The early academic progress of children with special educational needs

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Abstract

Children with special educational needs (SEN) are known to experience lower average educational attainment than other children during their school years. But we have less insight into how far their poorer educational outcomes stem from their original starting points or from failure to progress during school. The extent to which early identification with SEN delivers support that enables children who are struggling academically to make appropriate progress is subject to debate. This is complicated by the fact that children with SEN are more likely to be growing up in disadvantaged families and face greater levels of behavioural and peer problems, factors which themselves impact attainment and progress through school. In this paper, we evaluate the academic progress of children with SEN in England, drawing on a largescale nationally representative longitudinal UK study, the Millennium Cohort Study, linked to administrative records of pupil attainment. Controlling for key child, family and environmental factors, and using the SEN categories employed at the time of data collection, we first establish that children identified with SEN in 2008, when they were age 7, had been assessed with lower academic competence when they started school. We evaluate their progress between ages 5-7 and 7-11. We found that children identified with SEN at age 7 tended to be those who had made less progress between ages 5 and 7 than their comparable peers. However, children with SEN continued to make less progress than their similarly able peers between ages 7 and 11. Implications are discussed.

Introduction

Children with Special Education Needs (SEN) and disability are well known to fare worse in terms of educational attainment during their school years, and this can have long-term consequences for their opportunities and outcomes into adulthood (Jones, 2010; Loprest & Maag, 2003). Part of the reason may lie with the nature of the SEN, for example speech, language and communication difficulties, sensory impairments, or attention deficit hyperactivity disorder (ADHD), which imply particular difficulties with educational attainment. At the same time, the aspiration of educational policy is that categorisation as SEN and consequent learning support may enable children with SEN and disability to keep up with their peers (DCSF, 2010). Nevertheless, there has been longstanding concern that the education and educational support given to children with SEN does not necessarily enable them to fulfil their potential (Aron & Loprest, 2012; Blatchford et al, 2011; Crawford & Vignoles 2010). A key issue is whether the average poorer levels of attainment in later school life of children with SEN reflect the persistence of earlier problems, or whether they reveal a failure to progress at the same rate as peers with similar early cognitive skills, which would result in a widening gap through the school years. While the former scenario would appear consistent with identification with SEN in the first place, the latter raises questions about the effectiveness of SEN support.

It could be argued that it is unreasonable to expect children identified with SEN to make the same rate of progress as their similarly able peers, especially for those with needs that particularly impede learning. However, taking the overarching – and diverse – SEN category as a whole, while we may not expect equality of attainment between children with and without SEN, it seems less evident why children with SEN who have reached a particular educational level should make less subsequent progress than other children attaining that

level, especially if they are receiving additional support. While recognising that progress is itself a complex and contested concept, as we operationalise it here it provides a reasonable indication of ongoing development and realisation of potential among children who in past eras might have been 'written off, as benchmarked against those with comparable levels of initial academic attainment.

Department for Education statistics (DfE 2015) indicate that children with SEN in England make substantially less progress between 7 and 11, than those who started out with similar scores at age 7. Yet, we still know relatively little about how progress develops over the primary school years, how it relates to cognitive skills at school entry and to different forms of SEN support, and the extent to which that support is effective in improving performance among those who are falling behind. We also lack information on the extent to which academic progress of young children with SEN is shaped by other (background) characteristics. It is these issues and gaps in our knowledge which drive this study.

Most of our evidence on the educational and cognitive outcomes of children with SEN and disability comes from their school years, and, typically their older (teenage) school years (DCSF, 2010; DfE, 2011, 2013; Keslair & McNally 2009; though see Anders et al., 2011; Crawford & Vignoles 2010). This is despite the fact that increasing weight is now put on the significance of the early years as a period when cleavages in cognitive skills emerge, and where there may be the greatest possibility for equalising opportunities and skills (Anders et al., 2011; Heckman, 2006; Siraj-Blatchford, 2010). We have extensive information on the emergence and persistence of socio-economic gaps in educational attainment both nationally and cross-nationally (Bradbury et al., 2015; Dearden et al., 2011; Sullivan et al., 2013), yet know much less about the implications for children with SEN or disability, despite the fact that children with SEN or disability are more likely to come from disadvantaged backgrounds (Anders et al., 2011; Blackburn et al., 2010; Croll, 2002; Parsons

et al., 2013). Whilst much attention has been focused on the differential academic attainment and progress of different ethnic groups, with few exceptions, there is little on how this relates to SEN or disability. There is, though, some British evidence to show that certain minority ethnic groups are either under or over represented in SEN categorisation, with this relationship varying dependent upon type of and severity of SEN (Strand & Lindsay, 2009).

Children enter the school system with a wide range of competencies. Those who start off somewhat behind may well be expected to catch up as they are introduced to formal learning. Those who do not catch up, or who fail to progress at the level of their peers are, appropriately, the targets of additional support or classification with SEN. Such classification - and in particular the (differentiated) levels of support that follow from it – might then reasonably be expected to enable them to progress at an equivalent level to their peers even if average attainment remains lower than that for other children. If *progress* still lags behind that of similarly performing children, even taking account of family background, this may suggest that SEN support is not sufficiently enabling children with SEN to fulfil their opportunities. This leads us to ask the following questions:

1. Are those children who are identified with SEN in England by age 7 more likely to be those who a) start school with lower attainment, and b) make worse progress than their equally able peers between ages 5 and 7? Is this still the case when relevant family background and other characteristics are controlled for?

2. Do children identified with SEN at age 7 catch up, make equivalent progress, or fall further behind other children between ages 7 (Key Stage 1) and 11 (Key Stage 2)? Does this vary with the level of support provided? How far can progress be linked to other individual and family characteristics?

In this paper, we address these questions using a unique, nationally representative longitudinal data set, the Millennium Cohort Study (MCS) with rich family- and child-level information, which is linked to administrative data on school assessment and test scores, the National Pupil Database for England (NPD). Using these linked data enables us to go further than existing investigations of administrative records, by incorporating relevant child and family characteristics. At the same time we can exploit the official categorisation of school pupils with SEN, as it applied at the time of the data collection; and we can evaluate progress on the basis of their school-based test scores, rather than broader measures of cognitive ability. Specifically, we are able to disentangle patterns of school attainment and progress that are associated with family background and child behaviour from those that are linked to SEN. In line with existing research on SEN and educational progress (e.g. Crawford & Vignoles, 2010), and given data constraints, we use an overarching category of SEN, rather than differentiating patterns by primary need. While this may disguise some of the specific patterns of progress for different primary needs and the potentially different ways in which family background and individual characteristics mediate SEN status (Strand & Lindsay, 2009), it nevertheless provides us with a general understanding of how educational attainment evolves within the SEN system operating at the time of the study.

Focusing on test score measures of attainment in English and maths at ages 5 (Foundation Stage Profile), 7 (Key Stage 1) and 11 (Key Stage 2), we find that children who are identified with SEN at age 7 have lower test scores, on average, at age 5 *and* make less progress between ages 5 and 7, than their comparable peers. We also find that, despite the learning support put in place by identification with SEN by age 7, they continue to make less progress that their equally able peers between ages 7 and 11. The progress gap is, however, less pronounced than at earlier ages, indicating some role for SEN support in aiding progress.

Only a limited amount of the remaining gap can be attributed to family background and individual characteristics.

Given that the NPD data do not allow us to distinguish primary need among those classified with SEN, we subject our results to a range of robustness checks using measures in the MCS data, including analysis (where sample sizes permitted) of primary need. While the MCS data uses survey-specific measures of SEN which do not precisely correspond to those used in the administrative classification of SEN, the separation by category provides the opportunity to take account of potential diversity in our findings. In the MCS analysis we exclude those with cognitive disabilities– who might be expected to make less progress, even among those who are poorly performing at age 7. We also break down our findings by the largest SEN categories in the MCS measure of SEN for additional sensitivity testing. Our findings are largely robust to these checks, which we discuss at the relevant points. We conclude that children with SEN would merit from greater targeted investment in their learning in the early years, if they are not to face cumulative disadvantage across childhood and into adult life.

Background & Policy Context

Under the terms of the UK Equalities Act 2010, children with disabilities, including SEN, are required by law to be given the same chances and opportunities for reaching their potential. Yet, despite the extensive academic and policy concern targeted at socio-economic inequalities in early years attainment, as in the work of the Child Poverty and Social Mobility Commission (e.g. Social Mobility and Child Poverty Commission, 2013), much less attention has been paid to the systematic disadvantage faced by children with SEN or disability in their early years, and how their educational experience of failure to progress in primary school may impact their subsequent attainment and life chances (though see Anders et al, 2010;

Crawford & Vignoles, 2010). There has been limited investigation of the pathways taken by young children with SEN through pre-school and primary education, and how that intersects with other child and family characteristics. This is despite the fact that children identified with SEN now make up a substantial share of schoolchildren. Indeed, the fastest increase in disability between 1975 and 2005 was among children under 16 (Prime Minister's Strategy Unit, 2005), with around 20 per cent of school-age children having SEN, of whom, around three per cent had a statement of needs (DfE 2011). It is all the more surprising, therefore, that there is a lack of detailed, nationally representative evidence that provides understanding of the early educational development of children with SEN (Powell, 2003).

At the policy level, UK education policies have drawn attention to the challenges in attainment faced by children with SEN; and the development of SEN support has evolved over time, with an emphasis on progress as much as attainment. SEN is a broad term that identifies children with needs that impact their learning, whether specific skills difficulties, such as dyslexia, communication problems, such as autism spectrum disorders, social-behavioural problems as Attention Deficit Hyperactivity Disorder or sensory or physical impairments. These specific needs are often not experienced in isolation, and it is important to acknowledge the cumulative challenges met by a significant minority of children with SEN (Parsons et al., 2013).

In 2009, the Labour Government set out a series of major policy developments to build the 21st century school system in their Schools White Paper. Most of these, it was claimed, would 'directly benefit children with SEN and improve their prospects for good progress and achievement' (Secretary of State for Children, Schools and Families). Evidence was produced to show that children with Special Education Needs had lower educational attainment and made less progress compared with children with no additional needs. Yet the discussion promoted the 'encouraging' message that the 'gap' between both measures was

decreasing over time. As the figures showed, however, children identified with SEN remained between seven and 15 times less likely than their peers to reach key national thresholds from early years through to age 16 (DCSF, 2010). Although these findings provide limited insight into patterns of progress and how they evolve following school entry, they suggest that SEN support was not delivering the sort of educational opportunities that might have been hoped.

Moreover patterns of progress implied by attainment at different ages are potentially misleading. In 2013, the Department for Education, published results that showed that just 23 per cent of children with SEN, compared to 68 per cent of children with no additional needs, achieved a good level of development in the Early Years Foundation Stage Profile (DfE, 2013). At Key Stage 1 (assessments carried out during primary school when children are age seven), 51 per cent of children with SEN were performing at the national threshold in 2012, compared to 62 per cent among those with no identified SEN. Whilst this might imply progress for children with SEN from Foundation Stage Profile (age 5), the same results showed that 45 per cent of children with SEN were *working towards* the national threshold at Key Stage 1 compared with just 4 per cent of children with no SEN (DfE, 2013). By Key Stage 2 (age 11) 94 per cent of children with no SEN were achieving at level 4 and a similar proportion were making expected progress, compared to just 47 per cent of children with SEN achieving at level 4, with 79 per cent making the progress expected from their KS1 starting points.

Educational outcomes for children identified with SEN can therefore be seen to have been poorer than those for children without SEN at various points throughout their primary education. How these patterns evolve over time for individual children is likely to be impacted not only by their needs but also by the different levels of support provided under the SEN umbrella. The current Special Education Needs and Disability Code of Practice (DfE/

DH, 2015), takes a more graduated approach to identifying and supporting pupils with SEN, than the previously distinct categories of support 'School Action' and 'School Action Plus' (DfES, 2001). For children with more complex needs, a co-ordinated assessment process and an Education, Health and Care (EHC) plan have replaced the Statement of Needs. While our analysis cannot speak directly to these changes, the findings we present on progress under the pre-2014 regime are likely to be informative in relation to the aims of the current plan.

At the time the data used in this paper were collected, children with SEN could be designated School Action, School Action plus, or could be assessed with a Statement of Needs. While all three categories imply recognition of challenges in learning and imply actions to support those needs, they were differentiated by the level of resources attached to the learning support. In particular, a statement of needs implied more challenging learning support needs and ones that could not be met within school resources. On the one hand, then, those children with 'just' school action, might be expected to be higher performing and face fewer difficulties keeping up with their peers. On the other hand, the investment represented by a Statement of Needs, while it may not have enabled children to catch up with an *average* school child without SEN, might be expected to help them to progress at an equivalent level to other similarly able children without SEN.

Crawford and Vignoles (2010) in a study of the progress of children born in 1991/2 and identified with SEN (though not Statement) at age 10, found that, compared to equivalent children, those with SEN identification showed poorer progress in cognitive skills. This was taken to suggest that SEN support for children did not facilitate their educational development. One possible explanation given for this finding was the stigma associated with designation with SEN (see also Norwich, 2009). However, the authors were evaluating progress from age 7 to age 10, with SEN status measured at age 10. It is therefore plausible that identification with SEN at age 10 was specifically focused on those who had failed to

make progress up to that point. If this was the case the association between lack of progress and SEN categorisation at age 10 would instead indicate appropriate targeting of SEN support. The importance of the connection between progress, as opposed to attainment, and evaluation with SEN, is made explicit in the most recent policy changes to the structure of support for children and young people with SEN and disability.

The Children and Families Act 2014 introduced greater emphasis on co-ordination of support across the different domains of the lives of children with SEN and disability, recognising the interplay between education and other aspects of disabled children's lives. The changes it introduced are still working their way into the data and research, and a number are focused on the end of the school career rather than the beginning (for example extension of support up to age 25 provided the young people are still in education). Nevertheless, the Act highlighted the importance of helping children with SEN to achieve the best possible educational outcomes (Council for Disabled Children, 2014). It also makes the responsibility for children with SEN and disability a proactive duty for local authorities. Particularly relevant for this study, under the Act, one of the criteria for initiating an EHC assessment is that the child has not made the expected progress.

In the light of these developments and the partial nature of existing research on early educational progress of children with SEN or disability, a better understanding of early educational progress of children with SEN can contribute to the evidence base for current and future Special Educational Needs and Disability policy, and highlight potentially fruitful points of intervention. In conducting the ensuing analysis, we take the view that this emphasis on progress rather than on attainment is an appropriate way both of identifying those who might need additional support (because they are falling behind their comparably able peers), and of monitoring the effectiveness of SEN support. If support that is put in place enables children to maintain a level of equivalent progression with their peers, then that is a positive

endorsement of a system which has been subject to substantial critique. If children continue to fall behind even with SEN support in place, it suggests that there may be further to go in supporting children with SEN. The long-term consequences of educational development in the early years makes this study of progress during primary school especially relevant.

Data and variables

Data

We use data from the multi-topic longitudinal Millennium Cohort Study (MCS), a study of approximately 19,000 babies born to families living in the UK between September 2000 and January 2002, who are followed over time (Plewis, 2007). We use data from the first five sweeps of data collection, when the children were aged around 9 months, 3, 5, 7 and 11 years. We draw on information from personal interviews and self-completion questionnaires administered to parents, a postal questionnaire of teachers at age 7 and a self-completion questionnaire completed by the child at age 7. We focus on measures of socio-demographic family characteristics; parenting; and children's academic, social, emotional and behavioural development. As the earliest of our educational outcome measures, we use Early Years Foundation Stage Profile (EYFSP) scores incorporated into the main MCS age 5 data.

During the age 7 interview, MCS parents/carers were asked for consent to link to the child's education records. Overall, consent was obtained for 93.9% of children in England. For these children, records were linked to the National Pupil Database (NPD) that holds a wide range of information about pupils who attend schools and colleges in England, and has been used extensively in research and for providing key statistics and monitoring of the education sector. We use the NPD measure on SEN status (No SEN, School Action, School Action Plus, and Statement), recorded for the children when in Year 2 in 2007-8, together

with Key Stage 1 (KS1) and Key Stage 2 (KS2) performance scores in English (Reading and Writing at KS1) and Maths. These are detailed further below.

We restrict our sample to those children who lived in England and participated in all five waves, and whose parents consented to linkage to NPD records so that we could access their Key Stage 1 and Key Stage 2 results. When accounting for missing values, our final sample size is 4,899. For additional robustness analysis, using parent or teacher reported SEN from the age 7 MCS data, we use a slightly larger sample of 5,222 children. By using the MCS measure of SEN, numbers permitting, we are also able to look at progress for specific primary needs using the primary needs measures collected in the MCS data (dyslexia, ADHD, autism spectrum disorders, behaviour problems, hearing problems, sight problems, other physical disability, speech and language problems); and to exclude from the pooled analysis those with cognitive disabilities ('learning difficulties' in the MCS classification – N=183 out of total of 683 with SEN). Note, however, that the SEN categories of primary need do not directly correspond to those used in classifying SEN in administrative data. This level of detail on primary needs is not available in the linked NPD.

Variables

Dependent variables

Our dependent variables are constructed from measures of educational attainment in English (reading and writing) and maths at ages 5, 7 and 11.

At age 5, all teachers of primary school children in England record an Early Years Foundation Stage Profile (EYFSP) score during the children's first year at school (Reception class). The profile describes the child's level of attainment at the end of 'early years' education and identifies their learning targets for the next stage of school. There are 13 scales, each divided into 9 points or descriptions of attainment. Points one to eight can be

achieved in any order as they are not necessarily incremental, but point nine of each of the thirteen scales can only be achieved when all the previous eight points in that scale have been achieved. The overall score (range 0 – 117) is a composite of scores on the 13 separate scales, which include, for example, social development, emotional development, physical development, knowledge and understanding of the world. We constructed separate English and maths FSP scores. English scores are based on two of the 13 scales, reading and writing, with a score range of 0-18. The measures cover aspects such as whether the child has developed an interest in books, can recognise a few familiar words, can hold a pencil and use it effectively to form recognisable words, or can form simple sentences, sometimes using punctuation. Maths combines three scales with a score range of 0-27. It gives a profile score for mathematics including number and counting, calculating and shape, space and measures.

As children progress through school, those in state-funded schools in England complete 'Key Stage' tests. Performance in 'Key Stage' tests is graded at 'attainment levels' ranging between 1 and 5, with 1 being the lowest. Attainment levels are also subdivided, e.g. 2c, 2b or 2a to help teachers monitor how children are progressing within a school year. Performance levels are converted into points, as detailed in Figure 1. Key Stage 1 (KS1) tests are completed in Year 2 when children are age 7, when they are expected to be working at Level 2 (2C to 2A). The tests are marked by the class teacher, although some papers may be sent to the local education authority (LEA) to be moderated to make sure marking is consistent. At Age 11, at the end of primary school education in Year 6, children sit the Key Stage 2 (KS2) tests. These are assessed in a similar way to KS1. At KS2, children are expected to be working at Level 4. Children sat KS1 tests in Reading, Writing, Maths and Science and KS2 tests in English and Maths. We combined Reading and Writing to make an average 'English' score, ranging from 3-21. KS1 maths scores ranged from 3-27. We do not

use KS1 Science as this was not assessed at KS2. A more 'finely graded' continuous score was available for the KS2 assessments. These ranged from 9-35 for both English and Maths.

We use these measures of *attainment* in English and Maths at the three ages to construct measures of *progress* between ages 5-7 and 7-11. These progress measures are described further below.

Figure 1: Key Stage levels and equivalent points.

Level	W*	L1	L2 c	L2 b	L2 a	L3 c	L3 b	L3 c	L4 c	L4 b	L4 c	L5 c	L5 b	L5 a
Points	3	9	13	15	17	19	21	23	25	27	29	31	33	35

*W = working towards Level 1

Key explanatory variable

Our key explanatory variable is the four-category SEN status measure recorded in the KS1 NPD when children were in Year 2: No SEN, School Action, School Action Plus and Statement of Needs (DfES, 2001. We focus on SEN measured at KS1 (age 7), as our research questions aim to establish a) how identification with SEN at age 7 is linked to progress between ages 5 and 7; and b) how the implementation of varying levels of SEN support through the different forms of SEN categorisation at age 7 is implicated in subsequent progress up to KS2 (age 11).

School Action (SA) applies when there is evidence that a child is not making progress at school and there is a need for action to be taken to meet their learning targets. SA can include the involvement of extra teachers and may also require the use of different learning materials, special equipment or a different teaching strategy. School Action Plus (SA+) is used where SA has not been able to help the child make adequate progress. At SA+ the school will seek external advice from the LEA's support services, the local Health Authority or from Social Services. As well as the use of external services, SA+ requires more detailed planning of interventions for children whose progress has been limited. A Statement of Needs

(Statement) is a formal document detailing a child's special educational needs and the help that will be given to a child. A statement is only necessary if the school is unable to meet a child's needs on its own. We therefore know the evaluation of the extent of the child's SEN, but the available data do not detail what the specific needs are. For this reason we could not exclude particular categories of children who might reasonably be expected to struggle to maintain equivalent levels of progress, even with support in place, such as those with learning difficulties.

For robustness analysis, as noted above, we therefore used parent or teacher report of No SEN, SEN or Statement in the MCS data at age 7 (wave 4). While it did not exactly correspond to the NPD measure, and consisted of just two categories, SEN and Statement, it additionally identified the nature of the educational need. We could therefore construct a measure that excluded those children identified as 'gifted and talented' or with 'learning difficulties', as well as explore our findings for subsamples of those with different needs, as outlined above in the data section. The results from these robustness analyses are discussed further below, but were largely consistent with the analysis of the NPD SEN categories.

Covariates

An advantage of using the linked MCS-NPD data is that we can include a range of variables that have been found to be significantly associated with academic achievement and/or disability and SEN in previous research. These can be separated into child characteristics, family background, and environmental context. All covariates were measured prior to the progress outcome (i.e. 9 months to 5 for progress by age 7 and 9 months to 7 for progress by age 11).

Child characteristics

Apart from including a child's gender and ethnicity in all models, measures with an established association with SEN (Strand & Lindsay, 2009), we also control for age. Academic assessments at school are carried out at the end of the academic year, and it is well known that performance on these tests varies according to whether children are 'old' or 'young' for their year (Crawford et al., 2014). We therefore include the season (term) they were born in to take account of the age of the child relative to other children when they were being assessed. While, it might not be expected that SEN would differ with month of birth, we know that children who are young for their year are, nevertheless, more likely to be identified with SEN (Anders et al., 2011; Wallingford & Prout, 2000).

Behavioural problems are associated both with poorer educational performance and with classification with SEN (AUTHORS. 2014; Keslair & McNally, 2009; Moses, 1982). We therefore include a measure of the child's behaviour problems derived from the Strengths and Difficulties Questionnaire (SDQ). The SDQ is widely validated cross-nationally and cross-culturally for use in community settings (Goodman, 1997). The SDQ was completed by the child's main carer in all surveys from age 3. It comprises 25 attributes, both positive and negative, organized into five five-item scales (conduct problems, peer relationship problems, hyperactivity/inattention, emotional symptoms and prosocial behaviour). For each negative attribute, the parent is asked to say whether it is 'not true' (0), 'somewhat true' (1) or 'certainly true' (2) about their child's behaviour, with scores reversed for positive attributes. The four 'problem' scales can be summed to provide a measure of 'total difficulties', with a higher score representing more problems. We use this total difficulties score.

Family background

Family socio-economic situation was captured in three ways: parental education, income poverty and lone parenthood. There is extensive research demonstrating that early

educational attainment differs according to these measures, though much of the lone parent

effect is driven by income (Sullivan et al., 2013). In addition, disabled children or children

identified with SEN are also likely to come from more disadvantaged backgrounds (Anders et

al., 2011; Blackburn et al., 2010; Parsons et al., 2013). Parental education was based on the

highest qualification held by a parent living in the household when the child was 9 months

old (sweep one). Qualifications were grouped according to the national qualification

framework levels, and were rated on a 5-point scale, ranging from no qualifications to level 4

or 5, which equates to having a first degree or higher. Income poverty was measured as the

number of sweeps (0-3 for age 7 outcomes or 0-4 for age 11 outcomes) that the family's

household income was less than 60 per cent that of adjusted median household income.

Similarly, lone parenthood was captured as the number of sweeps (0-3 or 0-4) that the child

was living in a lone parent household. While it was beyond the scope of this paper and our

data to disentangle the ways in which family background and child characteristics are linked

to different primary needs, and the implications for patterns of progress across these primary

needs, since we know that these factors are associated both with classification with an

overarching SEN and with educational attainment, it is important that we take account of

them in our models. However, it is possible that the failure to distinguish the specific

pathways for different primary needs attenuates some of their potential to mediate the impact

of SEN classification on progress.

Environmental context

Two measures of context were included: home learning environment and bullying

victimisation. While it might also have been relevant to have considered school type, our data

did not allow us to distinguish special school provision.

While SEN and childhood disability may make parenting more challenging (Kelly & Barnard, 2000), a positive early home-learning environment can influence a child's educational progress and reduce at least some of the negative effect of their disability or the chances that they will be identified with SEN (Anders et al., 2011; Sammons et al., 2003). Longer term effects of a child's early home learning environment and the skills learnt in the first three years have also been identified (Sammons et al., 2007; Pungello et al., 2010). For a measure of home learning environment, we utilised a scale derived from measures when the child was age 3 (wave 2), covering parental activities with the child – reading to the child, teaching him/her numbers etc. For further details see de la Rochebrochard (2012).

In their meta-analysis, Nakamoto and Schwartz (2008) identified a small negative association between being a victim of bullying in school and educational outcomes. There is also a developing body of research on the associations between disability / SEN and bullying victimization (Connors & Stalker, 2002; Watson et al., 1999; Sweeting & West 2001; Chatzitheochari et al.,2015). At age 7, children were asked in the self-completion questionnaire how often do other children bully you, with three response options: never, some of the time, and all of time.

Analytical approach

The appropriate measurement of academic progress is not straightforward. Where a common measurement is recorded at two time-points, a typical approach is to control for the first measure in exploring associations with the second measure: the lagged dependent variable approach (see e.g. Anders et al., 2011; Keslair & McNally, 2009; Sullivan et al., 2013). However, this approach, by construction, assumes that different groups have common starting points, and hence is driven by differences at the second time point (Allison, 1990). Such an assumption of a common initial position may be implausible in many common applications

of lagged dependent variable models, such as those comparing across socio-economic background. It is clearly inappropriate when studying progress of children with SEN compared to children not identified with SEN who both start and end with lower average scores (as we show below). When there are not common starting points, lagged dependent variables models can lead to the identification of different levels of change (or progress) between groups when the average gap over time has in fact remained constant (Lord's paradox).

In such circumstances measuring the change in scores between the two time points provides instead an intrinsically simple measure of whether progress is comparable across children with and without SEN, which can be extended to a multivariate context where change in score is the dependent variable. However, change scores also have their limitations, particularly when the measurement at the second time point may be causally linked to that at the first (Allison, 1990). They also require the same measure at both time points. There is also the issue of 'regression to the mean'. For example, if children with SEN have particularly low scores at the first time point, then they are more likely to experience positive change over time. However, this issue of regression to the mean, or the potential of making greater progress among those with low initial scores, should apply in general to those at the bottom of the distribution at the initial measurement point, not just those with SEN.

We therefore adopt an approach that captures the progress made by a child at the second time point relative to those who had a similar initial score – essentially a 'value added' score. A positive value added score then represents higher performance relative to their peer group and a negative value added score represents less progress relative to the initial peer group. This tells us not only if children with SEN are making progress relative to all other children but, importantly, whether they are making as much progress as other children who started off with equivalent (low) scores.

Aggregate value added scores are used to evaluate the success or quality of schools in England, since they are not contingent on the performance of the initial intake. Rather, they can demonstrate how schools with relatively poor performing intakes are – or are not – successful in improving that performance. Hence our measure maps onto that used for judging progress at policy level. The further advantage of value added scores is that they are not contingent on having precisely the same measure at both time points. Thus we can estimate differences in progress from FSP to KS1 and from KS1 to KS2 even though the assessments differ.

In this analysis we define the peer group for the purposes of calculating value added scores as those in the same 10 per cent of the distribution on the assessment at the earlier time point. For each decile group of scores at time 1, we calculated the average score at time 2. This average was then subtracted from each individuals actual time 2 score. Hence, a score at or near zero indicates the child made the 'to be expected' progress between the two 'assessments' for their decile group; a positive score indicates more progress was made than was expected; a negative score indicates that less progress was made than expected. Table 1 includes all measures included in the value added analysis.

Table 1: Educational assessment measures used for value added analysis

Time 1	Time 2
Measures at age 5	**Measures at age 7**
FSP reading and writing (English)	KS1 reading and writing (English)
FSP maths, numbers, etc	KS1 maths
Measures at age 7	**Measures at age 11**
KS1 reading and writing (English)	KS2 English
KS1 maths	KS2 maths

We first provide descriptive statistics of all the covariates included in the analysis by SEN status at age 7 and then the mean scores, across all the school based assessments from age 5, age 7 and age 11. We thereby show that *attainment* is lower at all ages for those with SEN. We then estimate patterns of *progress* by SEN status, first showing mean 'value-added' scores and

then estimating ordinary least squares (OLS) regression models of progress at age 7 and at age 11, comparing models with just SEN status with models controlling for the full set of covariates.

All analysis takes account of the complex survey design of MCS and adjusts for survey non-response using appropriate weights. Since the vast majority of MCS children are the only child in their school a multilevel framework was not required – and indeed would have been inappropriate. As noted, we do not have adequate measures of school type to control for differences between special and mainstream schools. The analysis was conducted using Stata 13.1.

Results

Descriptives of all the measures included in the analysis, by SEN status, are given in Table 2. From Table 2 we can see that boys are far more likely to be identified with additional needs, and particularly to have a Statement. This is consistent with existing administrative and research evidence on SEN (e.g. DfES, 2005; Chatzitheochari et al, 2015), and represents a statistically significant difference. Other significant differences are also in line with expectations from prior research. Younger children, that is, those who were summer born, are more likely to be identified with SEN, consistent with existing research (Anders et al., 2011; Wallingford & Prout, 2000). Children from minority ethnic groups are more likely to have a Statement, though the small sample size does not yield statistical significance. This is, however, again consistent with existing research, though Strand and Lindsay (2009) show there is variation in 'under-' and 'over-' representation for specific primary needs. Behaviour difficulties and a less positive home learning environment are also associated with identification with SEN (Fauth et al., 2014), together with lone parenthood and poverty (Anders et al., 2011; Blackburn et al., 2010; Parsons et al., 2013). Additional needs are also

associated with lower parental qualifications, with the exception of children with a Statement, where again the small sample size suggests some caution in interpreting the distribution of parental qualifications for this group.

Table 2: descriptive characteristics by SEN status

	No SEN %	SA %	SA+ %	Statement %
Gender: male	46.7	56.1*	67.8*	77.7*
Season of birth				
Autumn	26.7	21.7*	19.5*	25.1
Winter	24.6	23.3	20.8	13.7
Spring	26.0	25.6	23.2	40.8
Summer	22.8	29.4*	36.5*	20.5
Ethnicity				
White	88.8	86.8	84.6	74.8
Mixed	2.9	4.1	5.5	3.6
Indian	1.9	1.3	1.3	9.8
Pakistani/Bangladeshi	3.4	3.5	2.9	4.5
Black/Black British	1.9	3.0	4.9	7.3
Other	1.1	1.2	0.8	0
Ever Bullied?				
Never	52.8	44.4*	39.9*	33.8*
Sometimes	40.3	39.4	43.0	44.3
Always	7.0	16.3*	17.1*	22.0
Mean **SDQ** score	6.4	9.8*	11.2*	16.3*
Mean **HLE** score	26.4	24.1*	24.3*	22.0*
Parent Highest Qual				
NVQ4 / Degree +	46.5	27.1*	32.0*	45.9
Lone parent family				
Never	76.0	60.8*	61.0*	62.9
Some experience	14.1	23.5	18.5	20.2
Always	9.9	15.6*	20.5*	16.9
In Poverty				
Never	61.6	39.8*	41.8*	49.7
Some experience	22.2	26.7	27.6	23.3
Always	16.2	33.5*	30.6*	27.0
N(100%)	*4029 (81.3%)*	*588 (12.8%)*	*252 (5.2%)*	*30 (0.7%)*

*Significantly different from No SEN group at p<.05 level

Table 3 illustrates the mean attainment at ages 5, 7 and 11, by SEN status. It also identifies those differences in mean score that are statistically significantly different across SEN statuses.

Table 3: Average scores in academic assessments at ages 5, 7 and 11 by SEN status (N=4,899)

	No SEN	SA	SA+	Statement
FSP English Score range: 0-18	13.4	10.0*	9.3*	8.7*
FSP Maths Score range: 0-27	21.8	18.1*	16.9*	15.9*
KS1 English Score range: 3-21	16.8	12.2*	11.4*	10.2*
KS1 Maths Score range: 3-27	17.3	13.7*	13.0*	11.5*
KS2 English Score range: 9-35	30.1	25.7*	24.7*	21.8*
KS2 Maths Score range: 9-35	30.2	25.9*	25.3*	21.9*

Note: KS1 scores are not continuous; *Mean scores significantly different from No SEN group at p<.05 level

We see that children with SEN have lower average scores in all assessments at all three ages, with differences between groups being most marked for children identified with a Statement of Need (though we have a relatively small sample of these children). For example, the average KS1 English score at age 7 for children with No SEN was 16.8, compared to 10.2 for children with a Statement – that is a substantial 'gap' of more than 6 points. Importantly, the scores indicate that, on average, children with No SEN are working at the high end of the expected level for their age group (Level 2) whereas children with SA, SA+ or a Statement are working at Level 1, below the expected level (see Figure 1).

This information cannot, however, tell us whether children with SEN make progress in line with their peers or not. We therefore now turn to the measures of progress. Table 4 shows the average value added scores at KS1 and KS2 by SEN status, estimated as described in our Analytical approach, above. That is, rather than the mean test score for each SEN status group, as shown in Table 3, they show the mean points above or below their similarly performing peer groups' mean score.

Table 4: Average 'progress' (value added) scores by SEN status (N=4899)

	Key Stage 1 measures		Key Stage 2 measures	
	English	Maths	English	Maths
No SEN	1.15	0.49	0.07	0.12
School Action	-2.96*	-1.18*	-0.48*	-0.54*
School Action +	-3.72*	-1.52*	-1.05*	-0.43*
Statement	-5.78*	-2.75*	-3.39*	-2.85*

*Mean scores significantly different from No SEN group at p<.05 level

We see that, on average, children identified with SEN made significantly – and in some cases substantially – less progress from age 5 to 7 and from age 7 to 11 than children not identified with SEN who achieved similar scores as them at the earlier time point. We found a consistent pattern when using the MCS measure of SEN status (results available on request). At the same time, we see that the size of the negative effect appears to be substantially larger for KS1 progress. That is, those who were identified with SEN at age 7 appear to be those who were making substantially less progress between ages 5 and 7, which is in line with the role of expected role of SEN support (Norwich, 2009). Between ages 7 and 11, however, while the gap was smaller, SEN support did not seem to be equalising progress for children with SEN.

To check that these results were not being driven solely by those who had lowest attainment at the earlier time point, which would be most likely to include those with cognitive disabilities, we repeated the analysis by decile group and found that the pattern essentially holds across the whole distribution of attainment at the earlier time point, although small numbers of children with SEN in the top decile groups limit robust within-group analysis. Difference in progress by SEN status at age 7 was, however, most marked at the lower end of the distribution. We therefore repeated the analysis using the MCS SEN measure, excluding children with specific learning disabilities, and found a similar pattern for the MCS Statement group, whose lack of progress should be expected to be particularly

marked. The results were less clear for SEN without a Statement (results available on request).

Thus, children who made less than expected progress could expect to be identified as in need of SEN support by age 7; and those with a Statement were likely to be those who made the least progress. SEN status at age 7 appeared, then, to be (appropriately) identifying those in need of additional support, as indicated by their difficulties in progressing. This answers our first research question.

However, the descriptive results also indicated that having already made less-than-expected progress by age 7, children identified with SEN continued to fall behind up to KS2, despite having support at different levels (SA, SA+ and Statement) in place. We now turn to consider whether these patterns of less progress were shaped in part by other child, family and environmental characteristics.

Table 5 presents the results from regressing value added scores on SEN status alone (unadj) and adjusted for child, family and environmental characteristics (adj). We present only the results for the variable of interest, SEN status; but full results are provided in the Appendix. Table 5 shows that, despite the importance of family factors for identification with SEN, between age 5 and age 7, differences in progress across SEN status are only partially attenuated when controlling for these family factors. Additional analysis showed that this is partly because, although socio-economic background is strongly associated with *attainment*, both in unadjusted and fully adjusted models, it is less strongly associated with *progress*, even before SEN status is added to the models (results available on request).

Table 5: Coefficients from OLS of Value added scores on SEN status

	Key Stage 1 measures				Key Stage 2 measures			
	English		Maths		English		Maths	
	Unadj	Adj	Unadj	Adj	Unadj	Adj	Unadj	Adj
No SEN	0	0	0	0	0	0	0	0
School Action	-.25**	-.21**	-.20**	-.17**	-.05*	-.02	-.07**	-.05*
School Acton +	-.20**	-.17**	-.16**	-.14**	-.08**	-.06**	-.04	-.03
Statement	-.11**	-.09**	-.10**	-.08**	-.10**	-.09**	-.08**	-.08**
R^2	.10	.13	.07	.11	.02	.05	.01	.06
N	4899		4899		4899		4899	

Standardized beta coefficients. Controls: Season born, gender, ethnicity, SDQ score [age 5 or age 7], bullying, home learning environment, parent highest qualification, number of times low income, number of times lone parent. *$P<0.05$; **$P<0.01$.

Turning to the right hand panel of Table 5, we see that here again, the full set of covariates only partially attenuate the association of SEN status with progress between ages 7 and 11. Again, this is in part because socio-economic background is more weakly associated with progress than with attainment. SEN status continues to be linked to somewhat lower levels of progress, but the impact is much less, with relatively small differences, even if they are consistently negative. On the one hand this indicates that identification of SEN at age 7 enabled support for children to be put in place that allowed them to get closer to equalising the gap with children without SEN and with similar early educational attainment. On the other hand, children who had started on average behind and had already fallen well behind their peers by age 7 were still not making up the difference, even with SEN support.

Additional analysis using the MCS SEN measure that excluded gifted and talented and those with cognitive disabilities produced very similar findings (results available on request). In addition, we used the MCS measure to inspect patterns for different forms of SEN, as far as sample sizes allowed. That is we re-estimated the models for behaviour problems, ADHD, speech and language difficulties, autistic spectrum disorders sight problems, hearing problems and other physical disabilities, in turn, using the MCS SEN measures of these primary needs. While the analyses are largely consistent with those for the overarching SEN measure, they suggested that speech and language difficulties were

particularly associated with lower progress – for maths as well as English. On the other hand dyslexia was associated with less progress by age 7, but with more progress in English between 7 and 11, suggesting that strategies put in place for dyslexia can be highly effective in supporting children to catch up, even after controlling for the family background differences that distinguish dyslexia from other SEN (Parsons et al., 2013). Small sample sizes for these subgroups make the analyses provisional; but more detailed investigation by type of SEN would be a valuable area for future research.

Discussion and conclusion

In this paper we set two questions. First, we asked whether children who are identified with SEN by age 7 were already performing less well when they entered school *and* made less progress by age 7 than their similarly performing peers. The answer was that this was unequivocally the case, even taking account of family background and context. Second, we asked whether those who were identified with different forms of SEN support continued to make less progress between ages 7 and 11, or whether they managed to equalise their progress, even if that meant their overall attainment still remained lower on average. Here the answer was not so clear-cut. We observed that they did continue to make less progress than their similarly performing peers, but the gap was much less at this age. As with progress by age 7 we were able, interestingly, to explain little of the differences in progress at KS2 between children with and without SEN by individual or family characteristics or context. This seemed to be in part because socio-economic background was somewhat less strongly associated with progress when referenced to the similar performing peer group, than we might have expected given its strong association with attainment. It was also partly due to the fact that SEN itself appeared to be in part a channel through which socio-economic variations in progress were captured. However, given what we know about the complexity of patterns of

association between family background and child characteristics and types of SEN classification, disentangling further the role of background, SEN primary need and educational progress would merit further study, data permitting.

Our results are generally consistent with DfE results based purely on administrative data that found more limited progress among children with SEN as well as lower overall attainment. They also lend support to Crawford and Vignoles' (2010) findings that children with SEN face a disadvantage in attainment, though the gaps we identified were substantially less stark. We were able to demonstrate that family background factors and child characteristics played a relatively minor role in shaping the patterns of progress of children with SEN. Patterns of progress (and hence of ultimate attainment) appear to be neither simply an issue of behavioural problems interrupting learning (Keslair & McNally, 2009; Moses, 1982) nor an alternative manifestation of socio-economic inequalities. This implies that the potential role of appropriate intervention and learning support may be greater than sometimes implied in the literature.

We linked the timing of SEN identification to patterns of progress in order to enhance understanding of the role of SEN support. Our conclusions here were somewhat equivocal. On the one hand, those children identified as SEN appear to be by and large those who are falling behind what might be expected from them in terms of attainment. This is on one level reassuring, as it aligns with what we might expect as a manifestation of SEN – relative failure to progress. It also accords with the emphasis in current policy on using lack of progress as a stimulus to an EHC. On the other hand, using an overarching measure of SEN, children with SEN seemed to be making systematically less progress at KS2, even with support in place, and even if the scale of the gap is relatively modest. This finding was also supported by using an alternative measure of SEN from the MCS.

Since they start from a lower average baseline, this cumulative failure to make progress remains a concern. There would appear to be further to go in supporting the educational development of children with SEN and therefore mitigating (some of) their disadvantage and maximising their educational opportunities. If this can be done it is likely to have long-term benefits for the children concerned. This is particularly the case, given a life course perspective on disability and learning support needs (Powell, 2003; Priestley, 2003), which emphasises the importance of the early years and the relevance of the particular trajectories that young people are set on for their subsequent self-fulfilment.

We should note that because we focused on an overarching measure of SEN, albeit with the classification into forms of support operating at the time of the data collection, our analysis may be less precise in measuring both the relationship between SEN and progress and the role of background characteristics in shaping patterns of progress than if we had been able to focus on specific forms of SEN. Our exploratory analysis with the MCS indicated that there may be some distinct patterns of progress for those with different primary needs, and this is likely to be a fruitful area for future research.

Finally, we note that the R-squared value, which measures the amount of variance in scores explained by the covariates, remains small in the final models. The highest R-squared had a value of 13 per cent, and all the KS2 models had an R-squared of under 10 per cent, despite the comprehensive nature of the controls. This indicates that most of the variation between children is child-specific and we can only account for a small amount of it by SEN alongside the other covariates. Thus the relationship between SEN and progress, even if consistent and statistically significant is far from being deterministic. This indicates substantial potential for exploring further the circumstances under which children with SEN *do* learn and make progress, and how this differs for the attainment and progress made by children in different categories of SEN. In the context of the new legislation and proposals for

a more joined-up approach, we can hope that this may facilitate new opportunities for supporting children's school progress more generally.

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Appendix

Table A1: Value added progress in Key Stage 1 and Key Stage 2 assessments: NPD SEN measure

	Key Stage 1				Key Stage 2			
	English		Maths		English		Maths	
	unadj	adj	unadj	adj	unadj	adj	unadj	adj
SEN status (ref cat: No SEN)								
School Action	-0.251**	-0.214**	-0.203**	-0.168**	-0.051*	-0.023	-0.072**	-0.050*
	(0.255)	(0.273)	(0.139)	(0.135)	(0.165)	(0.171)	(0.174)	(0.181)
School Action plus	-0.198**	-0.168**	-0.162**	-0.136**	-0.081**	-0.062**	-0.039	-0.031
	(0.485)	(0.509)	(0.227)	(0.244)	(0.290)	(0.283)	(0.321)	(0.319)
Statement of Need	-0.106**	-0.086**	-0.098**	-0.084**	-0.103**	-0.090**	-0.081**	-0.077**
	(1.145)	(1.051)	(0.800)	(0.764)	(0.935)	(0.984)	(1.021)	(1.073)
Child characteristics								
Season born (ref cat: Autumn)								
Winter		0.013		-0.041*		-0.003		0.012
		(0.222)		(0.105)		(0.112)		(0.115)
Spring		0.042*		-0.029		0.022		0.075**
		(0.239)		(0.115)		(0.119)		(0.130)
Summer		0.054**		-0.046**		0.061**		0.102**
		(0.243)		(0.114)		(0.120)		(0.135)
Gender: (ref=Boy)		0.019		-0.111**		0.031		-0.107**
		(0.183)		(0.083)		(0.102)		(0.093)
Ethnicity (ref=White)								
Mixed		0.032*		0.015		0.010		0.012
		(0.410)		(0.223)		(0.241)		(0.281)
Indian		0.011		0.033*		-0.007		0.035**
		(0.466)		(0.279)		(0.289)		(0.233)
Pakistani/Bangladeshi		0.006		-0.009		0.037*		0.056*
		(0.584)		(0.246)		(0.275)		(0.371)
Black/Black British		-0.011		-0.028*		0.046**		0.036*
		(0.572)		(0.255)		(0.286)		(0.297)

| | Key Stage 1 | | | | Key Stage 2 | | | |
| | English | | Maths | | English | | Maths | |
	unadj	adj	unadj	adj	unadj	adj	unadj	adj
Other		0.040*		0.040*		0.015		0.035*
		(0.856)		(0.407)		(0.334)		(0.505)
Family background characteristics								
Parent highest qual S1 (ref cat: Level 4)								
Level 3		-0.032		-0.053**		-0.078**		-0.063**
		(0.268)		(0.114)		(0.126)		(0.122)
Level 2		-0.064**		-0.061**		-0.066**		-0.109**
		(0.222)		(0.108)		(0.116)		(0.122)
Level 1		-0.042*		-0.050**		-0.073**		-0.067**
		(0.407)		(0.200)		(0.211)		(0.238)
None		-0.023		0.003		-0.022		-0.012
		(0.442)		(0.197)		(0.239)		(0.208)
No. of times lone parent (S1-S4)		0.012		-0.016		0.034		0.026
		(0.083)		(0.042)		(0.044)		(0.050)
No. of times income poverty (S1-S4)		-0.032		-0.015		-0.022		-0.042
		(0.089)		(0.042)		(0.050)		(0.046)
Family and environmental context								
SDQ score (S4)		-0.112**		-0.099**		-0.050**		-0.068**
		(0.019)		(0.010)		(0.009)		(0.010)
Ever bullied (S4) Never v Sometimes		0.009		-0.004		-0.001		-0.003
		(0.163)		(0.086)		(0.082)		(0.099)
Never v All the time		-0.007		-0.040*		-0.032		-0.009
		(0.385)		(0.168)		(0.166)		(0.185)
Home Learning environment S2		0.012		0.029		0.052**		0.030
		(0.012)		(0.006)		(0.007)		(0.007)
R^2	0.10	0.13	0.07	0.11	0.018	0.045	0.012	0.061
N	4899	4899	4899	4899	4899	4899	4899	4899

Standardized beta coefficients; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$