Disability Differentials in Educational Attainment in England:

Primary and Secondary Effects[1]

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Abstract

Childhood disability has been largely overlooked in social stratification and life course research. As a result, we know remarkably little about mechanisms behind well-documented disability differentials in educational outcomes. This study investigates educational transitions of disabled youth using data from the Longitudinal Study of Young People in England. We draw on social stratification literature on primary and secondary effects as well as that on stigma and labeling in order to explain disabled young people's educational outcomes. We find that disability differentials in transition rates to full-time academic upper secondary education and to university are largely the result of primary effects, reflected in differences in school performance between disabled and non-disabled young people. However, we also find evidence for secondary effects, with similarly achieving disabled young people less likely to pursue full-time academic upper secondary education compared to their non-disabled peers. We examine the extent to which these effects can be explained by disabled youth's suppressed educational expectations as well as their experiences of being bullied at school, which we link to the stigma experienced by disabled young people and their families. We find that educational expectations play an important role at crucial transitions in the English school system, while the effect of bullying is considerably smaller. By drawing attention to different social processes contributing to disability differentials in attainment, our study moves beyond medical models that implicitly assume a naturalized association of

disability with poor educational outcomes, and demonstrates the parallels of disability with

other ascriptive inequalities.

Keywords

Introduction

There is growing evidence that individuals who have experienced childhood disability generally lag behind in educational, occupational, and social outcomes in adulthood (Janus 2009; Powell 2006; Murray 2003; Shandra and Hogan 2009; Wells, Hogan, and Sandefur 2003). While traditional 'medical' understandings of disability attribute these patterns to deficiencies caused by individual impairments and conditions (Altman 2014), contemporary 'biopsychosocial' models of disability recognize the 'dynamic interaction between health conditions and environmental and societal factors' (World Health Organization 2001). It is therefore surprising that disability differentials have been largely overlooked in social stratification and life course research (Powell 2003; Priestley 2001). As a result, we know remarkably little about the contribution of micro and macro-level social factors to the adverse outcomes experienced by many disabled children and young people.

This study describes educational transitions of disabled youth in contemporary England. We contribute to social stratification literature by empirically testing potential mechanisms behind disability differentials in educational attainment (Reskin 2005). Research in special education and disability studies has examined the attainment of disabled students, particularly focusing on those with learning disabilities (Joshi and Bouck 2015; Lee et al. 2015; Shandra and Hogan 2009; Shifrer, Callahan, and Muller 2013). Overall, existing studies suggest that school performance differences are the main driver behind disability differentials in post-secondary enrollment rates. However, few studies have sought to identify other pathways through which disability may be influencing educational trajectories. This is despite the fact that many impairments are not inherently linked to cognitive limitations and research showing that similarly achieving disabled adolescents are less likely to pursue an academic

track compared to their non-disabled counterparts, even after controlling for socio-economic background (Shandra and Hogan 2009; Shifrer 2013; Shifrer, Callahan, and Muller 2013).

In order to delineate different mechanisms contributing to disability differentials in attainment, we draw on Boudon's classic distinction between primary and secondary effects of social background on educational outcomes (1974). Following this framework, we define primary effects as all biological and socio-cultural influences that shape the distribution of academic *performance* among disabled and non-disabled students. Secondary effects of disability refer to the different educational *choices* disabled and non-disabled students with equivalent academic performance make at relevant transition points in educational trajectories, as revealed by their academic pathways. Our first aim is to assess the relative importance of primary and secondary effects for disabled youth's educational trajectories. To our knowledge, this is the first study that adopts Boudon's framework to better understand the different social processes that perpetuate disabled young people's educational disadvantage. By firmly placing childhood disability within this strand of social stratification research, we aim to demonstrate its parallels with other ascriptive inequalities, and move beyond its naturalized association with poor educational outcomes offered by the 'medical' model (Janus 2009; Jenkins 1991; Powell 2003).

Our second aim is to contribute towards explaining secondary effects of disability on educational attainment. We argue that, given rich empirical evidence on the stigmatization of children with disabilities and their families (Gray 2002; Green 2003), stigma should be placed in the foreground of explanatory models of disabled young people's transitions to adulthood. Drawing on literature on stigma and labeling (Link and Phelan 2001; Pescosolido and Martin 2015; Scambler 2009; Scambler and Hopkins 1986), we propose two pathways

through which disability-related stigma may affect educational performance and decision-making: 1) by compromising disabled young people's educational expectations (Shifrer 2013), and 2) by increasing their risk of being bullied at school (Chatzitheochari, Parsons, and Platt 2016). We empirically test these propositions, contributing to the emerging literature that considers the role of stigma on life-course trajectories (Link and Phelan 2001).

We use data from the Longitudinal Study of Young People in England (LSYPE), a nationally representative youth cohort study that followed approximately 16,000 adolescents drawn from 658 secondary schools from age 13/14 to age 19/20. Linked with administrative records on school performance, the LSYPE provides rich longitudinal data and a sufficiently large number of disabled young people for analysis, rectifying the lack of nationally representative information on childhood disability in England (Blackburn, Spencer, and Read 2010). This allows us to produce evidence on an under-researched topic in the UK context. The LSYPE also includes questions on long-term illness and special educational needs from which we construct an overarching disability measure that includes students with a wide range of conditions and impairments that are disabling in the school context. This enables us to move beyond existing studies that solely focus on learning difficulties (Joshi and Bouck 2015; Lee et al. 2015; Shifrer, Callahan, and Muller 2013; Shifrer 2013).

Using LSYPE data we address the following questions:

- Do disabled young people exhibit poorer outcomes at successive key points in the English education system?
- To what extent are disability differentials in educational attainment driven by primary effects captured by prior attainment, and secondary effects linked to stigmatization of disabled youth captured by educational expectations and bullying?

In order to explore the role of educational expectations in explaining disability differentials, posited in the latter question, we also need to address the prior question:

- Do disabled young people's educational expectations differ from those of their non-disabled counterparts? And how far are these differentials driven by earlier differences in attainment and parental expectations?

In sum, the contribution of our study is both theoretical and empirical: By bridging insights from social stratification and stigma literature and testing novel hypotheses, we shed light on some of the mechanisms that link childhood disability to social disadvantage, filling an important gap in life-course and disability studies.

Key points of transition in the English education system

Schooling in England is compulsory from age 5 to age 16. Students attend lower secondary school from age 11 to age 15, when they sit the General Certificate of Secondary Education (GCSE) public examinations. GCSE tests typically cover a number of subjects taken during the last two years of lower secondary schooling, including English and Mathematics. Grades are expressed in a nominal scale, ranging from A* to G. Achieving Level 2 qualifications, that is 5 or more A*–C GCSE grades including English and Mathematics, is typically required to continue to the traditional 'academic track' in upper secondary education, and is thus considered a benchmark of achievement. Students who do not achieve Level 2 have considerably fewer opportunities for further education and limited options for vocational studies (Hodgson and Spours 2008). Students may fail either by not reaching the requisite standard in GCSE examinations or by choosing combinations of subjects that render Level 2 attainment unattainable from the outset.

Students have several options after the end of lower secondary school, including academic qualifications, vocational qualifications, and apprenticeships. The most common route to university is to continue to full-time upper secondary education and study 2-3 Advanced Level subjects over two years. Performance at Advanced Level subjects constitutes the main criterion for admission to higher education. Universities specify minimum requirements for different degrees and students are offered a place if they meet these grades.

Therefore, in order to better understand disability differentials in educational attainment, we need to examine the propensity of disabled students to successfully make these three sequential transitions in the school system: 1) attain Level 2 qualifications at age 16, 2) continue in full-time academic upper secondary education, and 3) enter university.

Researching disability

While the term 'disability' is used to refer to the long-term physical, mental, or emotional functional limitations and difficulties experienced as a result of active or residual impairments (Altman 2014), the term 'special educational needs' is employed to refer to the greater learning difficulties faced by some children and young people compared to the majority of students of the same age. There is, however, considerable overlap between those diagnosed with disabilities and special educational needs in England (Burchardt 2004), rendering the distinction between the two categories somewhat tenuous. It is also important to note that students identified with special educational needs do not necessarily present cognitive deficits; rather, they form a highly heterogeneous group with social, ethnic, linguistic, physical, and intellectual disadvantages (Powell 2006). A related point here is the contested character of diagnostic criteria and classifications of special educational needs (Tomlinson 2017), with implications for the general reliability and validity of the category.

Taken together, these points suggest that the distinction between disabilities and special learning needs is not meaningful for this analysis of educational attainment.

In order to understand the social processes and structural barriers that contribute to disability differentials in attainment, our study moves beyond earlier research that focuses on specific conditions, implicitly locating disadvantage within the individual in line with the medical model. Instead, we draw on the social model to adopt an overarching definition of disability as encompassing all impairments and difficulties constructed as 'disabling' by health professionals and educators, and consequently formulate a single set of hypotheses regarding its influence on educational transitions. However, we empirically test the robustness of our findings to this assumption of an overarching binary disability category.

Primary and secondary effects in disability differentials in educational attainment

Despite recent theoretical advances towards more sociological conceptualizations of disability (Powell 2003; Priestley 2001), mainstream sociology has shown little empirical interest in advancing understanding around the different social processes implicated in disability differentials in attainment. This omission can be partly attributed to the general lack of appropriate longitudinal datasets that track the movement of disabled students through the education system and provide researchers with sufficient measures to distinguish between performance-driven explanatory mechanisms (primary effects) and other disability-specific considerations influencing educational choices and orientations (secondary effects). In this section we review existing literature to formulate a set of hypotheses about the effect of disability status on educational trajectories and the potential mechanisms behind disability differentials.

Empirical evidence suggests that disabled children and young people in England perform consistently worse academically than non-disabled peers, with disability gaps already formed during primary school (Parsons and Platt 2017; Department for Children, School, and Families 2010; Keslair, Maurin, and McNally 2012). Low attainment is common among students with different types of disabilities, including those whose special educational needs require specialist support beyond that available in mainstream teaching provision in English schools (Blatchford et al. 2011; Crawford and Vignoles 2010). However, lower attainment is only partly related to lower cognitive ability (Parsons and Platt 2017). A recent report showed that children with special educational needs in England are between 7 and 15 times less likely than their peers to reach key national examinations 'benchmarks' from early years through to age 16 (Department for Children, School, and Families 2010). Several factors may be driving these patterns, including repeated absences due to poor health and doctor appointments, depressive symptoms associated with certain long-standing conditions, and socio-economic disadvantage that is often associated with disability (Blackburn, Spencer, and Read 2010; Champaloux and Young 2015; Crump et al. 2013). Considering this weight of evidence, we expect that primary effects constitute the main pathway through which disability differentials in educational attainment develop. We anticipate that disabled young people will have a lower likelihood of attaining Level 2 qualifications compared to non-disabled peers, and that this educational performance will largely be driven by prior attainment differences. Prior attainment, it should be noted, captures the cumulative influence of several factors that have influenced educational progress up to that point, including disabling processes and barriers.

Existing studies from the US suggest that primary effects do not fully account for disability differentials in attainment, emphasizing that similarly achieving disabled adolescents are less likely to follow an 'academic track' compared to non-disabled peers (Shandra and Hogan

2009; Shifrer 2013; Shifrer, Callahan, and Muller 2013). We expect to find similar secondary effects in the English context. Rather than focusing on disability-related factors such as school absence, already implicated in attainment and hence primary disability effects, we instead turn to the concept of stigma to explain the mechanisms through which disability-specific considerations influencing orientations and choices come into play. Following Scambler (2009: 441), we define health-related stigma as a social process 'characterized by exclusion, rejection, blame or devaluation that results from experience, perception or anticipation of an adverse social judgment about a person or a group'. This judgment is usually based on an 'enduring feature of identity conferred by a health problem or a health-related condition' (Scambler 2009: 442). While recent years have witnessed increased interest in the role of stigma in influencing life trajectories (Link and Phelan 2001; Pescosolido and Martin 2005), there has been little effort to understand mechanisms through which stigma is translated into negative outcomes. We suggest that stigma experienced by disabled young people and their families (Gray 2002; Green 2003;) affects educational attainment through two main pathways that represent *felt* and *enacted* stigma. We suggest the first is captured by suppression of disabled young people's educational expectations, and the second by increasing their risk of being bullied by their peers.

Regardless of how far they are embedded in strictly realistic projections, educational expectations are known for influencing educational attainment and student's likelihood of making certain educational transitions (Goodman, Gregg, and Washbrook 2011; Need and De Jong 2001; Sewell, Haller, and Portes 1969). Embedded in family and school processes, they are initially formed in early childhood under the influence of significant others, and serve as a key motivational resource throughout educational careers (Sewell, Haller, and Portes 1969), occasionally revised to reflect changes in students' school performance and perceived costs

and benefits of certain choices and pathways (Need and De Jong 2001). Considering the consistent association of childhood disability with lower attainment in England, it is reasonable to expect that disabled adolescents have lower university expectations than their non-disabled peers. However, we hypothesize that disabled young people exhibit lower expectations *net of academic performance*, and that this can in turn be explained by their parents' expectations about their academic future. Research has described parental reactions following diagnosis of childhood disability, emphasizing overprotective parenting, suppressed expectations, anxiety about the future, and concerns about less sheltered settings (Kearney and Griffin 2001; Sanders 2006). This suggests that parents may discourage adolescent's academic pursuits, possibly recognizing the lack of appropriate teaching provisions in higher education settings and subsequent risks of experiencing discrimination on grounds of 'difference' in the labour market (Jones, Latreille, and Sloane 2006; Holloway 2001). Widely known as 'stigma coaching' (Scambler and Hopkins 1986), this process is likely to increase disabled adolescents' experience of *felt* stigma, which refers to the fear and anticipation of encountering actual discrimination on the basis of a negatively viewed attribute or condition (Scambler 2009). Felt stigma involves self-devaluation by application of negative stereotyping to oneself and withdrawal as a means of adaptation, often leading to a self-fulfilling prophecy (Link and Phelan 2001; Pescosolido and Martin 2015). Taking these points into account, we anticipate educational expectations to have a direct effect on key school examinations by lowering the perceived benefits of educational success, over and above other factors. We further expect that disabled adolescents who attain Level 2 qualifications will be less likely to continue in upper secondary education compared to non-disabled peers, and that this differential will be partly explained by their suppressed university expectations.

Enacted stigma refers to actual experiences of violence and discrimination on the basis of a devalued characteristic or condition (Scambler 2009). We suggest that bullying victimization, a repetitive and harmful form of aggression (Olweus, 2003), constitutes the most immediate and pervasive form of enacted stigma for disabled adolescents. We have previously established that disabled youth in England is more likely to be subjected to bullying, net of other risk factors (Chatzitheochari, Parsons and Platt 2016). This higher bullying risk is found for adolescents officially labeled as having special educational needs, and those who are disabled but do not receive any additional support at school. Additionally, it is not associated with the 'visibility' of particular conditions. As bullying is strongly associated with school disengagement and depression, we expect a negative effect on both educational attainment of disabled adolescents and on their decision to remain in full-time education after GCSE examinations and to pursue higher education (Woods and Wolke 2004).

The disability literature has identified additional mediators that may explain secondary disability effects on attainment. School engagement influences educational attainment (Cunha and Heckman 2007), and is implicated in the association of disability with lower educational attainment insofar as exclusionary and segregation processes alienate disabled children from the school environment. Social relations are both more challenging and restricted through the same mechanisms that cause young people to be bullied. Peer group effects might therefore also be associated with lower attainment and worse transitions, and have also been found to be influential for disabled students' trajectories (Lee et al. 2015; Murray 2003) Finally, the school proportion of students with special educational needs may influence the ways disability is dealt with and accepted in the classroom and among peers.

Given that childhood disability in England is strongly associated with socio-economic disadvantage (Blackburn, Spencer, and Read 2010), we expect negative disability effects at different transition points to be partly attributable to variations in parental background. Existing literature provides consistent evidence for the existence of both primary and secondary negative effects of parental background (Jackson et al. 2007), rendering it an important control for our study.

As those who successfully complete successive educational transitions are more academically able, less socio-economically disadvantaged, and consequently less susceptible to disability-related stigmatizing processes (Link and Phelan 2001), we expect disability effects to decline with each transition.

Data and Methods

Data and sample

We use the Longitudinal Study of Young People in England (LSYPE), a nationally representative youth cohort survey of approximately 16,000 individuals born in 1989–1990, sampled from English schools and interviewed annually between 2004 and 2010 (Department for Education and National Centre for Social Research 2012). The LSYPE collected information on topics related to education, and is linked with administrative data on academic performance and school characteristics from the National Pupil Database (NPD) (Department for Education 2015). Interviews were conducted with young people and their parents from waves 1-3 (ages 13/14, 14/15, and 15/16), and with young people only from wave 4 onwards (ages 16/17, 17/18, 18/19, and 19/20). The linked NPD data include information on performance on 'Key Stage' examinations, which are standardized national tests taken at the end of primary school at age 11 (Key Stage 2), at age 14 (Key Stage 3, abolished in 2008), at

the end of lower secondary schooling at age 16 (Key Stage 4/GCSEs), and at the end of upper secondary schooling at age 18 (Key Stage 5/Advanced Levels).

We analyze separate samples for sequential outcome measures, excluding those who fail to complete a transition from subsequent models. We exclude those with missing data on relevant variables, whether through non-response or attrition over time. Sample sizes are shown in Table 1.

We investigated the extent to which non-response and attrition were associated with our measure of disability. This analysis, available as supplementary online material, suggests that disability is associated with slightly highly rates of attrition and that disabled youth is thus under-represented in the overall sample at successive sweeps. However, we do not find evidence that disability is a major driver of attrition across the survey waves. In addition, sample composition remains largely consistent across waves when wave-specific survey weights are employed. As elaborated in our analysis, while there is some differential response by disability across the study as a whole, response rates between disabled and non-disabled people are very similar within our conditional analytical samples for later transitions.

Measures

1) Outcomes

We model four outcomes: early educational expectations at age 14/15, followed by three key transitions in the English school system: 1) attaining Level 2 qualifications at age 16, 2) continuing in full-time academic upper secondary education after age 16, and 3) entering/attending university at age 19/20.

Educational expectations were measured with young people's response to the question, 'How likely do you think it is that you will ever apply to go to university to do a degree?', with four response options from 'very likely' to 'not at all likely'. We model this as a binary variable, focusing on those who responded 'not at all likely'.

Attainment of Level 2 qualifications, measured as a binary outcome, was linked from NPD in wave 3. Information on whether the young person remained in full-time education or not was captured from their wave 4 status. Those reporting studying at university at wave 7 are classified as having successfully completed the third transition of interest.

2) Disability status

Our study uses a single binary measure of disability that captures a wide range of conditions identified as potentially disabling in the school context, which is in line with current theoretical understandings of childhood and adolescent disability (Altman 2014). We construct this measure by using parental reports of disability provided in two separate survey sections: Parents were first asked whether the young person has a long-standing illness, condition or impairment, and, if so, they were asked two follow up questions as to whether this affects school attendance or ability to complete schoolwork. According to our theoretical conceptualization of disability, as well as LSYPE recommendations, we define as disabled those young people whose long-standing condition(s) influence school attendance and/or their ability to complete schoolwork. Parents were also asked whether the young person *currently* has special educational needs of any kind (at age 13/14). While there is considerable overlap between these two measures, a number of young people are solely identified with a long-standing school limiting condition or with special educational needs. Recognizing that this disagreement is indicative of varying understandings around the

meaning and implications of disability that may have influenced parental report (Powell 2003), we employ an overarching measure of disability combining these two measures that capture varying conditions that may affect school performance in different ways. We also carry out various robustness checks, as outlined below, to test the assumptions behind our overarching measure.

Our parental measure of special educational needs yields somewhat lower estimates than those that prevailed among secondary school pupils in state schools in England at the time of data collection (12.5 per cent as opposed to 18 per cent). We are thus capturing fewer students than would be administratively identified with special educational needs. There are no official figures to compare against our general measure of disability as long-standing limiting condition.

3) Mediators

Primary effects: prior attainment

Prior attainment measures are used to explore the extent to which disability differentials are due to primary, educational performance effects. We use measures of prior attainment at different transition points: Key Stage 2, an average score of performance across three core subjects (English, Mathematics, and Science) in a national examination taken at the end of primary school (age 11), is employed in the model of Level 2 qualifications. This attainment measure provides an estimate of prior attainment that precedes the transition to the current school environment, while it captures all the ways in which children's performance has been impacted by disability up to that point. It is therefore our preferred measure. However, as a robustness check we also used a measure of attainment, Key Stage 3, which is contemporaneous with our disability measure. Performance at Advanced Levels is included

in the final model of university entry. 'Points' achieved range from 300 for A* to 150 for E. We constructed a 4-category points score variable: 1) 0-299 points (equivalent to less than 2Es, a level at which a place in any university is unlikely to be attained), 2) 300-629 points (equivalent of 2Es to just under 3Cs), 630-779 (equivalent of 3Cs to just under 2As and a B), 780 points or more (two As and a B or higher, usually the minimum level for courses in higher status universities). Given that offers are made on the basis of thresholds rather than a GPA of the continuous distribution, this was our preferred measure. However, as a robustness check we estimated the models with the continuous A' level points score. Results were the same. Instead of controlling for educational performance, we condition on Level 2 attainment in our second transition model. This is because only those who achieve Level 2 qualifications can realistically continue to upper secondary education with any prospect of university entry. In additional analysis, we established that adjusting for school absences through illness, which might be implicated in educational attainment, left our reported results unchanged.

Secondary effects: expectations and bullying

We investigate the extent to which secondary effects of disability that remain after controlling for prior attainment can be attributed to processes of stigmatization of disabled young people, as expressed in our posited mechanisms of educational expectations and bullying. For our outcome measure of early expectations, we anticipate that parental expectations will be the main driver. Parental expectations for the young person's academic prospects were measured at wave 1 in the same way as those of young people, with the same response options. We enter this measure as a set of dummy variables. The young person's educational expectations then become a mediator in the first and second transition models. Acknowledging that expectations may change depending on GCSE performance (Need and De Jong 2001), we use an identical expectations question fielded at age 16/17 (wave 4) in the

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final transition model. Including expectations as dummies or as a continuous measure gave consistent results. We report the specifications employing educational expectations as a continuous measure.

Bullying experiences were measured at age 13/14 (wave 1). Young people answered five questions covering different types of physical and relational bullying. As repetition is a key element across bullying definitions (Olweus 2003), we use a binary measure classifying those experiencing at least one type of bullying 'once every two weeks or more often' as victims.

Other mediators

Information on the proportion of students with special educational needs in the school is included in the first two transition models. The share of students with special educational needs ranged from 0 per cent to 65 per cent in our sample, indicating that our analysis is predominantly capturing pupils in mainstream rather than special schools. Fifty per cent of students attend schools with less than 15 per cent of students with special educational needs. Since school context might be expected to have a particular influence on disabled youth, we estimated models interacting school proportion with special educational needs with disability status. These interactions were not statistically significant so we retained the more parsimonious specification.

At wave 2, young people were asked what they thought most of their friends would do at the end of compulsory schooling. Peer group effects are treated as a binary measure taking the value of 1 for students responding that most friends will remain in full-time education.

A 12-item school engagement scale was included at wave 2. Items were of the form of a series of statements such as 'School is a waste of time for me' or 'On the whole I like being at school' with response options from strongly agree (1) to strongly disagree (4). Cronbach's alpha was 0.83. We reverse coded all positive statements so that a higher score represented greater engagement, summed all non-missing values, averaged by the number of non-missing responses, and standardized scores.

4) Controls

All models control for sex, ethnicity, and parental education as a measure of socio-economic status. All of these measures are significantly associated with disability status. We constructed the measure of parental education from Wave 1 responses using the dominance approach. That is, we took the highest qualification reported for either parent. The measure has six categories from degree or more to none. Using social class as an alternative measure of parental background did not change results.

Analytical approach

We follow a sequential transition model approach proposed by Mare (1980), excluding those who fail to complete a transition from subsequent transition models. This allows us to estimate conditional effects of disability at each transition point, accounting for the social selectivity that occurred in earlier transitions. Table 1 illustrates raw differences in outcomes between disabled and non-disabled young people. We then model these differences to analyze the extent to which they can be accounted for by our posited primary and secondary effects.

We use the KHB method (Karlson, Holm, and Breen 2012), as operationalized in Stata by Kohler, Karlson and Holm (2011), to decompose the total disability effect into the relative contribution of each of our posited mediators to the indirect effect as well any remaining direct effect of disability. This method is appropriate for estimating the partial contribution of explanatory variables for binary outcomes estimated with logistic regression, taking into account the rescaling issue and potential sensitivity to differences in the error distribution (Karlson, Holm and Breen 2012).

We present results graphically, illustrating the total effect net of controls, the indirect effect and the relative shares explained by our different mediators, as well as the remaining direct (or unexplained) contribution of disability.

We exploit the longitudinal design of the survey to employ temporal ordering to indicate direction of effects. That is, all explanatory variables are measured prior to outcome variables.

All descriptive statistics and model results are adjusted for non-response and attrition using wave-specific weights provided in the data files. We adjust for clustering at the school level, using the *svy* command for descriptive statistics and the '*cluster*' option in the *khb* command.

Robustness checks for heterogeneous effects

While our overarching disability measure encompasses all those who might reasonably be subject to stigmatization and labeling processes through the ways in which disability is constructed and made visible in the school system (Tomlinson 2017; Powell 2003), it is a very heterogeneous category, which might reflect combined different effects of different

subpopulations. We therefore carried out analyses to check how far our results could reasonably be generalized across the whole category. We did this by disaggregating our measure and excluding different populations in turn to ensure that results remained robust to these exclusions. A number of young people with special educational needs receive additional school support that is represented in a 'statement' of special educational needs. Based on parental report of 'statement', we first excluded this small, but potentially distinctive group who has been shown to have lower academic performance. Results remained the same. Parental report on the type of special educational need, was coded to distinguish: Dyslexia/reading difficulties; Literacy, expression, communication, interaction; Numeracy problems; Specific physical problems (eg. deafness, sight); Attention deficit hyperactivity disorder; Other behaviour problems; General or unspecified learning, memory difficulties; Other. Again, we excluded each in turn and our results remained the same. A single exception was that in the educational expectations model, excluding dyslexia (the largest of these categories) reduced power. With around 600 cases in the base sample, dyslexia was the only category large enough for separate analysis. When we re-estimated our models on this subgroup, the size and sign of effects was consistent with overall results, even if some of the models were underpowered. Since, dyslexia is not an obviously 'visible' disability, this lends additional support to our understanding of disability in the school context as a stigmatizing process. We were not able to separately distinguish the specific nature of the disability among those with long-standing limiting illness; but when excluding those 20 per cent of our overarching disabled category who had a long-standing limiting illness but were not classified with special educational needs, our results remained the same. This indicated that heterogeneity within this group was not driving our results. Finally, given that the prior attainment measure at age 11 does not fully capture educational performance, and disability may arise subsequent to that measurement point, we re-estimated our results

with Key Stage 3 scores (age 14). Our results remained the same. Additionally, using information on when special educational needs identification took place, we verified that 87 per cent were identified prior to age 11. Excluding those identified after age 11 did not alter the results. Full regression models and reported robustness checks are available upon request.

Results

Table I shows that disabled youth enter secondary school with lower educational attainment (Key Stage 2 scores) (Samples A and B), and achieve substantially lower rates of Level 2 qualifications (26 per cent of disabled young people compared to 67 per cent of non-disabled young people: sample B). This suggests that disability differentials in educational transitions are largely the result of primary effects. However, there is also evidence for secondary effects, with a lower proportion of disabled students who attain Level 2 qualifications continuing in full-time upper secondary education (75 per cent as opposed to 85 per cent among the non-disabled; sample C). There is only a slight disability differential in university attendance among those who continue to study Advanced Level subjects (61 per cent as opposed to 64 per cent among the non-disabled; sample D).

Table I also shows that disabled young people are more likely to exhibit characteristics negatively associated with educational performance. However, those who successfully complete educational transitions are increasingly positively selected in terms of parental education and university expectations.

[Table I about here]

[Figure 1 about here]

We first examine early educational expectations. The KHB decomposition in Figure 1 indicates that disabled young people are 15 percentage points more likely to have low university expectations compared to their non-disabled counterparts, once sex, ethnicity, and parental education are taken into account. Figure 1 also shows that the vast majority (84 per cent) of this disability effect on expectations is explained by other covariates. More specifically, prior attainment accounts for 39 per cent of the indirect effect, whilst the remaining 61 per cent is due to parental expectations. These results thus confirm that university expectations of disabled adolescents are lower than those of their non-disabled peers net of prior academic performance, and highly dependent on parental expectations. This is in line with our earlier discussions around 'stigma coaching' and the role of the family in 'protecting' disabled adolescents from potential future risks, recognizing the barriers to higher education access faced by disabled people. A modest but significant 16 per cent of the disability effect remains unexplained, indicating that there are other factors associated with disability that impact expectations.

We then turn to attainment of Level 2 qualifications. As shown in Table 1, there is a raw disability differential of approximately 41 percentage points. Figure 1 shows that this is reduced to a total effect of 34 percentage points when adjusting for controls. According to the KHB decomposition the majority of this effect (78 per cent) is captured by mediators, with primary effects playing the dominant role: prior attainment accounts for 79 per cent of the indirect effect. Having already established that disabled young people have lower university expectations, we show that these account for 15 percent of the indirect effect, over and above attainment. We see a weaker role of other mediators intended to capture secondary effects, with bullying victimization accounting for only 1 percent of the indirect effect. At the same

time, a significant and not insubstantial effect of disability remains unexplained: disabled young people have a 22 percentage point lower probability of attaining Level 2 compared to otherwise equivalent non-disabled peers. This implies that there are factors beyond attainment, expectations, and other measures included in our models that are associated with the academic attainment of disabled young people. These may relate to "ability" differences insufficiently proxied by prior attainment, or other experiences within the school that limit disabled students' ability to succeed.

We next examine the decision to continue in full-time upper secondary education, solely focusing on those who attained Level 2 qualifications. Table I suggests that disability status becomes less influential following Level 2 attainment, given the large share of disabled youth not attaining this level. However, there remains a 10 percentage point disability differential, with disabled young people less likely to choose to remain in full-time education compared to non-disabled peers. The KHB decomposition demonstrates that approximately 35 per cent of the total disability effect (net of controls) is accounted for by the proposed mediators. Among these, suppressed expectations dominate, accounting for 80 per cent of the indirect effect. This confirms our hypothesis that expectations play an important role in compromising disabled adolescents' choices, even when they attain comparably to non-disabled peers. In contrast, Figure I shows a small role of bullying on the decision to continue in full-time education. As bullying can be considered the most pervasive form of enacted stigma experienced by disabled adolescents, this finding suggests that felt stigma is potentially more important for adolescent educational trajectories (Scambler 2009). School engagement and school percentage of students with special educational needs have a similarly small influence, while peer group effects account for approximately 10 per cent of the indirect effect. While this model demonstrates that expectations and peer group effects are important drivers of

secondary effects at this transition point, 65 per cent of the overall disability effect remains unexplained.

The final model examines university entry/attendance. Those disabled students who stay on in full-time education have very similar expectations to non-disabled peers, constituting a highly selected sample in terms of parental education (see Table I, sample D). However, as Figure 1 illustrates, we still find a statistically significant difference in the probability of entering university, net of controls: there is a differential of approximately six percentage points after controlling for sex, ethnicity, and parental education. The KHB decomposition underlines the relevance of primary effects, as the disability effect is largely explained by Advanced Level performance. Despite the highly selected nature of this sample, illustrated by the fact that university expectations actually widen the disability gap, these disabled young people still perform relatively poorly at Advanced Level, with consequent implications for university participation. Approximately 40 per cent of the disability effect remains unexplained in this final model, though the direct disability effect is not statistically significant.

Discussion

There has to date limited sociological interest in explaining well-documented disability differentials in educational attainment (Powell 2006; Murray 2003; Shandra and Hogan 2009). In this paper, we employed concepts from social stratification and stigma literature to develop a conceptual framework for understanding the association of childhood disability with low educational attainment. Our empirical analysis then sought to test different mechanisms behind disability differentials in educational attainment in England, using nationally representative longitudinal data. Drawing on existing literature, we argued that

disability arising from a range of impairments and conditions has repercussions for school performance, and that both informal and institutional labeling stigmatize individuals and their families. We consequently adopted an overarching definition of disability encompassing a wide range of conditions and impairments, moving beyond the narrow focus on learning disabilities of earlier studies. Our study contributes to the relatively sparse sociological literature on life-course outcomes of disabled children and adolescents (Janus 2009; Shandra and Hogan 2009; Wells, Hogan, and Sandefur 2003). Additionally, by examining a large-scale dataset with non-disabled peers as a basis of comparison, we make a contribution to disability studies that largely rely on small-scale samples (Shifrer 2013). At the same time, we respond to earlier calls to better understand the processes through which stigma experiences during childhood and adolescence are translated to negative outcomes (Link and Phelan 2001; Shifrer 2013).

We find that disability differentials in educational attainment are largely a result of primary effects during the first crucial transition in the English school system, that is, attainment of Level 2 qualifications at GCSE examinations. However, we also provide evidence for the existence of secondary effects of disability at Level 2 and in subsequent educational transitions, and show that disability continues to have a negative but considerably less strong effect on the performance of the very selected sample of disabled adolescents who stay on in full-time upper secondary education. Overall, our study establishes that, similar to social class and ethnicity (Cebolla Boado 2011; Jackson et al. 2007), disability differentials in educational attainment in England are the result of *both* primary and secondary effects. This draws attention to the importance of moving towards more sociological understandings of disability, with an empirical emphasis on the multitude of factors and social barriers that perpetuate disabled young people's disadvantage. Our findings also confirm that disability

effects on educational transitions operate in a similar manner to those of parental background, that is, declining across transitions (Jackson et al. 2007).

We hypothesized that disability-related stigma influences attainment through two distinctive mechanisms: 1) by suppressing expectations, and 2) by increasing the risk of being bullied at school. We explored the extent to which these two pathways explain secondary effects of disability at different transition points. We acknowledge that stigma is a multidimensional concept that is difficult to measure, particularly in a social survey context (Van Brakel 2006). Our empirical investigation of stigma effects should therefore not be regarded as exhaustive, as there are other possible pathways through which both enacted and felt stigma may influence educational attainment. However, we note the advantage of using indirect measures of stigma in empirical research (Shifrer 2013), and argue that our two identified pathways are sensibly justified drawing on insights from educational and stigma literature.

Our models suggest that university expectations have a considerably stronger effect than bullying on educational transitions. Considering that bullying victimization captures enacted stigma, and expectations are most likely related to felt stigma, this finding is in accordance with research suggesting that negative outcomes of stigmatized populations are primarily a result of psychological processes relating to internalized stigma (Scambler 2009). Expectations have a relatively modest direct influence on GCSE attainment, but explain more than a quarter of disabled youth's lower likelihood to continue to full-time education after GCSE examinations. The importance of expectations for attainment is not surprising given existing evidence (Goodman, Gregg, and Washbrook 2011; Need and De Jong 2001; Sewell, Haller, and Portes 1969). However, the finding that expectations of disabled adolescents are largely dependent on their parents' expectations, independently of academic performance,

supports our suggestion that 'stigma coaching' is influential for disabled youth's trajectories. These results are also in accordance with recent work evidencing the influence of labeling on parental expectations, net of academic achievement (Shifrer 2013).

We acknowledge that our study presents some limitations that should be addressed by future research. First, our data allowed us to only focus on adolescence, while our results direct attention to factors contributing to lower attainment earlier in childhood, that are likely to include stigma-related processes. Second, our results can only be generalized to more 'able' disabled adolescents that attend mainstream schools in England. We do not capture those in special schools that solely cater for the needs of disabled students. Moreover, our transition modeling speaks to the relative performance of those who succeed. The outcomes for the majority of disabled adolescents who face more limited opportunities deserve greater attention. Third, our analysis shows unexplained disability effects, indicating the importance of processes potentially not captured in our data and not considered in our hypotheses. While disability studies have produced substantive knowledge on the potential family and school processes that negatively influence disabled children and adolescents, multi-purpose social surveys continue to provide few opportunities for operationalization of many of these concepts. This likely reflects that, despite the move towards more sociological conceptualizations of disability, there is still little sociological interest in this social division compared to other ascriptive inequalities, limiting empirical investigations and constraining policy relevant research. Despite these data limitations, we argue that our study has identified a number of important factors associated with disabled youth's low educational attainment, producing novel insights for social stratification research and disability studies.

Notes

1. This research was conducted as part of the ESRC Secondary Data Analysis Initiative

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Table

Table I: Estimation Samples Descriptives, Proportion / Mean (SD)

	Sample A (N=10,848)		Sample B (N=9,703)		Sample C (N=6,104)		Sample D (N=4448)		Disabled sig diff from non-disabled?
	Not disabled (9,512, 85.3%)	Disabled (1336, 14.7%)	Not disabled (8,651, 86.9%)	Disabled (1,052, 13.1%)	Not disabled (5,793, 94.5%)	Disabled (311, 5.5%)	Not disabled (4237, 95.2%)	Disabled (211, 5.2%)	
Dependent variables									
1. University expectations									
Not at all likely to go to university	13.1	38.3							P<0.000
2. Attained Level 2 qualifications			66.5	25.5					P<0.000
3. Continued in full-time upper secondary education					84.7	75.0			P<0.000
4. Entered/Attended university							64.1	61.4	P>0.1
Explanatory Variables									
Prior attainment									
Mean Key Stage 2 score (SE) (range 15-36)	27.0 (0.06)	23.2 (0.24)	27.9 (0.06)	23.9 (0.14)					
Advanced Level points score									
0-299							18.0	31.6	
300-629							23.4	21.7	
630-779							25.3	18.3	
780 and higher							33.4	28.4	
Expectations									
Parental expectations for university education									
Not at all likely	13.6	43.4							
Not very likely	17.8	23.8							
Fairly likely	31.1	19.6							

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	Col1	Col2	Col3	Col4	Col5	Col6	Col7	Col8
Very likely	37.6	13.2						
Mean university expectations at age 14/15 (SE) (range=1 (not at all likely) to 4 (very likely))			2.9 (0.02)	2.2 (0.09)	3.2 (0.02)	3.0 (0.06)		
Mean university expectations at age 16/17 (SE) (range= 1 (not at all likely) to 4 (very likely))							3.5 (0.01)	3.6 (0.06)
Other measures								
Bullied (%)			12.3	21.6	10.5	15.8		
Friends likely to stay in full-time education after age 16			78.7	61.6	87.1	81.7		
Mean school engagement: standardised measure based on 12 school engagement questions (SE) (Cronbach's alpha=0.83)			0.13 (0.01)	0.01 (0.03)	0.14 (0.01)	0.17 (0.00)		
Mean school share with special educational needs (SE)			15.3 (0.32)	17.2 (0.53)	14.2 (0.32)	14.2 (0.57)		
Control variables								
Girls	51.3	39.2	52.0	40.9	53.9	51.4	54.5	58.4
Ethnic group								
White	86.6	92.5	86.0	92.0	85.9	91.7	85.5	91.4
Mixed	2.9	2.4	2.8	2.6				
Indian	2.7	1.0	2.9	1.1				
Pakistani	2.1	1.0	2.4	1.0				
Bangladeshi	0.9	0.2	1.0	0.2				
Black Caribbean	1.4	1.4	1.5	1.5				
Black African	1.3	0.7	1.5	0.3				
Other	2.1	0.9	2.0	1.2				
All non- white					14.1	8.3	14.5	8.6

Parental education:

Degree or higher	18.5	11.3	16.6	11.2	22.9	27.3	26.8	35.5
Higher education, no degree	16.0	13.7	15.9	13.3	18.5	17.6	20.0	21.7
Advanced Levels (age 18) or equivalent	18.4	18.1	18.7	18.3	19.3	16.9	18.4	16.0
GCSE A-C or equivalent	27.8	27.4	28.4	29.4	25.6	25.0	22.9	20.8
Less than GCSE A-C or other	7.1	11.3	7.6	12.0	4.9	6.9	4.0	3.9
None	12.2	18.3	12.8	15.8	8.7	6.4	7.9	2.2

Notes: Unweighted Ns, weighted percentages and means. Samples: A: non-missing observations on expectations outcome and all explanatory measures; B: non-missing observations on level 2 outcome and all explanatory measures; C: non missing observations on all measures and attained Level 2 qualifications; D: non missing observations on all measures, attained Level 2 qualifications, and continued in full-time upper secondary education.