single cohort who were aged 16 in 2006.[2]

The second obstacle is that despite the UK having an impressive set of birth cohort studies, the 1946, 1958, and 1970 cohorts pre-date the introduction of GCSEs (see Elliott & Shepherd, 2006; Power & Elliott, 2006; Wadsworth, Kuh, Richards, & Hardy, 2006). The Millennium Cohort Study (MCS) began in 2000–2002 (see Connelly & Platt, 2014). A new dataset has recently been released linking education data (including GCSE exam results) to the records of MCS participants based in England. Whilst these data are likely to prove valuable for studying school GCSEs, analyses will still be restricted to a single cohort.

A significant development in the UK data infrastructure was the creation of the National Pupil Database (NPD) and the collection of the Pupil Level Annual Schools Census (PLASC) (Florian, Rouse, Black-Hawkins, & Jull, 2004). Access to these data are important and to a certain extent help to overcome the first two obstacles. The third obstacle, however, is that administrative educational data resources do not ordinarily include detailed measures of parental social class.

In practice, researchers using administrative data are limited to using fairly crude proxy measures of social class, such as the eligibility for (or take up of) Free School Meals (FSM). FSM eligibility is a deprivation measure that indicates the most disadvantaged pupils. Free School Meals are available to a minority of families living in poverty (Gorard & See, 2009). Taylor (2018) commented that FSM eligibility does not capture the broader multi-dimensionality of social advantage and disadvantage. A similar position is echoed in earlier work such as Hobbs and Vignoles (2007). The analysis of panel (i.e. repeated contacts) data on household incomes shows evidence of 'income churning' (see Jarvis & Jenkins, 1998). This highlights the instability of a poverty-based measure, such as FSM eligibility.

An alternative strategy for researchers using administrative educational data is the use of geographical measures, for example relating to neighbourhood deprivation, as proxies for social class (see Crawford, Macmillan, & Vignoles, 2017; Hamnett, Ramsden, & Butler, 2007). Given the economic and social diversity of English neighbourhoods, the extent to which such area-based measures are valid proxies of parental social class is also questionable (Deas, Robson, Wong, & Bradford, 2003).

We attempt to circumvent the three obstacles outlined above by using data from two large scale, nationally representative household panel studies. The first part of the analyses uses the British Household Panel Study (BHPS) (see Taylor, With Brice, Buck, & Prentice-Lane, 2010). The BHPS data window spans 1991–2008, i.e. the full range of waves available in the BHPS. An attraction of BHPS data is that it partially overlaps the period covered by the YCS, which was a specialist youth and education survey. The second part of the analyses uses the UK Household Longitudinal Study (UKHLS) (see Buck & Mcfall, 2011). The UKHLS began in 2009, and it augments and extends the BHPS. Administrative GCSE data can be linked to the UKHLS up to 2013. Combining these two data sources provides a unique 22-year window of observation for investigating social class inequalities in English school qualifications.

Data

The first analysis uses data from the BHPS (University of Essex, Institute for Social and Economic Research, 2010). The second analysis uses data from the UKHLS (University of Essex, Institute for Social and Economic Research, 2018). These studies are large scale and have nationally representative data collection enterprises that facilitate a broad, interdisciplinary range of empirical analyses (see Longhi & Nandi, 2015). We exploit the household data collection strategy of the BHPS, which collected information on young people, parents, and other adults within the household. The BHPS collected suitable information on young people's GCSE outcomes in the adult survey. We matched the young person's GCSE information with information on parental social class, parental education, and other measures, which were collected from interviews with both the young person and their parents.

An innovative feature of the UKHLS is that education data from administrative education records has been linked to UKHLS individuals (Department for Education, University of Essex, Institute for Social and Economic Research, 2015). The data are linked for English state school pupils in the National Pupil Database (NPD). A special license is required to access these data and they can only be analysed in a Secure Lab setting.[3] School GCSE outcomes have been linked to the main UKHLS survey contingent on consent given in Wave 1 (University of Essex, 2015). We matched the young person's UKHLS survey responses and administrative educational records with information on parental social class, parental education, and other measures from interviews in the main UKHLS survey.

Annual waves of BHPS data were collected in the autumn (Buck, Burton, Laurie, Lynn, & Uhrig, 2006). The UKHLS has a much larger sample and therefore requires a wider fieldwork window (see Table 1 in Knies, 2018). The timing of the data collection, in both studies, does not neatly map onto the English school year. We have carefully organised the data into 'synthetic' school year cohorts. The mechanics of the data wrangling processes are elaborated in Stopforth (2020).

GCSE qualifications

The GCSE examinations taken at the end of secondary schooling mark the first major branching point for young people in the English education system. GCSEs are awarded at the subject level and are graded alphabetically into discrete, ordered categories. Historically, the highest grade was A and the lowest G, with a higher A* grade introduced from 1994 (Yang & Woodhouse, 2001).

In practice, pupils have individualised GCSE profiles. This is because a pupil's results comprise both compulsory GCSEs (e.g. English Language, English Literature, Maths, and Science) and non-compulsory GCSEs. There are a large number of non-compulsory GCSEs spanning the humanities, arts, languages, and some technical and vocational subjects (Carroll & Gill, 2017). Teachers offer guidance, but pupils and parents are given a large degree of choice over which subjects are studied. Choices are made within structural constraints such as the subjects on offer and the school timetable. There is no single overall or 'agglomerate' measure of school GCSE outcomes. Following Schmitt and Wadsworth (2006), Connelly et al. (2013), Shakeshaft et al. (2013), and Gayle et al. (2016), we use the number of GCSEs gained at grades A*–C as the outcome measure throughout this paper.[4]

Parental social class

There is an expanding array of alternative measures of social class (for a review, see Lambert & Bihagen, 2014). In these analyses, we measure parental social class using the 8-category version of the National Statistics Socio-Economic Classification (NS-SEC) (see Rose & Pevalin, 2003). NS-SEC is the official UK social class measure and it is widely used in educational research. NS-SEC is a well-documented and transparent social class measure, and a great deal of theoretical groundwork and empirical testing has been directed towards developing this measure (see Office for National Statistics, 2010). In the analyses presented below, we construct the parental NS-SEC measure using information on both fathers and mothers, in line with the dominance approach suggested by Erikson (1984).

Additional explanatory variables

The association between parental education and children's educational outcomes is well established (Ermisch & Pronzato, 2010; Korupp, Ganzeboom, & Van Der Lippe, 2002; Shavit & Blossfeld, 1993), and also observed in outcomes of school qualifications (Drew, 1995; Drew, Gray, & Sime, 1992; Gayle, Berridge, & Davies, 2003). We are aware of ongoing discussions about the different components of children's social origins and their educational outcomes. However, we concur with Bukodi and Goldthorpe (2013) who emphasised that parental education level and parental social class measure separate, independent effects on children's educational attainment.

There is a large portfolio of sociological research on gender and education (for a review see Hadjar, Krolak-Schwerdt, Priem, & Glock, 2014). A number of previous studies have reported gender differences in school qualifications (Biggart, 2000; Burgess, Mcconnell, Propper, & Wilson, 2004; Department for Education and Skills, 2007; Gayle et al., 2003; Machin & Mcnally, 2005). There is also evidence of an association between household tenure and children's school outcomes (Connelly et al., 2013; Gayle et al., 2016).

There are political and policy concerns relating to ethnic inequalities in education (Gillborn, Rollock, Warmington, & Demack, 2016). A number of empirical studies report ethnic inequalities in educational outcomes (Connelly et al., 2013; Connolly, 2006; Demack et al., 2000; Drew, 1995; Platt, 2010; Strand, 2014). Ethnic differences should be investigated in contemporary analyses of English school education data, however, we emphasise that the BHPS was a nationally representative sample and had correspondingly low coverage of households with minority ethnic occupants. This issue was explicitly addressed, and the UKHLS is designed with a minority ethnic boost sample (see Berthoud, Fumagalli, Lynn, & Platt, 2009). Despite the over-sampling of 'ethnic minority' households in the main UKHLS survey, the number of minority ethnic young people in our dataset remains relatively small. Ethnicity measures are included in the analyses but should be viewed as providing additional statistical controls. We also control for time using an indicator for 'synthetic' school year cohorts (i.e. academic cohort).

Results

In this section, we report the results of analyses of the BHPS and the UKHLS. The overall trend in school GCSE outcomes is depicted in Figure 1. It mirrors the patterns in official statistics, and the results from analyses of the Youth Cohort Study reported in Gayle et al. (2016). The overall picture is one of improving school GCSE outcomes for successive cohorts of young people. As Stringer (2012) suggests, numerous factors could explain the general increase in GCSE outcomes, alone or in combination. For example, the quality of pupils' work might be increasing, the examinations might be graded increasingly leniently, or a combination of both. Subtler explanations might involve pupils changing their

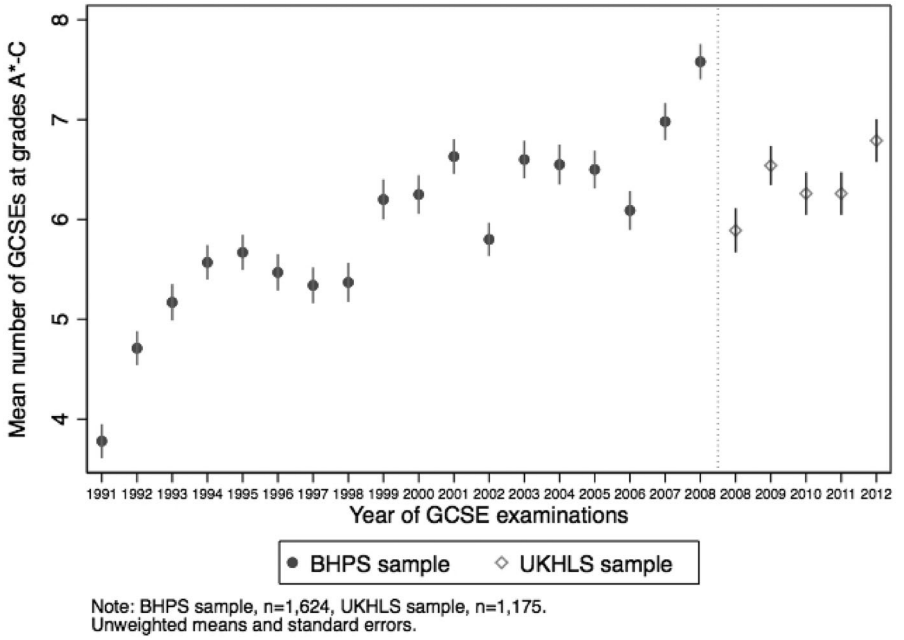

Figure 1. Mean number of school GCSEs at grades A*–C by school year.[5]

choices of subjects. Alternatively, in order to improve their overall results schools might encourage pupils that are more likely to have good outcomes to enter for more GCSEs, whilst those who are less likely are encouraged to take fewer GCSEs. The overall patterns of GCSE outcomes, and the potential explanations, are not integral to the present analyses where the focus is on relative social class inequalities.

The descriptive statistics for the analytical variables are reported in Table 1 and they indicate that school GCSE outcomes are stratified. There is a discernible social class gradient in the BHPS sample. Pupils with parents in NS-SEC 1.2 (i.e. higher professional occupations) on average gain eight GCSEs at grades A*–C. This is in sharp contrast to pupils with parents in NS-SEC 7 (i.e. routine occupations) who on average gain only four GCSEs at grades A*–C. The social class gradient is remarkably similar in the more recent UKHLS school year cohorts. There is also a strong parental education gradient, and pupils with more educated parents on average gain more GCSEs at grades A*–C, in both the BHPS and the UKHLS samples. In both samples, pupils whose parents own or privately rent their homes on average gain more GCSEs at grades A*–C than pupils who are from families living in social housing. Young women on average gain slightly more GCSEs at grades A*–C than young men in both samples.

Table 1. Descriptive statistics and mean school GCSE outcomes (grades A*–C).

	BHPS sample				UKHLS sample			
	Frequency	Percent	Mean A*–Cs	Standard Deviation	Frequency	Percent	Mean A*–Cs	Standard Deviation
Parental NS-SEC								
1.1 Large employers and higher managerial occupations	99	6.10	7.23	3.63	89	7.57	8.19	2.95
1.2 Higher professional occupations	154	9.48	8.08	2.96	113	9.62	8.67	2.40
2 Lower managerial and professional occupations	463	28.51	6.61	3.59	318	27.06	7.21	3.38
3 Intermediate occupations	176	10.84	6.03	3.75	121	10.30	6.57	3.45
4 Small employers and own account workers	199	12.25	5.30	3.80	163	13.87	5.80	3.74
5 Lower supervisory and technical occupations	172	10.59	4.75	3.86	71	6.04	4.70	3.35
6 Semi-routine occupations	207	12.75	4.46	3.88	194	16.51	4.70	3.82
7 Routine occupations	154	9.48	4.10	3.73	106	9.02	4.27	3.67
Parental education level								
Higher education	290	17.86	8.14	3.01	383	32.60	8.11	3.11
Further education	658	40.52	6.19	3.76	172	14.64	6.67	3.27
School-level education	506	31.16	5.05	3.72	504	42.89	5.47	3.66
Below school-level education	170	10.47	3.07	3.40	116	9.87	3.73	3.59
Housing tenure								
Owned or privately rented	1440	88.67	6.20	3.73	990	84.26	6.79	3.56
Social housing	184	11.33	3.14	3.69	185	15.74	3.88	3.50
Gender								
Male	821	50.55	5.33	3.90	571	48.60	5.82	3.82
Female	803	49.45	6.40	3.73	604	51.40	6.82	3.53
Total *n*	1624	100	5.86	3.85	1175	100	6.34	3.71

Models for count data are most appropriate for modelling the number of GCSEs gained at grades A*–C (see Cameron & Trivedi, 1998). A sensitivity analysis comparing alternative statistical models suitable for count data was undertaken separately on the two samples.[6] A significant likelihood ratio test provided evidence of over-dispersion and therefore the negative binomial regression model was preferred to a Poisson model (see Long & Freese, 2014). There were high percentages of young people with zero counts in both samples. A significant Vuong test provided evidence that a zero-inflated model was most suitable for these data (see Vuong, 1989).

In the BHPS sample, 10% of the variance in the number of GCSEs at grades A*–C was explained by parental social class (NS-SEC). An additional 6% was explained by the inclusion of parental education in the model. Housing tenure and gender each explained a further 2%, and ethnicity explained less than 1%. The cohort measure (i.e. the school year that the pupil undertook GCSEs) explained an additional 4% of the variance.[7]

The results of the zero-inflated negative binomial model of the number of GCSEs gained at grades A*–C for the BHPS sample are reported in Table 2. The models are adjusted for the complex designs of the surveys (see 'svy' in StataCorp, 2017) and also include ethnicity and the school year cohort indicator. The upper panel of Table 2 reports the results of a logistic regression model of the zero count (i.e. zero GCSEs at grades A*–C). Pupils with parents in NS-SECs 4, 5, 6, and 7 have significantly higher log odds of gaining zero GCSEs at grades A*–C, compared with their counterparts with parents in NS-SEC 1.2. Following Goldthorpe and McKnight (2004) and Goldthorpe (2016), we consider that occupations in NS-SEC 4 can reasonably be conceived of as forming a 'petty bourgeoisie', NS-SEC 5 is largely a 'blue collar' class, and NS-SECs 6 and 7 form a 'wage earning' working class.

Pupils with parents with school-level or below school-level education have significantly higher log odds of gaining zero GCSEs at grades A*–C, compared with their counterparts whose parents have higher education. Pupils living in social housing have significantly higher log odds of gaining zero GCSEs at grades A*–C. Female pupils have significantly lower log odds of gaining zero GCSEs at grades A*–C compared with males. The lower panel of Table 2 reports the results of a negative binomial regression model of the number of GCSEs gained at grades A*–C. Social class, parental education, housing tenure, and gender are all significant.

A comparable model was estimated using the UKHLS data. The results of the zero-inflated negative binomial model of the number of GCSEs at grades A*–C for the UKHLS sample is reported in Table 3. The two samples cannot feasibly be analysed in a single model because the household panel studies have different designs, selection, and sampling strategies. Overall the results of the two models bear a remarkable similarity across all of the analytical variables. It is worth noting, however, that in the UKHLS sample (i.e. for the most contemporary school year cohorts) it is only pupils from the 'wage earning' working class (NS-SECs 6 and 7) who have significantly higher log odds of not gaining any GCSEs at grades A*–C. This finding is a cause for concern against the backdrop of general progress in GCSE outcomes.

The focus of this paper is the relationship between parental social class and school GCSE outcomes. Figure 2 depicts the expected counts of school GCSEs at grades A*–C for pupils in the BHPS and UKHLS respectively, conditional on them attaining some GCSE passes. The overall social class gradient in both samples is striking. The relative magnitude

Table 2. Zero-inflated negative binomial regression model – number of GCSEs at grades A*–C (BHPS).

				Quasi-Variance		
	Coefficient	Standard Error		Standard Error	Lower Comparison Interval	Upper Comparison Interval
Logistic estimation: Zero A*–Cs						
Parental NS-SEC						
1.1 Large employers and higher managerial occupations	0.64	(0.67)		–	–	–
1.2 Higher professional occupations	Ref.	(.)		–	–	–
2 Lower managerial and professional occupations	0.80	(0.49)		–	–	–
3 Intermediate occupations	0.65	(0.55)		–	–	–
4 Small employers and own account workers	1.43	(0.50)	**	–	–	–
5 Lower supervisory and technical occupations	1.22	(0.55)	*	–	–	–
6 Semi-routine occupations	1.62	(0.53)	**	–	–	–
7 Routine occupations	1.36	(0.54)	*	–	–	–
Parental Education Level						
Higher education	Ref.	(.)		–	–	–
Further education	0.73	(0.39)		–	–	–
School-level education	0.87	(0.41)	*	–	–	–
Below school-level education	1.38	(0.45)	**	–	–	–
Housing Tenure						
Owned or privately rented	Ref.	(.)		–	–	–
Social housing	1.23	(0.23)	***	–	–	–
Gender						
Male	Ref.	(.)		–	–	–
Female	−0.68	(0.17)	***	–	–	–
Constant	−2.67	(0.63)	***			
Negative binomial estimation: GCSEs A*–C						
Parental NS-SEC						
1.1 Large employers and higher managerial occupations	−0.07	(0.05)		0.04	−0.16	0.01
1.2 Higher professional occupations	Ref.	(.)		0.03	−0.06	0.06
2 Lower managerial and professional occupations	−0.11	(0.04)	**	0.02	−0.15	−0.06
3 Intermediate occupations	−0.12	(0.05)	*	0.04	−0.20	−0.04
4 Small employers and own account workers	−0.17	(0.06)	**	0.05	−0.26	−0.08
5 Lower supervisory and technical occupations	−0.23	(0.06)	***	0.05	−0.32	−0.13
6 Semi-routine occupations	−0.21	(0.06)	**	0.05	−0.31	−0.11
7 Routine occupations	−0.21	(0.07)	**	0.06	−0.34	−0.09
Parental Education Level						
Higher education	Ref.	(.)		0.03	−0.06	0.06
Further education	−0.14	(0.03)	***	0.02	−0.17	−0.11
School-level education	−0.23	(0.04)	***	0.03	−0.29	−0.16
Below school-level education	−0.41	(0.07)	***	0.06	−0.54	−0.29
Housing Tenure						
Owned or privately rented	Ref.	(.)		–	–	–
Social housing	−0.18	(0.06)	**	–	–	–
Gender						
Male	Ref.	(.)		–	–	–
Female	0.12	(0.02)	***	–	–	–
Constant	1.95	(0.08)	***			
Log of alpha	−3.04	(0.27)	***			
Observations	1624					
Cox-Snell Pseudo R^2	0.237					
Nagelkerke Pseudo R^2	0.238					
McFadden's Adjusted Pseudo R^2	0.036					
BIC (d.f.)	8637.312 (63)					
BIC (based on deviance)	−3368.348					

Note: BHPS sample. Adjusted for complex survey design. Model also includes ethnicity and a school year cohort measure.
*$p < .05$.
**$p < .01$.
***$p < .001$.

Table 3. Zero-inflated negative binomial regression model – number of GCSEs at grades A*–C (UKHLS).

				Quasi-Variance		
	Coefficient	Standard Error		Standard Error	Lower Comparison Interval	Upper Comparison Interval
Logistic estimation: Zero A*–Cs						
Parental NS-SEC						
1.1 Large employers and higher managerial occupations	1.49	(1.29)		–	–	–
1.2 Higher professional occupations	Ref.	(.)		–	–	–
2 Lower management and professional occupations	1.57	(1.10)		–	–	–
3 Intermediate occupations	1.15	(1.15)		–	–	–
4 Small employers and own account workers	1.68	(1.10)		–	–	–
5 Lower supervisory and technical occupations	1.73	(1.15)		–	–	–
6 Semi-routine occupations	2.53	(1.09)	*	–	–	–
7 Routine occupations	2.43	(1.11)	*	–	–	–
Parental Education Level						
Higher education	Ref.	(.)		–	–	–
Further education	0.48	(0.56)		–	–	–
School-level education	1.40	(0.41)	**	–	–	–
Below school-level education	1.80	(0.49)	***	–	–	–
Housing Tenure						
Owned or privately rented	Ref.	(.)		–	–	–
Social housing	0.94	(0.29)	**	–	–	–
Gender						
Male	Ref.	(.)		–	–	–
Female	−0.64	(0.25)	*	–	–	–
Constant	−4.78	(1.14)	***			
Negative binomial estimation: GCSEs A*–C						
Parental NS-SEC						
1.1 Large employers and higher managerial occupations	0.00	(0.04)		0.03	−0.06	0.07
1.2 Higher professional occupations	Ref.	(.)		0.03	−0.06	0.06
2 Lower management and professional occupations	−0.08	(0.04)	*	0.02	−0.13	−0.03
3 Intermediate occupations	−0.12	(0.06)	*	0.05	−0.22	−0.03
4 Small employers and own account workers	−0.19	(0.06)	**	0.05	−0.29	−0.09
5 Lower supervisory and technical occupations	−0.42	(0.09)	***	0.08	−0.60	−0.25
6 Semi-routine occupations	−0.21	(0.06)	**	0.06	−0.33	−0.09
7 Routine occupations	−0.28	(0.08)	***	0.07	−0.43	−0.13
Parental Education Level						
Higher education	Ref.	(.)		0.02	−0.05	0.05
Further education	−0.14	(0.04)	**	0.04	−0.22	−0.06
School-level education	−0.15	(0.04)	***	0.03	−0.21	−0.10
Below school-level education	−0.29	(0.09)	**	0.09	−0.47	−0.12
Housing Tenure						
Owned or privately rented	Ref.	(.)		–	–	–
Social housing	−0.22	(0.07)	**	–	–	–
Gender						
Male	Ref.	(.)		–	–	–
Female	0.09	(0.03)	**	–	–	–
Constant	2.15	(0.05)	***			
Log of alpha	−4.52	(1.11)	***			
Observations	1175					
Cox-Snell Pseudo R^2	0.256					
Nagelkerke Pseudo R^2	0.257					
McFadden's Adjusted Pseudo R^2	0.043					
BIC (d.f.)	6208.567 (37)					
BIC (based on deviance)	−2097.535					

Note: UKHLS sample. Adjusted for complex survey design. Model also includes ethnicity and a school year cohort measure.
*$p < .05$.
**$p < .01$.
***$p < .001$.

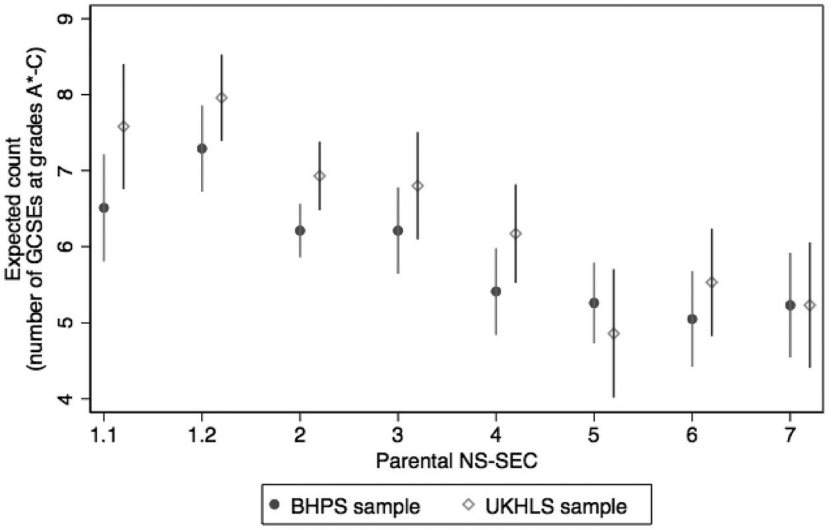

Figure 2. Expected count of school GCSEs at grades A*–C by parental NS-SEC.

of the social class effect is subtle, but substantively important. Pupils with parents in NS-SEC 1.2 on average are expected to gain seven GCSEs at grades A*–C. These are the children of parents in higher professional occupations (e.g. doctors, lawyers, university lecturers). By contrast, pupils in NS-SECs 4, 5, 6, and 7 on average are expected to gain only five GCSEs at grades A*–C. It is substantively important to note that many pupils with parents in these social classes do not achieve the recognised policy benchmark of gaining five or more GCSEs at grades A*–C (see Leckie & Goldstein, 2009).

A nuanced aspect of the results from the zero-inflated negative binomial model is that the social process is modelled in two stages. We should be cognisant that the expected counts presented in Figure 2 are contingent on the young people gaining at least one GCSE at grades A*–C. Therefore, the initial hurdle that pupils from less advantaged social classes face should not be overlooked. Given that the young people achieve some GCSE passes, those from more advantaged classes are then much more likely to gain five or more GCSEs at grades A*–C than their less advantaged peers.

Conclusion

Improving school qualifications is intrinsically attractive and it is hard to construct a plausible argument for lowering educational standards. We can find no reasons to suspect that outcomes in school qualifications will fall off the political agenda at any time soon. Indeed, school exam results have become a nationally newsworthy annual event (Warmington & Murphy, 2004). The qualifications that English young people gain at school are consequential. The GCSEs gained at school affect further participation in education, and opportunities to engage in training, and choices and chances in the labour market (Babb, 2005; Jones et al., 2003; Noah & Eckstein, 1992). For many pupils, the GCSEs gained at school will be the only qualifications that they obtain (Leckie & Goldstein, 2009).

Since the introduction of GCSEs, there have been marked improvements in results, and more recent cohorts have performed better. Through using data from the two British household panel studies we have been able to provide new information on the relationship between parental social class and school GCSE outcomes in two decades for which appropriate large scale data are scarce. Despite a general trend of improved educational attainment over successive cohorts, the central empirical finding is that there is a persistent social class gradient in GCSE outcomes. This is in line with previous empirical research (Connelly et al., 2013; Connolly, 2006; Demack et al., 2000; Gayle et al., 2016; Playford & Gayle, 2016; Strand, 2014; Sullivan, 2001). The overall message of this work is one of remarkable stability in social class inequalities. Patterns of social class inequalities in GCSE outcomes are observable in the 1990s and early 2000s, and persist in the late 2000s and early 2010s.

In particular, pupils in the 'wage earning' working class have increased log odds of not gaining any GCSE passes at grades A*–C. Simultaneously, pupils with parents in more advantaged social classes (e.g. higher professional occupations) gain more GCSE passes at grades A*–C than pupils from families in the 'wage earning' working class. Having fewer good GCSEs is likely to limit working class children's participation in more advanced education and to limit their options in the labour market.

Uniting analyses of the BHPS and the UKHLS, we have overcome three data-related obstacles; the lack of suitable large scale, nationally representative youth datasets, the absence of suitable birth cohort data, and the unavailability of parental social class measures within administrative educational data. The analyses that are presented above provide important original results, but we are aware that the sample sizes for each school year cohort (in both the BHPS and the UKHLS) are much smaller than in specialist youth surveys (e.g. the YCS) and the British birth cohorts. Therefore, we conclude that until additional, more recent, administrative educational data are added to the UKHLS it is not especially feasible to undertake further analyses of trends.

We have some reservations about the general suitability of administrative educational data for studying social class inequalities. Micro-level administrative social science datasets tend to have a large number of observations, for example, pupils, but a smaller number of social science-related explanatory variables than would be the case in social surveys (Playford, Gayle, Connelly, & Gray, 2016). At the current time, administrative educational datasets do not ordinarily contain detailed socio-economic measures.

The results presented above convince us that the effects of parental social class are nuanced and would fail to be adequately captured by simple proxy measures such as Free School Meals eligibility. A possible strategy to address this would be linking social class information from birth records. Connelly and Gayle (2017) undertook a detailed investigation into the consistency of social class information in UK birth records, which raised serious questions about the validity and reliability of these data. We are additionally sceptical about area or geographical measures being used as proxies for social class because of the economic and social diversity of English neighbourhoods. These issues lead us to conclude that detailed formal measures of social class (e.g. NS-SEC) are essential to appropriately study inequalities in pupils' school GCSE outcomes.

For the young people in these analyses, GCSE examinations marked the end of compulsory schooling. In England, the rules surrounding school leaving have changed. Pupils can

leave school in June of school year 11 (as long as they are aged 16 by the end of the summer holidays), but they must stay in full-time education (e.g. at a college), start an apprenticeship or traineeship, or spend 20+ hours per week working or volunteering while in part-time education or training until they are 18 years old.[8] This change in policy was designed to reduce the proportion of young people Not in Education, Employment or Training (NEET) (see Department for Education, 2016). Following the Wolf (2011) report, changes in policy also require young people who fail to obtain suitably high GCSE passes in English and Maths to continue to study these subjects after the age of 16 (see Department for Education, 2014). There have also been changes in the structure and content of GCSEs. It is claimed that these changes will make GCSEs more ambitious, providing a 'greater stretch for the most able' pupils.[9] A new numerical grading system for GCSEs has also been implemented.[10] The numerical system ranges from 1 to 9, with grade 9 the highest grade and grade 1 the lowest.

These policy changes lead us to conjecture that sociological analyses of social class inequalities in school qualifications will not diminish in importance. If the UK Government are serious about monitoring the results of these policy changes, and their effectiveness in reducing social inequalities, then suitably high quality data with appropriate measures are required. There is a clear requirement for an annual (or even biennial), large scale, nationally representative data collection exercise which collects detailed information on pupils, their parents, and their household, which is then linked to administrative data on GCSEs and schools. Such a data infrastructural resource would enable the study of a range of educational inequalities and better facilitate the study of trends over time.

Notes

1. The data are usefully tabulated and reported by Brian Stubbs see http://www.bstubbs.co.uk/gcse.htm#Totals accessed 19 December 2019.
2. See https://cls.ucl.ac.uk/cls-studies/next-steps/ accessed 19 December 2019.
3. See https://www.ukdataservice.ac.uk/use-data/secure-lab.aspx accessed 19 December 2019.
4. A detailed review of alternative GCSE measurements and a thorough sensitivity analysis is reported in Stopforth (2020).
5. In the following analyses, two different synthetic cohorts (BHPS and UKHLS) contribute GCSE data in the academic school year 2007/2008. We do not model GCSE outcomes for both synthetic cohort samples in the same model because the household panel studies have different structures, designs, and sampling strategies. We are confident that the minor difference in the observed mean number of GCSEs in the two synthetic cohorts is inconsequential.
6. These included the Poisson model, negative binomial model, zero-inflated Poisson model, and zero-inflated negative binomial model. Details are reported in Stopforth (2020).
7. The negative binomial regression model does not have an equivalent to R^2 in OLS regression. Cox-Snell Pseudo R^2 measures were calculated, but this measure is illustrative rather than confirmatory (see Long & Freese, 2014). The Cox-Snell Pseudo R^2 measures reported above are similar to standard R^2 measures calculated from a simple OLS model of the number of GCSEs at grades A*–C. Possible alternatives include the Nagelkerke Pseudo R^2 which produced very similar results, or the McFadden's Pseudo R^2 measure (1 – log likelihood (current model) / log likelihood (null model)). It is common for McFadden's Pseudo R^2 to provide much lower estimates of the proportion of variance in the response variable which is explained by the predictors. For illustration, McFadden's Pseudo R^2 estimates were NS-SEC = 0.02; + Parental Education = 0.03; + Housing Tenure = 0.03; + Gender = 0.04; + Ethnicity = 0.04; + Cohort = 0.05. We also are at pains to note that the BHPS is a complex sample. Suitable adjustments have been made for the survey design in the modelling process. At the current time, however,

appropriate overall 'goodness-of-fit' measures are not available for these models. The measures reported are therefore calculated from unadjusted models.

8. See https://www.gov.uk/know-when-you-can-leave-school accessed 19 December 2019.
9. See https://www.gov.uk/government/speeches/gcse-and-a-level-reform?utm_source=rss&utm_medium=rss&utm_campaign=statement-to-parliament-gcse-and-a-level-reform accessed 19 December 2019.
10. See https://www.gov.uk/government/publications/gcse-changes-a-summary accessed 19 December 2019.

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No potential conflict of interest was reported by the author(s).

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