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# Educational engagement, expectation and attainment of children with disabilities: Evidence from the Scottish Longitudinal Study

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Government statistics show that children with special educational needs and disabilities do not achieve as well academically as their peers, which impacts on later employment and socioeconomic circumstances. Addressing these inequalities is a key policy area which currently lacks a satisfactory evidence base. To explore the issue, the present study used data from the Scottish Longitudinal Study which contains data from the 1991, 2001 and 2011 censuses along with other administrative data, from a representative sample of the Scottish population. Using this large and longitudinal sample, the present study examines educational engagement, expectations and attainment for children with self-reported disability, controlling for other early childhood factors. The results show that children with mental health problems were at higher risk of leaving school early, and that children with learning difficulties were less likely to gain advanced qualifications. Neither limiting long-term illness in early childhood nor disability in adolescence were significant predictors of engagement, however, they did predict measures of academic expectation and attainment. Results suggest there is a critical phase for attainment, with area deprivation in early childhood but not adolescence being important for later educational inequalities.

**Keywords:** disability; education outcomes; health inequalities; mental health

## Introduction

Many reports and studies have found that children with special educational needs and disabilities (usually abbreviated as SEN or SEND) are disadvantaged compared to their non-disabled peers in terms of educational outcomes, which in turn carry implications for economic, social and health outcomes in later life. In this Introduction we summarise the evidence base as well as the methodological issues arising from it, in particular the proxy measures used for disability such as SEN and Limiting Long-term Illness (LLTI).

In terms of education, children with SEN have been found to be less likely to achieve full literacy and numeracy (Coulter & Madden, 2011), and to achieve fewer

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qualifications. For example, Coulter and Madden (2011) reported that whilst 61% of children with no Special Educational Needs in their sample achieved 5 good GCSE results, only 17% of children with SEN did so. The report also quoted Labour Force Survey figures showing that disabled people were three times as likely to have no qualifications compared to non-disabled people. Young people with SEN are reported to be four times less likely to be in higher education than their peers with no SEN (Equality and Human Rights Commission, 2010; Coulter & Madden, 2011; DWP, 2013). Higher rates of exclusion from school are reported for children with Special Educational Needs (Department for Education, 2010, 2014a; Coulter & Madden, 2011). The particular difficulties faced by pupils with mental health problems are now being recognised more widely (Young Minds, 2017). Evidence has shown that children with mental health problems are less likely to achieve well academically (Meltzer and the UK Statistics Authority, 2003), and this issue has recently been the subject of new government policies, both in England and Wales (Department of Health and Department for Education, 2017) and Scotland (The Scottish Government, 2017b).

After leaving school, inequalities continue for those with disabilities. By the age of 26, disabled people are nearly four times as likely to be unemployed as those without disabilities, and those who are in work earn substantially less than non-disabled peers with the same level of qualification (DWP, 2013). Analysis of the Scottish Household Survey 2013 revealed that just 21% of working-age adults reporting an LLTI or disability were in full-time employment, compared to 52% of those without (The Scottish Government, 2014b). As the DWP's *Fulfilling Potential* report points out, these inequalities are interlinked, with poor educational attainment also feeding into poor employment outcomes. Disability and lack of employment are both linked to poverty and social isolation, which in turn can create barriers to re-entering the workforce (DWP, 2013).

Aside from government statistics and survey results, a small number of empirical studies have examined the relationship between health conditions or disability and educational attainment. For example, Ek *et al.* (2011) explored educational attainment for 119 children with Attention Deficit Hyperactivity Disorder (ADHD) or behavioural/learning difficulties. The results showed that children with these disabilities had significantly lower grades than their peers. No control for other background factors—such as ethnicity, household deprivation or parental disability—was made in the paper. Forrest *et al.* (2011) explored the characteristics of children with Special Health Care Needs (SHCN) and, like Ek *et al.* (2011), found lower academic attainment for these children compared to their peers. Whilst comparison was made on a number of factors for children with and without SHCN, no analyses were conducted to explore how these might interact to explain the between-group differences. A more robust study (Fleming *et al.*, 2017) demonstrated poor academic attainment for children taking ADHD medication. The analysis used a large Scottish sample, and the effect of ADHD on attainment remained significant even after controlling for a wide range of background factors including deprivation, ethnic group, maternal characteristics, birthweight and comorbid conditions.

Some European countries consider disability a high-risk factor for early school leaving and have developed targeted interventions to help keep this group within

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education for longer (European Commission/EACEA/Eurydice/Cedefop, 2014). Despite this, the question of whether children with disabilities are more likely to disengage with the education system and become early leavers has received little attention in the research literature. Recent reviews note a scarcity of research on the topic, with few longitudinal studies found, and those studies which do exist having serious methodological flaws such as a lack of control for background factors (Melkevik *et al.*, 2016; Bowman *et al.*, 2017). Newer studies have emerged, however, and these appear to clearly demonstrate increased risk of early leaving for children with mental health conditions such as anxiety or depression (Brännlund *et al.*, 2017; Butterworth & Leach, 2018; Hetlevik *et al.*, 2018) and for those with hyperactivity, behavioural problems and/or ADHD (Fleming *et al.*, 2017; Hetlevik *et al.*, 2018).

In Scotland, children are considered to be early leavers if they leave school before completing the upper secondary level or before reaching the age of 16 (European Commission/EACEA/Eurydice/Cedefop, 2014). It is conceivable that children with disabilities are at greater risk of early disengagement if they are not being fully supported, are struggling academically or have low expectations of their academic potential (or their teachers or parents have low expectations). Using a combination of School Census and 2011 Census variables, the present analyses sought to identify those who left school before, or as soon as, they were legally allowed to do so in order to tease out whether children with disabilities are any more likely to disengage early from education.

Whilst there exists a good deal of cross-sectional data on the relationship between disability and educational achievement, to date there is little evidence on the *longitudinal* effects of having a disability on educational success. Without longitudinal data it is not possible to establish a likely order of events, or determine whether there are particular critical phases of education when having a disability harms educational success. In the *World Report on Disability*, the World Health Organization explicitly notes the lack of longitudinal analyses and makes the collection and analysis of longitudinal data one of their key recommendations, arguing that:

> Longitudinal data. . . allow researchers and policy-makers to understand better the dynamics of disability. Such analyses would provide better indications of what happens to individuals and their households after disability onset, how their situation is impacted by public policies aimed at improving the social and economic status of disabled people, of the causal relationship between poverty and disability, and how and when to instigate prevention programmes, modify interventions, and make environmental changes. (World Health Organization and World Bank, 2011, p. 46)

The present study seeks to help fill this gap by exploring the relationship between disability and education longitudinally, looking at how health and other key factors in early childhood affect later outcomes.

The proxies used for disability in much of the existing evidence are potentially problematic. The measures used are dependent on the data source, and so proxies are often the only available option (Read *et al.*, 2007; DWP, 2015). For example, many studies and government departments (e.g. Equality and Human Rights Commission, 2010, 2017; Coulter & Madden, 2011; DWP, 2013; Shaw *et al.*, 2016; Department for Education, 2017) use Special Educational Needs as their measure.[1] Educational

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support needs are not perfect as a proxy for disability, as they may not capture all conditions well (Cohen *et al.*, 1995; Payne & Saul, 2000; Keil *et al.*, 2006) and include needs that lie outside most definitions of disability such as: 'English as a second language'; being bullied; being gifted; and interruptions to learning such as 'difficulties at home' (Fauth *et al.*, 2014; Riddell *et al.*, 2016). Some conditions are also under-reported by the SEN measure. For example, children who are not registered as deaf are not included, and hearing impairment is not always recorded in the SEN record where more complex support needs exist (National Deaf Children's Society, 2019).

Limiting Long-term Illness is another proxy for disability that is often used in research (Blackburn *et al.*, 2013; Fauth *et al.*, 2014; Platt *et al.*, 2014). LLTI is defined as 'A long-term health problem or disability that limits a person's day-to-day activity, and has lasted, or is expected to last, at least 12 months' (2011 Census definition). Whilst LLTI is strongly related to health service use and mortality (e.g. Payne & Saul, 2000), it is problematic as a proxy for disability. Research using the new questions in the Northern Ireland 2011 Census shows that LLTI is more closely associated with some health conditions than others (Wright *et al.*, 2016), and there is evidence that levels of LLTI self-reporting for a given level of mortality vary across the UK, and are sensitive to factors such as religious denomination and socioeconomic status (O'Reilly & Rosato, 2010; Young *et al.*, 2010; Black *et al.*, 2017).

For the present study, we made use of the large, representative dataset of the Scottish Longitudinal Study (SLS). This dataset includes census and administrative data for an approximately 5% sample of the Scottish population. Because of this we have been able to use a combination of two census questions for our measure of disability at 2011. In this way we hope to create a measure of disability which better captures the Equality Act 2010 definition of having 'a physical or mental impairment that has a "substantial" and "long-term" negative effect on his or her ability to carry out normal day-to-day activities' (Office for Disability Issues, 2011). The Scottish 2011 Census contained a new question on health conditions which may provide a better measure of disability, along with the possibility of allowing researchers to break down analyses by disability type. This question asked: 'Do you have any of the following conditions which have lasted, or are expected to last, at least 12 months?' and allowed respondents to choose as many options as applicable from a list (see Table 2 later for details). In addition, the more familiar census question on LLTI[2] provides an indication of the *extent* to which people are limited by their health condition. By using these two questions in combination, the present analyses aim to define a measure of disability which more closely resembles the Equality Act definition by capturing a wider range of health conditions. The ability to break down our analyses by different types of disability allows us to explore whether specific conditions (e.g. mental health problems) have more impact on some outcomes than on others.

Small sample size is another common methodological issue for research in the area of children with disabilities. Due to difficulties in finding and recruiting participants, research studies are often based on very small samples of a few hundred individuals at most (e.g. Ek *et al.*, 2011; Forrest *et al.*, 2011). There is a need for quality research based on representative samples of the wider population (Blackburn *et al.*, 2007) and with sufficiently large sample sizes to examine educational outcomes according to disability types with stratification by social/economic variables. The present study begins

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to fill this gap by analysing a sufficiently large sample to examine educational outcomes according to disability types with stratification by social/economic variables, using the SLS. The SLS additionally provides context on other key background factors, such as parental health problems, ethnicity and deprivation. By using this dataset we can provide a wider context to health conditions, including specific health problems, drawing on a large and representative sample of the population as a whole.

In summary, although it is commonly found that disabled children are disadvantaged academically, the existing evidence on educational outcomes for disabled children suffers from key methodological issues, such as cross-sectional rather than longitudinal design, small sample sizes and sub-optimal proxy measures. In order to address these key methodological gaps, the present article makes use of new longitudinal data available from the Scottish 2011 Census for a large representative sample of children and explores the impact of early childhood as well as more contemporaneous factors. The research focuses on three key outcomes:

- *Engagement*. Are children with disabilities more likely than their peers to demonstrate disengagement with secondary education by leaving school early?
- *Expectation*. Are children with disabilities just as likely to be registered to sit advanced qualification examinations?
- *Attainment*. Are children with disabilities just as likely as their peers to reach a high level of secondary school attainment?

## Methods

The Scottish Longitudinal Study was used for the analyses. The SLS is an approximately 5% representative sample of the Scottish population drawn from the Scottish census and is created and maintained by the SLS Development Support Unit based in the offices of the National Records of Scotland. Due to the nature of the census, the data are characterised by excellent response rates and low drop-out rates. For example, in Scotland the 2001 Census was estimated to have a national response rate of 96.1%, and in 2011 the response rate was 93.8% (General Register Office for Scotland, 2003; National Records of Scotland, 2015).

In order to create the SLS, individuals whose birthday falls on one of 20 dates across the year are included as 'SLS members'. Information from the 1991, 2001 and 2011 censuses is included for SLS members, and this forms the core of the dataset along with key information about individuals living in the SLS member's household. Information for household members is not tracked between censuses. In addition to census variables, data from a range of government administrative sources are also linked to the SLS, including vital events registrations (births, deaths, marriages, stillbirths), socioeconomic indices, ecological variables and education datasets (from ScotXed), creating a rich and unique data resource. The ScotXed education datasets include information from the School Census, absences, exclusions and Scottish Qualifications Authority (SQA) attainment from 2007 to 2010. (For an overview of the SLS, see Cox & Marshall, 2017; for more detailed information on the creation of the SLS, see Boyle *et al.*, 2009. Technical working papers, including detailed

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linkage rates and measures of population representativeness, are available from the SLS website at https://sls.lscs.ac.uk/outputs/working-papers/).

### *Sample*

All SLS members aged 3–11 years at the time of the 2001 Census were included in the sample analysed in this article. This age range was selected in order to maximise the number of children who were sitting SQA exams or had completed secondary school at the time of the 2011 Census. After data cleaning and listwise removal of 3,582 missing cases based on our dependent and independent variables, a sample of 20,143 children was included in our analyses. For the model of being registered to sit Scottish Higher exams, a subsample was created of those most likely to have had the opportunity to sit Highers. Children aged 14 years or more at the 2011 Census were selected for this subsample, a total of 18,036 children. Our attainment model included the cohort of children who had been registered to sit at least one Higher, a total of 5,500 children. Descriptive statistics for the main sample are given in Table 1.

### *Key variables*

The key dependent variables for the models relate back to the research questions above. Since there are concerns that disabled children leave school early, possibly due to lack of support, 'leaving school early' is used as a measure of *engagement* in education. The second dependent variable used is 'being registered to sit at least one Scottish Higher Grade examination'[3] , which we use as a measure of *expectation* of ability, whether on the part of the child, their parents or teachers. The third dependent variable created was 'achieving at least 3 A–C grade Higher passes', which may be considered a measure of high academic *attainment*, since this level of qualification is a key route into further education and skilled work (Tinklin, 2003). The creation of these variables is described in more detail below.

*'Engagement' variable.* The engagement variable captured those children who left school either before or shortly after their 16th birthday. In Scotland, children may legally leave school either: at the end of May, if they reach their 16th birthday between 1st March and 30th September of the same school year; or after the Christmas holidays, if they reach their 16th birthday between 1st October and the end of February of the same school year (UK Government, 2017).

From the variables available in our data, we defined early leavers as pupils who, at the 2011 Census, were aged 16 or over, were not listed as a student, who had no qualifications listed beyond level 1[4] and who did not appear in the School Census for their fifth or sixth year of secondary schooling. Early leavers were coded as '1' in our model, whilst those who remained in education into the senior phase were coded as '0'. In all, 747 pupils met this definition of early leaver (3.71% of the sample).

*'Expectation' variable.* The second key dependent variable in the models gauged the level of expected advanced academic achievement by measuring whether the child

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Table 1. Sample descriptives. The 'disability' variable defines individuals as having a disability if they report having a health condition at 2011 *and* report day-to-day limitations. Total sample $n$ = 20,143

| | Disability variable (2011) | | | |
|---|---|---|---|---|
| | No disability ($n$ = 18,976) | | Has disability ($n$ = 1,167) | |
| | *n* | % | *n* | % |
| *Gender* | | | | |
| Male | 9,593 | 50.55 | 667 | 57.16 |
| Female | 9,383 | 49.45 | 500 | 42.84 |
| *LLTI (2001)* | | | | |
| No LLTI | 18,480 | 97.39 | 795 | 68.12 |
| Has LLTI | 496 | 2.61 | 372 | 31.88 |
| *LLTI (2011)* | | | | |
| No LLTI | 18,923 | 99.72 | 0 | 0 |
| Has LLTI[1] | 53 | 0.28 | 1,167 | 100 |
| *Carstairs deprivation 2001 (quintile 1 = least deprived)* | | | | |
| Quintile 1, 2001 | 4,601 | 24.25 | 259 | 22.2 |
| Quintile 2, 2001 | 4,018 | 21.17 | 199 | 17.05 |
| Quintile 3, 2001 | 3,504 | 18.47 | 180 | 15.42 |
| Quintile 4, 2001 | 3,321 | 17.50 | 241 | 20.65 |
| Quintile 5, 2001 | 3,532 | 18.61 | 288 | 24.68 |
| *Carstairs deprivation 2011 (quintile 5 = least deprived)* | | | | |
| Quintile 5, 2011 | 4,253 | 22.41 | 239 | 20.48 |
| Quintile 4, 2011 | 4,003 | 21.10 | 187 | 16.02 |
| Quintile 3, 2011 | 3,719 | 19.60 | 203 | 17.4 |
| Quintile 2, 2011 | 3,583 | 18.88 | 263 | 22.54 |
| Quintile 1, 2011 | 3,418 | 18.01 | 275 | 23.56 |
| *Household type 2001* | | | | |
| Individuals/single parent | 3,831 | 20.19 | 317 | 27.16 |
| Married parents | 13,549 | 71.40 | 741 | 63.5 |
| Cohabiting parents | 1,596 | 8.41 | 109 | 9.34 |
| *Parental LLTI, 2001 (at least one parent has an LLTI)* | | | | |
| No | 16,436 | 86.61 | 854 | 73.18 |
| Yes | 2,540 | 13.39 | 313 | 26.82 |
| *Ethnic group 2001* | | | | |
| Non-white | 420 | 2.21 | 21 | 1.8 |
| White | 18,556 | 97.79 | 1,146 | 98.2 |
| *Health condition 2011 (categories not mutually exclusive)* | | | | |
| Blindness | 56 | 0.30 | 53 | 4.54 |
| Deafness | 84 | 0.44 | 57 | 4.88 |
| Learning disability | —[2] | — | 101 | 8.65 |
| Learning difficulty | 626 | 3.30 | 305 | 26.14 |
| Developmental disorder | 104 | 0.55 | 262 | 22.45 |
| Physical disability | 14 | 0.07 | 164 | 14.05 |
| Mental health | 86 | 0.45 | 185 | 15.85 |
| Long-term illness | 754 | 3.97 | 557 | 47.73 |
| Other condition | — | — | — | — |
| Age at 2001 | 7.177 | 2.579 | 6.914 | 2.61 |

*Note*: [1]'Limited a little' plus 'Limited a lot'.
[2]'—' denotes small cell: values hidden to prevent any possible identification of individuals.
*Source:* Scottish Longitudinal Study.

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was registered to sit Higher Grade examinations. Using the SQA attainment data, a dummy variable was created to indicate whether children had been registered to sit Higher Grades regardless of whether they subsequently actually sat the examinations. Those who were registered to sit at least one Higher Grade exam were coded as '1'; those who were not registered to sit any Higher Grades were coded as '0'. Of the 18,036 children aged 14 or over, 5,500 children (30.49%) were registered to sit at least one Higher.

*'Attainment' variable.* This dependent variable acted as a measure of advanced educational attainment. A dummy variable was created using the SQA attainment database to indicate whether a minimum of 3 A–C grade Higher passes had been achieved; these children were coded as '1' in the model, whilst those who achieved fewer than 3 A–C grade Higher passes were coded as '0'. This criterion matches measures of 'high attainment' used in other studies (Tinklin, 2003; Fleming *et al.*, 2017). Of the 5,500 children registered to sit at least one Higher Grade examination, 3,104 gained a minimum of three good passes (56.44%).

*'Disability' variable.* As discussed in the Introduction, the addition of a new 'health conditions' question in the Scottish 2011 Census allowed us to create a finer measure of disability for our analyses. For our variable, children were considered 'disabled' if they recorded having at least one health condition and also reported that their day-to-day activities were limited by a health condition. Relevant census questions relating to LLTI and health conditions are summarised in Table 2.

## Results

A series of logistic regression models were conducted to explore how disability affected our key outcome variables. All analyses were conducted using SAS Statistical Software v9.4 in a Windows 7 environment.

Independent variables in all three models fitted were gender, disability at 2011, LLTI at 2001, Carstairs deprivation deciles at 2001 and 2011 (measured at the census output area [OA] level), household type at 2001 (individuals, single parent, married parents, cohabiting parents), parental LLTI (2001) and ethnicity (white, non-white). Models 1b, 2b and 3b additionally included each of the health condition categories listed in the 2011 Census. Model coefficient estimates and statistics are reported, along with graphs of predicted probabilities. In all figures of predicted probabilities, the red line (and intercept value) represents the probability of the dependent variable—for example, leaving school early— if the child was male, had no disability or LLTI; lived in the least deprived areas at both 2001 and 2011; lived with both parents in early childhood; had no parents with LLTI in early childhood; and was of white ethnicity.

### *Model 1. Engagement*

The first model had the 'early leaver' variable as its dependent variable (see above). Model coefficient estimates and statistics are shown in Table 3 and a graph of

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Table 2. Questions relating to LLTI and health conditions available in the 2001 and 2011 Scottish Census

| Source and question | Response options |
|---|---|
| *Census 2001, LLTI* | |
| 'Do you have any long-term illness, health problem or disability which limits your daily activities or the work you can do?' | Yes<br>No |
| *Census 2011, LLTI* | |
| 'Are your day-to-day activities limited because of a health problem or disability which has lasted, or is expected to last, at least 12 months?' | Yes, limited a lot<br>Yes, limited a little<br>No |
| *Census 2011, health condition* | |
| 'Do you have any of the following conditions which have lasted, or are expected to last, at least 12 months? (Tick all that apply)' | Deafness or partial hearing loss<br>Blindness or partial sight loss<br>Learning disability (e.g. Down's Syndrome)<br>Learning difficulty (e.g. dyslexia)<br>Developmental disorder (e.g. autistic spectrum disorder or Asperger's Syndrome)<br>Physical disability<br>Mental health condition<br>Long-term illness, disease or condition<br>Other condition[1] |

*Note*: [1]Write-in option. These were coded as present/not present for the present analyses.

predicted probabilities is given in Figure 1. (Model 1a goodness-of-fit: $\chi^2 = 315.25$, $p < 0.0001$).

The results show that neither disability at 2011 nor LLTI in early childhood had a significant effect on the probability of leaving school early ($\beta = -0.053$ and $-0.042$, respectively, n.s.). Significant effects were seen for several other variables, however, in line with the literature (European Commission/EACEA/Eurydice/Cedefop, 2014). Females were significantly less likely to leave school early compared to males ($\beta = -0.639$, $p < 0.001$). There was a clear gradient effect of area deprivation at both time points, with children from more deprived areas most likely to leave school early. Family environment in early childhood was also shown to significantly affect the likelihood of completing secondary education: there was an effect of household type, with children from 'married parent' households least likely to be early leavers (individuals, $\beta = 0.582$, n.s.; single-parent family, $\beta = 0.237$, $p < 0.01$; cohabiting parents, $\beta = 0.327$, $p < 0.01$) and children with at least one parent with an LLTI at 2001 were more likely to leave school at age 16 ($\beta = 0.208$, $p < 0.05$). No significant effect of ethnicity was observed ($\beta = -0.456$, n.s.).

In order to test whether the lack of association between our engagement outcome and disability masks effects for individual disabilities, the model was repeated to include each of the 2011 Census health conditions as additional independent variables: visual impairment, hearing impairment, learning disability, learning difficulty, developmental disorder, physical disability, mental health condition, LLTI and other condition (see Model 1b in Table 3 and Figure 1). As can be seen in Figure 1,

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Table 3. Models 1a, 1b—Engagement (probability of leaving school early)

| | Model 1a | | | Model 1b | | |
|---|---|---|---|---|---|---|
| | Coeff. | SE | Sig.[1] | Coeff. | SE | Sig. |
| Gender (m = 0, f = 1) | −0.6394 | 0.0787 | *** | −0.6488 | 0.0791 | *** |
| Disability (2011) | −0.0525 | 0.1619 | | −0.0316 | 0.2061 | |
| LLTI (2001) | −0.0419 | 0.1778 | | 0.0178 | 0.1807 | |
| *Carstairs deprivation 2001 (reference = quintile 1, least deprived)* | | | | | | |
| Quintile 2, 2001 | 0.5235 | 0.1585 | *** | 0.5229 | 0.1586 | *** |
| Quintile 3, 2001 | 0.8190 | 0.1571 | *** | 0.8213 | 0.1572 | *** |
| Quintile 4, 2001 | 0.8335 | 0.1614 | *** | 0.8373 | 0.1615 | *** |
| Quintile 5, 2001 | 1.0436 | 0.1633 | *** | 1.0483 | 0.1634 | *** |
| *Carstairs deprivation 2011 (reference = quintile 5, least deprived)* | | | | | | |
| Quintile 4, 2011 | 0.5203 | 0.1584 | *** | 0.5176 | 0.1585 | *** |
| Quintile 3, 2011 | 0.5568 | 0.1602 | *** | 0.5523 | 0.1602 | *** |
| Quintile 2, 2011 | 0.7392 | 0.1604 | *** | 0.7291 | 0.1605 | *** |
| Quintile 1, 2011 | 0.8793 | 0.1640 | | 0.8657 | 0.1641 | *** |
| *Household type 2001 (reference = married parents)* | | | | | | |
| Individuals | 0.5815 | 1.0425 | | 0.5799 | 1.0482 | |
| Single parent | 0.2367 | 0.0911 | ** | 0.2334 | 0.0912 | ** |
| Cohabiting parents | 0.3271 | 0.1207 | ** | 0.3326 | 0.1209 | ** |
| Parental LLTI, 2001 | 0.2080 | 0.0977 | * | 0.2062 | 0.0978 | * |
| Ethnic group, 2001 (white = 0, non-white = 1) | −0.4555 | 0.3240 | | −0.4529 | 0.3241 | |
| *Health conditions 2011 (reference = no condition)* | | | | | | |
| Blindness | | | | 0.0218 | 0.5254 | |
| Deafness | | | | 0.3676 | 0.3998 | |
| Learning disability | | | | −1.2622 | 1.0307 | |
| Learning difficulty | | | | 0.1004 | 0.1740 | |
| Developmental disorder | | | | −0.3988 | 0.3224 | |
| Physical disability | | | | −0.6475 | 0.5363 | |
| Mental health | | | | 0.6045 | 0.2734 | * |
| Long-term illness | | | | 0.0145 | 0.1686 | |
| Other condition | | | | −11.0152 | 252.10 | |
| Constant | −4.8419 | 0.3532 | *** | −4.8381 | 0.3534 | *** |
| *n* observations | 20,143 | | | | | |

*Note*: [1]*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
*Source:* Scottish Longitudinal Study.

predicted probabilities for the independent variables from Model 1a remained the same, and as before the intercept probability was 0.008 (Model 1b goodness-of-fit: $\chi^2 = 328.74$, $p < 0.0001$).

It can be seen that, as in Model 1a, there was no increased probability of early leaving due to disability at 2011 or LLTI at 2001. Of the nine health conditions, only the mental health condition indicator was significantly predictive of early disengagement: visual impairment, $\beta = 0.022$, n.s.; hearing impairment, $\beta = 0.368$, n.s.; learning disability, $\beta = -1.262$, n.s.; learning difficulty, $\beta = 0.100$, n.s.; developmental disorder,

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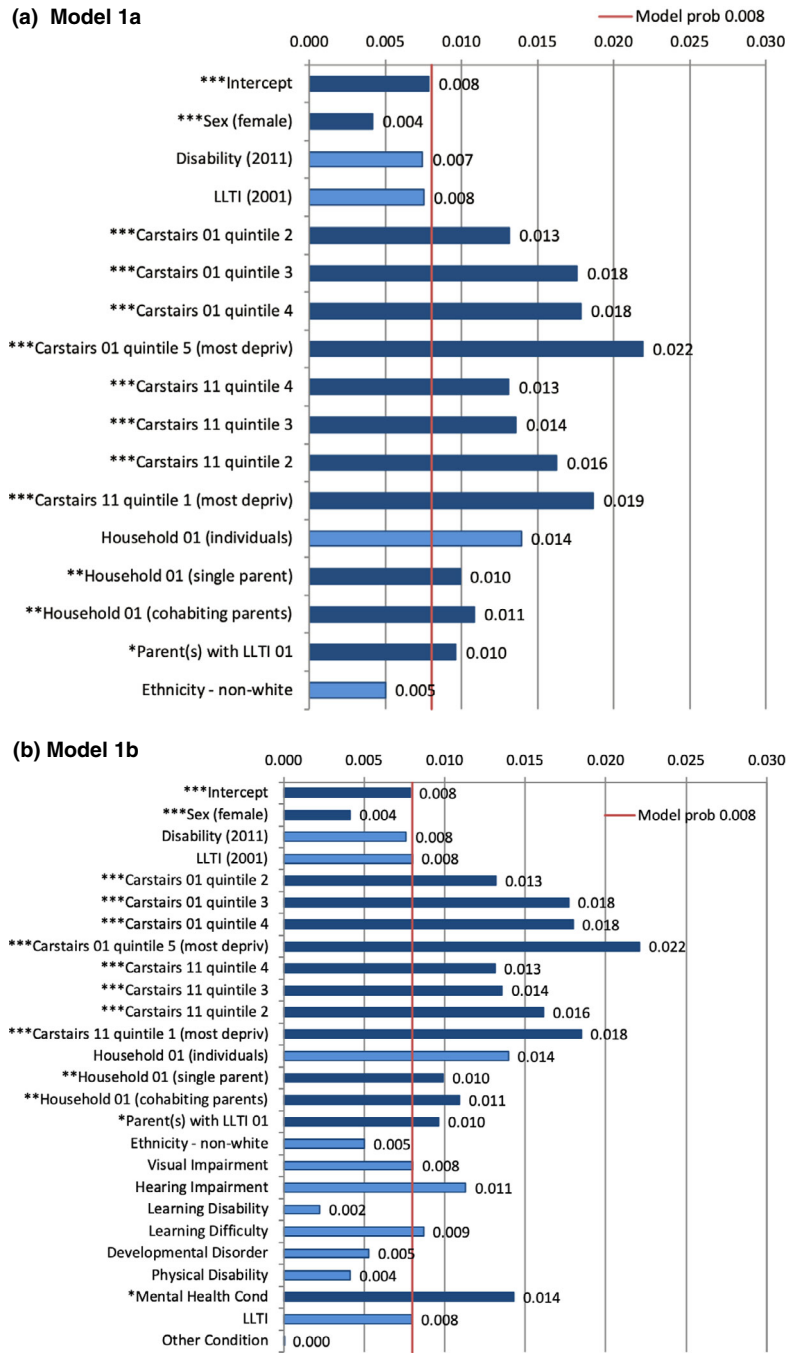


Figure 1. Predicted probability of leaving school early: (a) Model 1a; (b) Model 1b- Engagement. Probability of leaving school early. The intercept (and vertical line) represents the probability of the model reference categories: male, no disability (2011), no LLTI (2001), least deprived Carstairs OA quintile (2001, 2011), living in a married family at 2001, no parents with LLTI at 2001, ethnicity white, no health condition (2011). $*p < 0.05$, $**p < 0.01$, $***p < 0.001$
*Source*: Scottish Longitudinal Study [Colour figure can be viewed at wileyonlinelibrary.com]

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$\beta = -0.399$, n.s.; physical disability, $\beta = -0.648$, n.s.; mental health condition, $\beta = 0.605$, $p < 0.05$; LLTI, $\beta = 0.015$, n.s.; other condition, $\beta = -11.015$, n.s.

It is apparent that most types of disability were not significant predictors of leaving school before or at age 16, however children with mental health conditions were shown to be at particular risk of early leaving. The observed deprivation gradients in these models show that the more deprived an area of residence is, the less likely a child is to complete the upper stages of secondary education. This is seen to be true of both the area where the child lived in 2001 in early childhood, and in 2011—deprivation matters across childhood.

*Model 2. Expectation*

Models 2a and 2b explored whether children were registered to sit at least one Higher examination, taken as a proxy for their expected academic achievement (see above). Independent variables for Model 2a were as for Model 1a. Model coefficients and statistics are shown in Table 4 and predicted probabilities are provided in Figure 2 (Model 2a goodness-of-fit: $\chi^2 = 711.14$, $p < 0.0001$).

The results of Model 2a show that the probability of being registered to sit Highers was significantly lower for children with an LLTI at 2001 or disability at 2011 ($\beta = -0.258$, $p < 0.01$; $\beta = -0.632$, $p < 0.001$, respectively). A deprivation gradient was observed for 2001 and for those in the most deprived Carstairs quintiles at 2011. Children from single-parent or cohabiting-parent families at 2001 were significantly less likely to be registered to sit any Highers ($\beta = -0.262$, $p < 0.001$; $\beta = -0.292$, $p < 0.001$), as were those with a parent with health problems at 2001 ($\beta = -0.143$, $p < 0.01$). Children from non-white ethnic groups were significantly more likely to be registered for Highers ($\beta = 0.290$, $p < 0.01$).

As before, the model was repeated including each 2011 Census health condition as additional independent variables (Model 2b) to check how individual conditions relate to our dependent variable (Model 2b goodness-of-fit: $\chi^2 = 758.63$, $p < 0.0001$). Due to very small sample sizes, it was necessary to drop 'learning disability' and 'other condition' from this model. This analysis found that children with learning difficulties or developmental disorders were significantly less likely to be registered for Highers than those children without such difficulties (learning difficulties, $\beta = -0.514$, $p < 0.001$; developmental disorders, $\beta = -0.342$, $p < 0.05$). Although Model 1b showed that children with mental health conditions were more likely to leave school early, they were not seen to be less likely to be registered to sit Highers if they stayed on at school. No other health conditions showed a significantly reduced chance of being registered.

Whereas Model 1 found no effect of LLTI or disability on the probability of leaving school early, Model 2 demonstrates that these children were significantly less likely to be registered to sit advanced examinations (LLTI, $\beta = 0.102$, $p < 0.05$, disability, $\beta = -0.413$, $p < 0.001$). Model 2b revealed that children with learning difficulties or developmental disorders were much less likely to be registered for Highers than their peers, perhaps as a consequence of the nature of their disabilities. As in Models 1a and 1b, deprivation at both time points had a significant impact on education outcomes, not just deprivation in early childhood.

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Table 4. Models 2a, 2b—Expectation (probability of being registered to sit Higher Grades)

| | Model 1a | | | Model 1b | | |
|---|---|---|---|---|---|---|
| | Coeff. | SE | Sig.[1] | Coeff. | SE | Sig. |
| Gender (m = 0, f = 1) | 0.2868 | 0.0331 | *** | 0.2764 | 0.0332 | *** |
| Disability (2011) | −0.6324 | 0.0895 | *** | −0.4129 | 0.1115 | *** |
| LLTI (2001) | −0.2580 | 0.0988 | ** | −0.2027 | 0.1019 | * |
| *Carstairs deprivation 2001 (reference = quintile 1, least deprived)* | | | | | | |
| Quintile 2, 2001 | −0.0330 | 0.0474 | | −0.0346 | 0.0475 | |
| Quintile 3, 2001 | −0.2247 | 0.0530 | *** | −0.2273 | 0.0530 | *** |
| Quintile 4, 2001 | −0.3560 | 0.0582 | *** | −0.3615 | 0.0583 | *** |
| Quintile 5, 2001 | −0.6719 | 0.0654 | *** | −0.6774 | 0.0655 | *** |
| *Carstairs deprivation 2011 (reference = quintile 5, least deprived)* | | | | | | |
| Quintile 4, 2011 | 0.0185 | 0.0490 | | 0.0171 | 0.0491 | |
| Quintile 3, 2011 | −0.0767 | 0.0532 | | −0.0758 | 0.0533 | |
| Quintile 2, 2011 | −0.1892 | 0.0576 | *** | −0.1893 | 0.0577 | *** |
| Quintile 1, 2011 | −0.2398 | 0.0639 | *** | −0.2377 | 0.0640 | *** |
| *Household type 2001 (reference = married parents)* | | | | | | |
| Individuals | −0.6631 | 0.6456 | | −0.5678 | 0.6499 | |
| Single parent | −0.2620 | 0.0471 | *** | −0.2616 | 0.0472 | *** |
| Cohabiting parents | −0.2922 | 0.0658 | *** | −0.2892 | 0.0659 | *** |
| Parental LLTI, 2001 | −0.1431 | 0.0503 | ** | −0.1439 | 0.0504 | ** |
| Ethnic group, 2001 (white = 0, non-white = 1) | 0.2902 | 0.1067 | ** | 0.2926 | 0.1069 | ** |
| *Health conditions 2011 (reference = no condition)* | | | | | | |
| Blindness | | | | −0.5565 | 0.2994 | |
| Deafness | | | | −0.3414 | 0.2353 | |
| Learning difficulty | | | | −0.5135 | 0.0944 | *** |
| Developmental disorder | | | | −0.3424 | 0.1753 | * |
| Physical disability | | | | −0.0793 | 0.2448 | |
| Mental health | | | | −0.3196 | 0.1785 | |
| Long-term illness | | | | 0.0362 | 0.0786 | |
| Constant | −0.2463 | 0.1116 | * | −0.2179 | 0.112 | * |
| *n* observations | 18,036 | | | | | |

*Note*: [1] *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
*Source:* Scottish Longitudinal Study.

### *Model 3. Attainment*

The third model looked at academic attainment, with gaining at least 3 A–C grade Higher qualifications as the dependent variable (see above). Independent variables were as for Models 1 and 2, and the coefficients and predicted probabilities can be seen in Table 5 and Figure 2 respectively (Model 3a goodness-of-fit: $\chi^2 = 273.84$, $p < 0.0001$). Model 3a did not find any lower probability of achieving three good Highers for children with a disability at 2011 ($\beta = -0.272$, n.s.), however, those with an LLTI in early childhood did show a significantly lower probability of high attainment compared to the model reference ($\beta = -0.460$, $p < 0.01$). Deprivation gradients were apparent for 2001 area deprivation quintiles only, with children being significantly less likely to achieve three Highers the more deprived the area they lived

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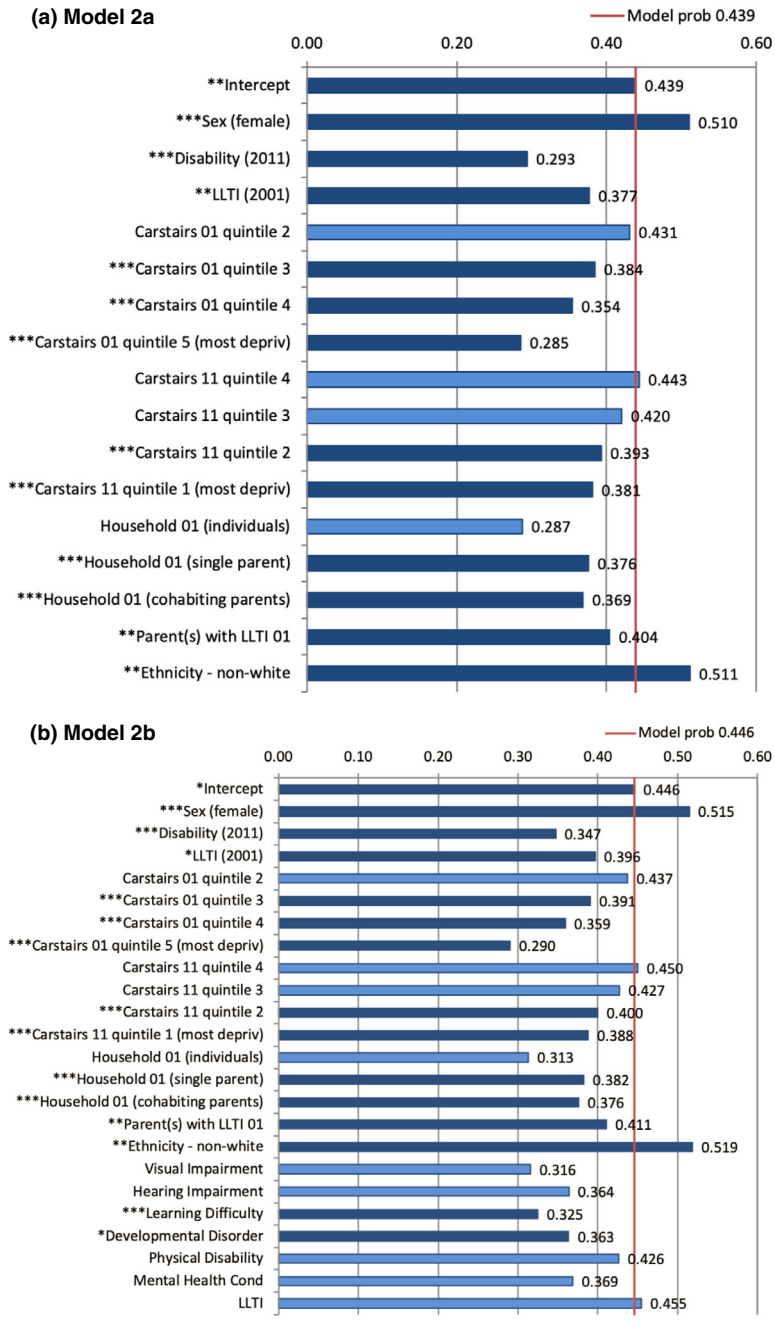


Figure 2. Predicted probability of being registered to sit at least one Higher: (a) Model 2a; (b) Model 2b- Expectation. Probability of being registered to sit Higher Grades. The intercept (and vertical line) represents the probability of the model reference categories: male, no disability (2011), no LLTI (2001), least deprived Carstairs OA quintile (2001, 2011), living in a married family at 2001, no parents with LLTI at 2001, ethnicity white, no health condition (2011). $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

*Source*: Scottish Longitudinal Study [Colour figure can be viewed at wileyonlinelibrary.com]

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in during early childhood. Children living in single-parent families or with cohabiting parents at 2001 were less likely to achieve three Highers (single-parent family, $\beta = -0.254$, $p < 0.01$; cohabiting parents, $\beta = -0.463$, $p < 0.001$), as were those who had a parent with an LLTI at 2001 ($\beta = -0.181$, $p < 0.05$). Non-white children were more likely to achieve 3 A–C grades compared to those from white ethnic groups ($\beta = 0.502$, $p < 0.01$).

Model 3b repeated the analysis with the addition of 2011 Census health conditions as for Model 2b (Model 3b goodness-of-fit: $\chi^2 = 888.70$, $p < 0.0001$). As can be seen from Table 5 and Figure 3, once the separate conditions were added to the model, the influence of LLTI in early childhood remained ($\beta = -0.515$, $p < 0.01$), and of the individual health conditions at 2011 only children with learning difficulties showed a significant disadvantage ($\beta = -0.637$, $p < 0.001$).

Models 3a and 3b show that LLTI in early childhood was a significant hinderance to advanced scholastic achievement for our sample, and that children at secondary school with learning difficulties had a much lower chance of achieving this target than their peers. This may be due at least in part to the earlier observation that children with learning difficulties were significantly less likely to be registered to sit any Higher Grades. The deprivation gradients show that only area deprivation in early childhood was related to academic results, and not the area of residence in adolescence.

For each of the models above, interactions of disability with sex, household type and deprivation were tested, but were not significant and so are not reported here.

## Discussion

These analyses have demonstrated new and interesting findings in relation to disability and secondary schooling outcomes. By examining multiple types of health condition, we have been able to identify specific subgroups of children with disabilities who are at higher risk of failing to complete secondary schooling with advanced qualifications. These associations were robust to inclusion of the socioeconomic correlates of education outcomes in our models.

As discussed in the Introduction, engagement has not been widely explored in the research literature on disability and education, despite being identified as a risk factor for early leaving (European Commission/EACEA/Eurydice/Cedefop, 2014). The widely reported findings of educational inequalities for children with disabilities (e.g. Department for Education, 2010; Coulter & Madden, 2011; The Scottish Government, 2014a, 2017a) might lead to a prediction that disabled children would be more likely to leave school early, but the present analyses show that these children were no less likely than their peers to leave school as soon as possible.

Once we included a breakdown of health conditions, the only category of disability significantly related to leaving school early was mental health problems, and early leaving was the only one of our outcomes for which this group showed a disadvantage. This appears to indicate that the education system is not successfully supporting children with mental health problems in a way that helps them to be able to cope with school and encourages them to stay on to the senior years. This is supported by a small qualitative study by Ramsdal *et al.* (2018) who interviewed young people with mental ill-health, half of whom had dropped out of school and half of whom were

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Table 5. Models 3a, 3b—Attainment (probability of gaining at least 3 A–C grade Highers)

| | Model 3a | | | Model 3b | | |
|---|---|---|---|---|---|---|
| | Coeff. | SE | Sig.[1] | Coeff. | SE | Sig. |
| Gender (m = 0, f = 1) | 0.1555 | 0.0562 | ** | 0.1594 | 0.0564 | ** |
| Disability (2011) | −0.2715 | 0.1640 | | −0.2633 | 0.2063 | |
| LLTI (2001) | −0.4595 | 0.1818 | ** | −0.5151 | 0.1887 | ** |
| *Carstairs deprivation 2001 (reference = quintile 1, least deprived)* | | | | | | |
| Quintile 2, 2001 | −0.3212 | 0.0782 | *** | −0.3228 | 0.0784 | *** |
| Quintile 3, 2001 | −0.5262 | 0.0883 | *** | −0.5310 | 0.0886 | *** |
| Quintile 4, 2001 | −0.8893 | 0.0980 | *** | −0.9041 | 0.0984 | *** |
| Quintile 5, 2001 | −1.0249 | 0.1129 | *** | −1.0372 | 0.1133 | *** |
| *Carstairs deprivation 2011 (reference = quintile 5, least deprived)* | | | | | | |
| Quintile 4, 2011 | −0.0484 | 0.0809 | | −0.0483 | 0.0811 | |
| Quintile 3, 2011 | −0.0525 | 0.0888 | | −0.0564 | 0.0890 | |
| Quintile 2, 2011 | 0.0274 | 0.0973 | | 0.0324 | 0.0975 | |
| Quintile 1, 2011 | −0.0259 | 0.1073 | | −0.0209 | 0.1075 | |
| *Household type 2001 (reference = married parents)* | | | | | | |
| Individuals | 0.0696 | 1.2278 | | 0.0512 | 1.2279 | |
| Single parent | −0.2535 | 0.0813 | ** | −0.2504 | 0.0815 | ** |
| Cohabiting parents | −0.4633 | 0.1156 | *** | −0.4617 | 0.1158 | *** |
| Parental LLTI, 2001 | −0.1812 | 0.0875 | * | −0.1849 | 0.0878 | * |
| Ethnic group, 2001 (white = 0, non-white = 1) | 0.5016 | 0.1808 | ** | 0.4825 | 0.1813 | ** |
| *Health conditions 2011 (reference = no condition)* | | | | | | |
| Blindness | | | | 0.4606 | 0.5709 | |
| Deafness | | | | 0.4471 | 0.4437 | |
| Learning difficulty | | | | −0.6373 | 0.1713 | *** |
| Developmental disorder | | | | 0.3130 | 0.3313 | |
| Physical disability | | | | 0.0892 | 0.4658 | |
| Mental health | | | | −0.3726 | 0.3331 | |
| Long-term illness | | | | 0.0933 | 0.1380 | |
| Constant | 1.2351 | 0.1885 | *** | 1.2296 | 0.1891 | *** |
| *n* observations | 5,500 | | | | | |

*Note*: [1] *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
*Source:* Scottish Longitudinal Study.

about to complete a college course. Those children who had dropped out of school cited a lack of social and academic support as a key reason for leaving, whilst those who were now in college cited good support as one of the key factors that had helped them to cope with school and to succeed academically. In 2017, both the UK and Scottish Governments outlined strategies to increase mental health support within schools (Department of Health and Department for Education, 2017; The Scottish Government, 2017b; Young Minds, 2017), and it would be an interesting test of the effectiveness of such initiatives to repeat our analyses with 2021 Census data.

Our second set of models explored whether children were registered to sit advanced examinations, as a proxy for *expectation* of academic achievement. LLTI in early childhood and disability in adolescence were both linked to a significantly reduced probability of being registered to sit any Highers, and children with learning

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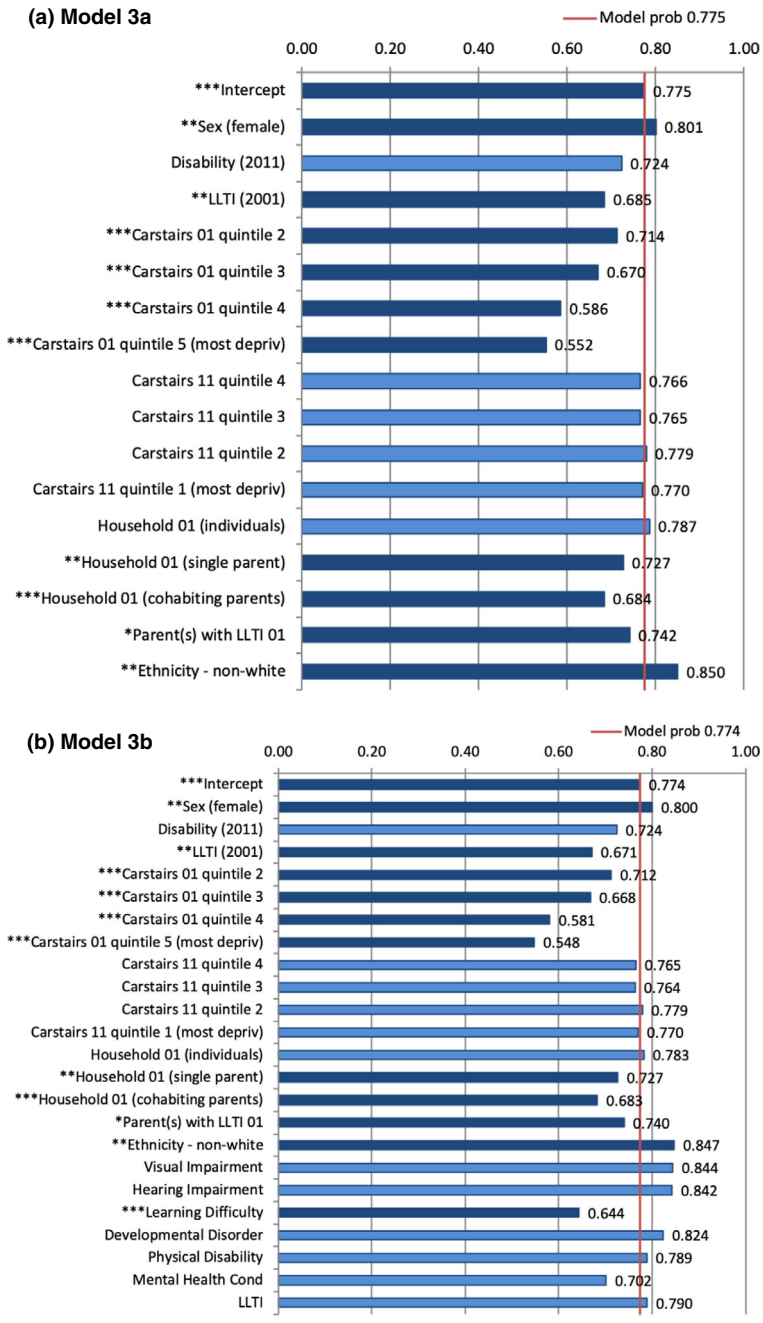


Figure 3. Predicted probability of achieving at least 3 A–C grade Highers: (a) Model 3a; (b) Model 3b- Expectation. Probability of being registered to sit Higher Grades. The intercept (and vertical line) represents the probability of the model reference categories: male, no disability (2011), no LLTI (2001), least deprived Carstairs OA quintile (2001, 2011), living in a married family at 2001, no parents with LLTI at 2001, ethnicity white, no health condition (2011). $*p < 0.05$, $**p < 0.01$, $***p < 0.001$

*Source*: Scottish Longitudinal Study [Colour figure can be viewed at wileyonlinelibrary.com]

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difficulties and developmental disorders were the only subgroups to show a significantly lower probability of being registered. This result tallies with research by Eisenberg and Schneider (2007) and Ek *et al.* (2011), who suggest that children with disabilities, and learning problems in particular, are at risk of underachieving academically due to underestimation of their ability. These findings around low expectations were also supported by our third set of analyses, which demonstrated that children with disabilities who were registered to sit Highers were no less likely than their peers to achieve three good passes (roughly equivalent to three AS level passes in England), and exploring the effects of different health conditions showed that only those children who had learning difficulties were significantly less likely to reach this level of attainment.

At first glance this result appears to contradict surveys and reports which show lower levels of qualifications being achieved by children with disabilities, however this discrepancy might be explained by differences in methodology. The current study has sought to identify children based on their reported level of day-to-day impairment, and to create a measure as close as possible to the Equality Act definition. Government statistics, in contrast, tend to use measures of SEN as a proxy, which may not capture all conditions equally well (Cohen *et al.*, 1995; Payne & Saul, 2000; Keil *et al.*, 2006; Wright *et al.*, 2016). In Scotland, Additional Support Needs eligibility is broad, covering all those requiring additional support due to 'learning environment, family circumstances, disability or health need, and social and emotional factors' (The Scottish Government, 2010). This inclusive approach makes the measure a poor proxy for disability, since it includes non-health barriers such as having English as a second language, being looked after and struggling at school due to family bereavement or bullying. A second key methodological difference is that the present analyses employed a longitudinal rather than a cross-sectional design, which allowed us to control for additional contextual factors such as deprivation, health, ethnicity and parental health in early childhood. The finding that overall disability did not lead to a reduced probability of achieving good qualifications is encouraging, and suggests that the Scottish education system is providing opportunities for pupils with disabilities.

Because of our different methodology, it is hard to say whether our findings point to something unique in the Scottish system. A potential direction for future research would be to conduct a similar analysis using data from the Northern Ireland Longitudinal Study, since the Northern Ireland 2011 Census included a detailed breakdown of health conditions similar to that in the Scottish 2011 Census.

Through the use of longitudinal comparisons, we have also provided evidence of a critical phase for educational attainment. The results show that disability and area deprivation in early childhood have a significant impact on later achievement, whereas deprivation in adolescence was not a significant risk factor for poorer results. Disability and area deprivation at the two time points were equally predictive of early school leaving and of being registered to sit Highers, suggesting that this critical phase does not influence all educational outcomes equally. It is clear that interventions for children in these higher-risk groups should be targeted most intensively during early primary schooling.

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Our measures of family circumstances were not measured at both 2001 and 2011 since we were primarily interested in their effects on later outcomes, but it was shown that family composition in early childhood—living with a single or cohabiting parents—and having a parent with long-term health problems were both key independent risk factors for all of our measures. Along with disability, family circumstances are recognised by the new Scottish Government Mental Health Strategy and the UK Government Green Paper on mental health provision, and so it is hoped that their effects on education outcomes will be reduced in future (Department of Health and Department for Education, 2017; The Scottish Government, 2017b).

There were several limitations to our study. Because we used census measures in younger childhood and then in adolescence, it was not possible to take into account circumstances and experiences which took part in the intervening period, and which may also have had some impact on our outcomes (e.g. changes in family circumstances or adverse life experiences). However, we were able to make some control for this by including measures of area deprivation and disability at both time points.

The effect of missing data is always a consideration in using national surveys, however as described in the Methods section above, the fact that the SLS relies on the national census as its core dataset means that it has much higher response rates than other sources such as sample surveys. Patterns of key demographics were compared for the cases included in our models against those excluded due to missing values (data available from the authors on request). The demographic pattern of missing cases from our model followed an expected distribution, with lower response rates for those living in more deprived areas or in single-parent households. It is possible that the significant effects of these variables in our models would have been greater if complete data for these cases had been available. Importantly, there was only a very small difference in the percentage of children with disability or LLTI between our model and the missing cases, and so we are confident that the missing data have not affected our main conclusions around the effects of disability on educational outcomes.

Another limitation was the use of self-reported data, which in this case is more likely to have been reported by parents rather than the children themselves. As noted in the Introduction, measures of self-reported health are sensitive to various factors such as socioeconomic status and religious denomination, and may favour some health conditions more than others (Payne & Saul, 2000; O'Reilly & Rosato, 2010; Young *et al.*, 2010; Wright *et al.*, 2016; Black *et al.*, 2017). Whilst this should always be borne in mind when using self-reported measures, we hope that the inclusion of a measure of specific health conditions helped to improve the accuracy of our disability measure. For our population, a further complication is that it is very likely that it was the children's parents/carers who completed their information on the census forms, particularly at the 2001 Census. Research has shown that parents tend to over-estimate the effects of impairments on their children's Quality of Life (Longo *et al.*, 2017; Ólafsdóttir *et al.*, 2018), and so it is possible that our sample includes children who would not have reported themselves as limited by their condition on a day-to-day basis. The use of more objective measures, such as prescription and health service data, is one way to address the issue of subjective and self-reported measures (e.g. Fleming *et al.*, 2017), however this approach only captures those using health services and may lead to a narrower definition of impairment, since children need to be more

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severely impaired and for a longer period in order to be diagnosed and receive medical treatment. A similar issue arises with using SEN as a proxy since, as noted above, children without official diagnosis, or who have more complex needs, may not be accurately recorded in the data. A preferred method might be one similar to that used by Doebler *et al.* (2017), who compared objective medical data alongside subjective self-reported health measures for the same population, though again this may lead to an underestimation of certain conditions and those conditions which have yet to be officially diagnosed or treated.

## Summary and conclusions

By utilising a longitudinal design with control for background variables and a finer measure of disability, this study has demonstrated that the prevailing view of children with disabilities performing worse than their non-disabled peers in secondary school may in part be an artefact of the methodology and definitions used. Contrary to the evidence of snapshot statistics and surveys, we did not find that, as a whole, children with disabilities were more likely to disengage from secondary schooling as early as possible, nor did we find that they were less likely to achieve an advanced level of attainment. However, we did demonstrate that LLTI in early childhood was a significant risk factor for poorer academic achievement. In addition, family composition and area deprivation in early childhood were significantly related to poorer outcomes in all three models. The idea of a critical phase in early childhood for later academic attainment is supported by our findings.

It was also clear that children with certain subtypes of disability face greater barriers in education. Children with mental health problems clearly require additional support in order to maintain engagement with the school system, and we support recent UK government initiatives aiming to improve support for this group as a step towards tackling this issue. If these strategies are successful, it should be possible to see a different pattern of results in the future, with no categories of disability being at higher risk of disengagement.

A second key finding of concern was that the ability of children with disabilities is potentially being underestimated—although children with disabilities were no less likely to attain high grades, they were significantly less likely to be put forward to attempt advanced qualifications. It is vital that low and inaccurate expectations of staff and parents must not be allowed to limit the opportunities of children with disabilities. Qualitative research exploring both the experiences of children and the attitudes of parents and teachers would be invaluable in exploring the rationales behind such decisions, and in informing strategies which can challenge beliefs that might prevent children reaching their full potential.

The use of a longitudinal, rather than a cross-sectional, design is demonstrated to be important both in terms of controlling for contextual factors and in showing that the influence of risk factors such as disability and deprivation appears to have slightly different effects across childhood and adolescence. It is regrettable that so few studies have been able to exploit this methodology, and we would echo the call of the World Health Organization and World Bank (2011) that more longitudinal evidence must be produced.

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Our results illustrate the value of comparing how different subtypes of disability impact on educational outcomes. We have also shown how the measure of disability used can greatly affect the findings. It is recommended that statistical agencies and government departments seek to find an improved measure of disability for their statistics, since the use of Special Educational Needs may confound disability with behavioural and other non-health-related barriers to educational success. A misleading evidence base results in misdirected interventions; only by identifying the real issues faced by children with disabilities can they properly be addressed.

## Acknowledgements

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NOTES

[1] In Scotland prior to 2010 the measure was of Additional Support Needs (ASN), which has since been replaced by SEN. It should be noted that the criteria for being recorded as having a SEN differs between Scotland and England (for a discussion of these differences and the issues posed by them, see Riddell *et al.*, 2016). In England and Wales SEN has now been replaced by Special Educational Needs and Disability (SEND; Department for Education, 2014b; Department for Education, 2010), though the DfE statistics still report on SEN (Department for Education, 2017).

[2] 'Are your day-to-day activities limited because of a health problem or disability which has lasted, or is expected to last, at least 12 months?' with response options: 'Yes, limited a lot', 'Yes, limited a little' and 'No'.

[3] In Scotland, Higher Grade examinations are undertaken during the senior secondary stage—at approximately 15–17 years of age—and are roughly equivalent to English AS levels (Scottish Qualifications Authority, 2017).

[4] From the SLS data dictionary, level 1 for this purpose is defined as 'O Grade, Standard Grade, Access 3 Cluster, Intermediate 1 or 2, GCSE, CSE, Senior Certificate or equivalent; GSVQ Foundation or Intermediate, SVQ level 1 or 2, SCOTVEC Module, City and Guilds Craft or equivalent; Other school qualifications not already mentioned (including foreign qualifications)' (Scottish Longitudinal Study Development and Support Unit, 2017).

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