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Highlights

- This paper explores whether ability grouping in UK primary schools at age 7 affects how much pupils like Maths, English and school generally by age 11;
- How much pupils *like* particular school subjects and school generally is an important outcome to consider because there is no *a priori* reason why those in higher and lower ability groups should diverge over time with respect to the degree to which they *enjoy* their studies (as distinct from their perception of how *well* they are doing academically relative to other pupils);
- Our key finding is that pupils placed in the lower ability groups were less likely than their peers in the high ability group to come to enjoy, continue to enjoy, or increase their enjoyment of Maths between the ages of 7 and 11, both before and after controlling for maths ability at age 7, sex and social class background. Similar patterns were evident in relation to liking of English and school generally before controlling for these factors, but were largely statistically insignificant after the inclusion of control variables;
- This finding is robust to different modelling strategies including individual fixed effects;
- Given that the extent to which pupils like their studies is known to influence their level of academic engagement and achievement, our findings lend support to the wealth of evidence indicating that ability grouping - at least as currently practiced in UK primary schools - is harmful for those judged to be of lower ability.

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Does ability grouping affect UK primary school pupils' enjoyment of Maths and English?

Abstract
Advocates of grouping pupils by measured ability for instructional purposes claim that ability-homogeneous classrooms increase the attainment of high-ability pupils without detriment to the attainment of pupils judged to be of lower ability. Opponents of ability grouping, in contrast, argue that high-ability pupils do at best only marginally better in ability-homogeneous classrooms than they would have done in mixed-ability settings, whereas low-ability pupils do significantly worse. One mechanism posited by the critics of ability grouping is that this practice causes psychological harm to those labelled low-ability, resulting in a self-fulfilling prophecy of low attainment. Most previous studies have measured this posited psychological impact of ability grouping in terms of pupils' "academic self-concept", a term which refers to pupils' perceptions of how good they are in relation to particular subjects or to academic study generally. This paper explores the related but distinct concept of "academic enjoyment", which refers to the extent to which pupils like the particular subjects they study, and like school generally, which has been shown to be positively correlated with academic engagement and achievement. While academic self-concept may change over time as pupils become aware of their level of academic performance, as indicated by test scores and/or their placement in particular ability groups, this need not be the case for change over time in pupils' enjoyment of their studies which could, in theory at least, remain stable or change in a uniform direction regardless of the ability group in which pupils are taught. In this paper we explore whether pupils' enjoyment of Maths, English, and school generally, changes in a differential manner between the ages of 7 and 11 depending on the ability group in which pupils were placed at age 7. We do so by drawing on data from the Millennium Cohort Study (MCS) which has followed a nationally representative sample of children in the UK born between 2000 and 2002. Compared to pupils in the high ability group, those in the low ability group were less likely to come to enjoy, continue to enjoy, or increase their enjoyment of Maths between the ages of 7 and 11, both before and after controlling for pupils' measured ability in Maths at age 7 and the key demographic variables of gender and social class background. Similar divergences with respect to enjoyment of English and school generally were evident before controlling for these additional factors, but were largely statistically insignificant after the inclusion of these controls. Overall our findings suggest that ability grouping in primary schools does more harm than good, at least in relation to pupils' enjoyment of Maths.

Keywords: ability grouping; setting; streaming; tracking; labelling;

1. What do we know about ability grouping in the UK?

Despite the shift from a selective to a comprehensive model of schooling in the UK since the late 1960s, the practice of grouping pupils within schools on the basis of measured ability[1] has become widespread. Although no systematic and routine data is recorded, ability grouping is especially common at secondary level (Taylor *et al*, 2020), with figures for the early 2010s indicating that most pupils attending non-selective state secondary schools in England were being taught in ability-homogeneous 'streams' (i.e. separate classes for all or most subjects) or 'sets' (i.e. separate classes for specific subjects) for Maths (71%), Science (62%), and English (58%) (Dracup, 2014). More recent studies show that the prevalence of grouping practices remains in place (Taylor *et al*, 2020). This is in addition to the 5% of all state-educated secondary pupils in England who attend academically selective grammar schools left over from the pre-comprehensivization era (Danechi, 2020). At primary school level - the focus of this paper - ability grouping is less common but is increasingly becoming standard practice. Some authors have argued that pressures on schools and teachers to raise standards and meet attainment targets are partly driving this trend (Bradbury, Braun & Quick, 2021; Bradbury & Roberts-Holmes, 2017; Marks, 2016). While fewer than 3% of primary schools reported streaming pupils by ability in the early 1990s (Lee & Croll, 1995), by 2008 16% of 7 year olds were being streamed by ability for all subjects, 26% were being taught in ability sets for both English and Maths, and a further 11% were set for either English or Maths (Hallam, 2012; Hallam & Parsons, 2014). In a recent study based on a national large-scale survey, teachers reported that ability grouping is becoming increasingly common in the Early Years (ages 3–4) and in Key Stage 1 (ages 5–7) (Bradbury & Roberts-Holmes, 2017).

This resurgence of ability grouping within schools was encouraged by the New Labour governments of the 1990s and 2000s (DfE, 1997; DfES, 2006). A discourse analysis of the education policy documents produced by government during this period highlights the framing of ability grouping as serving to "raise standards" generally, and to "stretch the brightest" pupils in particular; claims that arguably 'naturalise' the notion of substantial and largely fixed ability differences between pupils, and that are notably at odds with much of the extant research (Francis *et al*, 2017a). Indeed, decades of research indicates that in terms of academic achievement pupils judged to be of high ability benefit only modestly from being taught in ability homogeneous groups, whereas pupils judged to be less able generally do worse than comparable pupils taught in mixed ability classrooms; findings that hold not only for the UK (Parsons & Hallam, 2014; William & Bartholomew, 2004; Ireson, Hallam & Hurley, 2005) but also other countries with an extended use of ability grouping such as France (Duru-Bellat & Mingat, 1998), the USA (Steenbergen-Hu, Makel & Olszewski-Kubilius, 2016; Gamoran, 1992; Kulik & Kulik, 1982) or New Zealand (Hornby & Witte, 2014). A study focused specifically on UK primary schools found that pupils placed in the high ability stream achieved higher scores in Key Stage 1 tests administered at age 7 than pupils placed in lower ability streams (Parsons & Hallam, 2014). These results held even after the authors controlled for test scores at age 5, alongside indicators of pupils' socioeconomic backgrounds, pupils' enjoyment of school, parental support for learning at home, parental engagement with the school, and the proportions of pupils in the school who were in receipt of free school meals or registered as having special educational needs. Findings are similar for studies focusing on attainment at GCSE, an important set of national exams taken by all secondary school pupils at age 15-16 (Ireson, Hallam & Hurley, 2005; William & Bartholomew, 2004). Much of the policy discourse promoting ability grouping focuses on the benefits to high ability pupils, minimising the drawbacks for pupils judged to be of lower

[1] Throughout this paper we understand ability grouping as measured ability grouping, acknowledging that ability is a wider concept and that measured ability is influenced by a range of socioeconomic factors (Francis *et al*, 2017a). Recent studies also refer to measured ability grouping as 'attainment grouping' (e.g. see Towers *et al*, 2020).

ability (Francis *et al*, 2017a). Correspondingly, much of the policy discourse also overlooks the balance of the evidence which indicates that ability grouping does little to "raise standards" across the school system overall (Ireson, Hallam & Hurley, 2005; Kutnick *et al*, 2005; Ireson & Hallam, 2001; Boaler, Wiliam, & Brown, 2000; Slavin, 1990).

Research has also shown that ability grouping is especially detrimental to pupils from socioeconomically disadvantaged backgrounds. This is partly because pupils from less advantaged backgrounds tend to score less well on ability tests (Bruckauf & Chzhen, 2016), but is also because such pupils are less likely to be placed in high ability groups than their middle class peers even when they have comparable ability test scores (Hallam & Parsons, 2013). Indeed, there is a virtual consensus in the research literature spanning half a century that measured ability is not the only factor influencing pupils' placement in different ability groups (e.g. Jackson, 1964; Tomlinson, 1987; Boaler, 1997; Dunne *et al*, 2007, Taylor *et al*, 2018). Research focused on UK primary schools found that while test scores at age 5 and 7 were significant net predictors of ability group placement, so too were other various indicators of socioeconomic background including living in a lone parent family, living in a local authority rented property, having a mother with few or no educational qualifications, and living in a non-working or a low income household, as well as other factors including being male and having been born later in the academic year (Hallam & Parsons, 2013 & 2014). Similarly, pupils' ability group placements in UK primary schools at age 11 have been found to be statistically associated with teachers' assessments of pupils' behaviour, attitudes and aspirations for the future, and with pupils' gender and family income, after controlling for verbal test scores (Hartas, 2018). These findings are replicated in studies focusing on ability group placement in secondary schools in the UK, with around one third of all pupils allocated to higher or lower ability groups for Maths than their prior performance in Maths would warrant, with misallocation to lower ability groups more common for girls, free school meal recipients, and ethnic minority pupils (Connolly *et al*, 2019; see also Muijs & Dunne, 2010). Moreover, research suggests that there tends to be little pupil mobility between ability groups, either up or down, over the course of the school career, even where pupils' progress might justify such movements (Taylor *et al*, 2018; Dunne *et al*, 2011).

2. Mechanisms behind the impact of ability grouping on attainment

Researchers have identified a range of potential mechanisms through which ability grouping tends to widen rather than narrow disparities in attainment. One set of mechanisms focuses on differences in the teaching and learning environments experienced by those in high, medium and low ability groups arising from teacher quality, teacher expectations, and the content of the curriculum and associated levels of assessment. A second, related, set of mechanisms focus on the impact of ability grouping on pupils' identities and self-perceptions in relation to their capacities to achieve in education.

Ability group differences in teaching and learning environments

With regard to teacher quality, while it might be theorised that lower ability pupils are most in need of being taught by the most experienced and skilled teachers, studies have found that teachers who are highly qualified in their discipline are less likely to be allocated to teach lower ability groups (Francis *et al*, 2019). In relation to teacher expectations, while one motivation for teaching low ability pupils separately might be to make it easier to help such pupils catch up with their peers, studies suggest that teachers have lower expectations of pupils in lower ability groups and do not expect to see their relative performance improve over time, even in primary education (McGillicuddy & Devine, 2018). This usually translates into a self-fulfilling prophecy wherein students from lower ability groups perform more poorly than would have been the case if they had been taught in mixed ability settings (Smith *et al*, 1998). Although the vast majority of empirical studies on the topic suggest that self-fulfilling prophecies are real, their effects are typically small and these tend to dissipate rather than

accumulate over time, and its influence being powerful only among stigmatised students (Jussim & Harber, 2005). Indicative of this, a recent mixed methods study of Maths and English teachers working with pupils in the first year of secondary school found that pupils in lower ability groups were constructed as 'dependent learners' who were unable to learn without substantial guidance and support from their teachers, potentially creating barriers to pupils becoming active agents in their own learning (Mazenod *et al*, 2018). Finally, while ability groups have the potential to facilitate learning by making it possible to tailor curriculum content to pupils current levels of understanding, studies have found that pupils in lower ability groups tend to be continually exposed to less demanding curricula and are frequently precluded from accessing higher-level qualification routes (Dunne *et al*, 2007; Ireson, Hallam & Hurley, 2005).

Ability group differences in pupils' identities and self-perceptions

Pupils assigned to different ability groups may internalise the positive and negative labels associated with these groups, with consequences for pupils' self-esteem (i.e. subjective evaluation of their own personal worth), self-concept (i.e. perception of what they are capable of), and self-efficacy (i.e. sense of agency in relation to learning and attainment) (Francis *et al*, 2017b). Pupils are particularly likely to internalise the labels implied by ability groups if they experience inequitable teaching and learning environments as described above, and research indicates that ability grouped pupils are keenly aware of the ways in which pupils in lower ability groups are perceived and treated in ways that risk bringing about a 'self-fulfilling prophecy' (McGillicuddy & Devine, 2020; Francis *et al*, 2017b). Conversely, studies have found that pupils in all ability groups recognise and value the equity-promoting nature of mixed ability teaching environments, although a corresponding preference for mixed ability teaching was more likely to be expressed by pupils in the low ability groups (76%) than in the high ability (51%) and middle ability (41%) groups (Tereschchenko *et al*, 2019; see also Archer *et al*, 2018).

Research has shown that pupils do appear to internalise, at least to some degree, the labels associated with different ability groups. However, the pattern varies across countries depending on the type of ability grouping arrangement in place. For instance, in countries with "course-by-course tracking" (i.e. setting) like the United States, the United Kingdom and Australia, students tend to experience an 'assimilation effect', as high ability group students tend to have a higher self-concept while low ability group students tend to have a lower one - at least in Maths (Chmielewski, Dumont & Trautwein, 2013). Conversely, a reverse pattern can be found in countries with between-school streaming (e.g. Germany) and within-school streaming (e.g. Belgium), where students placed in high ability schools/groups tend to have a lower self-concept in relation to their group average; while pupils in low ability schools/track tend to have a higher self-concept in relation to their group average (Chmielewski, Dumont & Trautwein, 2013). The main explanation provided by the authors is that when students are only grouped for certain courses, they are constantly reminded of their relative position in relation to the whole group, while when consistently streamed in different groups/schools this more homogenous group becomes their salient reference group and they are no longer exposed to all achievement levels. These results seem to be consistent over time, as previous studies have also systematically produced the same conclusions (Smith *et al*, 1998). Similarly, a longitudinal study in Singapore showed that streaming by ability has a negative effect on academic self-concept among students in the lower ability group immediately after streaming, but that in the long term lower-ability stream students have comparable (if not higher) academic self-concept compared to high-ability stream pupils (Liu, Wang & Parkins, 2005). The authors also attribute these differentiated short and long term results to students' reference group (all students vs same stream students). Therefore, all these studies are aligned with the Big-Fish-Little-Pond-Effect model (BFLPE: Marsh, 1987), which predicts that "equally able students have lower academic self-concepts (ASCs) when attending schools where the average ability levels of classmates is

high, and higher ASCs when attending schools where the school average ability is low" (Marsh *et al*, 2008: 319).

In line with the international research literature, a study of secondary school pupils in 23 UK secondary schools found that pupils in the high ability groups had more positive self-concepts in relation to Maths, English and Science at age 15-16, and that self-concept was positively correlated with a desire to continue learning in the future (Ireson & Hallam, 2009). Similarly, an analysis of nationally representative survey data for pupils in their first year at UK secondary schools found a statistically significant association between placement in ability groups for English and Maths and pupils' self-confidence in those subjects, and in their learning in general (Francis *et al*, 2017b). Similar results were found for a study in Singapore, showing differences between English and Maths streams: while in English streams some lower (higher) achievers showed disproportionately lowered (heightened) self-concept in relation to their academic performance in English, no differences were found for Maths streams (Liem, McInerney & Yeung, 2015).

Unfortunately none of the three studies just cited included a 'before' measure of self-concept. Consequently it is unclear whether or not ability grouping served to create and/or exacerbate differences in academic self-concept. Nor do these three studies include controls for measured ability at the time of ability group placement, such that it is ambiguous whether or not pupils' reported levels of self-concept simply reflect accurate perceptions of their objective levels of academic performance. However, an extension of the Francis *et al* (2017b) study did employ 'before' and 'after' measures of academic self-concept and controls for measured ability. This more recent study found that the gap between students in the top and bottom ability groups with respect to general self-confidence and confidence in English (but not Maths) had widened to a statistically significant but modest degree over the course of the first year of secondary school (Francis *et al*, 2020). However the effect sizes observed in this latter study were modest, perhaps because of the relatively short one-year interval between the before and after measures of pupils' self-perceptions.

3. Contribution of this study

Most studies of pupils' internalisation of the labels implied by ability groups have focused on secondary education rather than primary education, reflecting the fact that ability grouping is far more prevalent in secondary schools than in primary ones. However, ability grouping is on the rise in UK primary schools as noted above, as well as in other countries (e.g. the USA, see Steenbergen-Hu, Makel & Olszewski-Kubilius, 2016). Previous evidence suggests that teachers' judgments and assessments of primary school pupils are systematically biased by socioeconomic, gender and ethnic stereotypes (Campbell, 2015), among other students' characteristics. Since students are typically placed in ability groups based on teachers' judgments and assessments, this is likely to enhance inequalities across pupils from different socioeconomic backgrounds, promoting the internalisation of positive or negative labels at an early age. A recent study looking at primary school pupils in Ireland concludes that ability grouping provoked strong emotional and psychosocial responses in students. Those in lower ability groups more commonly relate to feelings of 'shame', 'upset' and 'inferiority', while those in the higher ability group are more prone to feel 'pride', 'happiness' and 'confidence' (McGillicuddy & Devine, 2020). This becomes especially relevant in education systems that rely heavily on standardised testing and assessments as a metric of success, such as the UK system. If students are initially grouped by 'ability' based on teachers' judgments and assessments, the internalisation of the labels implied by ability groups are likely to influence ongoing and subsequent educational engagement and attainment. The present paper sets out to fill this gap in the literature by examining whether ability grouping impacts on primary school pupils' enjoyment of their studies as they progress through primary school.

Previous research exploring the consequences of ability grouping on learners' identities has mainly focused on academic self-concept or self-confidence, while limited efforts have been devoted to other dimensions such as academic enjoyment. We argue this latter dimension is an important part of students' identities, since students who like school and specific subjects are more likely to engage and improve their learning outcomes, enhancing attendance and inclusion in compulsory and post-compulsory education (Gorard & Huat See, 2011). A positive relationship between academic enjoyment and achievement by subject has also been reported (Goetz *et al*, 2008), and recent studies suggest this relationship persists over time (Putwain *et al*, 2018). Since most previous studies of pupils' learner identities have operationalised this in terms of academic self-concept or self-confidence, we exploit the opportunity to make use of data about changes in the extent to which pupils taught in ability-homogeneous and mixed-ability groups *like* particular subjects and *like* school in general. Our operationalisation differs from more commonly used measures in at least two important ways. First, while academic self-concept/self-confidence is almost certainly influenced by pupils' awareness of their current levels of academic performance as indicated by test scores and/or their placement in particular ability groups, this need not be the case for pupils' enjoyment of their studies. Indeed, the UK government, among other proponents of ability grouping, have claimed that teachers are better able to foster pupils' enjoyment of and engagement with learning, regardless of their current level of performance, when pupils are taught in ability-homogeneous settings, including pupils in the low ability group (DfE 1997: 38). Second, academic self-concept/self-confidence is a relational construct, involving pupils' perception of how 'good' they are compared to other pupils or to a specific benchmark of performance (i.e. the Big-Fish-Little-Pond-Effect mentioned earlier: Marsh, 1987). However, enjoyment is not relational, in that it does not invoke a comparison with others but relates to the pupils own personal/individual degree of like or dislike for learning. A now outdated meta-analysis of American studies (Kulik & Kulik, 1982) showed that students grouped by ability developed more positive attitudes towards the subject compared to students in mixed ability groups. We consider whether this pattern also applies to primary school pupils in the UK, or alternatively whether being placed in different ability groups is associated with a divergence in pupils' enjoyment of specific subjects and of school in general over time.

In light of the above, this paper sets out to answer the following research questions:

1. Does pupils' enjoyment of Maths, English, and school generally change in a differential manner between the ages of 7 and 11 depending on the ability group in which pupils were placed at age 7?

2. If so, are these differential changes in enjoyment over time robust to controls for potentially confounding factors, specifically measured ability in these subjects at age 7 and pupils' sex and parental social class background?

3. Data and variables

Our analysis makes use of waves four and five of the Millennium Cohort Study (MCS) (University of London, 2020a & 2020b), a prospective longitudinal cohort study which has followed the lives of around 19,000 young people born in England, Scotland, Wales and Northern Ireland in 2000-02. Cohort members have been surveyed 7 times to date, first at 9 months old and then at ages 3, 5, 7, 11, 14 and 17. We draw on data from the surveys conducted at ages 7 and 11, when pupils were in their third and sixth/final year of primary school, which include broadly similar questions about how much pupils liked Maths and English, and school in general. We focus our analysis on the sub-set of pupils (N=8,876) whose teachers completed a survey indicating whether the cohort member was taught in a high-ability, medium-ability or low-ability group or a mixed-ability classroom for Maths and/or for English at age 7. We combine teachers' responses to a series of questions about whether or not pupils in that school were allocated to either within-class or between-class

ability groups for the subject concerned, and if so whether the pupil in question had been allocated to the top, middle or bottom ability group. Within-class ability grouping is the most common form of ability grouping in UK primary schools (Hallam and Parsons 2013; Marks 2013), but it is difficult to get a static picture of grouping practices because ongoing (daily) grouping decisions are made (Towers *et al*, 2020) based on a range of factors (Bradbury & Roberts-Holmes, 2017). Although we recognise that our measure is a simplification of a more complex reality, combining within-class and between-class measures is justified as we are interested in the relationship between ability grouping and academic enjoyment rather than the influence of different types of grouping on academic enjoyment. Moreover, this way we make sure we have enough cases in each category to perform our analyses. Our analytical sample includes all cases with non-missing values for all key measures (N=6,951). The data is weighted to take into account stratification and clustering within the sample design, as well as attrition and non-response, using the weighting variables contained within the MCS longitudinal family file (Ketende & Jones, 2011).

Our analysis makes use of the following variables, descriptive statistics for which are reported in Table 1.

Ability group placement for Maths at age 7: This variable distinguishes between pupils identified by their teachers as being in high, middle or low ability groups for the purposes of Maths instruction, or alternatively, as being taught in a mixed ability group, at age 7. The high ability group has the most cases (41.7%), followed by the middle (35.6%), low (15.8%) and mixed (6.9%) ability groups.[2]

Ability group placement for English at age 7: This variable is the same as the previous one except for the focus on English rather than Maths, and the distribution of values is similar to that for Maths.

Liking of Maths at ages 7 and 11: This variable captures pupils' responses to the question "How much do you like number work?" asked at age 7, and to the comparable question "How much do you like Maths?" asked at age 11. We use the three response options recorded in the data: "I don't like it", "I like it a bit" and "I like it a lot". Enjoyment levels are quite high across the sample overall, with slightly over half of all pupils reporting that they liked Maths a lot at age 7 (53.2%) and at age 11 (52.6%).

Liking of English at ages 7 and 11: This variable captures pupils' responses to the question "How much do you like reading?" asked at age 7, and to the comparable question "How much do you like English?" asked at age 11. We use the same three response options as listed above. At age 7 the modal response was "I like it a lot" (56.8%) but by age 11 the modal response had declined to "I like it a bit" (50.1%).

Liking of school at ages 7 and 11: This variable records pupils' responses to the question "How much do you like school?" asked at ages 7 and 11, with the same three response options listed above. At age 7 the modal response was "I like it a lot" (52.8%) but by age 11 there had been some convergence from this and the "I don't like it" category to the middle value of "I like it a bit" (47.1%).

Measured ability in Maths at age 7: This variable refers to pupils' standardised scores in a Maths test administered as part of the MCS fieldwork at age 7. The mean value for the analytical sample is 99.2.

[2] Because the sub-sample of pupils taught in mixed-ability settings is small, resulting in large confidence intervals around our model estimates, we focus our discussion of empirical findings on the contrast between pupils in the high, middle and low ability groups.

Table 1. Descriptive statistics for the weighted analytical sample (N=6,951)

	Age 7	Age 11
	%	%
Maths ability group		
High ability group	41.1	
Middle ability group	35.7	
Low ability group	16.2	
Mixed ability group	7.0	
English ability group		
High ability group	38.4	
Middle ability group	35.7	
Low ability group	18.2	
Mixed ability group	7.7	
How much do you like number		
I don't like it	15.3	10.2
I like it a bit	31.3	37.0
I like it a lot	53.4	52.8
How much do you like reading/English?		
I don't like it	11.6	9.5
I like it a bit	31.8	49.8
I like it a lot	56.6	40.7
How much do you like school?		
I don't like it	16.0	5.4
I like it a bit	31.1	47.1
I like it a lot	52.9	47.5
Standardised test scores		
Maths score – mean (sd)	99.0 (41.0)	
Reading score – mean (sd)	113.4 (36.4)	
Sex		
Male	48.8	
Female	51.2	
Parental social class (NS-SEC)		
Higher managerial and professional	16.8	
Lower managerial and professional	28.4	
Intermediate	13.3	
Small employers and self-employed	7.4	
Lower supervisory and technical	6.4	
Semi-routine	12.7	
Routine	7.5	
Not known	7.5	

Measured ability in English at age 7: This variable refers to pupils' standardised scores in a reading test administered as part of the MCS fieldwork at age 7. The mean value for the analytical sample is 113.8.

Sex: This records whether the pupil was male or female, and is included as a control variable in the analysis.

Parental social class: This records pupils' parental social class background based on occupation data reported by parents when pupils were aged 7. This was coded into seven

National Statistics Socio-economic classification (NS-SEC) categories, ranging from high skilled “Higher managerial and professional occupations” to low skilled “Routine occupations”, and is included as a control variable in the analysis.

4. Results

We begin, in Table 2, with some bivariate descriptive statistics which show pupils’ levels of enjoyment of Maths, English, and school generally, at age 7 and subsequently at age 11, broken down by ability group at age 7. At age 7, pupils placed in the low ability group were more likely than those in the high ability group to report that they didn’t like Maths (21.9% vs. 10.3%), English (23.8% vs. 6.4%), and school generally (23.3% vs. 12.1%), and were less likely to report that they liked Maths (47.3% vs. 59.2%), English (45.7% vs. 65.3%), and school generally (45.4% vs. 57.1%) a lot. A similar pattern is evident at age 11, although the percentage point gaps between low-ability and high-ability grouped pupils has narrowed with respect to disliking English and school generally, but widened with respect to liking Maths, English and school generally a lot. Those taught in mixed ability settings, in contrast, report levels of enjoyment that are more similar to that for the high ability group at both age 7 and age 11.

Table 2. Crosstabulation of ability group by enjoyment at age 7 and at age 11

	Age 7 (row %)			Age 11 (row %)		
	I don’t	I like it	I like it	I don’t	I like it	I like it
Enjoyment of Maths						
High ability group	10.3	30.5	59.2	5.9	32.7	61.4
Middle ability group	18.6	32.4	49.0	12.0	39.3	48.7
Low ability group	21.9	30.8	47.3	17.3	41.4	41.3
Mixed ability group	12.0	32.0	56.0	9.3	40.3	50.4
Enjoyment of English						
High ability group	6.4	28.3	65.3	6.5	47.0	46.5
Middle ability group	11.8	35.2	53.0	11.1	52.2	36.7
Low ability group	23.8	30.5	45.7	13.8	51.2	35.0
Mixed ability group	8.0	37.1	54.9	7.2	49.1	43.7
Enjoyment of school						
High ability group	12.1	30.8	57.1	3.2	42.9	53.9
Middle ability group	19.3	31.1	49.6	6.7	50.8	42.5
Low ability group	23.3	31.3	45.4	10.0	55.0	35.0
Mixed ability group	11.4	32.3	56.3	5.1	41.0	53.8

To explore more precisely whether pupils’ enjoyment changes in a differential manner between the ages of 7 and 11, depending on the ability group in which pupils were placed at age 7, we run a series of multinomial logistic regression models to estimate the extent to which pupils like (1) Maths, (2) English, and (3) school generally, at age 11 given their level of enjoyment of these at age 7 coupled with their ability group placement at age 7.[3]
Model 1 begins by predicting enjoyment at age 11 simply as a function of the combination of pupils’ enjoyment levels at age 7 and ability group. In Model 2, we add controls for potential confounders, specifically pupils’ scores in standardised tests in Maths and/or English

[3] Where the dependent variable is enjoyment of school generally, we consider ability group placement in Maths or English whichever is the higher of the two (68% of sample members are in the same ability group for both subjects).

administered at age 7 and pupils' sex and social class background. All results are reported in the form of predicted probabilities.

Table 3 reports the results of the two multinomial logistic regression models predicting the extent to which pupils liked Maths at age 11. Model 1 shows that, before controlling for any potentially confounding variables, pupils placed in the low and middle ability groups were less likely than their peers in the high ability group to come to enjoy, continue to enjoy, or increase their enjoyment of Maths between the ages of 7 and 11. For example, among pupils who disliked Maths at age 7, 25.5% of those placed in the low ability group continued to dislike Maths by age 11, compared to only 9.9% of those placed in the high ability group. Among pupils who liked Maths a bit at age 7, 15.1% of those placed in the low ability group had come to dislike Maths by age 11 compared to just 6.9% of those in the high ability group, while only 36.8% of low-ability grouped pupils had come to like Maths a lot by age 11 compared to 54.7% of those placed in the high ability group. Among those who liked Maths a lot at age 7, only 47.9% of low-ability grouped pupils continued to like Maths a lot by age 11, compared to 67.7% of pupils in the high ability group. Model 2 shows that, after controlling for maths ability, sex and social class background at age 7, this pattern persists in only slightly attenuated form and most contrasts remain statistically significant. The results for pupils taught in mixed ability settings, however, are not substantially or significantly different to those for high-ability grouped pupils in either model, but nor are they significantly different to those for the low-ability group perhaps owing to the relatively small size of the sub-sample of pupils taught in mixed ability groups.

Table 4 reports the findings of the same analysis for liking of English at age 11. Model 1 shows that pupils placed in the low and middle ability groups were less likely than their peers in the high ability group to continue liking English a lot between the ages of 7 and 11, at 38.6%, 40.2% and 50.9% respectively. After controling for maths ability, sex and social class background at age 7 in Model 2, these disparities persist in attenuated form, but remain statistically significant only for those from the middle ability group. In both models, there are no significant differences between pupils from the mixed as compared to the high ability group.

Finally, Table 5 reports the findings of the same analysis but this time the dependent variable is the extent to which pupils like school generally at age 11. Model 1 shows that pupils placed in the low and middle ability groups were less likely than their high-ability grouped peers to continue liking or increasingly like school between the ages of 7 and 11. For example, 43% of low-ability grouped pupils continued to like school a lot compared to 53.6% of middle-ability grouped pupils and 62.7% of pupils in the high ability group. Controlling for ability in Maths and reading, sex and social class background at age 7 in Model 2, these patterns persist in attenuated form, but the only contrast that remains statistically significant is the lower likelihood of continuing to like school a lot for pupils placed in the low rather than the high ability group. Moreover, in both models there are no significant differences between pupils from the mixed as compared to the high ability group.

Table 3. Multinomial logistic regression models predicting the probability of enjoying Maths a age 11

	Model 1			Model 2		
	I don't like it	I like it a bit	I like it a lot	I don't like it	I like it a bit	I like a lot
Enjoyment of Maths at age 7 by ability group at age 7						
I don't like it - high ability group (ref)	9.9	45.7	44.4	11.4	47.1	41.6
I don't like it - middle ability group	21.0*	42.4	36.6	19.1	42.4	38.5
I don't like it - low ability group	25.5*	41.1	33.4	21.7*	42.1	36.2
I don't like it - mixed ability group	14.9	46.7	38.4	14.5	48.0	37.5
I like it a bit - high ability group (ref)	6.9	38.4	54.7	7.6	38.1	54.3
I like it a bit - middle ability group	12.4*	44.3	43.3*	11.8	42.9	45.3
I like it a bit - low ability group	15.1*	48.1	36.8*	12.2	46.9	40.8
I like it a bit - mixed ability group	7.8	48.8	43.4	7.7	47.4	45.0
I like it a lot - high ability group (ref)	4.8	27.5	67.7	5.8	29.1	65.1
I like it a lot - middle ability group	8.2*	34.8*	57.0*	7.8	34.5	57.7
I like it a lot - low ability group	14.8*	37.3*	47.9*	12.4*	37.2*	50.4
I like it a lot - mixed ability group	8.9	34.1	56.9*	9.4	34.5	56.1
Standardised Maths score at age 7 (sample mean value)				9.5*	37.4*	53.1
Sex at age 7						
Male (ref)				8.5	32.3	59.2
Female				11.7*	41.4*	46.9
Parental social class at age 7						
Higher managerial/professional (ref)				9.3	41.4	49.3
Lower managerial/professional				10.9	40.7	48.4
Intermediate				10.0	35.5	54.5
Small employer & self-employed				10.6	35.1	54.3
Lower supervisory/technical				9.2	34.5	56.3
Semi-routine				10.3	32.3*	57.4
Routine				11.0	35.9	53.1
Not known				8.8	28.9*	62.3

Note: * indicates a predicted probability that is statistically significantly different ($p<0.05$) from the corresponding figure for the relevant reference category.

Table 4. Multinomial logistic regression models predicting the probability of enjoying English at age 11

	Model 1			Model 2		
	I don't like it	I like it a bit	I like it a lot	I don't like it	I like it a bit	I like a lot
Enjoyment of English at age 7 by ability group at age 7						
I don't like it - high ability group (ref)	12.0	54.7	34.4	11.4	53.1	35.5
I don't like it - middle ability group	14.4	56.3	29.3	12.8	54.3	32.9
I don't like it - low ability group	20.1	44.2	35.0	15.2	42.7	42.1
I don't like it - mixed ability group	12.7	51.3	36.0	10.1	49.0	40.9
I like it a bit - high ability group (ref)	8.9	51.8	39.3	9.9	51.2	38.9
I like it a bit - middle ability group	11.6	54.6	33.8	11.2	53.9	34.9
I like it a bit - low ability group	11.5	58.8	29.7*	9.4	57.0	33.7
I like it a bit - mixed ability group	8.0	47.8	44.2	7.9	47.7	44.4
I like it a lot - high ability group (ref)	4.9	44.2	50.9	6.0	46.3	47.7
I like it a lot - middle ability group	10.0*	49.8	40.2*	10.4*	50.7	38.9
I like it a lot - low ability group	11.6*	49.8	38.6*	9.6	49.2	41.2
I like it a lot - mixed ability group	5.9	49.7	44.5	6.2	50.0	43.8
Standardised reading score at age 7 (sample mean value)				9.2*	50.0*	40.8
Sex at age 7						
Male (ref)				11.4	54.8	33.8
Female				7.5*	45.3*	47.2
Parental social class at age 7						
Higher managerial/professional (ref)				8.2	53.6	38.2
Lower managerial/professional				8.9	51.3	39.8
Intermediate				10.0	49.8	40.2
Small employer & self-employed				11.6	49.2	39.2
Lower supervisory/technical				9.0	48.6	42.3
Semi-routine				9.9	49.6	40.4
Routine				11.1	44.7*	44.2
Not known				9.5	42.6*	47.9

Note: * indicates a predicted probability that is statistically significantly different ($p<0.05$) from the corresponding figure for the relevant reference category.

Table 5. Multinomial logistic regression models predicting the probability of enjoying school at age 11

	Model 1			Model 2		
	I don't like it	I like it a bit	I like it a lot	I don't like it	I like it a bit	I like it a lot
Enjoyment of school at age 7 by ability group at age 7						
I don't like it - high ability group (ref)	10.3	59.4	30.3	9.8	58.2	32.0
I don't like it - middle ability group	13.2	64.1	22.6	11.0	62.7	26.3
I don't like it - low ability group	17.4	57.6	25.0	10.7	55.3	34.0
I don't like it - mixed ability group	14.1	40.2	45.7	11.1	37.8	51.1
I like it a bit - high ability group (ref)	2.9	50.3	46.8	3.6	51.6	44.9
I like it a bit - middle ability group	6.5	56.4	37.1*	6.5	55.5	38.0
I like it a bit - low ability group	7.2	62.0*	30.8*	4.8	57.7	37.5
I like it a bit - mixed ability group	5.4	50.1	44.5	5.5	50.2	44.2
I like it a lot - high ability group (ref)	1.8	35.5	62.7	2.5	38.5	58.9
I like it a lot - middle ability group	4.4*	42.1*	53.6*	4.3	42.3	53.5
I like it a lot - low ability group	8.1*	48.8*	43.0*	5.7	45.8	48.5*
I like it a lot - mixed ability group	3.2	35.9	60.9	3.4	37.5	59.1
Standardised Maths score at age 7 (sample mean value)				5.5*	47.1*	47.4*
Standardised reading score at age 7 (sample mean value)				4.8*	47.5*	47.7*
Sex at age 7						
Male (ref)				6.8	51.8	41.4
Female				3.8*	43.0*	53.2*
Parental social class at age 7						
Higher managerial/professional (ref)				3.1	44.5	52.4
Lower managerial/professional				4.5	49.9	45.6*
Intermediate				4.8	48.0	47.2
Small employer & self-employed				5.2	44.0	50.8
Lower supervisory/technical				7.1*	44.6	48.3
Semi-routine				6.4*	49.7	43.9*
Routine				9.2*	45.8	45.1
Not known				6.1	44.7	49.2

Note: * indicates a predicted probability that is statistically significantly different ($p<0.05$) from the corresponding figure for the relevant reference category.

As a robustness check, we also run an individual fixed effects regression model to test the hypothesis that, for the same individual, being placed in a lower ability group for Maths than for English decreases enjoyment of Maths relative to English over time (and vice versa). For the purposes of this further analysis, we treat as continuous variables our outcome measures relating to pupils' enjoyment of Maths and of English at ages 7 and 11 (0 = I don't like it, 1 = I like it a bit, 2 = I like it a lot). Individual fixed effects models control automatically for any time-invariant individual characteristics correlated with the time-varying independent variables included in the model, thus controlling for all unobserved individual level variance. As such, we include as independent variables in the model only our key independent variables capturing pupils' ability group placements in Maths and in English at age 7. This further analysis is carried out only for those who were taught in ability groups for both Maths and English (N=6,185) using xtivreg2 command in Stata.[4]

The results of this further analysis are presented in Table 6. If the findings of our earlier analyses are robust, we would expect to see a negative effect on the change in pupils' level of enjoyment of Maths relative to English between the ages of 7 and 11 of being in a lower ability group for Maths than for English (and vice versa). This expectation is borne out. After controlling for the statistically significant positive effect of enjoyment at age 7 on enjoyment at age 11 (.107, p<.001), we find statistically significant negative effects on enjoyment over time of placement in the middle ability (-.320, p<.001) and low ability (-.582, p<.001) groups compared to the high ability group. Thus, these further analyses confirm the net influence of ability grouping on pupil's enjoyment of English and Maths.

Table 6. Fixed effects panel data regression results predicting change in enjoyment of Maths as compared to English between the ages of 7 and 11 as a function of ability group placement in Maths as compared to English at age 7

	Coefficient	Standard error	P-value
Enjoyment at age 7	.107	.017	.000
Ability group at age 7 (High=ref cat)			
Middle ability group	-.320	.037	.000
Low ability group	-.582	.057	.000

4. Conclusions

Most previous research on ability grouping has focused on its practice at secondary school level. In this study we have focused on the underexplored field of ability grouping in primary school in the UK, a practice which is currently on the rise. We have explored whether grouping pupils by ability at an early age (i.e. age 7) influences their liking of Maths, English and school generally later on (i.e. age 11), both before and after controlling for measured ability, sex and parental social class. This original approach contrasts with previous academic studies, which have mainly focused on secondary rather than primary education, on academic self-concept (as measured by responses to statements such as "I am good at…") instead of academic enjoyment, and on aspects of learners' identities measured at a single point in time. Measuring the impact of ability grouping on change over time in pupils' enjoyment of their studies is important given that enjoyment is known to be an important predictor of academic engagement and attainment.

[4] We use the xtivreg2 command instead of the more often used xtreg command because the former permits the inclusion of population weights (unfortunately neither command permits the inclusion of strata or of primary sampling units/ clusters).

As discussed earlier, there is no *a priori* reason why the extent to which pupils like particular school subjects and school generally should be differentially affected by ability group placement. While pupils' academic self-concept is likely to be informed and influenced by pupils' knowledge of how well they are currently performing at school, and therefore might be expected to be significantly associated with ability group placement, the extent to which pupils like particular school subjects and school generally does not necessarily follow from pupils' knowledge of how well they are doing at school. Indeed, those who advocate the use of ability grouping argue that this practice might be expected to cultivate enjoyment of learning for all pupils, since it is easier than in mixed ability settings to tailor teaching materials and pedagogical practices to match pupils' current levels of developed ability, and thereby foster a high degree of pupil engagement with and enjoyment of schooling. So while those allocated to the lower ability groups might report lower levels of enjoyment of their studies at the outset, compared to peers allocated to the high ability group, these disparities should not widen over time if ability grouping succeeds in its purported aim of ensuring that all pupils thrive at school.

While this may be possible in theory, our findings suggest that this is not how things work in practice, at least in relation to enjoyment of Maths. Our findings indicate that placement in a lower rather than a high ability group at age 7 depresses the probability of coming to enjoy, continuing to enjoy, or increasingly enjoying Maths by 11, even after controlling for pupils' measured ability in Maths, sex and social class background at age 7. Similar divergences with respect to enjoyment of English and school generally are evident before controlling for these additional factors, but become largely statistically insignificant following the inclusion of control variables. Overall, our findings are in line with much of the existing literature which indicates that ability grouping is detrimental to those judged to be of lower ability, at least in relation to Maths. As outlined earlier, previous research suggests that the impact of ability grouping on pupils' enjoyment of their studies is likely to be linked to corresponding differences in teacher quality, teacher expectations and curriculum content.

As discussed previously, prior research has shown that those from socioeconomically disadvantaged backgrounds are much more likely to be placed in lower ability groups than their more advantaged peers. This is partly due to social class differences in measured 'ability', but also to subjective judgements made by teachers. As such, the detrimental effect of being placed in a lower ability group, rather than a high or mixed ability group, on pupils' enjoyment of Maths disproportionately affects those from socioeconomically disadvantaged backgrounds. As such, the impact of ability grouping on pupils' enjoyment of their studies contributes to the reproduction of intergenerational inequalities in educational attainment and beyond.

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