

Dividing Lines: Streaming, access to the curriculum and Junior Certificate achievement in Ireland

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Abstract

This paper builds on previous stratification work that addresses the issue of educational inequality of opportunity depending on the ability grouping practices of schools (Oakes, 1985; Kerckhoff, 1986; Gamoran and Berends, 1987; Gamoran et al, 1995; Betts and Shkolnik, 2000; Boaler et al, 2000; Ansalone, 2003). The paper explores both placement in a stream and access to the curriculum in terms of student achievement in the Irish Junior Certificate examination, a compulsory national standardised examination which takes place at the end of lower secondary education in Ireland. The analysis involves comparing students who have been separated into groups based on perceived ability with those who have not been so separated into formal group placements. This paper also incorporates the level of the examination paper in exploring how access to examination papers may lead to differential effects of grouping for students. It argues that generally, students' differential opportunities to learn are in part due to the amount of access to higher level examination papers for particular groups of students. The results from the analyses suggest that the advantage of some students over others appears to be due to the level at which they sit the examination rather than simply their placement in a particular stream, illustrating the influence of more hidden differentiation of students within Irish schools.

Key words

Ability Grouping, Curricular Access, Educational Inequality

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Disclaimer

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1. Introduction

Educational sociologists have long suggested that the way schools sort their students for instruction may explain some of the differential achievement of students. Early studies in the area of ability grouping describe a rigid streaming system with observable distinctions between general, vocational and academic education ability groups within a general education system. These studies emanated primarily from the United States. However, recent literature has begun to look at more subtle and hidden ways by which students are stratified within schools (Lucas, 1999; Wiliam and Bartholomew, 2004; Hallam and Ireson, 2005). Many education systems today have moved away from structured 'tracking' or 'streaming'. However, in-school differentiation remains through within-subject curriculum differentiation. The literature has tended to concentrate on 'streaming', in the sense that students are allocated to the same teaching group for a number of subjects – what Sorensen (1970) termed a wide scope system – rather than on 'setting' which is carried out on a subject-by-subject basis and is a less overt way of differentiating students. This paper attempts to go further in exploring both stream placement and setting together, in order to understand how this might contribute to differential effects for students in different grouped situations in Ireland – the first study of its kind using Irish data.

1.1 Streaming and Curricular Differentiation

Curricular programmes and instructional experiences affect student achievement in the differential opportunities they offer students. Some argue that students in academic streams or tracks learn more than students in other programmes, even after initial differences are taken into account (Schafer and Olexa, 1971; Alexander and McDill, 1976; Alexander, Cook, and McDill, 1978; Rehberg and Rosenthal, 1978). Many educators maintain that homogeneous classes allow teachers to tailor the curriculum to students' needs (Wilson and Schmits, 1978). However, research shows that the rigid grouping of students adds to inequality when placement in a high-status stream permits students to gain more than if they had been assigned to a lower stream. For many years, students, teachers, and field researchers have reported that more learning occurs in higher streams (Hargreaves, 1967; Rosenbaum, 1976; Metz, 1978; Ball, 1981;

Oakes, 1985). Opportunities may also be stratified between schools if some schools allow more students to enter a rigorous programme or provide more advanced academic courses, and especially if such differences are tied to school achievement or socio-economic levels. Earlier research in the United States found that lower streams contained a disproportionate number of students of low socio-economic status (Reglin, 1992). Social class and race were also significant determinants of stream position in the United Kingdom (Bennett, 1986; Hallinan, 1991; Kershaw, 1992; Oakes, 1990; Persell, 1992).

Previous studies which compared high, middle, and low streams at schools with formal grouping to heterogeneous groups at schools that did not use formal grouping found that grouping did have differential effects (Kerckhoff, 1986; Hoffer, 1992; Argys, Rees and Brewer, 1996). There is some argument as to how big this differential effect is (see Betts and Shkolnik, 2000) but the evidence suggests that grouping practices, in the United States and the United Kingdom at least, harmed the middle grouped students and gave those in the top group an advantage. Ireson et al. (2002) concluded that higher level ability students benefit more from the grouping than lower level attaining students. Furthermore, Wiliam and Bartholomew (2004) confirmed previous work that grouping increases achievement for students in the higher level group while lowering achievement in the lower level group. Therefore, this body of work suggests an advantage for those with higher prior ability and those placed in the higher ability groups.

Ansalone (2003:7) describes the definition of the opportunity to learn 'as the percentage of the intended curriculum that is made available to the student'. This may go some way to explaining the differential effects found in streaming research as it is likely that lower streams may have limited access to the intended curriculum. This limited access is due to a number of factors, such as teacher expectations, disciplinary environment and perceived ability of the students. Hallam and Ireson (2005) found that the curriculum was more differentiated in ability-grouped classes along a number of dimensions such as content, depth, implementation and resources used. Thus, the deficit in curriculum

implemented in lower-stream classes may seriously disadvantage those students by not providing an equal opportunity to learn. Preparing for a particular level of examination paper determines the type and content of classes, and in effect, serves the purpose of distributing the opportunity to learn among students as access to levels is differentiated. Both group placement and access to honours level exam papers may establish trajectories for the achievement of students by determining how much of the intended curriculum will be presented and therefore how much they will learn and ultimately achieve at the end of lower secondary schooling.

1.2 Streaming and Curricular Differentiation in Ireland

William and Bartholomew (2004) describe how, within secondary schools in the United Kingdom, streaming might have reduced the range of achievement within a teaching group but the range of achievement was still very wide. In most secondary schools, subject-specific ability grouping or 'setting' was superimposed on streaming. The situation in Ireland could be described as broadly similar. Statistics from the Programme for International Student Assessment (PISA) 2006 show that the proportion of secondary schools grouping 15-year-old students by ability for at least one subject in Ireland is at around 90.9 per cent.

Some research has already been carried out in the Irish context on a number of the factors affecting student achievement at Junior Certificate level. A national study of second-level schools indicated significant variation between schools in performance levels, even controlling for student intake (Smyth, 1999). Some of the variation between schools in their student achievement was attributed to differences in how schools grouped their students for instruction. Students were found to achieve higher exam grades in mixed ability or higher stream classes. This issue was explored further in the longitudinal analysis of Smyth et al (2007) which found that the class to which students were allocated in first year had a substantive effect on how they fared academically.

The advantage of that study, the first of its kind in Ireland, was the added value of following individual students as they moved through the schooling system. The study

included some analysis which focused on class placement and its effect on Junior Certificate achievement, controlling for initial reading and computation scores. The results showed that there was a negative effect of being in the lower stream, even when controlling for these initial scores, indicating that these students made less progress than their peers in mixed ability base classes. However, this analysis did not include the level of examination students took for their Junior Certificate. This paper includes the important aspect of setting in determining how students would fare in different grouping settings once the level of examination they took is controlled for and if the advantage of some group placements is due to their access to the curriculum.

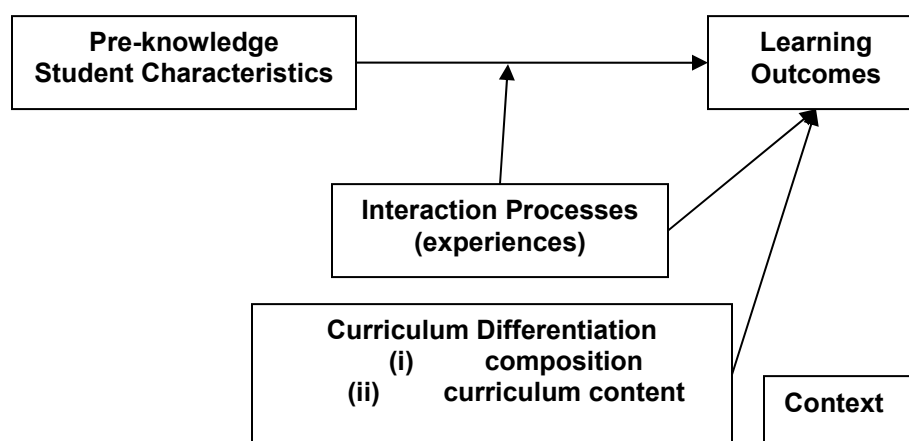
2. The Research Puzzle

Terwel (2005:659) describes curriculum differentiation as an institutional mechanism that offers students stratified opportunities by creating differences in content and methods and being selective. Much research in this area either looks at 'group placement' or curricular differentiation in 'course taking'. Here the data allow us to look at both group placement and course taking in order to examine the differentiation in opportunity students receive. Does being in a particular group placement have a positive or negative association with a student's Junior Certificate achievement? Furthermore, does differential achievement between group placements remain once we take account of what level examination paper they sat? The analysis attempts to distinguish the relationship between formal streaming and achievement through differentiated access to higher level exam papers.

Borrowing from Terwel's (2005) longitudinal multi-level model (see figure 2.1) the concept here is of how differentiation (ability group placement and curricular differentiation) is associated with learning outcomes (student achievement), taking account of student characteristics. This paper, like previous research, lets us compare students placed in high, middle and low groups with students in non-grouped schools. The analysis includes the level at which that students sat their examinations at the end of lower secondary schooling as a factor in differential achievement for students in different grouped situations. The addition of this factor allows us to explore if the

advantage of some groups over others is in part due to curricular opportunities through access to various levels of examination papers. Therefore, the analysis looks at the relationship between curricular access and student achievement, taking account of the school context which here is measured by whether the school streams students for instruction and the social class composition of that school. These are important contextual factors that shed light on student achievement, curricular access and group placement. The research highlights some interesting findings and suggests that more work exploring discreet differentiation practices needs to be carried out in order to explain the advantage of some students over others.

Figure 2.1: Trewel's (2005) Longitudinal Multi-Level Model



Source: Terwel, J. (2005) Journal of Curriculum Studies, Vol. 37, No. 6:653-670

3. Hypotheses

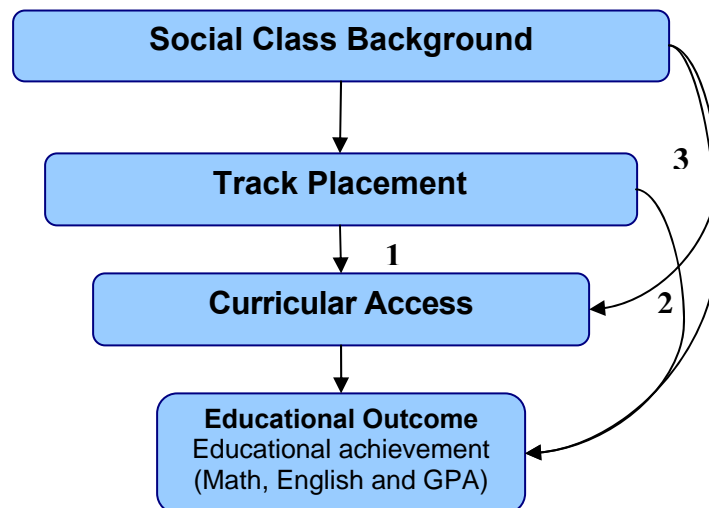
In summary, previous research has shown that streaming and curricular differentiation has an impact on student achievement. The question, therefore, is what role does access to the curriculum play in explaining differences in achievement depending on how a school sorts its students for instruction in Ireland? The figure below helps identify the relationships of interest. Firstly (1), stream placement is associated with curricular access as different streams are offered either a separate curriculum or differential access to elements of the curriculum either through curricular offers for different streams, and teacher expectations, or through teaching practices of teaching to a certain level within a stream. Secondly (2), stream placement has a direct effect on

educational outcomes through other mechanisms such as peer effects and time on task. Thirdly (3), social class background may influence access to the curriculum that a student receives directly due to such factors as his/her own perceived ability and teacher perception of his/her capabilities. Based on the literature and keeping these relationships in mind, the following two hypotheses are derived.

Hypothesis 1: Differentiation of students into streams within a school results in differentiated access to the curriculum in comparison to schools that do not stream their students.

Hypothesis 2: Students in the top stream have an achievement advantage in part due to their access to the curriculum which results in them sitting higher level papers.

Figure 3.1: Social Background, Streaming, Curricular Access and Educational Outcomes



Source: author's own figure

4. Data

This study draws on the Irish Economic and Social Research Institute (ESRI) database developed for *Moving Up: the experiences of first-year students in post-primary education* which was funded by the National Council for Curriculum and Assessment (NCCA). A postal survey of all secondary school principals in Ireland was conducted

early in 2002 to explore school practices in relation to lower secondary provision. The questionnaire examined areas relating to the transition from primary to post-primary schooling, support structures for first year students, approaches to subject choice and ability grouping along with perceptions of the junior cycle curriculum. On the basis of this survey, a purposive sample of students in twelve case-study schools was selected in terms of the school's approach to integrating first year students into the school, the school's approach to subject choice and the approach to ability grouping. Previous research suggests these three dimensions are likely to be crucial in their influence on the transition to secondary education and student experiences and achievement thereafter.

The sample included six schools which used streaming (i.e. allocating students by 'ability' to their base classes) and six which used mixed ability allocation. Secondly, six of the schools required students to select their subjects on or before entry to the school while the remainder allowed students to 'sample' their subjects for part or all of first year before making their choice. Thirdly, half of the schools which appeared from the postal survey responses to have a strong emphasis on student integration were selected along with six which had less of an emphasis on integration practices. As well as taking account of these three main dimensions of school practice the twelve schools in the study vary in terms of their sector and size as well as the gender and social mix of students.

At the beginning of the study, in September of 2002, self-completion questionnaires were administered to incoming first-year students in case-study schools (age 12/13). The questionnaire included students' experiences of school, teachers, and background characteristics. Nationally standardised reading and computation tests were also administered to the students to provide a baseline for assessing progress. The students' results in the National Standardised examination, the Junior Certificate, which takes place at the end of year 3 of secondary schooling (age 15/16), were also collected along with the level at which the students sat the examination paper.

Table 4.1 compares the percentages of students who took different levels of examination papers depending on their stream placement. Overall the table illustrates that streamed schools appear to have offered more differentiated access to papers supporting hypothesis 1. Those in the top stream had slightly more access to honours level papers in Mathematics compared to those in non-streamed classes, and took more honours level subjects on average compared to any other group. Similarly, those in the bottom stream almost exclusively took ordinary and foundation level papers. In non-streamed classes there was slightly less access to honours level papers in Mathematics; however, they took slightly more honours level papers in English. Overall, the number of papers they took at each level is more towards the middle. It is interesting to note that the level of papers was so clearly differentiated between the streams in streamed schools; however, the level of papers in mixed schools more closely resembled the pattern of those in the top stream.

Table 4.1: Percentage of streams that took different levels of examination paper for Junior Certificate

	Mixed	Top Stream	Middle Stream	Bottom Stream
Mathematics				
Honours Level	49%	50%	32%	0%
Ordinary Level	42%	45%	50%	58%
Foundation Level	9%	5%	18%	42%
English				
Honours Level	74%	73%	45%	13%
Ordinary Level	24%	26%	53%	66%
Foundation Level	2%	1%	3%	21%
Mean number of subjects at each level				
No. of Honours	6.41	6.53	4.58	1.70
No. of Ordinary	2.77	2.85	4.20	6.14
No. of Foundation	0.14	0.08	0.30	0.99

4.2 Variables

Based on both theoretical considerations and empirical findings from previous research several school and individual characteristic variables were selected in order to examine

their association with student performance in the domains of Mathematics, English and overall Junior Certificate performance.

Ability Grouping

Schools in Ireland may vary in the way in which they allocate students to base classes. They may employ streaming whereby students of similar assessed ability are grouped into classes, ranked from 'higher' to 'lower'. They may use banding, a somewhat looser form of streaming, where pupils are divided into broad ability bands (for example, two higher and two lower classes) but classes within these bands are mixed ability. Alternatively, students may be placed in mixed ability base classes; this can be based on random (e.g. alphabetical) allocation or, more rarely, schools may use ability test scores to achieve a mix across classes.

Students were placed in formal streams (high, middle and bottom) in half of the case-study schools in this analysis. Students in these formal streams typically took all their subjects together as a class and therefore were characteristically homogenous groups. The other half of the case-study schools placed students into base classes on a mixed ability basis and these groups were generally heterogeneous in their character.

The use of mixed ability base classes does not necessarily imply mixed ability teaching across all subjects. In first year, 17 per cent of schools that had mixed ability classes used setting for one or more subjects. Setting involves time-tabling higher and lower classes at the same time within particular subjects so that students may move levels depending on their ability in a specific subject. The timing and extent of setting varies among schools. However, by the Junior Certificate year all students have to be preparing for a particular level of examination for the core compulsory subjects of Mathematics, English and Irish – Honours Level, Ordinary Level or Foundation Level. Those in the streamed schools generally took all 10 of their Junior Certificate subjects together as a class, though there was some flexibility in the 'set' they were in for their core subjects – in other words the level at which they sat their exam paper. In the non-streamed schools students were not placed in homogenous groups for all 10 of their

subjects. However, 'setting' was used where students were placed into a 'set' for their core subjects.

Academic achievement

The study contained measures on students' Mathematics and reading abilities upon entry to the first year of secondary school (Entry level Math & Entry level Reading). Furthermore, their academic results in the national standardised state examination, the Junior Certificate, were also collected at the end of year three for all subjects (Junior Certificate Grade Point Average, Junior Certificate Mathematics Score, Junior Certificate English Score). Students in Ireland take on average 10 subjects for the Junior Certificate examination. For each exam subject, students were allocated points based on the examination level and the grade that they achieved. The points range from 1 for a D grade on a foundation level paper to 10 for an A grade on a higher level paper. A score of zero was allocated to those who received an E, F or NG grade (see table 4.1.1). The points system is broadly based on the points-type approach to university entry in Ireland (CAO <http://www.cao.ie/index.php?page=scoring&s=lce>), though it is extended to include foundation level. The same grade measure was used in *Coeducation and Gender Equality* (1996) and *Do Schools Differ?* (1999). Objectively, the achievement variables represent ordered categories. Theoretically, however, they are conceptualised as a linear continuum reflecting the highly hierarchical nature of the subject levels of the Irish Junior Certificate. Therefore, in this paper the modelling strategy employs the achievement measures in a linear fashion.

Only students who had taken more than four subjects are included in the analysis, although this excludes less than one per cent of the student cohort. The analysis looks at academic achievement at the end of lower secondary schooling while controlling for prior achievement in Mathematics and reading at the beginning of secondary education. Achievement is measured in three domains: Mathematics, English and overall Junior Certificate achievement. Mathematics and English are two core subjects that are generally compulsory for students to be examined in for the Junior Certificate examination and represent distinct areas of knowledge and competence. Modelling the

data using the overall academic achievement in the Junior Certificate as the dependent variable gives us a sense of academic achievement from a broader perspective distinct from the competencies in the key subjects of Mathematics and English.

Table 4.2: Allocation of Junior Certificate Grade Point Averages

	Higher Level	Ordinary Level	Foundation Level
A	10	7	4
B	9	6	3
C	8	5	2
D	7	4	1
E,F &NG	0	0	0

The models include information at the school level as well as at the individual level. The school Mathematics score and the school reading score are variables that result from aggregating the student data of individual Mathematics and reading scores from entry to lower secondary schooling.

Student Characteristic Variables

The dominant occupational status of the parent(s) was used as a measure of ‘social class.’ Occupation is measured in the data using the International Standard Classification of Occupation of the International Labour Office (ICO, 1990) and further collapsed into 7 categories based on the EGP class schema. Unfortunately, parental education is not included in the dataset due to the unreliability of asking students of such a young age what their parental education is. However, information as to whether the parent(s) held a medical card is available from the examination data and therefore included in the analysis as a further control of social background. A parent is entitled to a medical card if he/she earns less than €266.50 a week. Remembering that the current¹ minimum wage in Ireland is €8.65 an hour, someone working a 38-hour week would earn €328.70. This provides a benchmark to consider the entitlement of a medical card; someone must be either unemployed or working part-time to be entitled to a medical card. Both the percentage of medical card holders at a given school and the social class composition of a school were included in the models (which are aggregated from the individual level information). Students’ gender is also used in the analysis.

¹ As of October 2008

5. Method

To explore individual effects on student achievement, taking account of school composition effects, this analysis employs two-level hierarchical linear models (HLM) using a full maximum likelihood procedure. Survey data in education research has been increasingly analysed with hierarchical linear models. This approach is used as it is able to take into account the specific data structure of the *Moving Up 2002-2005* database. HLM models are particularly useful in analysing hierarchical data by taking into account the nested structure of the data (for a more detailed description of the advantage of HLM see Riddell, 1989; Bryk and Raudenbush, 1992; Hox, 2002). In this case students are nested in schools, and a benefit of the hierarchical modelling strategy is that it explicitly estimates between and within school variance. Simple linear regression models can provide an incomplete or inaccurate representation of education effects as they don't take into account the effects that may arise from the way students are nested in schools or in classes within schools. Therefore, HLM modelling was deemed appropriate in this case, particularly when the aim is to take account of school level variables such as composition and how schools sort their students for instruction.

All continuous variables in the model are grand-centred, and all interaction terms are computed using grand-centred variables where appropriate. 827 students in twelve schools have a valid measurement of the relevant variables. Although the N at the highest level (school) is quite small and therefore the results have to be interpreted with some caution, we have just enough units at the highest level to make reliable estimates in a random coefficient model (Snijders and Bosker, 1999:43-44). The suppression of one or two cases, particularly the cases of schools that track and have below average achievement (i.e. Dixon Street and Hay Street schools) may change the results from the models. Therefore the data were also modelled excluding these schools, and the similar results to the models including them were found, suggesting that these schools were not unduly influencing the results.

5.1 Access to the Curriculum

Based on the qualitative information collected during the study from both teachers and students, table 5.1.1 illustrates the timing and extent of choice for students in deciding what level they would take for the Junior Certificate examination. Teachers generally made decisions about the level at which students took their subjects, both in streamed and mixed base class schools. However, it was more overt in streamed schools as more often students were preparing for a particular level from day one and decisions were made on the basis of their group placement.

We group from the beginning and we therefore set the focus for each of those groups to achieve at certain levels

Principal, Lang Street, Boys School, Streamed, Working-class composition

The band normally picks the level for them. If they are in band 1 for example they are all doing Honours. If they are in band 2 we tell them from day one 'OK everything outside of Irish, English and Maths you are doing Higher.' That could probably be a bit into third year coming up to the mocks [practice examinations]. The level at which they are going to do it will probably be determined at the mocks [practice examinations] or even before it. The teachers will either know if it is good or bad but they are all encouraged to do the ... and it will be the student's decision at the end of the day. Principal, Wentworth Place, Boys School, Streamed, Mixed social class composition.

My approach anyway and I think it would be a fairly general approach is that, well we'll say the class that I'm in charge of, they're actually rated as being the strongest academically in third year. Now therefore I give everybody an opportunity to attempt honours level and I think that is the way with the other teachers as well. And so in my case then what I did was with regard to Irish that I covered the honours course. Class teacher, Dawes Point, Boys School, Streamed, Working-class composition

By the time it comes to Third Year, it normally is up to the teacher who advises them. What tends to happen again in the weaker streams is that it's chosen for them, they are all told that they are doing Pass... It's automatic almost in the A1, A2, part of B1 and then as you go down the house say for example the B2s and the C1s the majority would be taking pass subjects. Guidance Counsellor, Park Street, Boys School, Streamed, Mixed social class composition.

In mixed base class settings key personnel were more likely to describe students making decisions about their level with advice and input from their subject teachers. Although both streamed and non-streamed schools generally describe subject levels

being chosen mainly in second year, as illustrated by the above quotes, students in streamed schools were more likely to be preparing for a particular level earlier, even if the actual formal decision of the level was decided later. In mixed schools there was more of a description of students being in mixed common level classes for at least their first year, with those curricular and formal decisions regarding levels being taken in second year.

Mistakes can be made on the day of the entrance tests ... Some of them are very, very nervous and can do very badly and it just takes them a while as well, some of them. I think it's important then for the middle grouping ... that they could be too quickly put into foundation level classes and it's very difficult to move them back up then into a higher level. So for them then to give, just give them a chance to get the feel for the course and maybe to shine if there is an area that their strength lies within. Learning Support, Dawson Street, Co-educational, Non-streamed, Mixed social class composition.

In the Maths what happens is, they have an exam at the end of First Year and all 135 First Years sit the same exam at the end of the first year cycle and then, based on that exam, plus the teacher's knowledge of them throughout the year – we wouldn't put it just completely on an exam because let's just say a particular good student has a bad day, or is sick – you would know the form of a student based on having him in your class. Maths is divided at the end of First Year by level and the Irish would be the same. Guidance Counsellor, Fig Lane, Co-educational, Non-streamed, Middle-class composition.

Students in most of the case-study schools mainly described how examinations or performance at school determined the level at which they would take the Junior Certificate examinations. There was also recognition among the students of the disadvantage for those assigned to lower level classes. If students were preparing for lower level papers within their classes then they were unlikely to have the opportunity to take a higher level paper at a future date.

- It's a mix between us and the teachers, the teachers have more influence than us. If a teacher doesn't want you in their class your gone so. Like our Maths teacher he tries to make you drop down.
- He's always saying he can't stop you on the day; you can go in and say, on the day you can just ask for an ordinary level exam paper.

– But if you don't have any, if you haven't been taught anything in higher or ordinary then basically you don't have a choice. Middle stream class, Hay Street, Co-educational, Streamed, Working-class composition.

Table 5.1.1 School Profiles and Choice of Examination Level

		When choose level of examination?	Role of streaming in determining levels	Who makes the choice?	How levels are decided according to students
Dixon Street	Streamed	2 nd year, top stream honours Mathematics from start	Top stream always have access to honours Mathematics	Teachers	Grades/exams, low stream students felt level was decided for them. More flexibility in the top stream.
Park Street	Streamed	2 nd year	Levels determined by streams	Teachers	Grades/exams, mainly teachers deciding
Hay Street	Streamed	Middle of second year	Levels determined by streams	Teachers & students	Teachers and students, mainly teachers
Lang Street	Streamed	Third year	Students stay in their stream from first year for the core subjects	Students with advice from teachers	Grades/Exams
Dawes Point	Streamed	By 3 rd year	Levels somewhat determined by streams	Teachers teach to a certain level	Teachers/based on grades
Wentworth Place	Streamed	Prepared for particular levels from 1 st year	Level determined by streams mostly	Students decision but they are prepared for higher in top streams and lower in bottom	Info not available
Dawson Street	Mixed ability	At the end of first year. 2 nd year		Teachers	Grades/exams at end of first year
Barrack Street	Mixed ability	2 nd or 3 rd year		Students with advice from teachers	Teachers decide
Fig Lane	Mixed Ability	Mathematics & Irish by end of 1 st year. Others by third year.		Mainly subject teachers advise students	Teachers tell students what level they would be able for
Belmore Street	Mixed Ability	Start of 2 nd year		Students decide themselves	Students decide themselves, emphasis on higher level subjects
Wattle Street	Mixed Ability	2 nd year		Students with advice	After exams in 1 st year
Wynward Road	Mixed Ability	2 nd Year, some 3 rd year		Advised by teachers	Info not available

6. Results

6.1 Levels of performance

To explore achievement differences between formally streamed and non-streamed schools, Table 6.1.1 presents mean and standard deviations for the initial test scores upon entry to secondary school and the test scores achieved at the end of lower secondary schooling in the Junior Certificate examination by the level of examination paper the students took. Surprisingly, the mean entry test scores seem to be mainly comparable between the two types of schools between the different sets, particularly in Mathematics. By the end of lower secondary schooling, the test scores between the two different types of schools appear to be less comparable, with those in non-streamed schools achieving higher test scores in all comparable sets to those in streamed schools. It is interesting to note a particular case. Students who took the lowest level English examination paper (foundation) started school with a higher entry level score in reading in streamed schools compared to those in non-streamed schools (just over a 2-point difference). However, by the end of lower secondary school, the lowest level English group in non-streamed schools caught up and just about outperformed those taking the same level in streamed schools who initially had on average higher reading scores than them.

Table 6.1.1: Student achievement across different levels in streamed and non-streamed schools

	N (Students)	Entry Level (age 12-13)		Junior Certificate (age 15-16)	
		Mean	SD	Mean	SD
Streamed School Mathematics	355	16.15	6.80	5.19	2.74
Honours Set	118	22.39	5.83	7.88	1.54
Ordinary Set	176	14.28	4.41	4.41	2.10
Foundation Set	61	9.48	4.17	2.15	1.27
Non-Streamed School Mathematics	469	18.22	6.78	6.49	2.38
Honours Set	230	22.17	6.13	8.18	1.92
Ordinary Set	199	15.13	4.63	5.24	1.26
Foundation Set	40	10.85	5.10	3.00	0.96
Streamed School Reading	343	32.41	13.60	6.23	2.13
Honours Set	175	39.95	12.82	7.65	1.84
Ordinary Set	148	25.57	9.16	5.07	0.96
Foundation Set	20	17.05	6.44	2.42	0.77
Non-streamed School Reading	457	37.99	14.67	7.26	1.85
Honours Set	336	42.84	13.18	8.03	1.40
Ordinary Set	110	24.85	8.34	5.27	0.78
Foundation Set	11	15.13	9.55	2.50	0.93

The highest mean Mathematics entry level scores are in the honours set in streamed and non-streamed schools at approximately 22 score points. The maximum score on the entry level Mathematics test was 35, so this strongly suggests that the mean scores do not reflect a ceiling effect due to the limited nature of the test.

However, the scores for reading and Mathematics in the Junior Certificate (generally taken at age 15 or 16) suggest a floor effect. The mean scores for those in the foundation level set are generally only just above one standard deviation of the full sample standard deviation above zero. If the low ability groups are restricted in the possible range of scores they could obtain, this would mediate against tests of the divergence hypothesis because it would make students in the low ability groups appear to have higher relative scores than they would have on a more appropriate test. Although the models in the rest of this paper do not account for this floor effect, it is important to keep in mind when discussing the results.

6.2 Access to Higher Level Examination Papers

The descriptive table 6.1.1 illustrated that those in the top stream take more honours level subjects on average compared to any other group. Therefore the first set of models looks at the number of honours level papers as the dependent variable. The

first column in table 6.2.1 shows that although there was no significant gender differences in assignment probabilities, students from more advantaged social class families are taking more honours level papers, and students entitled to a medical card are taking significantly less. The second column includes school level characteristics and the group placement of a student. The social class and medical card effects remain. However, there are no school composition effects on the number of honours level papers.

Most interesting is the comparison of those in mixed base classes, top streams, bottom streams with those in the middle stream. Students in mixed base classes are taking more honours level papers, though it isn't statistically significant. Those in the top stream are taking significantly more honours level papers, and those in the bottom stream are taking significantly less honours level papers compared to those in the middle stream. There is no significant difference in the number of honours papers between the top stream and mixed base classes. Although this model controls for social class it does not control for previous achievement which may be an important factor to consider. It would not be surprising that the top stream was taking more honours level papers because they have higher prior achievement to begin with.

Column three illustrates that even after controlling for entry level scores, those in the top stream are taking significantly more honours level papers than those in the middle and bottom streams. However, those in the bottom stream are not taking considerably less honours level papers once we control for prior achievement. In conclusion, within streamed schools those in the top stream had a distinct advantage in terms of the number of honours level papers they were taking even when we control for their social class and prior achievement. This confirms hypothesis one that the differentiation of students into ability groupings within a school results in differentiated access to the curriculum as those in the top stream have more access to honours level papers even after controlling for prior ability.

Table 6.2.1: HLM model of the number of higher level papers taken

	<i>Ascribed Characteristics</i>	<i>School Level Characteristics + Group Placement</i>	<i>Achievement</i>	<i>Social Background² Interaction</i>	<i>Prior Achievement Interaction</i>
Model: Fixed Part	1	2	3	4	5
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	5.50 (0.48)***	4.40 (0.51)***	4.88 (0.53)***	5.32 (0.46)***	5.42 (0.46)***
Sex (1=Female)	0.37 (0.34)	0.39 (0.32)	0.31 (0.28)	0.32 (0.28)	0.32 (0.28)
Medical Card	-1.94 (0.03)***	-1.64 (0.28)***	-1.12 (0.22)***	-1.14 (0.22)***	-1.16 (0.22)***
Social Class	0.23 (0.04)***	-0.22 (0.06)***	0.04 (0.05)	-0.01 (0.07)	0.04 (0.05)
Mixed		1.23 (0.73)	0.64 (0.76)	0.19 (0.70)	0.15 (0.70)
Sch Social Class		-0.12 (0.79)	-0.64 (0.85)	-0.75 (0.82)	0.31 (0.93)
Sch MedCard %		-0.06 (0.03)	-0.05 (0.03)	-0.05 (0.03)	-0.05 (0.03)
Top Stream		2.39 (0.39)***	1.17 (0.34)***		
Bottom Stream		-2.09 (0.46)***	-0.58 (0.41)		
Entry Math Score			0.16 (0.02)***	0.18 (0.02)***	0.22 (0.02)***
Entry Reading Score			0.09 (0.01)***	0.09 (0.01)***	0.09 (0.01)***
Socclass*Mixed				0.10(0.10)	
Entry Math*Mixed					-0.07 (0.03)*
Entry Read*Mixed					0.01 (0.01)
σ^2_e (Student)	9.25	7.95	5.30	5.47	5.44
σ^2_{u0} (School)	2.26	0.94	1.15	1.05	1.07
Deviance	4340.4	4207.1	3557.9	3587.5	3589.5

*** significant at the <.001 level, ** significant at the <.01 level, * significant at the <.05 level

The last two columns, four and five, explore differential access to honours level papers depending on social class background and entry level achievement in streamed and non-streamed schools. When we control for other student and school factors we can see in column four that there are no significant differences between streamed and non-streamed schools in the gap between high and low socio-economic status students. It is not within the scope of this paper to explore why particular schools choose to stream their students whereas others do not. However, it could be theorised that streamed schools may be utilising streaming in response to the overall lower socio-economic composition of their incoming students. They may be trying to give students from a higher socio-economic background, relative to other students in the school, an academic advantage by giving them better access to the curriculum. However, when we control for ability upon entry and other characteristics of the school we do not find the empirical evidence that this happens more often in streamed schools compared to non-streamed schools.

² This model was also analysed for an interaction between being a medical card holder and whether the school used streaming or not and was also not found to be significant. Also, there was no significant interaction between social class and the socio-economic composition of the school.

Column five tells another story, however. Entry level Mathematics scores and the number of honours level papers a student takes are positively related. Moreover, this prior ability in Mathematics is more important in streamed schools than in schools that don't stream for access to higher level examination papers. Low entry achievers in streamed schools are not gaining the same access to the curriculum as low entry achievers in non-streamed schools. This is not surprising given the findings in column three that those in the top stream have significantly greater access to honours level papers even after controlling for ability. We can theorise that upon entry to a streamed school, those with higher levels of prior ability in terms of Mathematics scores are placed into the top stream and given better access to the curriculum. It may be the case that streamed schools are reacting to the overall lower average ability of their students and sorting the higher achievers into the top stream, therefore resulting in a disadvantage in access to the curriculum for the lower achievers in the lower streams which in turn leads to lower academic achievement. Differences in the three dimensions of student achievement between the group placements are now explored in the following sections.

6.3 Mathematics Achievement

The analysis above explored access to the curriculum. This section now turns to investigating student achievement in the core compulsory subject of Mathematics. Here, the aim is to examine differential student achievement between student group placements and how this is associated with their access to the curriculum. The further sections will explore if these relationships hold for English achievement and for overall Junior Certificate performance.

Model 0: Without any control (Intercept only model)

Using the Davis the Scott (1995) method of defining intraclass correlations a model of Mathematics achievement in the Junior Certificate without any independent variables has a total variance of 7.16 (75 per cent of the variance is at the student level and 25 per cent is at the school level) and the deviance/log likelihood is 4168.1.

Model 1: Student characteristics

The first model of table 6.3.1 illustrates that there are no significant differences between girls and boys in their Mathematics achievement at the end of lower secondary schooling. Unsurprisingly, higher prior achievement scores are associated with higher achievement in Mathematics in the Junior Certificate. The two social background measures, social class and medical card status, show different results. Although social class is not significant, those entitled to medical cards score significantly lower compared to those without. This may be due to the fact that being a medical card holder is a better indicator of poverty in comparison to the social class measure.³

Including individual background characteristics in the first model accounts for 54 per cent of the total variance in student achievement at the end of lower secondary education. In the schools selected, mean performance is highest among those with higher entry level scores and lowest among students who are entitled to the medical card. The difference of -0.65 points between those with medical cards and those without can be considered to be quite significant as this represents more than half a grade on the scale of Junior Certificate achievement.

Model 2: School Level Factors

The second model in table 6.3.1 introduces school level variables, the social class composition of the school, the proportion of medical card holders and the school mean entry level Mathematics score in explaining the variance in Junior Certificate Mathematics achievement. Interestingly, being in a school with a higher social class composition has an overall negative effect on Mathematics scores, while the proportion with medical cards is not significant. This negative social class composition effect may be due to the fact that students don't always experience a positive effect of being in a school with a higher concentration of students from higher socio-economic backgrounds. There is a counterbalance that students may suffer due to the competitive nature of being concentrated in a high status group of students (Meyer, 1970; Marsh, 1987). As might be expected, being in a school with

³ Students were asked what their parent's occupation was; as such there can not always be clear distinctions between social classes for given occupations and this may lead to a less accurate measure of social background, e.g. a smallhold farmer and farmers with bigger enterprises are categorised in the same way when the response to the occupation question was 'farmer'.

a higher mean entry level Mathematics score has a positive association with individual achievement in the Junior Certificate Mathematics examination.

The variable 'mixed' is also introduced at this level, indicating whether the school employs mixed base classes (1) or formally streams its students (0). When comparing the average student in a streamed school with the average student in a school with mixed ability base classes there appears to be no significant difference in Mathematics achievement. This result is not surprising given previous research results that compare average effects, but what is of interest here is the differential effects: how do students placed into different streams compare in achievement given their prior ability? The next model includes group placement in order to explore these possible differences.

Model 3: Group Placement

Variation in Mathematics achievement depending on group placement is explored in Model 3. The reference category is students in the middle stream. The results show that those in the top stream score significantly higher in the Junior Certificate Mathematics examination in comparison to those in the middle stream after controlling for school and student characteristics as well as prior achievement. However, students in the middle stream do not score significantly different from those in either the bottom stream or in mixed base classes once student characteristics and school level differences are taken into account. To what extent is the difference in Mathematics scores between the top and middle stream accounted for by the level of paper that students sat in the Junior Certificate examination?

Model 4: Level of Examination Paper (Set)

The final model of Mathematics achievement introduces the level at which students sat the Mathematics examination. Interestingly, when this control variable is introduced to the model we see that comparable students in the top stream and also those in mixed base classes score significantly higher in Mathematics compared to those in the middle stream, approximately half a grade higher.⁴

⁴ There is no problem with collinearity between track placement and number of higher level papers, or level taken in Math or English. (VIF 1.01 and Tolerance 0.98 for no. of higher papers, VIF 1.03 and Tolerance 0.97 for level of Math paper, VIF 1.02 and Tolerance of 0.98 for level of English paper).

Table 6.3.1: Mathematics Achievement in the Junior Certificate examination and Streaming

	Student Characteristics	School Composition	Group Placement	Level of Examination
Model:	1	2	3	4
Fixed Part				
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	5.86 (0.17)***	5.68 (0.14)***	5.47 (0.22)***	4.65 (0.21)***
Sex (1=Female)	0.16 (0.15)	0.22 (0.19)	0.19 (0.19)	0.19 (0.17)
Medical Card	-0.65 (0.09)***	-0.60 (0.17)***	-0.59 (0.17)***	-0.26 (0.15)
Social Class	0.02 (0.03)	0.02 (0.04)	0.02 (0.03)	0.01 (0.03)
Entry Math Score	0.15 (0.01)***	0.14 (0.01)***	0.13 (0.01)***	0.07 (0.01)***
Entry Reading Score	0.06 (0.01)***	0.06 (0.01)***	0.05 (0.01)***	0.03 (0.01)***
Sch Social Class		-0.85 (0.26)*	-0.85 (0.26)*	-0.60 (0.28)*
Sch MedCard %		-0.02 (0.02)	0.02 (0.02)	-0.01 (0.58)
Sch Entry Math		0.20 (0.08)*	0.22 (0.09)*	0.11 (0.09)
Mixed⁵		0.25 (0.23)	0.47 (0.29)	0.62 (0.27)*
Top Stream⁶			0.50 (0.24)*	0.43 (0.21)*
Bottom Stream⁴			-0.11 (0.29)	0.44 (0.26)
Honours Paper⁷				2.17 (0.15)***
Foundation Paper⁵				-1.48 (0.21)***
Random part				
σ^2_e (Student)	3.08	3.08	3.04	2.29
σ^2_{u0} (School)	0.25	0.03	0.05	0.06
Deviance	3112.5	3098.1	3091.7	2874.0

*** significant at the <.001 level, ** significant at the <.01 level, * significant at the <.05 level

What do these results tell us about streaming and achievement in Mathematics in the Irish Junior Certificate examination at the end of lower secondary schooling? The interesting results are found in models 3 and 4. The coefficients in model 3 show that students in the top stream and those in mixed base classes are scoring almost the same amount more than comparable students in the middle stream; there is hardly any difference between those in the top stream and the mixed base class (even though those in mixed base classes do not score significantly higher than those in the middle stream). Furthermore, there appears to be a suppressor effect when we consider the results in model 4. If we control for the level at which students sit the Mathematics exam, the coefficients suggest that the advantage of those in the top stream is decreased; in other words the advantage of the top stream over those in the lower streams is mainly due to their access to higher level papers.

⁵ This is a school level variable, whether the school uses mixed base classes (1) or not (0).

⁶ Reference group is the middle stream class.

⁷ Reference group is Ordinary Level paper.

Furthermore, when we control for level of the paper, those in mixed base classes actually do the best in Mathematics achievement. In other words, when we control for the level at which students took their examination papers, those in mixed base classes do the best, more than half a grade better than comparable students in the middle stream. Those in the top stream also do significantly better than those in the middle stream, though not as well as those students in mixed base classes. This is due to the greater percentage of mixed ability base classes taking foundation level papers in comparison to those in top stream classes which suppresses their academic achievement. The evidence does seem to indicate that although students in the top stream do gain an advantage over those in the middle and bottom streams, even after controlling for prior ability and other school and student characteristics, they do not gain an advantage from being in the homogenous group compared to their peers in mixed base classes. However, it is hard to conclude what might be driving this result. Are students in the top stream wasting the opportunity, or are schools that employ mixed base classes doing a better job?

6.4 English Achievement

The analysis now turns to how students fared in the English examination of the Junior Certificate, another compulsory subject for all students. These models are built in the same manner as the models above which looked at Mathematics achievement. The model of English achievement in the Junior Certificate without any independent variables has a total variance of 4.58 (72 per cent of the variance is at the student level and 28 per cent is at the school level) and the deviance/log likelihood is 3714.4 which is very similar to that of Mathematics achievement.

Model 1: Student Characteristics

The results in model 1 are interesting in comparison to those results in the same model for Mathematics achievement as there are significant gender differences, with girls scoring more than half a grade higher in the English examination compared to boys. Once again the social background effects are mixed with no significant differences between the social class backgrounds of students in their English achievement at the end of lower secondary schooling. Medical card holders score significantly lower compared to those without, almost a full grade lower even when

controlling for prior achievement. Higher prior achievement scores are unsurprisingly associated with higher achievement in English achievement in the Junior Certificate.

Model 2: School Factors

Model 2 introduces school level variables, the social class composition of the school, the proportion with medical cards and the school mean entry level reading score. The variable 'mixed' is also introduced at this level, indicating whether the school employs mixed base classes (1) or streams its students (0). Interestingly none of these school level variables appear to be significantly associated with English achievement.

Model 3: Group Placement

The differences between streams in English achievement are introduced in Model 3 in Table 6.4.1 below. The reference category is students in the middle stream. The results here show that those in the bottom stream score significantly lower in the Junior Certificate English examination compared to those in the middle stream (over half a grade lower); however, those in the top stream or those in mixed base classes do not score significantly higher or lower when student characteristics and school level differences are taken into account.

Model 4: Level of Examination Paper (Set)

The final model, model 4, introduces the level at which students sat the English paper in order to see if the difference in English scores between those in the bottom stream and those in the middle stream can be explained by the level at which students sat the exam paper. There are no significant differences between those in the middle stream and those in the bottom stream once the level at which they sit the exam paper is controlled for, suggesting that the advantage of the middle stream is due to the fact that they sat higher papers in comparison to their counterparts in the bottom stream. Interestingly, when we introduce this control variable we see that comparable students in the top stream score significantly lower in English compared to those in the middle stream, almost half a grade lower, suggesting that the advantage they have in achievement may be due to access to higher level papers.

Table 6.4.1: English Junior Certificate Achievement and Streaming

	Student Characteristics	School Composition	Group Placement	Level of Examination
Model: Fixed Part	1	2	3	4
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	6.60 (0.18)***	6.36 (0.24)***	6.47 (0.26)***	5.84 (0.19)***
Sex (1=Female)	0.57 (0.16)**	0.52 (0.17)**	0.53 (0.17)**	0.37 (0.14)**
Medical Card	-0.78 (0.13)***	-0.76 (0.14)***	-0.76 (0.18)***	-0.45 (0.12)***
Social Class	0.01 (0.03)	0.01 (0.03)	0.01 (0.03)	0.01 (0.02)
Entry Math Score	0.07 (0.01)***	0.07 (0.01)***	0.06 (0.01)***	0.03 (0.01)***
Entry Reading Score	0.05 (0.01)***	0.05 (0.01)***	0.05 (0.01)***	0.03 (0.01)***
Sch Social Class		0.47 (0.46)	0.49 (0.43)	0.46 (0.28)
Sch MedCard %		-0.02 (0.02)	-0.01 (0.01)	0.01 (0.01)
Sch Entry Reading		-0.09 (0.07)	-0.08 (0.06)	-0.01 (0.04)
Mixed⁸		0.48 (0.40)	0.34 (0.40)	-0.14 (0.28)
Top Stream⁹			0.04 (0.21)	-0.43 (0.18)*
Bottom Stream⁸			-0.57 (0.24)*	-0.23 (0.21)
Honours Paper¹⁰				1.87 (0.12)***
Foundation Paper⁹				-2.36 (0.27)***
Random part				
σ^2_e (Student)	2.02	2.02	2.00	1.45
σ^2_{u0} (School)	0.28	0.21	0.18	0.06
Deviance	2781.3	2777.6	2769.6	2511.0

*** significant at the <.001 level, ** significant at the <.01 level, * significant at the <.05 level

What conclusions can we reach about streaming and achievement in English in the Irish Junior Certificate and how does it compare to student achievement in Mathematics? Model 2 shows that on average those in non-streamed schools (those who employ mixed base classes) do not score significantly worse or better than the average student in streamed schools. Furthermore, those in mixed base classes do not score significantly higher or lower English grades compared to those in the top or middle stream. However, within the streamed schools, those in the top stream are actually scoring significantly lower English grades than those in the middle stream when we control for the level of paper they are sitting. This means that those in the top stream do not have a significant advantage over those in the middle stream, particularly as any slight advantage they hold is due to their access to higher level papers. Perhaps if those in the middle stream had the opportunity to sit higher papers they would actually do significantly better than those in the top stream.

⁸ This is a school level variable, whether the school uses mixed base classes (1) or not (0).

⁹ Reference group is the middle stream class.

¹⁰ Reference group is Ordinary Level paper.

What is particularly interesting here is to compare how the results for academic achievement in English differ from academic achievement in Mathematics. Based on the model for Mathematics achievement and the percentages taking the various levels of papers (table 4.1) we would expect once again that for English achievement that those in the top stream and those in mixed base classes would score roughly similar English achievement given their similar percentages taking the various levels of papers. However, despite taking similar levels of papers those in the top stream do not score as high as those in mixed base classes. As expected, due to their similar percentages taking various levels of papers, the decrease in achievement after controlling for level of paper is broadly similar (a decline of .40; almost half a grade).

Despite taking no honours level papers in Mathematics and taking twice the number of foundation level papers, the bottom stream did not do significantly worse than the middle track in Mathematics achievement. Therefore, once the model controlled for the level of paper the bottom stream's slightly lower achievement in Mathematics disappeared. However, this was not the case for English achievement. Students in the bottom stream scored more than half a grade lower than the middle stream in English achievement, and although this significant disadvantage disappeared after controlling for the level of paper, those in the bottom stream are still not achieving the same results as their peers in the middle track. This suggests that there is a difference between Mathematics achievement and English achievement for the bottom stream. The final analysis now turns to differences in the overall achievement of students in the Junior Certificate examination.

6.5 Overall Junior Certificate Achievement

This section examines overall student achievement across all subjects taken in the Junior Certificate examination at the end of lower secondary schooling. These models are built in the same manner as the models above looking at Mathematics and English achievement. Using a measure of aggregate performance across all subjects taken for the Junior Certificate examination takes a broad view of student achievement and the balance between grades in different examination subjects rather than solely in Mathematics or English. A model of overall achievement in the

Junior Certificate without any independent variables has a total variance of 3.31 (74 per cent of the variance is at the student level and 26 per cent is at the school level) and the deviance/log likelihood is 3446.8.

Model 1: Student Characteristics

Student characteristics are controlled for in Model 1. The results in model 1 are somewhat similar to the results for Mathematics and English. There is a small significant gender difference, with girls scoring higher overall in the Junior Certificate examinations compared to boys. The social class background results are consistent with the results for Mathematics and English; there appears to be no significant differences between the social class backgrounds of students in their achievement.¹¹ However, those with medical cards score significantly lower compared to those without, approximately half a grade lower. Higher prior achievement scores are unsurprisingly associated with higher achievement in the Junior Certificate examinations.

Including individual background characteristics in the first model accounts for 60 per cent of the total variance in overall student achievement in the Junior Certificate at the end of lower secondary education. In the schools selected, mean performance is highest among those with higher entry level scores and lowest among students that are entitled to the medical card. The difference of -0.54 points between those with medical cards and those without can be considered to be quite significant as this represents approximately a half a grade on the scale of Junior Certificate achievement.

Model 2: School Factors

Model 2 introduces school level variables, the social class composition of the school, the proportion with medical cards and the school mean entry level Mathematics and reading scores. The variable 'mixed' is also introduced at this level indicating whether the school employs mixed base classes (1) or streams its students (0). In schools with higher prior mean Mathematics and reading scores, students achieved

¹¹ Analysis not included here show social class differences in academic achievement in the Junior Certificate before controlling for student achievement at the beginning of secondary school. Those social class differences are found to be due to variation in initial reading and Maths scores. In other words, students from middle-class backgrounds do better academically because they come to secondary school with higher performance levels.

a higher Junior Certificate grade point average, even after controlling for their own prior ability. The average student in a school with mixed base classes did not score significantly higher overall Junior Certificate achievement compared to the average student in a streamed school.

Model 3: Group Placement

The next model, model 3, looks at the differences between the streams in order to explore differential achievement depending on stream placement rather than simply the average effects between streamed and non-streamed schools. The reference category is students in the middle stream. Model 3 presents some interesting results: there appears to be no significant difference between the middle stream and the top stream or between the middle stream and the bottom stream in terms of their overall Junior Certificate achievement; however, those in mixed base classes score significantly higher than those in the middle stream. This is particularly interesting as we saw at the beginning of this section that those in the top stream had the greatest access to higher level papers. However, this is not being realised in greater achievement in the Junior Certificate examination.

Model 4: Level of Examination Paper (Set)

The last model, model 4, includes how many exam subjects students sat at the honours level. When this variable is added to the model, the results show that there is no significant difference between the streams in terms of overall Junior Certificate achievement. It appears that the advantage of those in mixed base class schools is due to the fact they sit more papers at the higher level in the Junior Certificate.

Including student background characteristics, school factors, group placement and the level at which students sit the examination accounts for 74 per cent of the total variance in overall student achievement in the Junior Certificate. In the schools selected, mean performance is highest among those who have higher entry level scores and take a greater number of honours level papers. The results suggest that differential achievement between streams may be due to access to higher level papers for the Junior Certificate examination in the Irish case.

Table 6.5.1: Overall Junior Certificate Grade Point Average Achievement and Streaming

	Student Characteristics	School Composition	Group Placement	Level of Examination
Model:	1	2	3	4
Fixed Part				
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	6.77 (0.11)***	6.51 (0.11)***	6.44 (0.14)***	4.96 (0.13)***
Sex (1=Female)	0.24 (0.12)*	0.19 (0.12)	0.19 (0.12)	0.06 (0.09)
Medical Card	-0.54 (0.10)***	-0.52 (0.10)***	-0.52 (0.10)***	-0.18 (0.08)*
Social Class	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)	0.01 (0.01)
Entry Math Score	0.08 (0.01)***	0.08 (0.01)***	0.08 (0.01)***	0.03 (0.01)***
Entry Reading Score	0.05 (0.01)***	0.05 (0.01)***	0.05 (0.01)***	0.02 (0.01)***
Sch Social Class		-0.13 (0.19)	-0.13 (0.19)	-0.23 (0.16)
Sch MedCard %		-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)
Sch Entry Math		0.24 (0.08)*	0.25 (0.07)*	0.22 (0.06)*
Sch Entry Reading		-0.13 (0.04)*	-0.13 (0.04)*	-0.05 (0.03)
Mixed¹²		0.58 (0.26)	0.58 (0.21)*	0.36 (0.17)
Top Stream¹³			0.25 (0.15)	0.07 (0.11)
Bottom Stream¹²			-0.22 (0.18)	0.06 (0.14)
No. of Honours Papers				0.29 (0.01)***
Random part				
σ^2_e (Student)	1.22	1.21	1.21	0.83
σ^2_{u0} (School)	0.11	0.02	0.02	0.02
Deviance	2390.9	2376.5	2368.6	2082.9

*** significant at the <.001 level, ** significant at the <.01 level, * significant at the <.05 level

Looking at overall student achievement in the Junior Certificate we can see distinct differences in the results in comparison to the subjects of Mathematics and English. Once again the bottom stream have the lowest achievement (even when controlling for entry scores), and much of this is associated with the level of papers they took for the Junior Certificate. Top stream students do not show a significant achievement advantage in their overall Junior Certificate achievement despite having the best access to honours level papers (see table 6.2.1). Furthermore, top stream students are just competing in Mathematics achievement with those from mixed base classes and despite taking similar percentages in levels of papers for English are not achieving as well as mixed base classes. In sum, top stream students do not appear to be turning their access to higher level papers into an achievement advantage and the differentiated nature of the curriculum in streamed schools is resulting in large

¹² This is a school level variable, whether the school uses mixed base classes (1) or not (0).

¹³ Reference group is the middle stream class.

percentages of bottom stream classes taking the lowest level of papers which in turn affects their achievement.

7. Conclusions

This paper set out to explore variation in Irish student achievement at the end of lower secondary schooling depending on how schools grouped their students for instruction. The results illustrate some interesting differences in Junior Certificate results depending on a student's group placement. Students in the top stream score the highest Mathematics achievement scores at the end of lower secondary schooling, even when controlling for prior achievement, as expected. However, this advantage disappears when we control for the level of examination paper that a student sits. The results in the models suggest that if we control for the level at which students took their Mathematics exam, students in the mixed base classes actually do the best in Mathematics achievement. (Despite having a greater percentage of students taking foundation level Mathematics which could be expected to affect average achievement, their average achievement is the same as those in the top stream.)

Students in mixed base classes and those in the top stream do not have a statistically significant advantage over those in the middle stream in English examination achievement. Furthermore, once the level of the English examination paper is controlled for, those in the middle stream actually score significantly higher than those in the top stream. Those in the bottom stream do significantly worse in their English examination. However, the results suggest that this is likely due to the fact that they sit lower level papers.

The results for Mathematics, English achievement, and overall Junior Certificate grade point average, show between-group differences but there is no significant difference in achievement between those in streamed schools and those in non-streamed schools that employ mixed base classes. Within streamed schools, the top and bottom streams do not differ significantly in their overall achievement in the Junior Certificate from those in the middle stream. Those in mixed base classes, however, do significantly better. This advantage appears to be due to those in mixed

base classes taking a greater number of higher level exam papers in comparison to those in the middle stream.

In summary, for the most part mixed base classes in non-streamed schools have an advantage in overall Junior Certificate achievement due to the number of higher level papers and the low percentage of foundation papers they sit. They also have an advantage in English achievement due to the level at which they sit the English exam paper. Furthermore, those in mixed base classes would perhaps gain an advantage if they had fewer students taking foundation papers (i.e. if those students took higher level rather than foundation papers) in Mathematics. However, students may also be at risk of failing higher papers as well as having the opportunity to score higher. Nevertheless, we can conclude that the advantage for some streams over others is mainly due to the level at which they sit their Junior Certificate exam papers. Although the advantage does not always lie with the top stream, as was predicted by hypothesis 2, the differences between students in different group placements are explained by the level of paper they sit for the most part.

8. Policy Implications

The results in this paper illustrate an important mechanism by which students are being differentiated during lower secondary school and the implications this has for their achievement at the end of lower secondary education. Many have argued that students placed in academic streams learn more than the students placed in other programmes, even when prior differences in achievement are controlled for (Alexander and McDill, 1976; Oakes, 1985). The evidence here suggests that the key to any success of students in the top stream is their access to higher level papers which is likely to be due to teacher expectations; however, they are not taking full advantage of that access and turning it into a distinct achievement advantage. The analysis shows that those in the top stream are taking significantly more higher level papers compared to those in the middle stream and those in the bottom stream even after we control for entry level ability. However, by the end of lower secondary schooling, despite students in the top stream having greater access to higher level papers, this does not always translate into a significant achievement advantage over those in the middle stream.

The implication is that students in the top stream are not always gaining an achievement advantage that we might expect considering their access to higher level papers. Students in the top stream are not achieving a significantly higher overall Junior Certificate grade point average or scoring higher in English compared to the middle stream. Furthermore, they only just about compete with those in mixed base classes in terms of Mathematics achievement, and despite having similar levels of English papers and taking more honours level papers overall they do not score the same achievement as those in mixed base classes.

Having access to higher level papers is giving those in the top stream a significant advantage over other streams in streamed schools in terms of Mathematics achievement. On the other hand, those in non-streamed schools would actually have the highest achievement in Mathematics if they did not have a higher percentage taking foundation level papers in comparison to those in the top stream.

It is possible that schools are streaming students in response to the student socio-economic composition of the school in order to advantage the minority of students from higher social class backgrounds with higher entry scores. However, students in the top stream appear to be only barely competing with those students from non-streamed schools in their achievement at the end of lower secondary schooling. The pay-off is that students in the top stream are getting the best access to the curriculum without turning it into a 'real' achievement advantage, arguably at the cost of those in the lower streams who achieve significantly lower due to their lack of access to higher papers even after controlling for their prior ability.

These findings do not make for easy policy making. Dismantling the streaming structure will not necessarily result in greater equality. In this case it is perhaps a reaction of the socio-economic composition of the school to group students into distinct streams and to differentiate access to the curriculum. The assignment of honours level papers is likely to also be a measure of teacher and school expectations, with the top stream being assigned a more rigorous curriculum compared to those in the lower group placements. It does not appear to result in a significant gain for those in the top stream, and it does appear to be at the cost of

those in the lower streams. Even though the models control for the socio-economic composition of the school, it is difficult to disentangle streaming and school composition effects. Even if streamed schools were to move towards a non-streamed system it is difficult to say whether it would result in a gain amongst those in the bottom stream and not result in a loss among those in the top stream. It certainly appears that separating students into a top stream is not resulting in any achievement advantage compared to those in non-streamed classes, but perhaps those students would no longer be able to compete with students in non-streamed settings if they were not streamed and given better access to the curriculum. More work would need to be done in this area to tease out this issue of social class composition and streaming, such as a longitudinal exploration of schools that have transitioned from being streamed schools to being non-streamed and how their students fare in terms of access to the curriculum and any achievement advantages.

The one conclusion we can make in terms of policy is for students, regardless of their stream or background, to have better access to the curriculum. Those from families who are entitled to the medical card have significantly worse access to higher level papers even after controlling for their prior achievement which has significant negative effects for their achievement. This aspect of hidden differentiation illustrates that stratification during lower secondary schooling is more complex than simply group placement. It needs to be explored with further work examining who has access to higher level papers, and how 'setting' decisions are made, both at the individual and school level. Hidden differentiation is clearly as important in this context as more traditional methods of stratifying students within schools. Both are interrelated; more traditional methods of stratifying students lead to differentiated access to the curriculum which in turn affects achievement in the Junior Certificate.

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Appendix

Descriptions of variables used in the analysis

Variable	Description
Ability Grouping:	
Mixed	Whether the school adopts mixed base classes (1) or streamed base classes (0)
Top stream	Dummy variable for being in the top stream =1
Middle stream	Dummy variable for being in the middle stream =1
Bottom stream	Dummy variable for being in the bottom stream =1
Honours Level paper	Dummy variable for whether the student sat the Honours level paper in the Junior Certificate examination=1
Ordinary Level paper	Dummy variable for whether the student sat the Ordinary level paper in the Junior Certificate examination=1
Foundation Level paper	Dummy variable for whether the student sat the Foundation level paper in the Junior Certificate examination=1
Academic Achievement	
Entry level Math Score	Mathematics score ranging from 0-35 assessed during first month of secondary school
Entry level Reading Score	Reading score ranging from 0-71 assessed during first month of secondary school
School entry math score	Aggregated from student data of entry level mathematics Score
School entry reading score	Aggregated from student data of entry level Reading Score
Junior Certificate Grade Point Ave	Junior Certificate Grade Point Average for at least 4 subjects, ranges from 0-10
Junior Certificate Math Score	Junior Certificate Math Score, ranges from 0-10 depending on performance in Mathematics in the Junior Certificate
Junior Certificate English Score	Junior Certificate English Score, ranges from 0-10 depending on performance in English in the Junior Certificate
Student Characteristics	
Social Class	Based on the dominant parental social class. 7 categories from EGP, treated as an interval scale variable for purpose of analysis
School Social Class	Aggregated from student data
Medical Card holder (parent)	Entitled if you earn less than €266.50 a week for those with dependent children, remembering that minimum wage is €8.65/hr, 38hr week=€328.70)
%School medical card holders	Percentage of medical card holders (aggregated from student data)
Sex	1=Female

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