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Student mobility: Extent, impacts and predictors of a range of movement types for secondary school students in England

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Abstract

Moving school is a major event for students, with potential impacts on both student and school performance. Students can experience a diversity of move types, including variation in timing, origin and destination, though this complexity is not always acknowledged in studies or educational policies, which tend towards binary distinctions of movers versus non-movers. However, it is crucial to understand the vulnerabilities and outcomes associated with different mobility types, including to inform more effective and efficient targeting of support. We therefore study the extent, impacts and predictors of a diverse range of school moves during secondary schooling for a cohort of students completing their end-of-school examinations in 2018/2019 in England. We highlight a negative association between mobility and achievement for all movement types, however, we find substantial heterogeneity in the strength of their association with student performance and highlight the likelihood of making different types of school moves vary by student characteristics. Therefore, we recommend the wider consideration and examination of diverse mobility features by research and in educational accountability systems.

KEYWORDS
achievement, school moves, student mobility, England

Key Insights

What is the main issue that the paper addresses?

This paper addresses the need for research which explores diverse features of student mobility, moving beyond typical binary distinctions beween movers and non-movers. It is important to understand the variability of outcomes associated with different features of mobility in order to effectively support and manage mobile students.

What are the main insights that the paper provides?

We highlight variability in the negative association between student achievement and different mobility types, with the timing of moves shown as particularly important. This paper also demonstrates that disadvantaged students are more likely to undergo certain move types, further emphasising the need to consider diverse aspects of mobility.

INTRODUCTION

Changing schools represents a major event in the educational life course of students and is considered a matter of concern for schools. Students who move school must adjust to a new learning and teaching environment which takes time, whilst moving may also mean discontinuities in curriculum coverage (Clemens et al., 2017; Mehana & Reynolds, 2004). Student mobility can also disrupt a child's social ties and peer group, and thus the corresponding support and social capital that these interpersonal relationships bring (Coleman, 1988; National College for School Leadership, 2011; Pribesh & Downey, 1999). Many studies have identified negative associations between mobility and academic performance, as well as other outcomes such as absences, exclusions, school dropout and behavioural issues (Dobson et al., 2000; Engec, 2006; Mehana & Reynolds, 2004; Pribesh & Downey, 1999; Rumberger, 2003; Rumberger & Larson, 1998; Strand & Demie, 2007; Temple & Reynolds, 1999; Welsh, 2017).

Student mobility has potential spillover effects for schools and educational authorities. A high turnover of students may increase the administrative, logistic and teaching burden for schools and education authorities (Conger et al., 2007; Dobson et al., 2000; Han, 2014; Mordechay, 2018; Rumberger, 2003). Additionally, mobile pupils may arrive with varying levels of academic competence and knowledge which needs to be accommodated, impacting on the wider peer group (Welsh, 2017). Student mobility is an issue across international school systems, such as in England (Department for Education and Skills, 2004; National College for School Leadership, 2011), the United States (Clemens et al., 2017; U.S. Government Accountability Office, 2010) and Australia (Boon, 2011; Lu & Rickard, 2016), with several areas of policy relevance including the distribution of school funding, potential impacts on achievement and child development (Machin et al., 2006), as well as on school performance and accountability (Mao et al., 1997; Rhodes, 2005; Weckstein, 2003). Understanding and recognising the extent of student mobility is therefore important to effectively manage and support students and schools.

The treatment of mobility in research studies, as well as in educational policy, tends towards simple distinctions between movers and non-movers, or less frequent and more frequent movers (Burkham et al., 2009; Department for Education, 2019; Mehana & Reynolds, 2004; National College for School Leadership, 2011; Reynolds et al., 2009; Temple & Reynolds, 1999; Welsh, 2017). For example, the national funding formula for English schools (Department for Education, 2019) includes a mobility factor predicated on the proportion of students in a school who are mobile (based on students joining schools at non-standard times), an approach which ignores the exact timing of moves and gives no consideration to broader mobility features. In academic work, studies by Strand and Demie (2006, 2007) on the impact of mobility during primary (age 5 to 11) and secondary (age 11 to 16) school on academic performance focused on distinguishing whether students were stable or mobile during the period of interest. Mehana and Reynolds (2004) considered mobility as any change in schools between kindergarten (age 5 to 6) and sixth grade (age 11 to 12) for their meta-analysis, where they also showed that studies which investigated any move versus no moves were more common than studies considering more versus less frequent mobility. Such binary distinctions may mask important variations in the associated outcomes of mobility, and in which student groups are more likely to experience these outcomes. Identification and understanding of such heterogeneity across mobility types has implications for how to effectively manage mobility.

School moves can occur under a variety of situations, and for a myriad of reasons (Burkham et al., 2009; Dobson et al., 2000; Rumberger, 2015). For instance, a move may be motivated by a desire for a child to attend a better school, or equally to escape bullying or other negative school-based experiences (Dobson et al., 2000; Rumberger, 2015; Welsh, 2017). Family circumstances and events can also precipitate school moves, for example, family breakdown or expansion, a new job prospect or job loss, many of which may require relocation and thus a change in residence as well as school (Lu & Rickard, 2016; Pribesh & Downey, 1999). A related branch of research investigates the potential consequences for student outcomes of moving residence (Metzger et al., 2015; Sweet et al., 2019; Voigt et al., 2012), emphasising the need to consider the interplay of residential and school moves. Clearly, the specific confluence of circumstances surrounding a move, the idiosyncratic characteristics of individuals and families, as well as any management strategies by schools will all contribute to how a move potentially impacts on student outcomes. Whilst in-depth understanding of the consequences and predictors of mobility would require qualitative data accessing the lived experience of the parties involved (students, parents, schools, etc.) (Burkham et al., 2009; Messiou & Jones, 2015), quantitative data from administrative and survey sources can also help identify distinct features of mobility that could be important to its related influences.

Previous research highlights the importance of considering whether instances of mobility are ‘strategic’ moves seeking a better educational placement or ‘reactive’ moves in response to negative social or academic environments or events, with ‘reactive’ moves typically associated with more adverse outcomes (Rumberger, 2003). Leckie (2009) indicated that school moves occurring without a corresponding residential move are indicated as more detrimental than those made with a residential move, which may relate to the degree of strategy or planning associated with combined residential and school moves. Other studies highlight that there may be benefits to students from making particular types of school move, for instance where students are moving to a better-quality school (Engberg et al., 2012; Hanushek et al., 2004; Mao et al., 1997), which could offset the disruptive aspects of moving. Boon (2011) indicated that different coping strategies employed by students had the potential to alleviate some of the negative associations of moving school. These examples further substantiate the complex and heterogeneous nature of mobility and its impacts.

Variations in student outcomes may also be present according to the timing of moves. For example, moves closer to examinations and occurring within-year have been associated with lower student achievement (Burkham et al., 2009; Hanushek et al., 2004; Leckie, 2009; Schwartz et al., 2009), most likely related to the enhanced disruption expected for these move types (Welsh, 2017). However, results from Grigg (2012) do not support the timing hypothesis, finding no significant difference between moves occurring during or between school years in their study using data from Nashville, Tennessee. Timing of moves in terms of educational stage may also introduce heterogeneity in outcomes. Some studies have suggested earlier grade moves are more detrimental than later (Kaase & Dulaney, 2005; Welsh, 2017); others indicate that the negative impact associated with mobility may be greater in the secondary school phase (age 11 to 16) versus the primary phase (age 5 to 11) (Strand & Demie, 2006, 2007). Swanson and Schneider (1999) highlight a further dimension in the temporality of effects, indicating that moves early in high school may have short-term negative consequences, but longer-term educational benefits.

A recurring discussion in the literature on student mobility is to what degree moving school in and of itself is an influence on student outcomes, and to what degree mobility acts as a proxy for other unaccounted-for circumstances or characteristics which also relate to the same outcomes (Mehana & Reynolds, 2004; Rumberger & Larson, 1998; Wright, 1999). The associational effects researchers identify between student outcomes and mobility are likely to reflect selection as well as potential causal influences. The use of statistical adjustment, in the form of controlling for observable characteristics, can only go some way to isolating the 'causal' effects of mobility: there will always remain important unobserved characteristics. These could be factors such as family breakdowns, a student's mental or physical health, and many other personal, family and contextual influences that may not be captured by administrative or survey data (Temple & Reynolds, 1999). However, identifying associational relationships between mobility and student outcomes is still a useful exercise, for example, to help identify groups who are struggling and may benefit from extra support at school, irrespective of the exact causes of their underperformance.

Complementary to understanding associations between school moves and student outcomes, it is also important to understand which student characteristics predict school mobility. This would further aid in supporting students and in successfully managing mobility and turnover. Studies have indicated that certain student characteristics are more routinely associated with moving schools, and moving schools more often, in particular students of lower socioeconomic status and ethnic minority groups (Jørgensen & Perry, 2021; Machin et al., 2006; Mehana & Reynolds, 2004; Strand & Demie, 2007; Temple & Reynolds, 1999; Wright, 1999). However, there is relatively little research examining how patterns might shift when evaluating a more diverse typology of movement types (Welsh, 2017). Research exploring how student characteristics predict different types of student mobility would indicate who is more likely to experience the more detrimental mobility types, further aiding the efficient management of mobility support.

Thus, whilst there is a substantial extant literature addressing various aspects of student mobility, there are still research gaps to be filled. Here we focus on three key lacunae highlighted in two review studies of student mobility (Reynolds et al., 2009; Welsh, 2017): the need to explore a diversity of movement types; to understand which features of mobility are associated with (more) negative outcomes; and to understand which students experience these mobility types. Therefore, to address these gaps we conduct three analyses using a national administrative dataset of secondary school students in England: (1) an overview of the extent of overall mobility and different movement types; (2) an exploration of the relationship of different movement types with academic achievement and progress; and (3) an assessment of the predictors of different types of student mobility. This paper proceeds with an overview of the data and methods. We then detail the results for the three streams

of analysis before ending with a discussion of our findings and their implications for the use and treatment of mobility data in school systems.

DATA

Samples

This study utilises data from the National Pupil Database (NPD), an administrative dataset of all children educated in state-funded schools in England. We focus our study on one cohort of secondary school students, who started Year 7 (age 11) in the 2014/2015 academic year, and who finished compulsory secondary school in Year 11 (age 16) in 2018/2019.

We have chosen to focus our attention on a sample of students who in 2018/2019 were present in a school where the headline measure of school performance used by the English school accountability system (Progress 8) was published and for whom we have information from end-of-school examinations. These are students in mainstream schools [those not catering specifically for children with special educational needs (SEN) or those otherwise unable to attend school], and in this way we are capturing those students whose achievement schools were held accountable and judged for under the English system in 2018/2019. We keep the set of students who were recorded in each year's Annual Pupil Census throughout secondary school, linking students to their school histories over time. Students may have attended a non-Progress 8 school in the years preceding their end-of-school examinations in 2018/2019, but we exclude any students who were ever in private, fee-charging schools, being home-schooled, abroad or otherwise not captured in the NPD.

We create two versions of the dataset: (1) a long form with one observation per educational year transition per student (giving four time points in total for moves between Years 7–8, 8–9, 9–10 and 10–11); and (2) a short form with one observation per student with mobility variables summarised across all of secondary school. The long-form dataset is used for our first analyses examining the extent of student mobility. The short-form dataset, where we have nested students in their final-year school where they took their examinations, is used for the second and third analyses. The long-form dataset consists of 1 907 872 observations of educational transitions, 476 968 pupils and 3931 schools. The short-form dataset consists of 476 937 pupils within 3177 schools.

Mobility types

We first identify overall school moves, as indicated by any change in school ID over the 5 years of secondary school. Any indicated school move where there is no change in the school postcode between the two school IDs is treated as a non-move. These are likely to represent changes to school status, such as conversion to an academy (schools which are funded directly by the government with more freedom over management and curriculum), rather than a genuine student move. Approximately 48.9% of changes in school ID are assigned as non-moves in this way.

Overall moves are then delineated into six main groups of movement types. First, we assess the year students made a school move (*year*) and second, the timing of moves in terms of whether they are made between years or within a school year (as indicated by the month of entry to the destination school) (*timing*). Between-year moves are those where students enter their new school during the summer holiday (August) or at the start of term (September), within-year moves cover entry during the rest of the year.

Third, we distinguish what we term structured and non-structured moves based on whether the move is likely to have been precipitated by features of the school rather than the student (*structure*). For instance, where a school has closed (44.5% of structured moves) or does not teach for the full secondary school age range (51.3% teach only to age 14, 53.9% teach from age 14). As these different aspects of structured moves are overlapping in many cases, we consider structured moves all together.

Fourth, we evaluate whether school moves are made in conjunction with a residential move or not (*residential*). Residential moves are defined based on a change in Lower Super Output Area (LSOA) code across years. LSOAs are small neighbourhood units of on average 1500 individuals (Department for Communities and Local Government, 2015). In supplementary analyses, we also assess residential social mobility, whether students move to an LSOA of the same, higher or lower deprivation level, based on Income Deprivation Affecting Children Index (IDACI) (Department for Communities and Local Government, 2015) quintiles, where higher or lower moves are moving up or down by two or more quintiles. Only school moves made in conjunction with a residential move are considered for this supplementary analysis, meaning the reference is those who never made a combined residential and school move (but may have made a school move without changing residence).

For the fifth and sixth move types, we consider aspects of the geography of moves. This is captured through assessment of whether a school move is associated with a change in Local Authority or not (*LA*), and whether a school move is within or between regions (*region*).

In further supplementary analyses, we assess potential changes in school quality, where we assign a school's Progress 8 band from 2018/2019 across all years. These bands are five categories, defined by the Department for Education based on a school's Progress 8 score and 95% confidence interval (Department for Education, 2020). School performance is divided into: 'Well Below Average' (approximately 13% of our school sample in the 2018/2019 year); 'Below Average' (19%); 'Average' (37%); 'Above Average' (17%); and 'Well Above Average' (14%). We then evaluate whether a school move was made to a school with a higher or lower band. This analysis was thus made for the subset of students who conducted the entirety of their secondary schooling within one of the schools where Progress 8 was published in 2018/2019 ($N = 462\,492$; 97% of the short-form sample).

We briefly examined moves related to permanent exclusions (where a student must leave their current school). However, we decided not to pursue this as a separate movement type as very few students (0.17%) ever experience a move of this type and we anticipate that any identified relationships would more strongly reflect the effect of exclusion than the school move per se. In support of this viewpoint, Grigg (2012) indicated that expulsion moves are systematically different from other mobility types and should be treated separately.

Student characteristics

Several student demographic and social characteristics are captured in the annual student census; we use information on student's sex, month of birth, ethnic group, whether they speak English as an additional language (EAL), have SEN, have been eligible for Free School Meals (FSM) in the past 6 years, as well as quintiles of IDACI for the pupil's home LSOA. We also utilise two attainment measures, one summarising performance from the final year of secondary school (Year 11, age 16) and the other a prior attainment measure summarising the performance of students from the year before they enter secondary school (Year 6, age 11). Both are standardised, giving a mean of 0 and a standard deviation of 1, so that when considering the associations of student characteristics and mobility types, the estimates are given in standard deviation units. A table of descriptive statistics is available in the online Supplementary Material (Table S1).

METHODS

Analysis (1) involves using descriptive statistics to examine the extent of overall mobility and different mobility types. This includes assessing the distribution of mobile students across regions, LAs and schools, as well as examining the proportion of overall moves made up of each mobility type and how this changes over time.

Analysis (2) concerns the relationship of the different school move types with academic performance, aiming to identify which features of mobility have the most negative association with achievement. These models use our short-form dataset of students nested within their final-year schools and are run as linear regression models predicting the standardised student achievement score using cluster robust standard errors to account for school-level clustering dependency. For each of the main movement type groups we run two sets of models, an unadjusted model to assess the base influence of each mobility type on attainment without control for any other characteristics and an adjusted model which adds student background characteristics and prior attainment.

Analysis (3) considers how student characteristics predict moving school. Using the short-form dataset, logistic regression models are employed to predict the binary outcome of ever having made a school move. Student background characteristics and prior attainment are added as explanatory variables to assess how they predict experiencing a school move throughout secondary school. We repeat the analysis three times, for ever having made overall, within- and between-year moves.

RESULTS

Extent of overall mobility

First, we assess the extent of overall school moves; 12.4% of students make one or more school moves at some point during secondary school. The majority of mobile students move a single time: 11.3% make one school move, 1.1% move two or more times.

These mobile students are not distributed evenly across England. The top plot in Figure 1 shows that the North East and East of England regions show the highest percentage of mobile students, at approximately 19% and 16%, respectively, whilst the lowest percentage is seen in London at 8%. Looking at the middle plot for LAs, we see greater variation: the majority of LAs show a mobility rate between approximately 5% and 15%, with a tail of LAs showing much higher percentages, reaching to around 80% for Bedford and Central Bedfordshire. Northumberland, located in the North East region, also has a high proportion at 63%. As shown by Figure S1 in the online Supplementary Material, the majority of moves in the LAs with the highest percentages are made up of structured moves. These LAs still employ a three-tiered schooling system, where a move from a middle school to an upper or high school occurs during the course of the typical secondary school period (usually Year 8–9). Further examination of moves in these LAs reveals that 87.8% of moves in Northumberland, 74.6% in Bedford and 84.7% in Central Bedford are these ‘middle-school’ moves. It is notable that when considering non-structured moves only, the variation across all LAs is much less, with a range of 3–15% compared to 4–81% when considering all moves.

The bottom plot of Figure 1 demonstrates that further variation is seen between schools, with some showing extremely low percentages of mobile students. There are 148 schools (4.7%) where all students move at some point during secondary school; these are schools which only teach for a portion of secondary school, or where a school was not open for the full period of study. Again, in Figure S2 in the online Supplementary Material we see that the highest schools show dramatically lower percentages of mobile

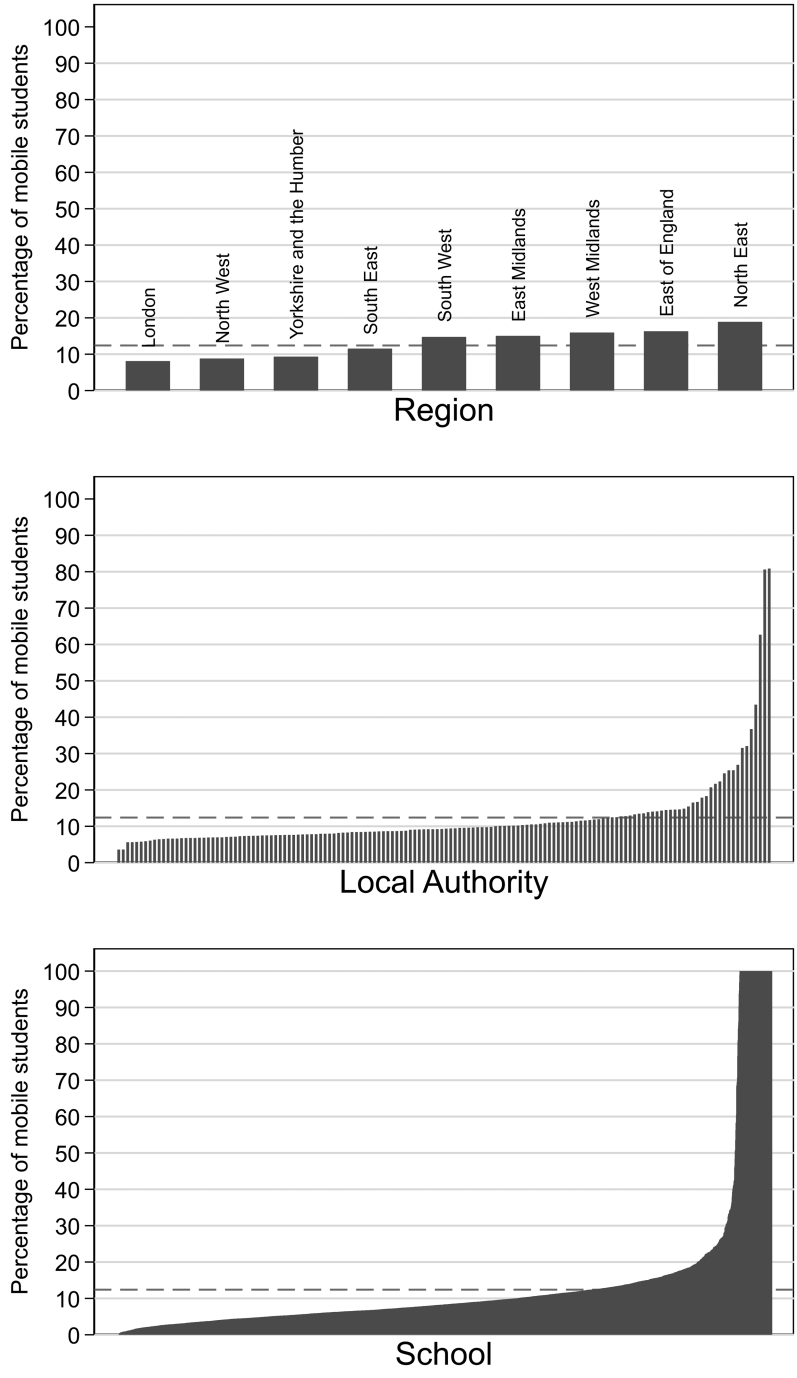

FIGURE 1 Percentage of mobile students by regions (top), LA (middle) and schools (bottom)

students when considering non-structured moves only. Importantly, as Table 1 shows, there is a clear and strong negative gradient in the average standardised achievement score for schools by the percentage of mobile students: those with higher percentages show lower scores. For instance, the schools with the lowest percentage of mobile pupils (0–5%) have an average standardised achievement score of 0.35, whilst the schools with

TABLE 1 Percentage of schools with different proportions of mobile students and the average standardised achievement score associated with these proportions

Proportion of moves	Mean standardised attainment	Number of schools	Percentage of schools	Number of students
0–5%	0.35	668	25.84	114557
5–10%	0.03	1023	39.57	170768
10–15%	−0.17	519	20.08	70297
15–20%	−0.24	214	8.28	24746
>20%	−0.29	161	6.23	14447
Total	0.03	2585	100.00	394815

Note: Based on sample of schools open throughout the cohort period and which cater for the full secondary school age range.

TABLE 2 Percentage of all school moves which are made up of different movement types

Move type group	Move category	Percentage of moves	Number of moves
Year	Year 7–8	25.20	16440
	Year 8–9	39.36	25677
	Year 9–10	27.10	17680
	Year 10–11	8.33	5437
Timing	Within year	49.94	32576
	Between year	50.06	32658
Structure	Structured	45.33	29568
	Non-structured	54.67	35666
Residential	With residential moves	31.30	20419
	Without residential moves	68.70	44815
LA	Between LA	30.60	19963
	Within LA	69.40	45271
Region	Between region	12.77	8332
	Within region	87.23	56902

the highest percentage (>20%) have an average score of −0.29, a difference of over half a standard deviation.

Movement types

This study is focused on assessing how relationships and associations for student mobility may change when considering a range of different movement types within overall school moves. Table 2 provides the percentage of overall school moves made up by the move types within the six main groups. Very few moves are made across Year 10–11 (8.3%), in comparison with earlier years (all in excess of 25%). This represents the time point closest to examinations, so parents and schools will likely aim to avoid a disruptive event such as a school move at this time. In other words, the moves that do occur are likely to be reactive, and to more extreme events. The trend of moves over time shows a slight rise for moves made across Year 8–9 (39%). This is a result of an uptick in structured moves at this time point (relating to middle school to high school moves). Figure S3 in the online Supplementary Material shows that if non-structured moves only are considered, there is a consistent decreasing trend of moves across all years of secondary school.

We find an even split of within- and between-year moves, and slightly more non-structured than structured moves (54.7% compared to 45.3%). These two sets of move types show considerable overlap: 72.0% of non-structured moves are within-year moves; 76.7% of structured moves are between-year moves. This is to be expected given that most structural changes in schools, whether it be opening, closing or transitions between school stages, will occur between years.

Table 2 shows that school moves not associated with a residential move are relatively more common as a percentage of overall moves than those that are associated with a concurrent residential move. However, whilst not the focus of this study, residential moves occurring without an associated school move would be the dominating type (83.6% of residential moves). Therefore, where families are making residential moves, these are mainly achieved without needing to change school, again aligning with the viewpoint that school moves are seen as a disruptive, potentially negative, event and thus to be avoided.

In terms of the distance covered by a school move, in the case of both LAs and regions, those occurring within the area are more common as move types than those occurring between schools in different areas. This is more prominent for regions, which is expected given their larger size, where only 12.8% of overall moves are made between regions. We expect these between-area moves to be more strategic than reactive in nature, as is backed up by many of these longer-distance moves being accompanied by a residential move: 64.8% in the case of between-LA moves; 86.7% for between-region moves.

There is clear overlap between the movement types as seen for structured and between moves, or between-region and residential moves for instance. Without more detail on the reasons underlying a move, we cannot distinguish the ultimate motivating cause of mobility; therefore, we have chosen to consider the six move types separately for the following analyses, using them as indicators of different aspects of student mobility.

Movement types over time

The top plot of Figure 2 shows the overall trend in the percentage of mobile students over time. As in Table 2, we see the same rise for moves across Year 8–9 due to a larger proportion of structured moves at this time. The bottom plot of Figure 2 shows the percentage of moves at each point in time that fall under different categories of mobility considered in turn. Within each main mobility group, the move types are a binary split; the corresponding rest of the mobility categories are provided in Figure S4 in the online Supplementary Material. The bottom plot of Figure 2 shows that within-year and non-structured moves show a drop in their relative proportion for moves between Year 8–9 (as discussed above, this time point is dominated by structured moves for middle school transitions), before showing increasing proportions throughout the rest of secondary school. At the final time point, whilst much fewer overall moves are made (see Figure 2 top), they are overwhelmingly made up of within/non-structured moves (where approximately 81.8% of within moves are also non-structured). These changes could represent a shift towards fewer planned moves closer to GCSE, whereas the kind of shocks and circumstance changes that could incite unplanned or reactive moves (e.g. family break-up, job loss, bullying) are less likely to be affected by the stage of school and thus do not see the same relative dropoff in proportion.

For moves which occur within the same LA, region or without a residential move, the proportion of overall moves made up of these types is less variable over the course of secondary school. All three follow the same approximate pattern to overall moves (with a slight increase in Year 8–9 followed by a decreasing trend) but with a flatter profile, indicating a more stable trend as a percentage of overall moves.

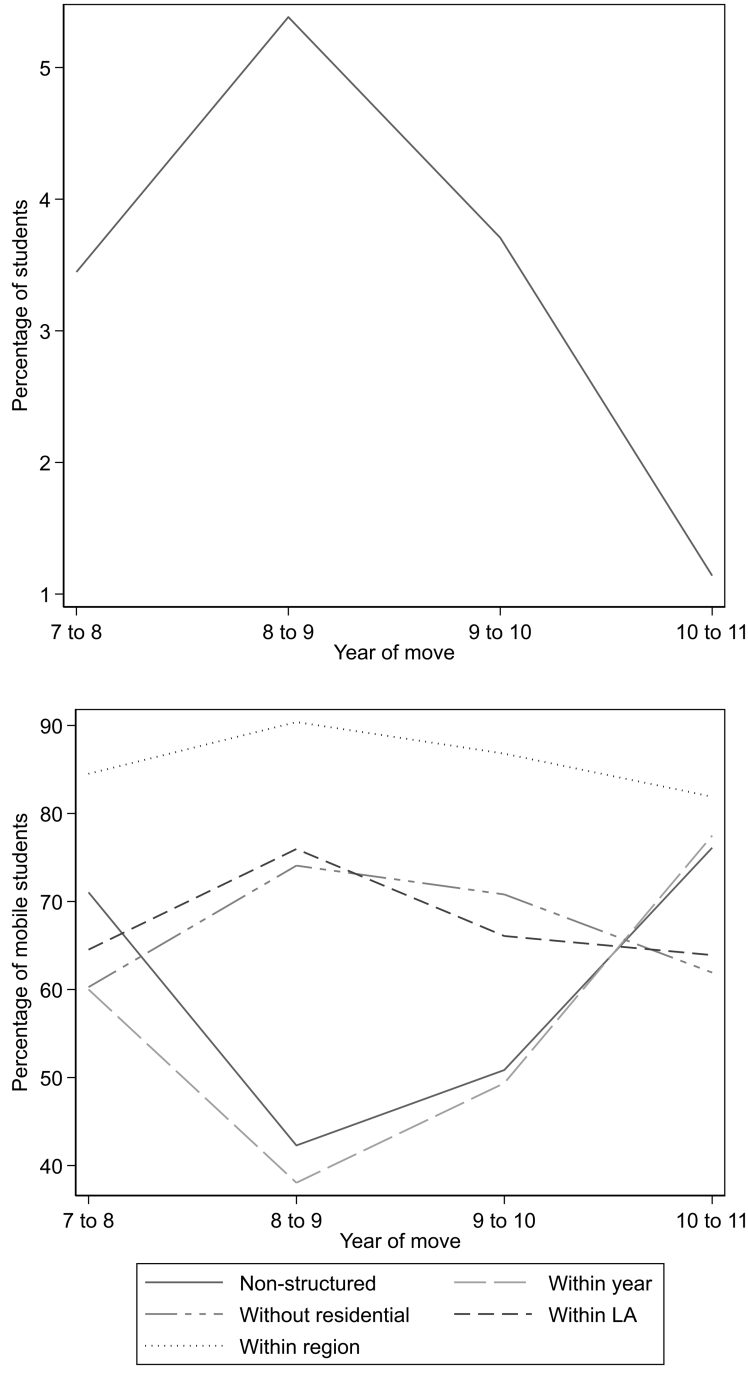

FIGURE 2 Percentage of students making a school move (top) and percentage of school moves made up by different move types (bottom) over time

Association with student achievement

Figure 3 presents the unadjusted and adjusted regression coefficients from our set of linear regression models predicting standardised student attainment score. We run seven models to examine overall moves and each of the six main mobility group types in turn. Therefore,

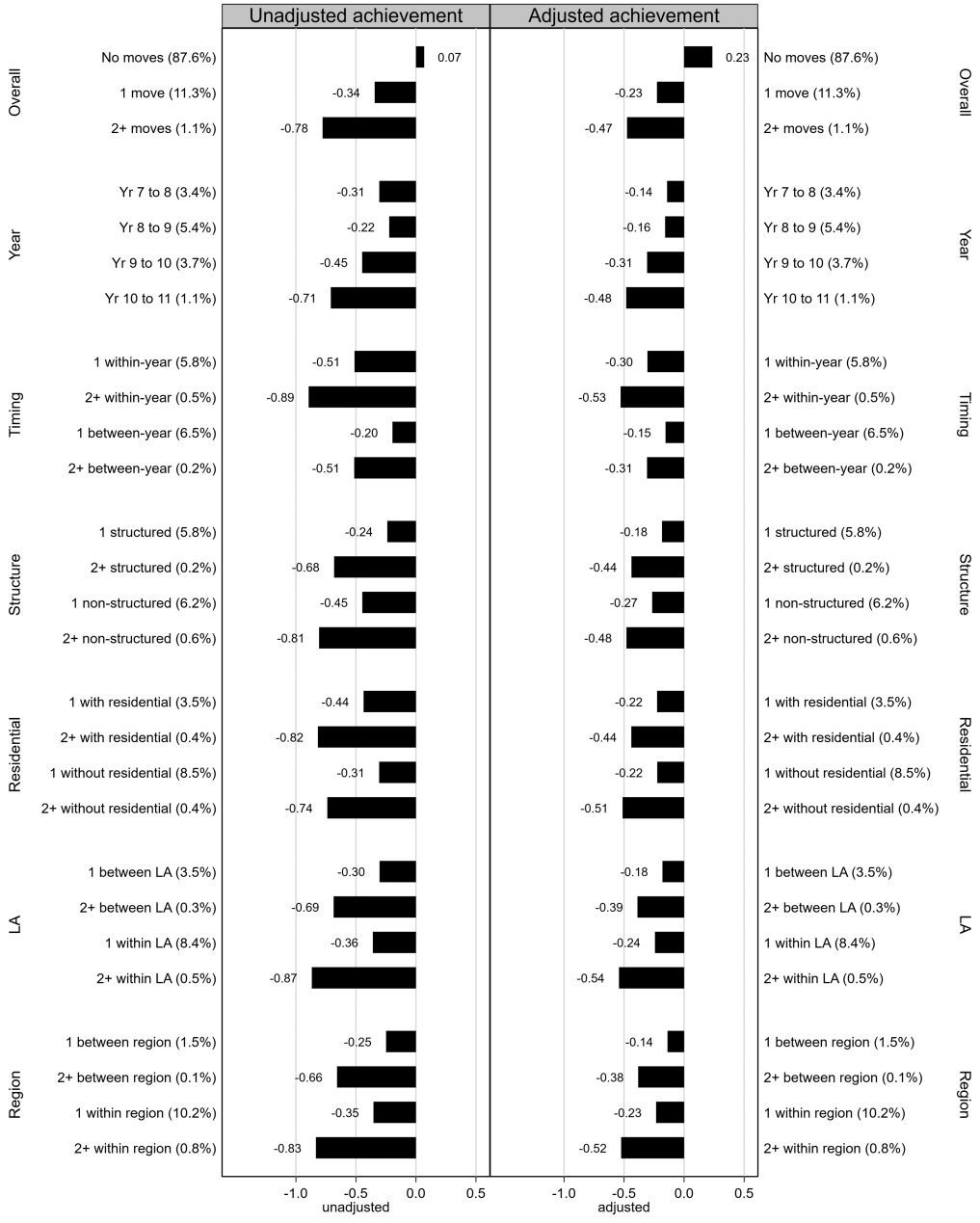

FIGURE 3 Estimated regression coefficients for separate linear regression models of move types predicting standardised student achievement in models unadjusted (left) and adjusted (right) for student background characteristics. *Note*: Each main mobility group has the same non-mover reference associated with the intercept and given for overall moves. The percentage of students experiencing each mobility subgroup is given in brackets at the end of the bar labels. Adjusted models include month of birth, sex, ethnic group, EAL, SEN, FSM, IDACI quintile and prior attainment score

each mobility group is examined separately from the other move types. The full results tables are provided as Tables S2–S8 in the online Supplementary Material. It is clear from Figure 3 that we find consistently negative associations of mobility with student achievement, which remain (though diminished by approximately 60% on average) under adjustment for a

range of student background characteristics and prior achievement. For instance, for overall moves in the unadjusted model, making one school move throughout secondary school is associated with a reduction in achievement score of −0.34 standard deviation units in comparison to those who never move, whilst making two or more moves shows a stronger negative association at −0.78 standard deviations. Another prominent finding evident from Figure 3 is the importance of the frequency of school moves made. For all move types, those who move two or more times show considerably stronger negative associations with student achievement than less frequent movers.

The only singular move type that is on a par with a higher frequency of moves is moving school across the final years of secondary school (−0.48 SD), with the year of a move showing a general trend of more negative scores for later moves. This is in line with the notion of greater disruption and associated negative impacts where moves occur closer to examinations (Swanson & Schneider, 1999). In the unadjusted model we see the impact of more structured moves across Years 8–9 with a smaller negative coefficient (as confirmed in Supplementary Figure S5, where we do not see the same reduction when focusing on non-structured moves only). However, in the adjusted model for overall moves, we find a smoothly increasing gradient whereby later year moves are related to lower student progress.

The timing of moves also has an associated influence on student achievement: within-year moves have more negative coefficients than between-year moves, for both those making one move or two or more moves throughout secondary school. Again, this is the expected pattern. Likewise, we also find that non-structured moves show consistently more negative associations with achievement than structured moves. However, structured moves still show a notable negative association, for instance one structured move in the adjusted model is associated with a −0.18 coefficient for student progress.

Examining school moves made in combination with or without a residential move shows a more mixed picture. In the unadjusted model, moves made with a residential move show the more negative association with student achievement. However, in the adjusted model, for one move made, the coefficient for moves with or without a corresponding residential move is the same, whilst for two or more moves, changing schools without a residential move has the more negative association with achievement. We suspect these findings, which run contrary to expected in the unadjusted model, are the result of our inclusion of both structured and non-structured moves in assessing residential interactions. This is borne out in Figure S5, where we focus on non-structured moves only and find school moves made with a residence change to be consistently less detrimental to student achievement than those made without a residential move.

In terms of the geography of moves, we see the expected pattern for both LA and region moves: those occurring between areas have smaller coefficients than those occurring within areas. This finding aligns with the notion of between-area moves being more strategic or planned, where students, for example, may gain an advantage in terms of attending a better-quality school, their family experiencing social mobility, or through increased time to prepare and manage the move (Welsh, 2017; Wright, 1999; Xu et al., 2009).

In our supplementary analyses we explored whether the type of area or school a pupil moves to may influence the associated relationship with achievement. Regarding moves to schools in different performance bands (Supplementary Table S10), it appears that moving to a higher-performing school may offset some of the associated negative influence of mobility (−0.143 in the adjusted model), whilst moves to a lower-performing school could exacerbate the negative relationship (−0.369), in comparison with moves to schools within the same progress band (−0.284). Though these findings are correlational rather than causal, they show the importance of considering different facets of student mobility; simply considering ever having made any type of move would have masked this heterogeneity. However,

it is worth noting that the association we find is still negative (though lessened) for moving to a school in a higher progress band.

We find the opposite pattern when considering whether students move to a more or less deprived area in conjunction with a school move (Supplementary Table S9). Moves to higher-deprivation areas show the least negative association with student achievement in the adjusted model; moves to lower-deprivation areas the most. This stands in opposition to what we might expect, given the neighbourhood effects literature which suggests that where you live is important for your life chances (Sweet et al., 2019). However, it should be noted that the fully adjusted model includes the IDACI quintile of a student's neighbourhood at the final year of secondary school, therefore the coefficients indicate the additional impact of ever having moved to a higher- or lower-deprivation area, over and above the main effect of their neighbourhood's IDACI. Therefore, the results could indicate that mobility itself is potentially less impactful for those in deprived circumstances, whereas for those who are less deprived the move is more disruptive, resulting in the increased negative association. However, given that few students ever made a move with a change in deprivation (0.21% and 0.32% for higher and lower moves, respectively) and the relatively limited set of characteristics we can account for using the administrative data of the NPD, we caution against over-interpreting these results. When the models are repeated with the main effect of IDACI removed (not shown), there are no significant differences across the deprivation move types, a result in line with work by Sweet et al. (2019) where all types of neighbourhood movements showed more negative associations with educational achievement than those staying in place, including moves of upwards social mobility.

Predictors of mobility

The third and final analysis considers how student characteristics predict mobility. Figure 4 presents the predicted probabilities from separate logistic regression models predicting ever having made a move, for overall, within- and between-year moves by student characteristics (see Supplementary Table S11 for full results). We focus on the timing of moves as one of the stronger differentials identified in the second analysis, where we also have large numbers making these types of moves. These models include student background characteristics and prior attainment as predictors. Predictions for being mobile are made holding all other predictors constant at their mean values. The top half of the plot shows that the pattern of the relationship by ethnic group remains similar for all three move types, with the same groups of students showing relatively higher or lower probabilities for moving school. Indian, Pakistani and Bangladeshi students show some of the lowest probabilities of moving school (at around 0.09–0.10 for overall moves). The highest probability of moving is shown consistently as the 'Missing' ethnicity group, followed by 'Any Other White Background'. Regarding the 'Missing' group, there is the potential for the direction of the relationship to run oppositely, that is students who experience a greater degree of mobility may be more likely to have missing information due to issues with tracking this through multiple educational establishments.

The bottom half of Figure 4 shows the predicted probabilities for the other student characteristics. EAL students show a lower probability of moving school than those who speak English as their first language. This counters work which highlights EAL status as a correlate of higher move frequency (Burkham et al., 2009; Strand & Demie, 2007), but it is in keeping with the idea of a 'settling' effect whereby immigrant families (here considering EAL as a proxy for this) are less likely to move after an initial period of settling in (Conger et al., 2007). This explanation makes sense here as any potential immigrant families associated with EAL status would have been in the country since at least the start of secondary schooling (age 11).

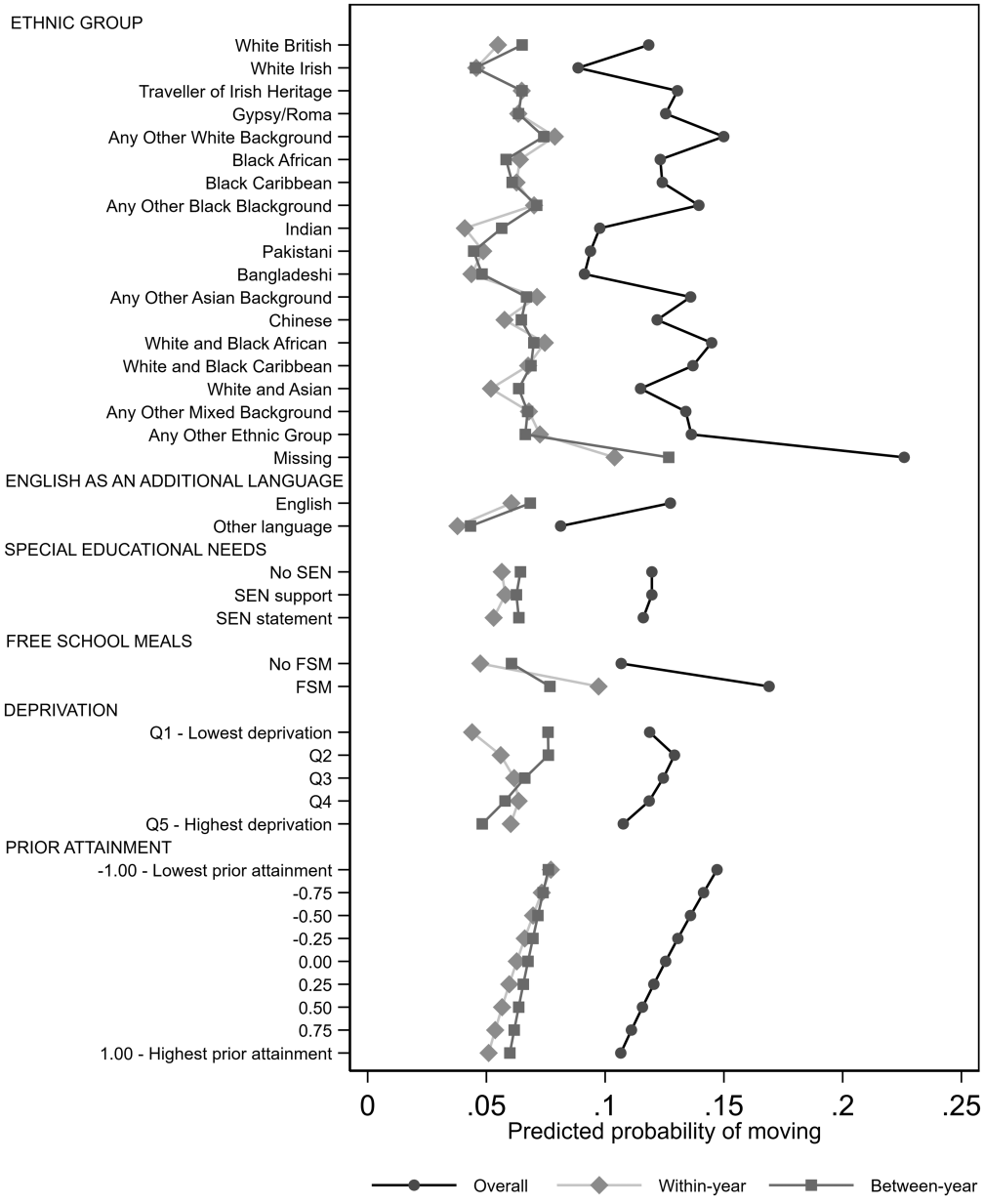

FIGURE 4 Predicted probability of moving school from separate logistic regression models of overall, within-year and between-year moves for different student characteristics. *Note*: Models include month of birth, sex, ethnic group, EAL, SEN, FSM, IDACI quintile and prior attainment score

We find marginal differences in probability across SEN types, but a distinct increase in the probability of being mobile for those eligible for FSM, for overall, between- and within-year moves. This spike for more disadvantaged students was also a consistent finding when predicting all the main movement types (results not shown) and aligns with previous research (Machin et al., 2006; Mehana & Reynolds, 2004). FSM shows a notable shift when we compare within- and between-year moves, with a larger difference between those eligible and not eligible for within-year moves than between-year moves (a difference in probability of 0.05 compared with 0.02, respectively). Students of generally lower socioeconomic

status are therefore even more likely to experience this more detrimental move type. There is also a clear crossover in the predicted probability of making within- and between-year moves by IDACI quintile. For between-year moves there is a declining gradient similar to that for overall moves, whereby those in the most deprived areas are less likely to make moves; for within-year moves we see the opposite pattern. This could reflect a higher degree of the circumstances and situations that may incite a, presumed more reactive, within-year move being more common in deprived areas, for instance job precarity. This patterning of results regarding student disadvantage was also repeated when we examined ever making structured or non-structured moves (results not shown), likely due to the high degree of crossover in these move types with the timing of moves.

Across the range of prior attainment score, all three mobility types show decreasing probabilities of moving school, and this was a finding which held when we examined all the movement types (results not shown). The decline is slightly steeper for within-year moves, meaning these diverge from between-year moves at the top end of the probability scale. The highest-attaining pupils entering secondary school may thus be further advantaged by being less likely to experience a school move, and particularly in being less likely to make the more disruptive within-year moves (Machin et al., 2006). For the highest attainers there would be less incentive to make 'strategic' moves to improve a student's chances by placing them in a better school; they may also as a group be socially advantaged in other ways, which also align with a lower propensity for mobility.

DISCUSSION

This study aimed to address a key gap in the literature on student mobility regarding the exploration of a wider range of movement types, moving beyond simpler distinctions of mobile versus non-mobile. We examined a range of student mobility types, assessing their extent, impacts on achievement and the student characteristics which predict them for a cohort of secondary school students in England.

Extent of mobility

Our descriptive analyses demonstrated that overall mobility varies considerably over regions, LAs and schools, with a clear and strong negative gradient in average achievement demonstrated for schools by the proportion of mobile students they serve. We also showed that the proportion of different move types over overall mobility changes throughout secondary school, with e.g. relatively more within-year moves nearer examinations. This highlights the need to carefully consider the treatment and use of mobility data for school performance and accountability systems. High turnover or proportions of mobile students, and particularly different types of mobile students, may feed through to performance metrics (Mao et al., 1997; Rhodes, 2005). Failing to account for mobility in accountability systems may also work to incentivise perverse practices such as off-rolling, whereby lower-achieving students are removed from schools to avoid being taken into account on school performance metrics (Hutchinson & Crenna-Jennings, 2019; Weckstein, 2003). Work by the FFT Education Datalab (2018) demonstrates how the mobility of students may be incorporated into Progress 8, the English headline school performance measure for accountability purposes, whilst Goldstein et al. (2007) and Leckie (2009) reveal how multilevel models can be extended to incorporate the complex school histories of students. The implementation of multilevel models that incorporate mobility for the study of other complex processes

like achievement growth is a complementary and developing research field (Grady & Beretvas, 2010; Leroux, 2019; Wolff Smith & Beretvas, 2017).

Association with student achievement

Previous research regarding the relationship of student mobility with achievement is mixed, with some studies indicating negative associations, others positive, whilst some suggest associations are spurious due to confounding by pre-existing differences across student characteristics (Pribesh & Downey, 1999; Strand & Demie, 2006; Wright, 1999). Our results support the literature that has indicated mobility as a potential detrimental influence of achievement (Dobson et al., 2000; Engec, 2006; Mehana & Reynolds, 2004; Pribesh & Downey, 1999; Rumberger, 2003; Rumberger & Larson, 1998; Strand & Demie, 2007; Temple & Reynolds, 1999; Welsh, 2017), building further evidence through examining multiple movement types, all of which were shown to have significant negative associations with student achievement.

The results also substantiate previous findings that the frequency of moves made is an important influence on how detrimental school moves appear for student achievement (Reynolds et al., 2009; Welsh, 2017), with two or more moves of any type consistently related to the worst outcomes. This suggests students making, or likely to make, multiple moves could be a beneficial group for the receipt of extra support from schools and educational authorities, and further, that researchers and educational policymakers considering mobility should at a minimum aim to account for movement frequency. Future research could explore how accounting for mobility frequency, or the proportion of highly mobile students in schools, may impact on school performance metrics and associated accountability implications.

The timing of moves was shown to be another key factor in associations with student achievement, both in terms of the timing within the course of secondary school and whether moves occur within or between school years. We find that moves closer to the end of secondary school and those that occur within years show substantively stronger negative associations with achievement than earlier moves or between-year moves, respectively. These findings confirm those of Leckie (2009) using a more up-to-date, and national, cohort of English students. Our descriptive analysis also showed that these dimensions of mobility timing are likely to interact, with the within-year moves increasing in relative proportion for the final years of secondary school. Within-year moves are likely to be more disruptive for a variety of reasons, such as: greater discontinuities in curriculum coverage; the likelihood of being driven by unexpected or shock changes, such as job loss, and so classified as more reactive; the heightened potential for missing school time; and, additionally, the choice of destination school may be limited mid-year, and thus driven more by convenience than preference (Burkham et al., 2009; Rumberger, 2015; Welsh, 2017).

Future research could benefit from the integration of large-scale administrative datasets with more detailed, in-depth qualitative data to access the impetus for moves and student's experiences of mobility in order to more fully understand which aspects of movement are most disruptive or damaging (Burkham et al., 2009). However, the current study highlights that using available data on different features of mobility from administrative datasets can highlight groups for extra support and where more effective management of mobile students may be most beneficial. Such approaches could take the form of, for example, identifying discontinuities in curriculum coverage early and ensuring adequate provision of resources and teachers, or employing strategies to help ensure optimum school transfers where a move is necessitated (Rumberger, 2015).

In our analysis, structured moves also showed negative associations with student achievement, though less so than non-structured moves. This result is in keeping with work by Engec (2006) and Grigg (2012), who also find experiencing compulsory or structured moves to be associated with more negative student outcomes than never moving, and thus we support the notion of a social cost or burden to accompany any school move. However, structural moves are often ignored by studies of mobility and educational policy (Department for Education, 2019; Pribesh & Downey, 1999; Reynolds et al., 2009; Siennick et al., 2017), and thus the associated influence of moves integrated into the school system is missed. In this study, we found a majority of structured moves are made up of transitions between middle and upper schools in three-tiered systems, or where students move to specialist vocationally orientated schools from age 14. Therefore, our results suggest that examination of the continued use of a three-tier school model in some LAs should be considered as it may be putting students in these areas at a disadvantage relative to those within all-through secondary schools. Additionally, our results support the recommendation that the age range of schools should be considered when using and making inferences from school performance measures (Leckie & Goldstein, 2019; Prior et al., 2021).

Predictors of mobility

Another contribution of this paper is the examination of the predictors of overall, within- and between-year moves. We reiterated the typical finding that more disadvantaged students (captured through FSM and residential deprivation quintile) are more likely to make a school move (Machin et al., 2006; Mehana & Reynolds, 2004; Strand & Demie, 2007; Welsh, 2017), but we additionally show that these students are also more likely to experience within-year moves over between-year moves. Given that within-year movers show a more negative association with student achievement, this emphasises the compounded disadvantage those of lower socioeconomic status are at risk of experiencing (Grigg, 2012). The potential impact of mobility is likely to be further exacerbated where families have fewer resources, whether these be in the form of economic or social capital (Mao et al., 1997; Temple & Reynolds, 1999).

Limitations and future work

This paper provides an investigation of the extent, impacts and predictors of a variety of student mobility types, however, there are limitations to the current work which offer opportunities for future research. In this work we considered the mobility types separately, however, a clear line for future research would be to broaden the scope through assessing interactions across movement types. For example, there may be temporal differences in how within-year moves, inter- or intra-district and residential moves relate to student outcomes, or how student characteristics predict moving (Conger et al., 2007; Gillespie, 2013; Kaase & Dulaney, 2005; Swanson & Schneider, 1999). Additionally, researchers could repeat this type of analysis in different contexts where the culture around school moves, as well as the socioeconomic and demographic characteristics of students and families, is different to the English context employed here. This could help reveal further insights into mobility relationships.

Our chosen sample included only those pupils who were in English schools from age 11 to 16. Therefore, we exclude any pupils moving into England during this period. This has implications for our findings, particularly regarding EAL, as this will be entangled with immigrant status. Previous work highlights that those pupils moving to their school from outside

the country are likely to make up a high proportion of mobile pupils (Strand et al., 2015). Therefore, we may underestimate the degree of mobility associated with EAL status, which may explain our finding in the third analysis where EAL pupils were less likely than non-EAL pupils to have experienced mobility throughout secondary schooling. Additionally, by excluding newer immigrant arrivals from our assessment of mobile pupils, we may underestimate the negative association with achievement to some degree. Previous work has indicated that EAL new arrivals show lower educational attainment (Demie & Strand, 2006).

We also chose to focus exclusively on student achievement, however, it would be beneficial to extend the exploration of different mobility types to their association on other student outcomes, such as absences and dropout for instance. These outcomes may also be involved in direct and indirect pathways with mobility (Reynolds et al., 2009), indicating that employing techniques such as mediation analysis and structural equation modelling could be helpful in giving insight into these pathways, and thus potential intervention points. Furthermore, it is important to recognise that the administrative data we used does not provide access to the full complexity of the lived mobility experience for pupils and schools. Rather, we use the available data source to identify distinct, higher-level features of school moves which may be important indicators of its potential relationships with pupil outcomes.

Summary

Overall, whilst we cannot make any causal claims on the identified relationships, we have substantiated the idea that moving school is a negative and disruptive event for students, with consistently negative associations found across a variety of movement types, which remained statistically significant after controlling for student background characteristics and, importantly, prior attainment. However, despite all associations being negative, we demonstrated the benefit of exploring a range of mobility features in revealing substantial heterogeneity across associations. Research would benefit from continued and extended exploration of different features and types of mobility, and the effective management and support of schools and mobile students may require moving beyond binary mobility distinctions of movers versus non-movers, or overall rates of turnover.

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CONFLICT OF INTEREST

The authors have no conflict of interest to disclose.

ETHICS APPROVAL STATEMENT

Research was proposed and conducted under an ESRC grant which has been granted ethnical approval by the ESRC and the Ethics Committee at the Faculty of Social Sciences and Law, University of Bristol.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the Department for Education. Restrictions apply to the availability of these data, which were used under licence for this study.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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