Inequalities in home learning and schools' provision of distance teaching during school closure of COVID-19 lockdown in the UK

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Non-Technical Summary

- Children receiving free school meals, from single-parent households, with less-educated parents, and with Pakistani and Bangladeshi heritage spend significantly less time on schoolwork at home than their peers during the COVD-19 school closure.

- Children with Pakistani and Bangladeshi backgrounds spend the least amount of time on home learning and are overrepresented in not receiving distance teaching provisions.

- The more distance teaching schools provide, the more time children spend on home learning.

- Schools' distance learning provisions explain half of the learning gap between children receiving free school meals and their peers.

- Schools' distance learning provisions fully explain the learning gap between children with Pakistani and Bangladeshi heritage and their peers.

The lives of millions of parents and their children have been affected not only by the health and economic implications of COVID-19 pandemic but also by school closures. The home and school environments are now intertwined, and most schools were caught unprepared. Since schools have a key role in creating equal opportunities, transferring schooling to families is likely to increase learning inequalities generated by family backgrounds. In this article, we examine the time pupils spend on learning at home and explore the differences across parental education, social class, ethnicity and single parenthood.

Using the Understandings Society COVID-19 dataset, we find children who previously received free school meals, those from lower-educated and single-parent families, and those with Pakistani or Bangladeshi backgrounds devote significantly less time to schoolwork at home during the COVID-19 lockdown in the UK.

Schools' offline and online distance teaching efforts and schoolwork checked by teachers significantly increase the time children spend on home learning and mitigate the disadvantages to a large extent. To decrease the negative impact of school closure on disadvantaged children, then, education policies should address the provision of learning to these children to close the learning gap in the years to come. Schools should also be prepared to provide distance teaching during school closures in the future.

Inequalities in home learning and schools' provision of distance teaching during school closure of COVID-19 lockdown in the UK[*]

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Abstract

Parents and schools were caught unprepared during the COVID-19 school closure. Since schools have a key role in creating equal opportunities, transferring schooling to families is likely to increase learning inequalities. Using the Understandings Society COVID-19 dataset, we find children who received free school meals, children from lower-educated and single-parent families and children with Pakistani or Bangladeshi backgrounds devote significantly less time to schoolwork at home. Schools' provisions of offline and online distance teaching and homework checking significantly increase the time children spend on home learning and mitigate most of the disadvantages.

Key words: Home learning, educational inequalities, schools, COVID-19, school closure

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Introduction

COVID-19 transformed homes around the world into classrooms in a matter of weeks, if not days. The learning environment was radically changed, and many schools had to create distance teaching and resources overnight. The transition to home learning in such a short time without warning or advance preparation has raised concerns that will be the focus for researchers, educators, policymakers, and all those interested in the educational and social welfare of young people for years to come.

In the UK, schools closed on 20 April 2020, except for schools for children of key workers and children with special needs. Phased reopening started on 1 June 2020 for children in Reception, Years 1 and 6 in England, if schools could guarantee social distancing rules. The fate of the rest of the children is uncertain, but schools are likely to stay closed until the next school year. Ongoing home learning is likely to generate new and accelerate existing inequalities between children from disadvantaged families and their well-off peers, but we suggest schools' involvement in home learning and provision of distance teaching might mitigate these disparities during the school interruption. In this article, we investigate whether parental background generates inequalities in the time students spend on schoolwork and how schools' provision of learning opportunities during the lockdown mitigates these inequalities.

Education is arguably the most important determinant of an individual's life prospects (Hout & DiPrete, 2006; Machin, 2006). Schools develop children's talents and abilities and play a key role in equalising opportunities in society, whilst not completely levelling the playing field (Breen, 2004). The present transfer of teaching responsibilities to families is likely to amplify the impact of family background on learning because the extent to which children can continue learning at home may depend on the support and resources available in the family. Even during summer holidays, children from underprivileged backgrounds

develop learning disadvantages whilst their well-off comparators continue to explore and learn (Alexander et al., 2001). It is estimated that 12 weeks of schooling interruption drops test scores significantly (Burgess & Sievertsen, 2020), suggesting further separation by socioeconomic status, if one group can continue to learn and another cannot. Studies of educational attainment and inequality in the UK reveal substantial disadvantages for working class families and certain ethnic groups (Pensiero & Schoon, 2019; Stevens et al., 2019). The school interruption will widen the gap if children in those socioeconomic and ethnic groups are under-served. In fact, emerging research is already suggesting the lockdown will have far-reaching educational consequences, especially for vulnerable children (Andrew et al., 2020; Bol, 2020;).

Looking at the Netherlands, Bol (2020) finds lower-educated parents feel unable to help or have limited understanding of the material schools have provided during the school closure. In the UK, Andrew et al. (2020) compare time spent on 'educational activities' across groups of children during the school closure; the richest primary school children spend, on average, six hours per day on educational activities, and secondary school students spend five and a half hours per day. However, these studies do not examine the impact of school closure on the learning of children with ethnic minority backgrounds and the poorest – those on free school meals, and these may be among the hardest-hit groups.

We followed up these two studies by considering the effect of various socioeconomic characteristics, ethnicity and single parenthood. More specifically, we comparatively analysed how much time children spend on schoolwork during the UK school closure using the nationally representative Understanding Society COVID-19 dataset. The data include boost samples for people with ethnic minority backgrounds and thus allow comparisons of ethnic groups. The data also have information from parents on schools' provision of distance teaching during the lockdown, giving us the unique opportunity to determine whether

schools' involvement might explain disparities in home learning. We raise the following questions:

     1) How much time do students spend on schoolwork during the COVID-19 UK school closure?

     2) To what extent does the amount of time students spend on schoolwork during the school closure differ by parental socioeconomic characteristics, ethnicity and single parenthood?

     3) To what extent does schools' provision of distance teaching (online and/or offline home learning material; checking homework) mitigate differences in the amount of time spent on homework?

Family background and education

     Research on the impact of parental background on educational attainment and learning is extensive, and the subject is central in the social sciences. Many countries have persistent class inequalities in educational attainment, and parents with more resources are able to help their children to achieve better outcomes (Cooper & Stewart, 2013; OECD, 2013). The UK is no exception. Studies document that at various key stages of education, students from working-class families acquire disproportionately lower qualifications and follow less prestigious career routes and enter less prestigious universities than their middle-class peers (Heath & Clifford, 1990; Bukodi & Goldthorpe, 2013; Sullivan et al., 2013). Recent statistics based on administrative data indicate children entitled to free school meals (FSM) because of family poverty have 18 to 20 per cent lower attainment than their more advantaged peers (Social Mobility Commission, 2019).

     There are also differences for some (but not all) ethnic minority groups. For example, studies report that students with Black-African, Black-Caribbean, Pakistani and Bangladeshi

backgrounds, on average, have lower grades than their white comparators. However, these gaps have diminished in the last decade (Rothon, 2007; DfE, 2015). Once socioeconomic outcomes are controlled, the disadvantage of Black-African, Black-Caribbean, Bangladeshi and Pakistani students is reduced, suggesting part of the finding of ethnic inequality is related to lower socioeconomic backgrounds. Lack of language skills, cultural dissonance and unfair treatment in schooling may explain the remaining education gap (Heath & Birnbaum, 2007; Gillborn, 2008).

The classic social mobility literature suggests that the impact of parental background on educational attainment and other life prospects will decrease and people's talent, skills and educational credentials will gradually become decisive over the course of industrialization (Coleman et al., 1966; Blau & Duncan, 1968; Machin, 2006; Erikson & Goldthorpe, 2010; Oreopoulos & Salvanes, 2010; Guveli at al., 2012; Zuccotti et al., 2017; Platt, 2019). In fact, education is increasingly imperative in our post-industrial knowledge economy (Guveli, 2006). Accordingly, social policies aim to minimize the impact of family background on education, to ensure equal opportunity for all members of society regardless of social or family background (Roemer, 1998; Morgan et al., 2006). For example, the UK's Industrial Strategy policy paper (DfBEIS, 2018) argues for the need to increase social mobility by expanding equal opportunities in education, working with young people and creating the skills necessary for their future jobs.

The COVID-19 pandemic has disrupted the delivery of education. We argue that the transfer of teaching responsibilities to families may increase social inequalities and widen the education gap, as the hardest-hit children are likely to be those with working class and/or less-educated parents, those in single parent families and those with ethnic minority backgrounds.

COVID-19 and children with disadvantaged backgrounds

Concerns about the negative effects of home schooling during the COVID-19 pandemic have been raised by many stakeholders, not just parents and teachers, but also policymakers, researchers and the third sector. A learning loss is expected, possibly affecting students' cognitive gains in the long-term (Brown et al., 2020) and disproportionately affecting children from disadvantaged families (UNESCO, 2020).

Families with skills, resources and knowledge might compensate for the negative impact of school closure (Andrew et al., 2020; Bol, 2020). Students with skilled and highly educated parents may even make greater strides, as these parents might spend more time with their children, teach them individually and/or hire online tutors to keep up with schoolwork (Lareau, 2011; Calarco, 2018).

Children in poor families live mostly under deprived conditions; they mostly live in small houses with no individual rooms or place to do their schoolwork. They might not have Internet or IT facilities to do home learning; if they do, they will likely need to share them with parents or siblings. They might not have access to outdoor spaces like a garden or balcony to entertain themselves, which might foster and increase their time in home learning.

Parental involvement is known to increase educational achievement in normal times (for a review, see Boonk et al., 2018). During the school interruption, it is important for parents to remain involved, to closely follow the instructions of school, create a programme, routine and conditions at home and monitor their children's schoolwork. If parents are less educated, these parents may feel less able to take up teaching responsibilities. Their cognitive ability, aspirations and understanding of the importance of education for the future of their children might lessen their involvement as well (Lee & Bowen, 2006). Recent research suggests parents with lower educational qualifications feel less confident supporting their children's learning during the lockdown (Bol, 2020; Cullinane & Montacute, 2020).

Another group of children are those in single-parent families. The school shutdown might place additional burdens on single parents; they will have limited time, support and resources to foster home learning. Using the Understanding Society COVID-19 data, Benzeval et al. (2020) find single parents face more economic loss than others during the lockdown. Hardship and loneliness might further decrease their ability to dedicate time and resources to home school their children.

Another group of children suffering relatively greater hardship in the UK because of the pandemic are those belonging to ethnic minorities (Benzeval et al., 2020; Platt & Warwick, 2020). As noted above, there is an education gap for children with Pakistani, Bangladeshi, Black-African and Black-Caribbean backgrounds (Hutchinson et al., 2019). School closure might widen the gap. Ethnic minority parents may have limited understanding of the learning materials or limited ability to support their children's learning. Whilst their aspirations for success may be high, ethnic minority and migrant families generally have limited resources and less knowledge of the education system, curricula and teaching style (Bayrakdar, 2015; Bayrakdar & Guveli, 2020). Some might have weak English language skills, further hampering their efforts.

Schools' homeschooling provision

Schools have the responsibility to foster talent, skills and cognitive competences and to provide knowledge transfer in our knowledge society. They enhance the chances of status attainment by children from disadvantaged families whilst limiting the likelihood of well-off families ensuring privileged positions for their children. In other words, schools are thought to be the engine of social mobility, safeguarding equal opportunities in the labour market and beyond. However, we have limited information on how schools prepared for the present shutdown and to what extent they developed curricula, guidance, learning materials and

programmes to continue teaching from a distance and monitor their students' learning. Schools' involvement might increase students' motivation to do schoolwork, and this could mitigate or limit learning drawbacks of the shutdown. That is, schools' homeschooling provisions might moderate the impact of parental background on students' home learning.

Even if physically closed, schools could continue to deliver teaching by offering online classes, materials, supervision and other kinds of communication to minimize the disruptive effect of closure. Such efforts might prevent learning gaps and maintain schools' equalizing function. However, schools might differ in their provision of distance teaching and home learning guidance, depending on their resources, such as staffing, IT facilities and distance teaching knowhow. In normal times, schools differ in terms of their resources, funding and teacher quality, and these characteristics affect student outcomes (Levačić & Vignoles, 2002; Rivkin et al., 2005; Steele et al., 2007). The effects remain significant even after controlling for family background (Borman & Dowling, 2010), suggesting school effects are not simply a result of student selection. It is reasonable to assume this effect will continue during lockdown.

In the UK, school performance tables are published annually, and parents often base their schooling decisions on them (Perryman et al., 2011). The creation of a 'quasi-market' in education affects student intake, as parents with more resources try to send their children to good schools (West & Pennell, 2010; Hobbs, 2016). At the same time, disadvantaged students are likely to have unqualified, inexperienced and out-of-subject teachers, possibly in schools with poor staff retention (Allen & Sims, 2018). Considering these factors, we expected disadvantaged students (i.e., those in poor families, those with less educated parents, those in single-parent families and those belonging to an ethnic minority) would less likely be supported by their schools during the lockdown.

Data

　　To probe our hypotheses, we used the first wave COVID-19 dataset of the Understanding Society study. Understanding Society is the UK's main longitudinal household survey, also known as the UKLHS; it includes information on all adults living in over 40,000 households. According to Benzeval et al. (2020) the representativeness of the Understanding Society data has been evaluated frequently, and these are considered high quality data to make population inferences (Fisher et al., 2019).

　　The Understanding Society COVID-19 Web Survey has taken place monthly during the pandemic (or lockdown), with the first wave occurring 24-29 April 2020 (Understanding Society, 2020). All members of the four samples (General Population, Ethnic Minority Boost, Immigrant and Ethnic Minority Boost, former British Household Panel Survey) who were over 15 were invited to answer interview questions taking approximately 20 minutes on the web and were offered a small financial incentive. A pre-notification letter was sent to their postal address on 17 April 2020, followed by three reminders to their email address and/or phone number during the fieldwork period. This dataset differs from many emerging COVID-19 datasets because its sampling design is based on the Understanding Society sample, and it is representative of the UK population.

　　The respondents were asked whether they had a child or children living in the household for whom they were the parent or guardian. If they did, they were asked the questions in the home schooling module included in the first wave of the Understanding Society COVID-19 web survey; these data cover children attending primary, secondary or higher secondary school. We used the children's dataset, and the units of analysis were the children. We added the parental characteristics from the main Understanding Society COVID-19 wave 1 dataset and from the baseline Understanding Society wave 9 dataset.

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The dataset includes an ethnic minority boost sample from the main ethnic minority groups (Chinese, Indian, Pakistani, Bangladeshi, Black-Caribbean and Black-African), in addition to respondents with a migration background in the nationally representative sample. Our analysis focused on students who were not in school at the time of the survey and who were receiving schoolwork from their schools; this accounted for 87.5 per cent of all the children in the dataset (3,953 out of 4,519 cases). After taking out the cases with missing information, 3,867 children were left. Wave 9 of Understanding Society does not include all adults in the COVID-19 survey, so inclusion of this information reduced the number of cases to 3,150. As a robustness check, we included the same model but excluded the information from the main Understanding Society dataset in Appendix A.

Variables

As *dependent variable*, we used time children spend doing their schoolwork provided by their school. The question is formulated as: 'Thinking about the situation now, on an average day when they are doing school work at home, how much time does {childname} spend on this?' Answer categories are: 1) less than an hour; 2) 1 to 2 hours; 3) 2 to 3 hours; 4) 3 to 4 hours; 5) 4 to 5 hours; 6) 5 or more hours. We treated these categories as the value of their upper limit, and this should be kept in mind when interpreting the results. Table 1 shows frequency distribution of all variables. Our dependent variable has an approximately normal distribution, with 24 per cent of children spending between 1 and 2 hours a day on home learning and another 24 per cent spending between 2 and 3 hours a day. Children in primary, secondary and higher secondary school spend, on average, 3.2 hours a day on schoolwork they receive from school, considerably lower than previous research has suggested (see Andrew et al., 2020).

Table 1: Descriptive statistics

	Freq	%		Freq	%
Time spend on home learning			School offline lessons		
Less than an hour	347	11.0	*None*	233	7.4
1 to 2 hours	761	24.2	*Less than one a day*	327	10.4
2 to 3 hours	750	23.8	*About 1 a day*	571	18.1
3 to 4 hours	656	20.8	*About 2 a day*	614	19.5
4 to 5 hours	386	12.3	*About 3 a day*	684	21.7
5 or more hours	250	7.9	*About 4 or more a day*	721	22.9
Sex			School online lessons		
Male	1,487	47.2	*None*	1,741	55.3
Female	1,476	46.9	*Less than one a day*	392	12.4
Unknown	187	5.9	*About 1 a day*	323	10.3
			About 2 a day	261	8.3
Education phase			*About 3 a day*	189	6.0
Primary: reception-KS2	1,543	49.0	*About 4 or more a day*	244	7.8
Secondary: KS3-KS4	1,265	40.2			
Higher-Secondary: KS5	342	10.9	Work being checked by teacher		
			No work provided	450	14.3
FSM			*None*	548	17.4
No	2,645	84.0	*Less than half*	424	13.5
Yes	505	16.0	*Half or more*	1,728	54.9
Parent education			Corona symptoms in household		
Degree	1,711	53.0	*No*	2,459	78.1
A/As level	300	9.5	*Yes*	691	21.9
GCSE or lower	1,139	36.2			
			Household Size		
Single parent			*1*	36	1.1
couple	2,745	87.1	*2*	116	3.7
single	405	12.9	*3*	499	15.8
			4	1,516	48.1
Ethnicity			*5*	638	20.3
White	2,579	81.9	*6*	269	8.5
Indian	141	4.5	*7*	34	1.1
Pakistani/Bangladeshi	187	5.9	*8*	21	0.7
Black	110	3.5	*9*	4	0.1
Other	133	4.2	*10*	8	0.3
			11	9	0.3
			Total	3,150	

As independent variables for *child characteristics*, we included sex of the child; the distribution of male and female children was about the same (47.2 per cent male and 46.9 per cent female). Sex is unknown for 308 children because they cannot be identified in the annual baseline Understanding Society dataset (Table 1). Therefore, we added these to our analysis as a separate category. The overwhelming majority of the total number of children in our dataset (96.6 per cent) were not attending school because of the school closure; some were going to school because either their parent(s) or guardian(s) were key workers or they were special needs children. We dropped both from the analysis. Table 1 shows that children in primary education constitute 49 per cent, about 40 per cent attend secondary school and about 11 percent are in higher secondary school. [1]

For *parental characteristics*, we included eligibility for free school meals and parent's/guardian's education as socioeconomic indicators. We also included whether parent/guardian was a single parent and the parent's ethnic background, using the parent (or guardian) who reported on the child(ren). As it is a common measure in education research in the UK, we used the information on whether child(ren) received free school meals at any time in January and/or February 2020 as an indicator of poverty and social class. We coded children 1 if received and 0 if they did not receive free school meals. Children who received free school meals represent 16 per cent of the sample (Table 1).

We operationalized the education of parent or guardian in three categories: 1) degree; 2) A/AS level (or other level 3 qualifications); 3) GCSE or lower. Children with higher-educated parents (a degree, its equivalent or higher) represent 53 per cent of the sample; 36 per cent of parents have GCSE or lower education; parents with an A or AS level constitute about 10 per cent (Table 1). Children with a single parent represent about 13 per cent of our

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[1] The differences between time spent on home learning of children in different key stages led to similar conclusions: pupils in Reception spend the least time, and this increases almost linearly by stage level, as we show in Appendix A.

sample (Table 1). We amalgamated parental ethnic background into five categories. The group *White* includes British, English, Scottish, Welsh, Northern, White Irish and any other White background and constitutes the majority of the sample (81.9 per cent). Children with *Pakistani or Bangladeshi* backgrounds represent about 6 per cent of the sample, and the *Black-Caribbean, Black-African* group is about 3.5 per cent. We created a separate group for *Indian* because of the fairly large number of children (4.5 per cent). We grouped the rest into an *Other* group, including all mixed backgrounds, Chinese, any other Asian and any other background (4.2 per cent).

We included three variables on *schools' provision* of distance teaching opportunities. One was the offline provision of lessons; the question is formulated as: 'How many off-line lessons (such as worksheets, assignments, videos) does {childname}'s school provide for them?' It has the following ordinal answer categories: 1) none; 2) less than one a day; 3) about 1 a day; 4) about 2 a day; 5) about 3 a day; 6) about 4 or more a day. A considerable proportion of children (7.4 per cent) do not receive any offline schoolwork from their school, but about 23 per cent receive four or more offline lessons each day. The dataset also includes information on school provision of online lessons; the question is formulated as: 'How many online (live or real-time) lessons or meetings does {childname}'s school provide for them?' This question has the same ordinal answer categories as the previous variable. The majority of the children (55.3 per cent) do not receive any online distance teaching from the school; the rest receive it from less than once a day (12.4 per cent) to four or more times a day (7.8 per cent).

Parents/guardians were asked whether the teacher checked the schoolwork: 'How much of {childname}'s completed school work do the teachers check, if it is sent in or uploaded?' The answer categories are: 0) no work provided; 1) none of it; 2) less than half; 3)

half or more; 4) all of it. About 17 per cent of the children do not have their work checked; about 55 per cent have half or more of their work checked (Table 2).

Finally, we controlled for whether somebody in the household showed COVID-19 symptoms and for household size.[2]

Methods of Analysis

We treated our dependent variable as linear and used Ordinary Least Square (OLS) regression for the data analysis. We also ran our models using Ordered Logistic Regression (see Appendix B), but these had the same conclusions. Since we are not interested in every answer category's size, in what follows, we discuss our OLS regression results to make the interpretation of our findings easier.

All our regression models included cluster corrections at parent level, as our units of analysis were children nested in parents/families; therefore, they were not independent units. We ran three regression models on the same sample (Table 4); after dropping all missing cases our sample size for each model constituted 3,150 children, thus allowing cross-model comparison of the coefficients. Model 1 includes children's sex, their school stage (primary, secondary, higher secondary education), COVID-19 symptoms in the household and the household size. Model 2 adds single parenthood, education of parent/guardian, child receipt of free school meals in January and/or February 2020 and ethnicity of parent. Model 3 adds variables on schools' provision of ongoing learning. Model 2 displays family background

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[2] We included other variables to control the relations in our model building (see Appendix A) such as 'relation to child' (whether mother, father or a guardian) and 'school type' (state or private). The 'relation to child' variable did not change our conclusions or improve our model. The information about the school type was missing for almost one third of the sample; therefore, we did not include this variable in our models. For the children for whom school type data were available, a small share (about 4 per cent) attended private school. For these reasons, we did not include this variable.

disparities in home learning, and Model 3 tests our expectation that schools' continued

involvement with home learning will mitigate these disparities.

Descriptive results

Before discussing how much time pupils spend on their schoolwork each day, we

present some descriptive findings about the share of children who still attend school because

they are the children of key workers or require special education. This variable also shows

children who do *not* attend school and do *not* receive schooling material from school for

home learning, and children who are *not* at school and receive schooling material from

school. We cross-tabulated these groups of students with eligibility for free school meals

(Table 2) and with parental ethnic background (Table 3) to look for selection in the

dependent variable.

Table 2: Free School Meal (FSM) by still attend school; not attend school & not receive schoolwork; not at school - receive schoolwork

	at school	not at school; not receive schoolwork	not at school - receive schoolwork	Total
No FSM	103	361	3,308	3,772
	2.7%	9.6%	87.7%	100%
Yes FSM	48	54	621	723
	6.6%	7.5%	85.9%	100%
Total	151	415	3,929	4,495
	3.4%	9.2%	87.4%	100%

Children who received free school meals are overrepresented in attending school

during the school closure period. Table 2 shows that about seven per cent of the children who

received free school meals in January and/or February 2020 are attending school; about three

per cent of children who did not receive free school meals are attending school as children of

key workers or they have special education needs. This contrast is not very large for children

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who are not attending school and not receiving distance learning provision; those who received free meals represent 7.5 per cent and those who did not represent 9.6 per cent.

Table 3: Parental ethnic background by still attend school; not attend school & not receive schoolwork; not at school - receive schoolwork

	at school	not at school; not receive schoolwork	not at school - receive schoolwork	Total
White	112	345	3,244	3,701
%	3.0%	9.3%	87.7%	100%
Indian	4	16	164	184
%	2.2%	8.7%	89.1%	100%
Pakistani/Bangladeshi	19	33	221	273
%	7.0%	12.1%	81.0%	100%
Black	10	6	131	147
%	6.8%	4.1%	89.1%	100%
Other	6	15	156	177
%	3.4%	8.5%	88.1%	100%
Total	151	415	3,916	4,482
%	3.4%	9.3%	87.4%	100%

Table 3 shows that 151 (3.4 per cent) of the children out of the total sample of 4482 are still at school. The share of children with an Indian background is the lowest (2.2 per cent); the shares of children with a Pakistani and Bangladeshi background (7 per cent) or a Black-Caribbean and Black-African background (6.8 per cent) are the highest. Four hundred and fifteen children (Table 3, column 3) do not attend school because of the shutdown but do *not* receive any schoolwork from their schools. The highest share is for children with Pakistani and Bangladeshi backgrounds (12 per cent) and the lowest is for children with Black-Caribbean and Black-African backgrounds (4 per cent). Finally, of the children who are staying at home during the school closure and receive schoolwork (87.4 per cent of the

total), Pakistani and Bangladeshi students represent the lowest share (81 per cent). There are minor differences between White, Black-Caribbean and Black-African, Indian and Other ethnic groups. These tables show that the most affected children are those with Pakistani and Bangladeshi backgrounds in all categories.

Figure 1: Hours learning by school by free school meal

Figure 2: Hours learning by school by single parent

Figure 3: Hours learning by school by parent education

Figure 4: Hours learning by school by parent ethnicity
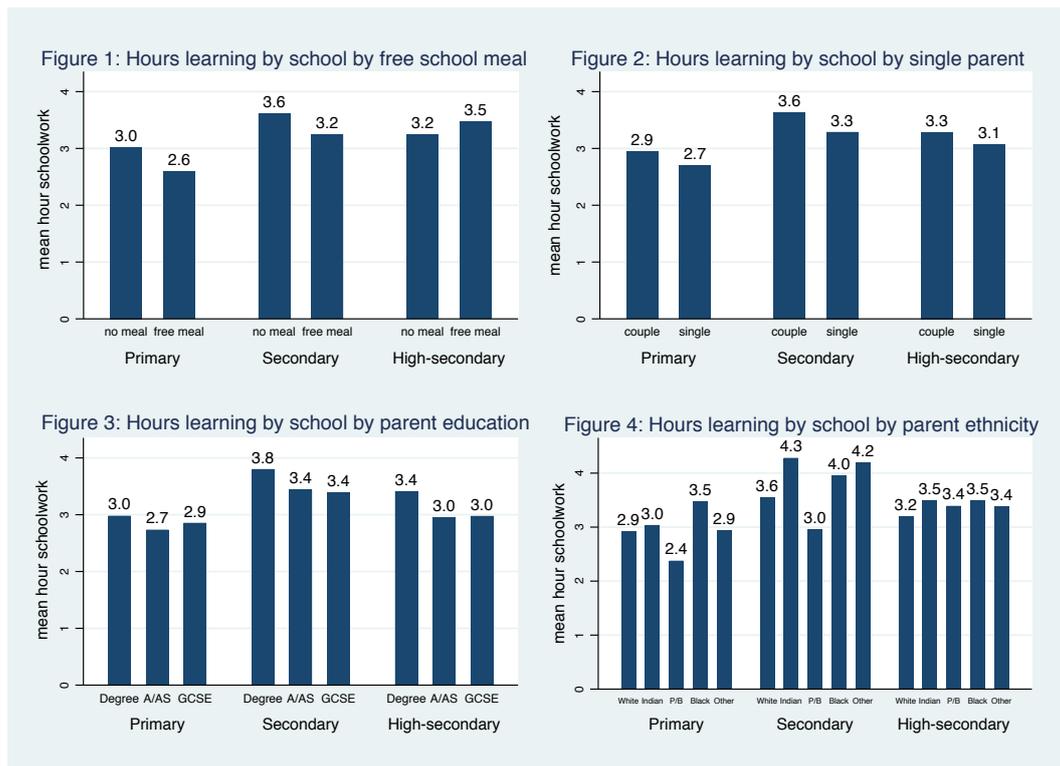
Figure 1 indicates the primary and secondary school children who were eligible for free school meals study less but those at the higher secondary level study more than their peers who do not receive free school meals. Perhaps these represent more industrious children who made it to that level. Single-parent children devote fewer hours to schoolwork at home at all school stages (Figure 2). Secondary and higher secondary school children whose parents have a degree spend more time learning at home than their peers whose parents do not have a degree (Figure 3); primary school children with educated parents devote slightly more time to learning.

Striking differences emerge for the ethnic minority groups. Figure 4 shows that primary and secondary school children with Pakistani or Bangladeshi backgrounds (P/B) spend substantially less time on home learning; interestingly, their comparators with a White majority background are the second lowest group. Moreover, primary school children with Black-Caribbean or Black-African background spend the most mean hours (3.5) on studying during the school closure. At the next stage, secondary school children with Indian and Other backgrounds spend the most time learning, on average, 4.3 hours and 4.2 hours respectively. It seems ethnic background does not play a sizable role in the amount of time higher secondary children spend on schoolwork; differences look small.

Multivariate Results

Multiple regression reveals significant differences between children's individual, parental and school provision factors in the amount of time they devote to schoolwork each day at home, taking into account household size and household experiences of COVID-19 symptoms. Model 1 of Table 4 shows female children spend significantly more time on schoolwork than their male peers, whereas children whose sex is unknown do not differ significantly from male children. Secondary school students spend significantly more time on schoolwork than higher secondary school students (Key stage 5 students); primary school children spend significantly less time.

Model 1 explains about seven per cent of the variation in home learning of students during the school shutdown; this increases to about 10 per cent when the factors on parental background are added to the model (Model 2). We argued that less-educated parents might be less able to get involved, discipline and motivate their children to spend time on home learning than higher-educated parents.

Table 4: Regression results on time spent on schoolwork

	Model 1 b/se	Model 2 b/se	Model 3 b/se
Sex of child (ref: male)			
female	0.351***	0.351***	0.251***
	0.05	0.05	0.045
unknown	0.127	0.196	0.102
	0.119	0.115	0.102
COVID19 symptoms in household	0.092	0.039	0.064
	0.077	0.076	0.069
HH size	-0.036	-0.04	-0.031
	0.026	0.029	0.025
School phase (ref: secondary)			
primary	-0.244**	-0.226*	-0.310***
	0.091	0.092	0.083
higher secondary	0.440***	0.426***	0.05
	0.092	0.091	0.081
Single parent		-0.282**	-0.251**
		0.102	0.087
Parental education (ref: higher education degree or diploma)		.	.
A/AS level		-0.265**	-0.232**
		0.098	0.078
GCSE or lower		-0.213**	-0.179**
		0.065	0.059
Free school meal eligibility		-0.280***	-0.161*
		0.077	0.068
Ethnicity (ref: White)			
Indian		0.338*	0.184
		0.152	0.131
Pakistani/Bangladeshi		-0.405**	-0.239
		0.138	0.126
Black-Caribbean/African/other		0.454**	0.313*
		0.169	0.138
Other ethnic background		0.134	0.075
		0.138	0.119
Offline schoolwork provision			0.299***
			0.018
Online schoolwork provision			0.181***
			0.016
Teacher checks schoolwork			0.194***
			0.023
_cons	3.130***	3.322***	1.473***
	0.137	0.151	0.159
r2	0.067	0.097	0.285
N	3150	3150	3150

The data show that children whose parents have A- and AS-level education spend significantly less time learning at home than those whose parents have a degree, and students whose parents have GCSE or less spend even less time. Controlling for all other factors in Model 2, we see children who received free school meals before the lockdown spend significantly less time studying at home than their peers who were not eligible for free school meals.

Model 2 compares time for home learning for children from different ethnic minority groups to those with a White background. Children with Indian and Black-Caribbean or Black-African ancestry spend significantly more time on schoolwork at home during the school closure than their White peers. In contrast, students with a Pakistani or Bangladeshi background spend substantially less time. Children from the Other category do not show significant differences in home learning, but this could be due to the diversity of ethnicities; this group includes Chinese and mixed-marriage children, who have been shown to do particularly well (Rothon, 2007; Platt 2019).

Schools' involvement in home learning

Provisions for distance teaching – the amount of offline learning material, online distance teaching and the checking of students' schoolwork – all significantly increase the time spent on schoolwork (Model 3 of Table 4). In other words, the more often schools provide offline schoolwork, the more time children spend on learning at home. If schools teach online from a distance, student learning time significantly increases. It also increases when teachers check schoolwork frequently.

Including schools' involvement in home learning partly and for some parental background factors fully explains the differences in the impact of parental background on the amount of time students do schoolwork at home. When we compare the differences in

regression coefficients of parental factors in Model 2 with their regression coefficients in Model 3, we see most differences have dropped considerably, and others are insignificant. For example, whilst the negative impact of single parenthood on students' home learning remains significant, taking schools' distance learning provision into account (Model 3) considerably reduces its negative impact. Furthermore, indicators of schools' distance teaching partly mitigate the negative impact of lower parental education. The negative effect of children's eligibility for free school meals decreases by half if the school remains involved in their teaching.

Except for children with a Black-Caribbean or Black-African background, schools' provision explains the differences between children from the White majority and the minority groups. On the one hand, findings demonstrate (Model 3) that children with an Indian background attend schools with better distance teaching provisions, and they spend more time on home learning. These schools provide offline and online teaching possibilities, and their teachers check schoolwork regularly. Therefore, schools' involvement is taken into account, the positive learning gap for them disappears. On the other hand, Model 3 shows the learning disadvantage for children with Pakistani or Bangladeshi parents is mitigated by schools' learning provision. That is, the learning gap of these children is likely produced by the schools they attend; more specifically, the schools less frequently offer distance learning materials and supervision.[3]

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[3] We ran several other models for robustness checks (see Appendix A). We tested models using school key stage information instead of school phase; this did not change our conclusions. We tried including parental occupational status and school type (private/state) to see if our results changed. In the parental occupation model, the effect of low parental education became significant as both indicators are of socioeconomic status. Similarly, in the model with the school type information, the effect for free school meals became insignificant, as school type is likely to behave as a proxy for socioeconomic class. Finally, we removed parental education, reducing our sample size substantially. This elimination increased the effect size of the free school meals, a plausible result, as the two variables are highly correlated and are often used interchangeably to measure socioeconomic status.

Figure 5: Marginal mean hours spent on home learning each day for children (not) receiving free school meal
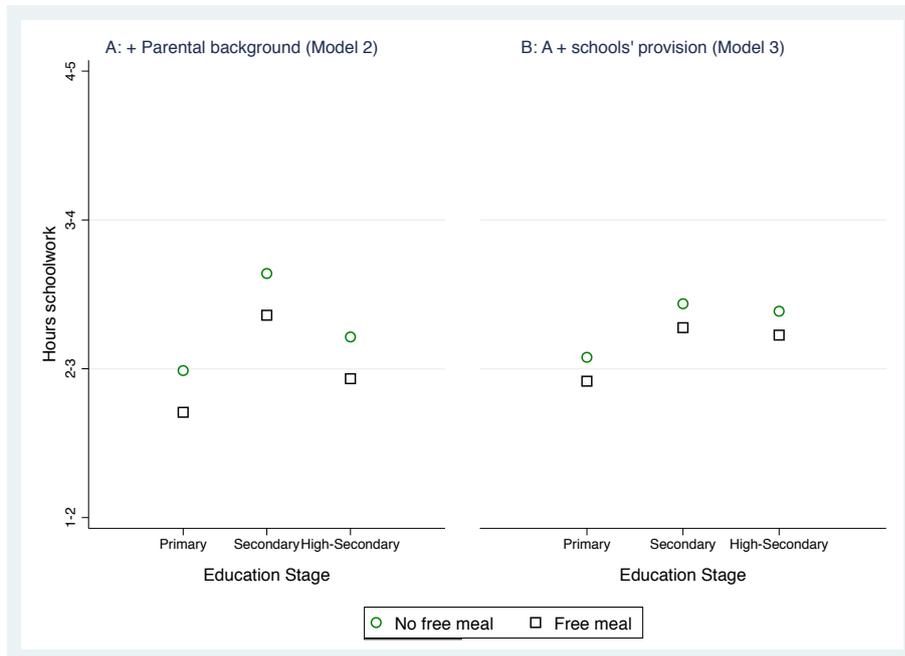
Note: Figures in A are taken from Model 2 and figures in B are taken from Model 3 of Table 4

Figure 6: Marginal mean hours spent on home learning each day for children from ethnic minority groups
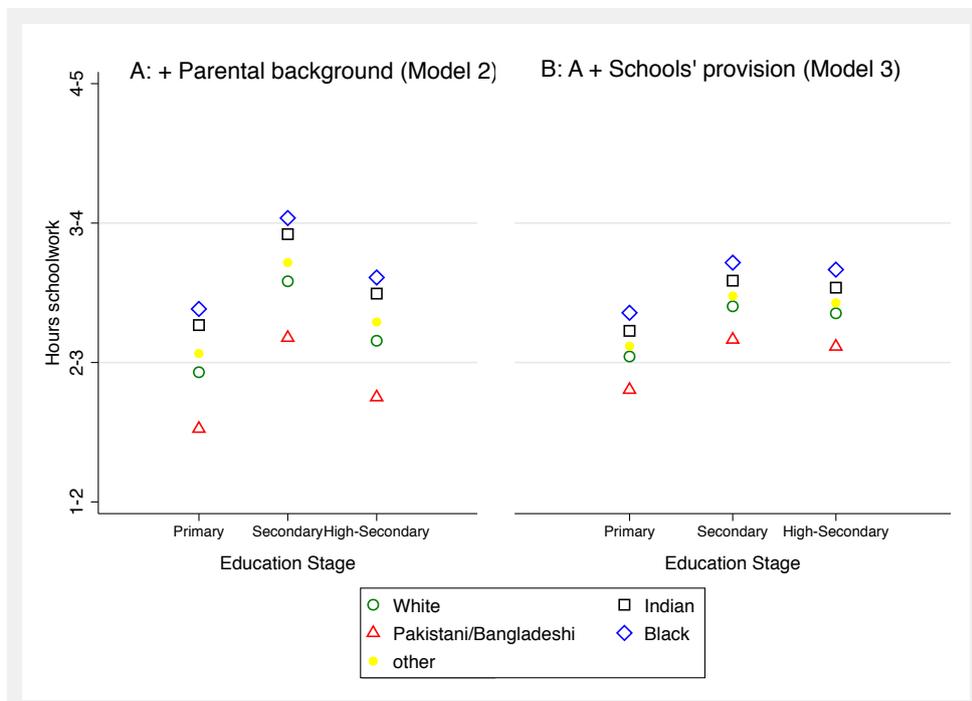
Note: Figures in A are taken from Model 2 and figures in B are taken from Model 3 of Table 4

Figure 5 visualizes the study time of the children in primary, secondary and higher secondary education who received free school meals in early 2020 and those who did not. Part A shows the marginal mean study hours for the different groups without school provision factors in the model (taken from Model 2 of Table 4). Part B shows the distances between groups after taking those factors into account (Model 3). As the figure shows, the home learning gap between students who did and did not receive free school meals decreases considerably when schools' distance teaching provisions are taken into account.

Figure 6 shows the study time of children with different ethnic backgrounds. Again, Part A shows marginal mean study hours without schools' distance teaching provisions in the model (taken from Model 2 of Table 4), and Part B includes those factors (Model 3). As the figure indicates, schools' involvement in home learning substantially reduces differences based on ethnicity, supporting our expectation that schools mitigate educational inequalities generated by family backgrounds.

Model 3 greatly increases the explanatory power of the variance in students' home learning time. Children's individual and parental characteristics and indicators for schools' involvement in home learning explain about 29 per cent of the variation.[4] The schools' provisions of distance learning explains the largest share (about 19 per cent), and parental background explains the smallest share (2 per cent) of variance in time spent on home learning during lockdown, showing the major role of schools in pupils' learning during the lockdown.

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[4] We checked which school provisions explained most of the variance by including these variables one by one in the model. Providing offline schoolwork material explained 19 per cent, teachers checking schoolwork explained 16 per cent and providing online teaching explained 15 per cent of the variance. Schools' provision of offline material and checking schoolwork explained 25 per cent, and these explained the lag for children with Pakistani/Bangladeshi heritage.

Discussion and conclusions

We asked whether family characteristics and schools' distance teaching provision are related to the amount of time students spend on home learning during the COVID-19 shutdown. We argued that children previously eligible for free school meals, children with lower-educated or single parents and children belonging to certain ethnic minority groups would be more disadvantaged because of the school interruption. We measured disadvantage by looking at the amount of time spent on schoolwork at home. We suggested that close involvement of schools in teaching their students at a distance will mitigate inequalities and learning losses.

To probe our expectations, we used the special COVID-19 wave of the nationally representative Understanding Society data, as its first wave, fielded during the school closure period in April 2020, included a home schooling module. Our findings show children who receive schoolwork from their school spend, on average, 3.2 hours a day on home learning, but there are differences, based on the children's social and family background. First, children who received free school meals in January and February and those with Pakistani, Bangladeshi, Black-African and Black-Caribbean heritage are overrepresented among those who are still attending school during the lockdown, apparently because of their parents' jobs as key workers. Second, although the majority of children are receiving instructions, materials and distance teaching from their schools, children with Pakistani or Bangladeshi backgrounds are overrepresented among those who are not receiving any distance teaching.

The data support our expectation that children eligible for free school meals, those with lower-educated parents and those in single parent families will spend less time in home learning than their peers. They also support our ethnicity hypothesis, in that students with a Pakistani or Bangladeshi background spend the lowest number of hours on schoolwork. Although children with an Indian heritage do significantly more schoolwork, this is in line

with previous research on ethnic differences in educational attainment in the UK (Rothon, 2007). As there are proportionally more children with Pakistani or Bangladeshi backgrounds who are in school but do not receive any schoolwork, the extent of disadvantage these children experience might be even larger than our estimations. A remarkable result is that children with Black-Caribbean or Black-African heritage spend the most average hours on schoolwork across all ethnic groups and education stages. This may come as a surprise to some, as their educational attainment is lower than their White and Indian peers (Richardson et al., 2020). This difference could potentially be explained by the high aspirations of these ethnic minority parents, but more research is needed to explain how parents and students' aspirations affect home learning or to look for other possible drivers of the difference.

Schools are often considered the engines of social mobility, and, as such, they may moderate the impact of family background on educational attainment and life prospects. Acting on this understanding, we investigated the relations between schools' provision of distance teaching and the extent of children's engagement with their schoolwork during the lockdown. We expected that schools' continued involvement with children's learning would mitigate the impact of school interruption. Our hypothesis was substantiated, in that schools' online and offline distance teaching and homework checking significantly increases children's time on home learning. Schools' distance teaching provisions explain the largest part of the variation in children's home learning whereas parental background constituted the lowest share in this, demonstrating the crucial role of schools in motivating and facilitating children's learning.

Moreover, we found the indicators of schools' distance teaching provisions moderate the disparities generated by parental and ethnic backgrounds, albeit with some differences. School provision explains the scarring impact of the shutdown on children with Pakistani or Bangladeshi backgrounds but partly explains the substantially higher hours of home learning

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of Black-Caribbean or Black-African children. That is, it is not ethnicity that makes Pakistani or Bangladeshi children study less each day; rather, their schools are less involved in ongoing learning. These schools may have fewer resources, or they may be in areas more affected by the pandemic. Future research should consider these and other possibilities. Nevertheless, the local and national authorities should invest in these schools in order to close the substantial learning gap their pupils developed during the school interruption. Furthermore, our results suggest schools should also be prepared to provide distance teaching during school interruptions, not just now but in the future, to prevent learning losses and widening social inequalities for the most vulnerable children.

Of course, spending more time on schoolwork may facilitate learning, but it does not necessarily equate to learning. Children who are spending time on home learning but who lack proper resources, such as a quiet space to study and parental guidance, will likely learn less, even if they spend more time on schoolwork. Future research should investigate how home learning happens, and how resources – a computer, a study space, online and offline learning material etc. – interact with the time spent on schoolwork. Future work should also focus on the consequences of home learning during the COVID-19 pandemic, looking for learning gaps in test results in the years to come. Finally, as schools have remained open for a considerable number of children of key workers, their learning should be followed over time as well, to see if they have advantages over the home-schooled.

Our research makes two important contributions to the literature with strong implications for policy development. First, education has been most disrupted for children with Pakistani or Bangladeshi heritage and children who received free school meals before lockdown. Second, schools can mitigate the impact of a long-term school lockdown and the subsequent negative effect on learning if they can provide distance learning.

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	Main model	Main model with key stages	Main model without parental education	Main model with occupational status	Main model with school type
	b/se	b/se	b/se	b/se	b/se
Sex of child (ref: male)					
female	0.251***	0.251***	0.258***	0.247***	0.253***
	0.045	0.044	0.04	0.045	0.045
unknown	0.102	0.091	0.057	0.1	0.320**
	0.102	0.101	0.088	0.102	0.114
COVID19 symptoms in household	0.064	0.056	0.066	0.064	0.063
	0.069	0.068	0.059	0.069	0.069
HH size	-0.031	-0.036	-0.042	-0.028	-0.033
	0.025	0.025	0.023	0.025	0.025
School phase (ref: higher secondary)					
primary	-0.310***		-0.315***	-0.305***	-0.310***
	0.083		0.074	0.083	0.083
secondary	0.05		0.024	0.064	0.014
	0.081		0.073	0.081	0.082
School phase (ref: KS2)					
Reception year (age 4)		-0.630***			
		0.095			
KS1: years 1-2 (age 5-7)		-0.372***			
		0.069			
		0.302***			
KS3: years 7-9 (age 11-14)		0.059			
		0.102			
KS4: years 10-11 (age 14-16)		0.076			
		0.186*			
KS5: years 12-13 (age 16-18)		0.085			
Single parent	-0.251**	-0.297***	-0.272***	-0.236**	-0.268**
	0.087	0.087	0.081	0.087	0.087

Parental education
(ref: higher education
degree or diploma)

A/AS level	-0.232**	-0.232**		-0.210**	-0.229**
	0.078	0.077		0.081	0.079
GCSE or lower	-0.179**	-0.202***		-0.123	-0.182**
	0.059	0.059		0.064	0.059
Free school meal eligibility	-0.161*	0.02	-0.211**	-0.152*	-0.092
	0.068	0.075	0.065	0.069	0.07
Ethnicity (ref: White)					
Indian	0.184	0.202	0.22	0.19	0.179
	0.131	0.131	0.12	0.132	0.131
Pakistani/Bangladeshi	-0.239	-0.239	-0.224	-0.223	-0.23
	0.126	0.123	0.115	0.125	0.125
Black-Caribbean/African/other	0.313*	0.311*	0.354**	0.325*	0.308*
	0.138	0.137	0.133	0.135	0.138
Other ethnic background	0.075	0.06	0.172	0.088	0.049
	0.119	0.116	0.118	0.12	0.118
Offline schoolwork provision	0.299***	0.292***	0.301***	0.297***	0.293***
	0.018	0.018	0.017	0.018	0.018
Online schoolwork provision	0.181***	0.179***	0.178***	0.184***	0.174***
	0.016	0.016	0.015	0.016	0.016
Teacher checks schoolwork	0.194***	0.185***	0.183***	0.192***	0.191***
	0.023	0.023	0.021	0.023	0.023
Parental occupational status (Ref: management & professional)					
intermediate				-0.013	
				0.085	
small employers & own account				-0.182	
				0.115	
lower supervisory & technical				-0.064	
				0.144	
semi-routine & routine				-0.287***	

	(1)	(2)	(3)	(4)	(5)
				0.076	
missing				-0.086	
				0.081	
School type (ref: state)					
private					0.211
					0.158
missing					-0.251***
					0.065
_cons	1.473***	1.365***	1.466***	1.510***	1.564***
	0.159	0.15	0.14	0.159	0.16
r2	0.285	0.297	0.275	0.29	0.289
N	3150	3150	3867	3150	3150

Appendix B: Results from ordered logistic regressions

	Model 1 b/se	Model 2 b/se	Model 3 b/se
Sex of child (ref: male)			
female	0.465***	0.476***	0.388***
	0.066	0.066	0.068
unknown	0.154	0.256	0.082
	0.153	0.152	0.153
COVID19 symptoms in household	0.104	0.035	0.08
	0.101	0.101	0.103
HH size	-0.047	-0.058	-0.041
	0.034	0.039	0.038
School phase (ref: high secondary)			
primary	-0.251*	-0.237	-0.420***
	0.122	0.126	0.122
secondary	0.596***	0.583***	0.063
	0.124	0.125	0.119
Single parent		-0.410**	-0.373**
		0.139	0.13
Parental education (ref: higher education degree or diploma)			
A/AS level		-0.334*	-0.337**
		0.13	0.118
GCSE or lower		-0.267**	-0.240**
		0.085	0.088
Free school meal eligibility		-0.404***	-0.238*
		0.104	0.104
Ethniciety (ref: white)			
Indian		0.439*	0.258
		0.201	0.202
Pakistani/Bangladeshi		-0.549**	-0.373
		0.187	0.191
Black-Caribbean/African/other		0.595**	0.505*
		0.221	0.204
Other ethnic background		0.164	0.133
		0.179	0.172
Offline schoolwork provision			0.478***
			0.031
Online schoolwork provision			0.272***
			0.024
Teacher checks schoolwork			0.305***
			0.036
cut1	-2.009***	-2.336***	0.29
	0.189	0.214	0.246
cut2	-0.493**	-0.790***	2.060***
	0.183	0.207	0.248
cut3	0.528**	0.258	3.301***
	0.183	0.206	0.255
cut4	1.591***	1.344***	4.567***
	0.186	0.208	0.263
cut5	2.705***	2.474***	5.829***
	0.196	0.216	0.276
N	3150	3150	3150