Tracking and Mixed-Ability Grouping in Secondary School Mathematics Classrooms: A Case Study
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Tracking and Mixed-ability Grouping in Secondary School Mathematics Classrooms: a case study

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ABSTRACT This article reports the findings of a retrospective study of ‘tracked’ grouping in a mathematics department in a co-educational comprehensive school in Greater London. Tracking consisted here of just two tracks, a ‘fast track’ for the top 25–30% of a cohort, and a ‘mixed track’ for the remainder. The article outlines the reasons for introducing tracking and explores its effects through interviews with teachers and data on the progress of students from age 14 to age 16. The teachers reported that tracking impacted differently on different students, and this is borne out by the quantitative data. It was not possible to provide for ‘setting’ across all the mathematics classrooms in the focal cohort, and therefore one mixed-ability class was created. The use of analysis of covariance (ANCOVA) models shows that fast-track students were not significantly advantaged by their placement in these tracks, but the progress of students in the mixed-ability group showed a significant interaction between progress and prior attainment, with placement in the mixed-ability group conferring a significant advantage on lower attaining students, while the disadvantage to higher attaining students was much smaller.

Introduction

This article reports the results of a study of the changes in grouping arrangements that were imposed on a mathematics department in a co-educational 11–16 comprehensive school in Greater London. After a brief description of the school, we summarise the background to the decision to impose some form of ability grouping on the Mathematics Department. We then trace the views of the teachers, from their initial concerns about the possible effects of a change in grouping, through their responses as to how the changes ought to be structured and carried through, to their perceptions of the impact of the new ‘tracked’ arrangement on their classrooms. We then examine the impact of these new arrangements on student achievement, focusing on a single cohort of students, as they move from being taught in mixed-ability classes in year 9 to being grouped by ability in years 10 and 11.
Much earlier research on ‘ability’ grouping has tended either to focus predominantly on considerations of equity (e.g. Hargreaves, 1967; Lacey, 1970; Ball, 1981; Abraham, 1989), or to measure in quantitative terms the differences in test performance of students assigned to different ‘ability’ groups (e.g. Oakes, 1985; Natriello et al., 1989; Hoffer, 1992). More recently, however, more integrated approaches to research on ability grouping have been developed (e.g. Boaler, 1997; Boaler et al., 2000). In a similar vein, this study draws on both qualitative and quantitative methods to try to build a more detailed picture of the differences in classroom experiences of students in different sets, and to relate these to their subsequent attainment. The primary aim here is to try to identify whether, as earlier research suggests (e.g. Oakes, 1990; Boaler, 1997), tracking produces systematic differences in provision for students. A secondary aim, within a department that raised the issue of differential provision as one of their concerns, is to identify the steps that were taken to address this. Boaler’s (1997) qualitative evidence from observations of setted classrooms suggests that the practices adopted by teachers in this environment may impact significantly on student performance. The focus here, though, is not confined to looking for the common features of setting or tracking in terms of classroom practices, but to look also at the impact of differences in these on the pattern of results obtained.

The School

Shackleton2 school is an 11–16 co-educational comprehensive school in Greater London, in a local education authority (LEA) where approximately half the secondary schools ‘opted out’ of local authority control to become grant-maintained schools in the early 1990s. Its immediate catchment area includes a large council estate that has been described by the local authority as an area of ‘multiple deprivation’ The majority of the school’s students are working class but the roll (of approximately 1200) also includes students from the more affluent surrounding areas. The intake of the school is unrepresentative of the national population in several respects, as can be seen from the data shown in Table I, which refer to 1996–97, when the cohort under study in the present project began Year 10.

The Mathematics Department has used the SMILE3 scheme—an individualised learning scheme—with all year groups since 1991, supplementing this with some whole-class teaching. Between 1991 and 1994 all mathematics classes were taught in mixed-ability groups.

The Background to Tracking

The decision to impose some form of ability grouping in mathematics followed two years of deepening concerns within the school’s Senior Management Team (SMT) about
the increasing proportion of pupils with special educational needs (SEN) entering the school, exacerbated by cuts in funding for these students. At the same time, the school was receiving an increasing number of letters from parents (largely, but not exclusively, middle-class parents) expressing concerns about the levels of disruption their children were experiencing in some classrooms in a range of subject areas. Some of these children were the high-attaining pupils that research on education markets (see, for example, Whitty et al., 1998) has shown to have become increasingly valuable to schools given the importance attached to ‘league tables’ of school results (Ball et al., 1994).

Interviews with members of the SMT and documentation from that period reveal the conflict in meeting the needs of a skewed intake while providing for the needs of higher attaining pupils. The decision to impose some form of banding in mathematics was, members of the SMT admitted, fuelled primarily by the letters from a small minority of parents: ‘It was where we were getting the most unhappiness from the parental point of view’ (Deputy Head). The decision was also influenced by perceptions from parents and members of the SMT that setting was the most ‘natural’ and ‘effective’ context in which to teach mathematics: ‘There was a perception from parents, and from research and the wider view—OFSTED, for example—that maths was usually streamed’ (Senior Teacher).

In June 1995, therefore, the SMT decided that from September 1995 some form of ability grouping would be introduced with year 8, since this was where the student cohort was most skewed in terms of attainment, and also where a significant number of parental concerns were being voiced.

The Mathematics Department’s Response

There was widespread concern within the Mathematics Department about the negative labelling that could be induced by ability grouping, and particularly about the impact that this could have within the classroom in terms of the motivation and behaviour of students. Ability grouping might, some teachers feared, actually make the General Certificate of Secondary Education (GCSE) results worse by creating unnecessary anxiety for the lowest-attaining students in a group, while demotivating those who just missed out on placement in a higher group. Empirical research into students’ responses to ability grouping (Boaler, 1997; Boaler et al., 2000), suggests that these issues are ‘real’, and not just negative perceptions of setting from teachers. Concerns were also expressed that the skew in the ability profile of students in Key Stage (KS) 3, and in years 7 and 8 in particular, made any form of ability grouping difficult, since the number of higher ability students was relatively small. In making the ‘top’ groups large in order to alleviate strains on lower groups, the ability range within them was likely to be wide. For example, the attainment at the start of year 8 in a ‘top’ group was likely to be anywhere between National Curriculum levels 4 and 7—a range that would include over half the national population. This, in turn, the department argued, was likely to preclude the prospect of large-scale whole-class teaching (if this was what parents and the school were expecting), and would also produce lower groups consisting entirely of students working at or below the national average. Members of the Mathematics Department also raised concerns about the organisational problems of ability grouping, such as ensuring that each class had sufficient numbers of SMILE cards and other resources to deal with the reduced ability range in some year groups.

The SMT had not specified what form ability grouping was to take in mathematics, and indeed seemed quite relaxed about how the Mathematics Department implemented
it, as long as some form of ability grouping was introduced. The Mathematics Department decided to implement a system of ‘tracking’, with just two (unequally sized) tracks. There would be a ‘fast track’ consisting of the most able 25–30% of the students in the cohort and the remainder would be taught in parallel classes in a ‘mixed track’. SMILE would continue to be used with all classes. This response minimised the extent of ability grouping, and was felt to be the most akin to mixed-ability grouping. The continued use of SMILE was also important, given that its introduction in 1991 had coincided with substantial improvements in the school’s GCSE results in mathematics. Another advantage of the tracking system proposed was that the top 25% or so of students in each year who were ‘creamed off’ into the fast track also contained the majority of students whose parents had voiced concerns about their learning. Tracking therefore provided a ‘visible’ response to their criticisms.

In the interests of trying to maintain equitable provision across the ability range, and minimise what were perceived as the negative effects of ability grouping, a decision was taken to make the fast-track groups large, and thereby allow greater individual attention for students in the mixed-track groups. It was also agreed that the progress of students would be monitored regularly so that students could be moved if their achievement warranted it.

The department therefore had tried to produce a compromise structure that fitted the constraints they faced. At this point (1995), tracking was still relatively rare in English schools, and where it existed, tended to consist of ‘enrichment’ or ‘express’ type pathways for the most able. This was not the function of the fast-track groups in this school—it was, rather, to give higher attaining students the opportunity to interact more constructively with their peers than was possible in mixed-ability groups (where their numbers would be limited). This aim, while not restricted to fast-track groups, finds considerable support in both theoretical and empirical studies (e.g. Cobb & Bauersfeld, 1995). The decision to continue using SMILE with both fast-track and mixed-track groups, though forced partly by financial considerations, was at odds with the wishes of some quarters within the SMT and the parental lobby.

Tracking was therefore introduced into year 8 in September 1995, and was extended to year 7 later the same year. In September 1996, the SMT decided to organise year 7 into mixed-ability groups, but year 8 remained ‘tracked’, and, at the same time, tracking was extended to years 9 and 10.

The cohort of students that is the focus of this article (henceforth referred to as the focal cohort) were those who started year 10 in September 1996, having been taught in mixed-ability groups in years 7, 8 and 9. They remained in these tracks until the February half-term of their Year 11 (4.5 of the 5.5 terms of KS 4), after which they were regrouped into Higher, Intermediate and Foundation groups, according to the tier of the GCSE which they were to sit, for examination preparation.

Although tracking had been introduced into years 7 and 8 the previous year, the introduction of tracking for students in year 10 had to take into account different choices of optional subjects, and an unusual system of ‘pathways’ that allowed students to study different subjects leading to a Diploma of Vocational Education (DVE), on to the General National Vocational Qualification (GNVQ) or to the GCSE.

Although it had been intended originally to have only two blocks, it was discovered that timetabling constraints required three blocks. Block 1 included all the students who had opted to follow any DVE options, along with some students enrolled on other routes, while Block 2 contained only students following GNVQ or GCSE courses. Block 3 consisted of just one teaching group, consisting of all the students who had taken media
Tracking and Mixed-ability Grouping

Studies as an option (and included only GNVQ and GCSE students). Because the GNVQ awards are more demanding than those within the DVE, the attainment of the students in Blocks 1 and 2 is not equal, with Block 1 containing a disproportionate number of the lower attaining students within the focal cohort.

Students were taught within these blocks for all their mathematics lessons, and for humanities. In mathematics, Blocks 1 and 2 each contained one fast-track group, and respectively, four and three mixed-track groups. Block 3 students were taught mathematics as a mixed-ability group throughout years 10 and 11. This arrangement is summarised as follows.

Block 1 (B1): one fast-track group (FT1); four mixed-track (MT1) groups
Block 2 (B2): one fast-track group (FT2); three mixed-track (MT2) groups
Block 3 (B3): one mixed-ability group (MA)

The net effect of this programme and the blocking structure for the Mathematics Department is that the three blocks varied quite considerably in terms of their attainment as measured by mathematics KS 3 test scores as can be seen in Fig. 1 (the shaded regions in each box represent 95% confidence intervals for the median of each batch, so that non-overlapping shaded regions indicate statistically significant differences in medians). It is also worth noting that the overlap between the mixed-track groups and the fast-track group within each block is considerable, indicating that factors other than KS 3 test performance were taken into account in selecting students for the fast-track groups.

Clearly, this mode of ‘blocking’ students makes for a far from straightforward analysis of the impact of tracking. Details of the sample in Table II illustrate these variations, identifying the ways in which the blocking arrangements interact with the sex and ethnicity of the students. The focal cohort for this study consisted of a total of 240 students. Some of these students arrived at the school during years 10 and 11, and since KS3 results were unavailable for the majority of them (and where they were available, could not be taken as an indicator of attainment prior to a change in grouping), they were removed from the data. GCSE scores were not available for some students (the vast majority of whom were those students who had left the school at Easter), and these were also removed, leaving a total of 180 students for whom complete data were available. A standardised mathematics KS3 test score was calculated for each student by equating the four tiers of the KS3 mathematics test. The mean KS3 score for those for whom GCSE scores were also available was 89.7, and for the others was 62.6, indicating that
the students who did not take GCSE cannot be considered representative of those who did. Since the vast majority of the excluded students were in the mixed tracks, any significant differences found in achievement, either between tracks or between blocks, is likely to understate rather than overstate the real situation.

### Tracking in Operation

Three teachers in the department each taught two groups within the cohort being considered. Two of them, Karan Davda and Janet Dyner, taught a ‘fast-track’ group in one block and a ‘mixed-track’ group in the other block. The third teacher, Enya Lama, taught two mixed-track groups (i.e. one in each of Blocks 1 and 2). Their views of how tracking impacted on the classroom, collected through open questionnaires and interviews, are presented below.

This analysis focuses on these three teachers for two reasons. Firstly, they were all at the school during the period in which the introduction of banding was discussed and were therefore aware of the policy context. Secondly, the fact that they each taught two groups allowed them to make comparisons between groups in terms of the progress, attitudes, working cultures and atmosphere within these classrooms in ways that relate to the tracking and blocking structures.

Although the introduction of tracking was imposed on the department, how it was to be operated was largely left to the department to determine. This point is important to note because all three teachers spoke about the decisions they made in the classroom regarding either their operational practices or the progress of their groups in terms of the curriculum or individual students, and not with reference to the concerns of SMT (or indeed parents). This practice of allowing teachers to interpret the implementation of policy as they see best appears to be part of the rationale of operation within the school, and has been viewed in previous work as having potentially both positive and negative effects. Broadbent et al. (1992) suggest that leaving the policy-making process to the senior managers, with reference to their study of how institutions interact with the market, actually preserves the sense of educational priority for the majority of staff through a process of reorientation, where systems do become changed, but in such a way that the values in the lifeworld are not compromised’. (p. 66).

Robertson (1996) and Angus (1994) amongst others though argue that the loss of control over policy which is implied in the imposition of tracking in this context actually depprofessionalises teachers. Whilst this question was not addressed directly by the

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**Table II. Characteristics of focal year group for whom matched data are available**

<table>
<thead>
<tr>
<th>Block</th>
<th>Sex</th>
<th>Ethnicity*</th>
<th>Total</th>
<th>FSM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>FSM 45%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>30</td>
<td>47</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>44</td>
<td>40</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>85</td>
<td>95</td>
<td>30</td>
<td>14</td>
<td>5</td>
</tr>
</tbody>
</table>

* AC: African Caribbean; AFR: African; AOG: Any other group; ASI: Asian; CHI: Chinese; MR: Mixed race (one ‘white’ parent); WHI: White; FSM: percentage of pupils receiving free school needs.
teachers here, the impression left from discussion was that there was a degree of sympathy with both these viewpoints.

Both Karan and Janet stated that behavioural problems were more common in their mixed-track group than in the fast-track group—a feature that has been documented extensively within previous research on setted environments (Ball, 1981; Abraham, 1995). In terms of developing a working culture with the mixed-track groups, the behavioural problems were compounded by the weak literacy of several individuals in these groups (an issue located almost exclusively within the mixed tracks), and generally poorer self-management skills. Whilst attitudes towards working varied between individuals within particular tracks, tracking overall did appear to affect students’ perceptions of themselves as learners of mathematics—Janet stated that students in the fast-track groups ‘perceived themselves as “doing well”’, whilst those in the mixed-track groups “perceived themselves as “low”’.

The impact of setting on students’ self-esteem has been widely researched. Sukhnandan and Lee’s (1998) review summarises this evidence thus:

research suggests that streaming and setting, compared with mixed-ability teaching, have a detrimental effect on the attitudes and self-esteem of average and low ability students. Research suggests that poor attitudes and low self-esteem can lead to a decrease in achievement which can create a vicious circle from which it is difficult for low ability students to escape. (p. 42)

These affective issues had implications for curricular provision for students in different tracks.

The Mathematics Department was anxious to avoid the negative stereotyping of lower attaining students and so a ‘standard’ target—the number of SMILE tasks to be covered in a term—was set for all students in the year group. Both teachers commented on the fact that whilst almost all students in their fast-track group were capable of meeting or exceeding this target, several students in their mixed-track group were unable to achieve it. As Janet put it, ‘this made it harder to be consistent with the M (mixed-track) groups’.

The use of SMILE was generally viewed as positive, but particularly so in relation to this issue of work rate, since the individualised programme allowed more able or more motivated students in the mixed-track groups to progress at a faster rate than the norm for these classes. This is likely also to have at least reduced, if not prevented completely, the teacher-led acceleration of pace that was a feature of the top sets observed in some recent studies (Boaler, 1997; Boaler et al., 2000) since here too, students had a significant degree of control over the pace of their learning.

The variation in attainment profile between Blocks 1 and 2 makes the investigation of differences in the classroom contexts between these relevant. Enya Lama taught a mixed-track group in each of Blocks 1 and 2. Her description of the differences between the two groups does in some respects follow the patterns that might be expected from the attainment profiles of the ‘mixed’ tracks. However, due to the measures taken by the school and the department to compensate for the lower attainment of students in Block 1, it also departs from expectations. The provision of four mixed-track groups in Block 1 resulted in an average class size of 22, compared with 26 in Block 2, where the mixed track contained only three groups. In addition, since there were more students with statements of special educational need, and students with English as an additional language (EAL) in Block 1, the mixed-track groups in Block 1 tended to have more support staff in their lessons. In Enya’s Block 1 group which, due to a large number of EAL students, benefited from particularly high levels of support, these factors made a
significant impact on the classroom ethos: ‘Well in Block 1, the group was much smaller and this made it easier to teach. They were almost always on task and well-behaved—almost silent sometimes’. Janet Dyner (who, as noted earlier, also taught a mixed-track group in Block 1) also stated that that the smaller classes were useful in allowing her to give greater individual attention to students in her group.

The development of a positive work culture appears to have been harder within the mixed-track groups in Block 2, due largely to the larger group size and the low (and in some cases non-existent) level of in-class support. This resulted in less teacher attention for individuals, and somewhat higher levels of disruption. Enya felt that these factors had more negative effects on the ‘borderline’ students in the mixed-track group she taught in Block 2 than the group she taught in Block 1. Talking about students who were moved down in Block 1, she said, ‘I don’t think they suffered because of this’, whilst in Block 2, one student who had been moved down was described as having ‘lost it’ in this group’. Both teachers also felt they had problems in motivating the higher attaining students within the mixed-track groups in Block 2 who had just failed to be placed in the fast track.

In its operation of tracking, therefore, the department’s efforts to compensate for the skew in attainment in Block 1 (which had been created by placing all the DVE students together) did, to some extent, alleviate problems in the classroom. However, this in turn resulted in large classes, and greater classroom management problems in the mixed-track groups in Block 2. Overall though, the differences between the blocks in terms of the atmosphere and progress within classrooms (to the extent that this can be gleaned from these qualitative data) appear to be considerably less than the differences between tracks. However, it is also important to note that there were substantial differences between teachers in the way that they taught groups in the two tracks. Although detailed differences in teaching style are beyond the scope of this article, there were differences between the teachers in their day-to-day operation that appeared to be directly related to the tracking system.

Boaler (1997) and Boaler et al. (2000) noted that teachers often develop notions about what a ‘top set’ group ought to be able to do:

The identification of students as ‘top set’ seemed to set off a whole variety of heightened expectations for the teachers about their learning capabilities. It was almost as if the teachers believed that they were dealing with a completely different sort of student, one that did not experience problems, one which understood the meaning of examples flashed up on the board for a few seconds and one which could rush through questions in a few moments and derive real meaning from them as they did so. (Boaler, 1997 p. 129)

Karan Davda, who taught the fast-track group in Block 1, expressed this expectation, both in terms of ability and in terms of attitudes and motivation:

With the top set—what I always felt right from the beginning was it wasn’t really a top group. There were big differences in the group. It was really like teaching two groups. One half worked really well, well motivated, they could start a task and carry it through on their own and discuss it, and come back when they needed help. The other half were like a mixed (-track) group—they were just there to make up the numbers.

Janet, who taught the fast-track group in Block 2, did not express problems in terms of a disparity between expectations and reality in the attitudes and attainment of her group,
although this could be due in part to the fact that her group had both a higher level, and smaller spread, of attainment, making the group more like a traditional ‘top’ set.

Both teachers described the fact that the initial act of placing students in a tracked environment had different effects on different students. For example, Janet said, ‘Some thrive, some feel threatened when low on the higher (fast-track) group … some thrive when high in the M (mixed-track) group.’ Both were clear too that for many of these students, the attitudes seen in a tracked environment represented a change in attitude for these individuals that they felt would have been unlikely to occur if they had continued in mixed-ability groups in which the majority of these students had obviously experienced a degree of ‘success’. Janet described ‘tensions at the cut-off points’, tensions that were directly related to the structure of tracking.

Karan had been in charge of allocating students to tracks, and she confirmed that whilst the vast majority of decisions were made on the basis of test achievement, she had followed up the cases where the level achieved on the KS 3 tests differed from the level awarded by the teacher, taking on board, where possible, representations made by teachers on behalf of particular students. These may have incorporated teachers’ views on the ‘educability’ of students, a notion discussed later in this section, but there was no evidence of the kind of biases found in other studies (such as the overrepresentation of working-class students in the lower sets).

Another aspect of the ‘borderline’ between tracks is the issue of movement between them. The placement of students was reviewed every term, and in some cases every half-term, and during years 10 and 11, a total of 21 of the 161 students in Blocks 1 and 2 changed groups. Most of these movements were movements into or out of the fast-track groups, attributable to particularly good, or poor, progress in mathematics, measured either in terms of work in lessons or performance in end-of-year examinations, although some movements were between mixed-track groups (usually as strategies to deal with inappropriate behaviour). In this area, although the two teachers of the fast-track groups in year 10 operated within the department’s agreed structure, their practice differed quite significantly. Karan (whose Block 1 fast-track group had a lower average achievement than the Block 2 fast-track group) viewed being in the fast-track group as a benefit for more able students:

A lot of these students, if they did well, did well because of the environment they were in, where they could actually work. They didn’t have the behaviour problems going on at the same time, not to the same degree anyway, and they were learning from one another.

This perception that the fast-track group provided an environment that was more conducive to learning impacted on her policy on moving students out. Through year 10, in line with department policy, students who she felt were making insufficient progress on SMILE were moved out of the fast track, with, in most cases, other students replacing them. In addition though, she makes it quite clear that she did move, on a quite regular basis, students who in terms of behaviour or motivation, were not pulling their weight in the classroom:

What I found was, I had a group of children who didn’t want to work—like (name of student) who was just there to be in the top group. She had the ability, but she didn’t want to work, but once I moved her out of the group, she wanted to be back because she couldn’t work in the other group.

Whilst attainment and progress were important factors in the decisions to move students between the tracks, in Block 1, other criteria, such as behaviour and motivation, also
clearly figured in decisions to move students. For example, Karan also took into her group, on a sporadic basis, students that were being especially disruptive. Two students in particular, one from the fast track and one from the mixed track, spent a significant proportion of their time in the ‘other’ track, and several others were moved temporarily. The use of an individualised learning scheme allowed for this without unduly disturbing these students’ access to the curriculum.

Research on teachers’ perceptions of students’ ‘educability’ (Haller & Davis, 1980; Haller, 1985; Dreeben & Gamoran, 1986; De Avila et al., 1987) matches the sentiments expressed here. Karan views some students as being able to profit from being in the fast track, and others as not being able to do so, with these judgements being formed on the basis of student behaviour and motivation, as well as attainment. Secada (1992), in summarising the evidence of studies on teachers’ views on the ‘educability’ of their students, states:

This more generalised notion of educability seemed based on a combination of factors that went beyond notions of student ability to include student classroom behaviour, student ability to learn, and the like. (p. 644)

As in the investigation above, no patterns were found that related these temporary movements to the students’ sex, ethnicity or social class.

Janet, teaching the fast track in Block 2, was clearly aware of some of the problems commonly associated with setting, and in particular that within-class differentiation was necessary even with ‘tracked’ groups:

introducing new material required a multi-level approach for each group—if not done well the level 10s … and the level 3s … were not sufficiently assisted.

This echoed the concerns of the Chief Inspector of Schools (OFSTED, 1998, p. 38), that ‘grouping alone is not the solution to providing effectively for students at different levels of attainment’.

She was also concerned about the potential demotivating effects of moving students ‘down’ from a fast-track group to a mixed-track group, resulting in her ‘hanging on’ throughout year 10 to students whose progress (or rather lack of it) indicated transfer to one of the mixed-track groups, making her fast-track group very large. This policy also made it difficult to move high-performing students in the mixed track into the fast track since there was no room. Janet, whilst defending her actions, acknowledged that this worked against some students in the mixed track: ‘a few in the M (mixed-track) group needed to be seen individually and would benefit less from discussion with fellow classmates’.

Karan too, takes up this issue of interaction, stressing its positive effects on students who were prepared to engage with their work. This recognition of the role of interaction in learning, across the school and within the department, raises the central tension of the tracking arrangement. Mixed-ability grouping, due to the skew in numbers, decreases the opportunities for higher attaining students to interact constructively whilst tracking does the same for lower attaining students.

Janet maintained too—having seen the examination results of the students she moved down—her opinion that the move overall had negative effects, particularly on two girls: ‘(Names the two students) seemed to do less well after leaving the H (fast-track) group’.

The implementation of tracking clearly benefited those students placed in the fast track, through the provision of a generally ‘well-behaved’ atmosphere that allowed for the establishment of a stronger work ethic, and faster rates of progress. The
negative features of pressurised conditions of learning, and emphasis on speed associated with top sets in the research of Boaler (1997) and Boaler et al. (2000), seem to have been avoided in the fast-track groups here through the continued use of individualised learning programmes. However, progress of students in the mixed-track groups was hampered by higher levels of disruption, lower levels of literacy and poorer self-image in terms of mathematical proficiency, although it should be noted that all the teachers stressed that the structure of tracking impacted on different students in different ways, and that this variation was particularly marked at the borderline between the two tracks. Some students became more motivated simply by virtue of being placed in either the fast track or the mixed track, while others found this demotivating.

The Impact of Tracking on Achievement

The relationship between KS 3 tests score and GCSE score\(^6\) for the 180 students for whom both data are available is shown in Fig 2, with separate regression lines shown for mixed-ability (MA), fast-track (FT) and mixed-track (MT) students. Analysis of covariance (ANCOVA) shows that there is a significant interaction (\(p = 0.006\)) between KS 3 test score and assignment to either the mixed-ability group (Block 3) or the blocks containing fast-track groups (Blocks 1 and 2). The model predicts that on average those scoring around level 4 at KS 3 would achieve grade G at GCSE if placed in the tracked blocks (Blocks 1 and 2) and grade E if placed in the mixed-ability group (Block 3). Those scoring around level 5 at KS 3 would achieve an E if placed in the tracked blocks and grade D if placed in the mixed-ability group. Only for the highest attaining 12% is placement in the tracked blocks (and therefore, by definition, the fast-track groups in these blocks) advantageous—in other words, placement in the fast track is beneficial for only the upper half of each fast-track group. For other students, in this school, tracking made no difference or was deleterious.

Whilst overall this finding in favour of mixed-ability grouping is consistent with those of Boaler (1997) and Linchevski (1995), this result should be interpreted with considerable caution, being based on just a single mixed-ability class in which it is impossible to disentangle other factors such as teacher effect. At the very least though, such a large effect across a wide range of student attainment does indicate that mixed-ability grouping in mathematics merits further attention.

The differences in performance between students assigned to the mixed track and fast track were also significant (\(p = 0.004\)), with placement in the fast track proving advantageous—a finding supported by earlier research (e.g. Kerckhoff, 1986; Hoffer, 1992; Linchevski, 1995). The impact of moving between tracks also needs to be considered here, and reveals a mixed picture. Upward movement resulted universally in achievement at or above the model for the relevant fast track while downward movement produced much more mixed results, with many students achieving lower GCSE grades than would be predicted on the basis of their KS3 test scores (whether based on the track they left, or the one to which they moved), although it is, of course, impossible to distinguish cause and effect here.

A range of earlier studies (e.g. Smith & Tomlinson, 1989; Boaler, 1997; Gaine & George, 1999) suggests that it is important to look at classroom process in terms of their interaction with sex, social class and ethnicity. The ANCOVA models discussed above showed no significant interactions with sex, but there was a strong (\(p < 0.001\)) interaction between KS3 score and ethnicity (ethnicity data was available on 200 of the 240 students in the cohort). Taking KS3 scores into account, Asian students scored 11.3
marks higher on the GCSE than whites (standardised effect size, $d = 0.44$), with Afro-Caribbean students scoring 3.2 fewer marks than white students on the GCSE, again taking KS 3 attainment into account ($d = 0.12$).

As noted earlier, and as illustrated in Fig. 1, the composition of the blocks differed, with more high-attaining students assigned to Block 2, but there was no significant interaction between block assignment and KS3 test score, so that the ‘value added’ in each block was comparable. However, while the regression lines of the mixed-track groups and the fast-track group in Block 2 are almost collinear (indicating that whether a student was assigned to the fast-track group or one of the mixed-track groups in that block made little difference), students assigned to the fast-track group within Block 1 were at a significant advantage. In Block 1, students in the fast track whose attainment on the KS 3 tests was in the overlap between tracks (i.e. those achieving KS3 scores between the lowest score achieved by a student assigned to the fast-track and the highest score achieved by a student in the mixed track) performed approximately one grade better at GCSE than those with comparable scores in the mixed track ($p = 0.001$). There was also an interaction between ethnicity and KS3 test score in Block 1 (though not in Block 2), and the interaction of KS3 test score with socio-economic status (as measured by entitlement to free school meals) was bordering on significance in Block 1 ($p = 0.090$) but not in Block 2 ($p = 0.744$).

**Discussion**

The fact that mixed-ability grouping appears to strongly benefit the majority of students in this cohort is worth considering from several standpoints. Firstly, the political climate continues to press schools to move away from heterogeneous grouping:
Tracking and Mixed-ability Grouping

Unless a school can demonstrate that it is getting better than expected results through a different approach, we do make the presumption that setting should be the norm in secondary schools. (White Paper, Excellence in Schools, 1997)

The findings of research on the relative merits of heterogeneous and homogeneous grouping are mixed (Slavin, 1990), but a large number of studies over an extended period have found a pattern which is in accord with the one seen in this context—that grouping by ability produces slightly better results for higher attaining students, whilst lowering the results of average and below-average attainers (Postlethwaite & Denton, 1978; Askew & William, 1995; Boaler, 1997). Within this study, it is also notable that the significant gains in achievement seen in the mixed-ability group are made in spite of the fact that both tracked and mixed-ability classes used SMILE. The studies by Boaler (1997) and Boaler et al. (2000) suggest that the poorer performance of students in setted environments was due to the imposition of lower level content and reduced pace in lower sets, and an emphasis on speed in the top set. This marked difference of content and pace between the tracked and mixed-ability environments is not a significant feature within this school since both use individualised work schemes (although it has not been entirely eradicated). The gain in this context, then, would appear to be related more fundamentally to the grouping structure than was the case in those studies.

The differences in performance between the blocks allow for an examination of how different student compositions, and to an extent, different teacher practices, impacted on eventual attainment. The significant ‘gap’ in performance between the fast-track group and the mixed-track groups in Block 1 is particularly interesting here. This ‘gap’ is caused to a large extent by the sizeable cluster of fast-track students at the lower end of the attainment range, for this group achieved particularly well in relation to what would be expected, given their KS3 scores. Several factors could have contributed to this. Firstly, the student composition in the fast-track group in Block 1, which contained more students working at lower levels than in Block 2, may have led to a greater emphasis on ‘lead-in’ or ‘consolidation’ type work on core topics in whole-class work, to ensure the achievement of a grade C at GCSE level. The more balanced attainment profile in the fast-track group in Block 2 could have switched this emphasis to differentiated work across all levels, with extension work being provided for the most able, which is supported by the remarks made by the teacher of this group. A similar argument could hold for the mixed-track groups in both blocks where a similar pattern of performance was seen.

Difference in the policies of the two teachers teaching fast-track groups on moving students could also have contributed to the cluster of positive residuals seen in the overlap region in Block 1. The evidence here suggests that the use of movement between tracks regularly, on a fluid and temporary basis for students who were not well motivated, has succeeded in raising levels of achievement in this range and these gains are not limited to students who were moved. The fluidity of movement seen here, both on an official basis across both blocks and more informally in Block 1, match the recommendations that are often made about how to improve the effectiveness of setting (see, for example, Hallam & Toutounji, 1996).

The significance of ‘track’ and ‘ethnicity’ (and the near significance of FSM) in Block 1 raises issues about the ethics of the structure of blocking used within the school, since it appears that having a more negatively skewed population in terms of prior attainment is associated with poorer performance for higher attaining students in both tracks, and
for some ethnic groups (‘African-Caribbean’ and ‘white’ students in particular here). One theory for these findings may be related to research which points out the positive effects of a more ‘comprehensive’ mix on eventual attainment (Willms, 1986; Gewirtz, 1997). The ANCOVA analyses for Blocks 2 and 3 support this, with the results for Block 2 in particular showing that none of the student background factors made a significant difference to them.

Conclusion

What is clear from this study is that the effects of grouping students by ability are highly complex, and current theorisation is inadequate to account for them. What goes on within classes, whether tracked or setted or not, is as important as how those classes are constructed. This study has replicated some findings of earlier studies, notably that the advantages of grouping by ability are limited, restricted to the highest attaining students, and secured at the expense of disadvantages for the lowest attainers (Sukhnandan & Lee, 1998). However, at Shackleton School, the decision to retain SMILE, and to try to treat all students as similarly as possible in terms of work rate, ameliorated the restriction of curricular opportunity, and the inappropriate pacing found in other studies.

The Government’s uncritical support of homogeneous ability grouping, irrespective of whether the students are taught individually or as a whole class, and of the scope and flexibility of the grouping structure, is certainly not grounded in evidence. To the extent that the evidence points either way, in fact, it is towards the greater use of mixed-ability grouping, in which case the advice to schools should be that:

Unless a school can demonstrate that it is getting better than expected results through a different approach, we do make the presumption that mixed-ability grouping should be the norm in secondary schools.

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NOTES

[2] The name of the school, and of the teachers are, of course, pseudonyms.
[4] Since the students were entered for different ‘tiers’ of the KS3 tests, the different tiers were equated using standard linear test equating within the level cut-offs specified by the Qualifications and Curriculum Authority. The equated scores have been scaled to the scores on the easiest tier. The scores on KS3 tests (and indeed GCSE) are not particularly reliable (estimates of the reliability of the KS3 tests range from 0.80 to 0.85), but this has little impact on the current study because the focus here is on groups of students (rather than individuals).
[5] We are aware that the system of ethnic classification presented here is problematic, but these categories were those used by the school, and it was not possible to obtain more appropriate data. In analysing these data, we have taken the view that to present data from a flawed classification is better than not to consider ethnicity at all.
[6] Again, linear equating was used to place scores from different ‘tiers’ of the GCSE on the same score scale, with scores scaled onto those on the lowest (Foundation) tier.
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