Department of Political and Social Sciences

Dividing Lines:

Examining the relative importance of between- and within-school differentiation during lower secondary education.

Allison Dunne

Thesis submitted for assessment with a view to obtaining the degree of
Doctor of Political and Social Sciences of the European University Institute

Florence, May 2010

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Examining Board:

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Abstract

This thesis addresses the issue of educational inequality of opportunity by exploring how countries and schools differentiate their students for instruction during lower secondary schooling. Using a combination of comparative work examining twenty four countries using the data on student achievement among 15 year olds from the Programme for International Student Assessment (PISA) 2006 and analyses with longitudinal case-study data from Ireland, this study builds upon existing knowledge in the area of stratification of educational opportunity. The methodology lends itself to a detailed investigation of the differentiating practices within countries and within schools and their impact on student achievement. In particular, this thesis focuses on the relationship between socioeconomic background, socioeconomic composition of the school and how students are sorted for instruction. In an attempt to contribute to the debate surrounding tracking practices the thesis explores how school composition effects vary depending on how a country sorts its students for instruction, the relationship between tracking and school composition and the role that curricular differentiation plays in explaining differential achievement.

The findings highlight that the known effect of how countries sort their students for instruction on the inequality of educational achievement appears to be mediated through school composition effects. The results show that differentiation at the country level accentuates compositional effects, i.e. school composition matters more in highly differentiated education systems. However, the pattern is less extreme for high socioeconomic status students; that is highly differentiated systems do less to magnify compositional effects for high socioeconomic status students as compared to low socioeconomic status students. In Ireland, schools that track their students are achieving less than their counterparts in non-tracked schools which is associated with the lower social class composition of the school. Furthermore, there is inequality of educational opportunity within tracked schools. Those from lower social backgrounds do significantly worse in tracked schools compared to their peers. Access the curriculum is more differentiated in tracked schools with those in the top track gaining the best access to the higher levels of curricula.

The findings in this thesis illustrate the payoff between offering an achievement advantage to a minority, or maximising achievement among the greatest number. Differentiating practices maximise the achievement advantage for the few who are high socioeconomic status students in high socioeconomic composition schools. Schools that track maximise the achievement advantage for the few who enter the school with higher ability levels by giving them better access to the curriculum which widens the gap in achievement between track placements. Comprehensive education systems and schools that do not track their students keep the channels of movement between courses of study open (Turner, 1960) and in doing so appear to maximise the achievement of a greater number with a small loss of achievement for the minority at the top. By exploring the role of differentiating practices within countries and within schools, this dissertation contributes to a greater understanding of how social class status and school-composition effects vary depending on how students are sorted for instruction.

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My PhD journey started in the lobby of a small bed and breakfast in north-eastern California at 4am in the morning when I took a scheduled telephone interview from the EUI in my efforts to secure a place. Professor Dronkers flexibility and support began that day when he facilitated for me to be interviewed by phone instead of in person because I was presenting at a conference. Now I feel as though I have come full circle; as I write this I am back on the west coast of the United States and Professor Dronkers is receiving phone calls from me at strange hours due to our nine hour time difference. I owe my supervisor so much throughout this time and I especially appreciate that his belief in my academic career has been unwavering. I am particularly grateful that he has always made himself available and given me detailed comments on every draft of anything I have written. I can honestly say that I could not have done this without him.

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My thanks really go to everyone who supported me along the way,

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Chapter One: Introduction

The reproduction of inequality is a central concern to sociologists. Research has a long history of examining how educational differentiation practices lead to unequal outcomes for particular groups of students. Authors have explored how educational systems differentiate their students for the purpose of instruction and the impact this has on student achievement. Research has also explored the average effects of differentiation between schools within a given educational system. Work has also considered the role of curricular differentiation in unequal outcomes. The focus of this thesis is to explore the outcomes for students depending on how they are differentiated within an education system, within schools and between schools. It contributes to research on differentiation within education systems, between schools and within schools; three levels that have rarely been considered together in such detail.

This chapter will outline five main aspects of this thesis. The first section will establish the purpose of this research which explores how students are differentiated for instruction during lower secondary schooling and will outline the main goal of the research. Secondly, the chapter will give an overview of the background to the research and tradition it follows in. This leads the chapter to identify the research aim, and furthermore, the research questions that this thesis specifically wishes to address. Finally the chapter will outline the limitations of the research design and data.

1.1 Purpose of the Research

This doctoral dissertation project investigates the relationship between educational differentiation and educational opportunities in modern industrial societies. The objective of the study is to contribute to the research debate on how the mechanisms countries and schools use to differentiate their students for instruction play a role in societal stratification through stratified educational opportunities. This study aims to build upon existing knowledge of stratification in educational opportunity by using a combination of comparative work examining twenty-four countries, and analyses with longitudinal case-study data from Ireland. This allows us to take a detailed look at how the differentiating practices within countries and within schools impact student achievement. Importantly, the research includes school composition and curricular access in understanding the relationship between differentiation and student achievement. The research explores the average effects of differentiation on

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student achievement and attempts to determine what the differential effects are for students from different socioeconomic status backgrounds.

The countries chosen for analysis are examples of comprehensive schooling systems with low levels of within school differentiation, highly differentiated schooling systems that use separate school types to stratify students, and education systems that have a high level of within school/internal differentiation without distinct school types. Analysis exploring the effect of how these countries sort their students for instruction on educational opportunity was possible by utilising the Programme for International Student Assessment (PISA) data set 2006. The Programme for International Student Assessment (PISA) is an internationally standardised assessment that was jointly developed by participating countries and administered to 15-year old in schools within those countries. However, the PISA data cannot offer a full explanation of the mechanisms of differentiation during lower secondary schooling due to its cross-sectional nature. Therefore, Ireland was chosen as a research site as it features a combination of mechanisms of differentiating students. A particular advantage of the Irish case-study data is both its longitudinal nature and combination of quantitative and qualitative information.

The goal of this thesis is to address the issue of equality of opportunity during second level education in modern industrial societies. Do school composition effects vary depending on how a country sorts its students for instruction? Do tracking effects remain when we take account of differences in school composition? What role does access to the curriculum play in explaining differential achievement between different track placements? The literature review chapter discusses macro-level sociological theories of inequality in society including the functionalist, conflict and interaction theory perspectives. Chapter two then turns to a more in-depth examination of the role of education systems in producing inequality in society and discusses the various perspectives that have developed in this area and explores quantifiable explanations of unequal educational opportunities. Following on from this is a discussion of the differentiating function of education during lower secondary schooling, resulting in unequal opportunities, through between-school and within-school differences.

The research design of the project and an outline of the methodology used in this research thesis are sketched out in the third chapter. The third chapter gives a profile of how countries sort their students for instruction, as well as a description of the variables included in the

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analysis. Decisions regarding weighting the data and missing values are also outlined. In addition, chapter three also includes a profile of the schools in the Irish database and the variables employed in the analysis.

There are three substantive chapters, chapters four, five and six. The chapters have a nested hierarchical approach. The first begins by looking at how countries differentiate their students for instruction by exploring differences between highly differentiated, internally differentiated and comprehensive schooling systems in terms of student achievement using the PISA 2006 dataset. The analysis looks at how school composition effects on student achievement vary depending on how a country sorts its students for instruction. The research moves down a rung on the ladder in chapter five and attempts to understand how the utilisation of tracking at the school level affects student achievement together with school composition. Finally chapter six takes into consideration the track placement of students and curricular differentiation. The chapter examines the effect of access to the curriculum on student achievement depending on track placement. Both chapters five and six use the Irish longitudinal case-study database.

The final chapter in this thesis attempts to synthesise the results from the three substantive chapters to give an overall picture of how students are differentiated during lower secondary schooling and the relationship this has with inequality of educational opportunity. It combines all the evidence in order to better understand stratification at each level of schooling, from access to the curriculum to how a country differentiates students for instruction. Furthermore, it collates the evidence to give us a better understanding of the mechanisms of differentiation and addresses the policy implications of these findings.

In this introduction, the research aim is addressed and particular research questions are posed. The main aim and focus of this research is to have a better understanding of the mechanisms by which both between-school and within-school differentiation structure educational inequality.

1.2 Overview

This thesis builds on a number of key areas of educational research in order to explore further how the differentiation of students during lower secondary education is associated with unequal educational opportunity. There are five key areas of research which are helpful in identifying what we already know.

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1.2.1 How stratified a country's educational system is contributes to inequality of educational opportunity

The way an education system organises its students for instruction has the effect of channelling students into differentiated educational paths and further life chances. Educational systems in industrialised countries use organisational mechanisms to sort students into hierarchically arranged categories, even if these mechanisms vary in both their nature and their timing. Research has shown that the degree of stratification within an educational system is influential in explaining cross-national differences in educational inequality. There is evidence from previous studies that in countries with early selection, the correlation between students' socioeconomic background and their performance was stronger (Marks, Cresswell & Ainley, 2006; Hanushek & Woesmann, 2006). Research has shown that students from lower socioeconomic backgrounds are disadvantaged by educational systems that differentiate their students early and rigidly (Horn, 2009).

1.2.2 How stratified a school is contributes to inequality of educational opportunity

Many studies support the hypothesis that early division of pupils into ability groups or tracks increases inequality (Kerckhoff, 1986; Gamoran, 2004; Oakes, Gamoran & Page, 1992). Even when prior differences in ability were considered research has found that students in higher tracks learn more than students in lower tracks (Schafer and Olexa 1971; Alexander and McDill 1976; Alexander, Cook, and McDill, 1978; Rehberg and Rosenthal, 1978). Studies point to a number of mechanisms at work that produce unequal educational opportunity depending on how a school sorts its students for instruction. Tracking can result in unequal opportunity due to both instructional differences and differences in social contexts. The majority of research claims a negative effect of tracking for those in the lower tracks and for students from lower socioeconomic backgrounds (Oakes, 1985; Harlen & Malcolm, 1997; Ireson & Hallam, 2001).

1.2.3 Variation in school socioeconomic composition contributes to inequality of educational opportunity

We also know from previous research that the variation in school socioeconomic composition contributes to inequality in educational opportunity even when we take prior achievement and a students own socioeconomic background into account. The mean socioeconomic composition of a school may be a marker for school-level factors potentially related to educational outcomes (such as educational resources in the form of quality teachers, access to

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the curriculum, disciplinary climate and so on), and these factors may affect all students in the school regardless of individual-level socioeconomic status. Numerous studies have shown that the mean socioeconomic background of a school has an impact on student achievement over and above the effect of individual student's family socioeconomic background (Gamoran, 1992; Willms 1986, 1992). Results from the PISA 2000 data also illustrated that the school average socioeconomic status had a statistically significant impact on student performance (OECD, 2005).

1.2.4 Variation in how academically competitive a school is contributes to inequality in educational opportunity

Although previous research suggests a positive effect of being in a school with a higher concentration of students from higher socioeconomic backgrounds, there is a counterbalance in how academically competitive a school is. Meyer (1970: 63) argued, "the higher the academic worth of the other students in his school, the lower will be the academic worth of any given student; and consequently, the less likely he will desire, or feel encouraged, to go to college." Marsh (1984, 1987) hypothesised that students compare their own academic ability with the academic abilities of their peers and use this social comparison impression as one basis for forming their own academic self-concept. This composition effect occurs when equally able students have lower academic self-concepts if the compare themselves to more able students, and higher academic self-concepts if they compare themselves with less able students. It is not socioeconomic composition of a school alone that constitutes peer effects and the effect of academic competitiveness can lower self-esteem and have a discouraging effect on educational achievement independently of social class status.

1.2.5 Access to the curriculum contributes to inequality in educational achievement

Access to the curriculum may establish trajectories for the achievement of students by determining how much of the intended curriculum is presented and how much students will learn and ultimately achieve at the end of their schooling. Having a deficit in how much of the curriculum is implemented within a class will seriously disadvantage those students by not providing an equal opportunity to learn. Research has shown that access to the curriculum is related both to track placement and the social class composition of the community in which the school is located (Monk & Haller, 1993). Oakes (1985) describes differences in the content provided and the quality of instruction in different tracks. Curricular differentiation can result in disadvantaging those in the lower track as it limits their access to developing

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higher order knowledge and skills (Darling-Hammond & Wise, 1985). Van Houtte (2004) has found that schools in higher social-class communities offer more advanced classes, and Gamoran (1992b) has shown that test scores matter more for access to the honours English curriculum for students from less advantaged backgrounds.

1.3 Research Aim

Previous academic research that examined the issue of educational inequality has generally focussed on the above specific individual mechanisms of producing unequal outcomes. However, there has been little or no consideration for the relative importance of each mechanism of differentiation and its outcomes, both cognitive and social/personal. Although there is some understanding of how these processes work individually, this is not necessarily particularly useful when trying to establish which of these mechanisms of differentiation leads to the most unequal outcomes for students in general and also for particular groups of students.

Differentiation at the education system level is likely to be mediated by school factors, especially the socioeconomic composition of the school. Students are not influenced directly by the 'invisible hand of society,' but rather their experiences and opportunities are shaped through their schooling experiences. Therefore, the main aim and focus of this research is to have a better understanding of the mechanisms by which both between-school and within-school differentiation structure educational inequality within different types of education systems.

Tracking research within education systems has looked at how differentiation practices produce unequal outcomes for different groups of students; however this generally has not taken account of school level differences in terms of school type or school composition. The problem has been highlighted by Lucas and Berends (2002) when they describe how current research which explores the effects of tracking has been individual-level analysis. This leads us to ask significant questions about school level factors, particularly the socioeconomic composition of the school. The effect of school composition on student achievement varies across countries. One reason the school composition effect on student achievement may vary across countries is that countries vary in the way they sort students for instruction during second level education. The effect of school composition on student achievement may also vary depending on how students are sorted for instruction within a school. Furthermore, access to the curriculum will vary depending on how students are sorted for instruction.

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1.4 Research Questions

In response to the gaps in previous studies, this thesis asks questions in terms of student outcomes based on the opportunities presented to children when they enter second level schooling;

> Question 1:
> Does the way a country sorts its students for instruction magnify school composition effects?
>
> Question 2:
> Does the differentiation of students in the form of tracking, school socioeconomic composition and the academic competitive environment of a school result in unequal outcomes for particular groups of students?
>
> Question 3:
> What role does access to the curriculum play in explaining differences in achievement depending on how a school sorts its students for instruction?

It is important to look at whether there is a higher average level of achievement in highly differentiated systems or schools and if, on the other hand, there is a lower average level of achievement in less differentiated systems or schools. However, the main aim of this thesis is to understand differential effects. How are both individual socioeconomic status and school socioeconomic composition related to achievement depending on how students are sorted for instruction within both countries and schools? Who wins and who loses when we look at the effect of how countries and school sort their students for instruction? This raises the difficult question of whether it is favourable to have an overall higher level of achievement despite a high level of inequality among different social groups, or higher levels of equality despite an overall lower general achievement level. A question which is mainly for individuals to decide, but is important to keep in mind when we are discussing inequality in education at during lower secondary schooling. There is an attempt to integrate this question at each level of the research in the substantive chapters and will be addressed in the concluding chapter.

1.5 Limitations of the Research

PISA 2006's major limitation is that due to its cross-sectional design it does not contain a measure of student's prior achievement. Previous research has highlighted the importance of controlling for prior achievement in order to deal with student's selection into a specific school or track. Furthermore, it is also difficult to draw causal inference from any international survey of student achievement that is cross-sectional in its design. It is also a

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challenge for any international survey to standardise the meaning of specific cultural contexts, particularly family background.

Although the PISA 2006 data has its limitations, these limits do not nullify the usefulness of this large-scale cross-national comparative survey of student achievement. Although we can not draw causal inference from the results presented in chapter four, the fact that PISA 2006 is an international comparative study allows the chapter to identify how contextual effects occur by highlighting a different pattern of school composition across different institutional contexts of educational systems.

The Irish case-study schools were selected based on a theoretical sample and therefore the data is not nationally representative. However, it is argued that it is appropriate to explore relationships found with the cruder, broader measures in the PISA data more in depth through the use of these case-study schools. Many influential studies of school effects have employed case-studies of schools, often in conjunction with representative surveys of schools. Some researchers have used a purposive sample of schools designed to capture a wide variety of school characteristics (see, for example, Rutter et al., 1979; Smith and Tomlinson, 1989). Others have selected schools to capture key dimensions hypothesised to influence student experiences and outcomes. In the Louisiana School Effectiveness Study, Teddlie and Stringfield (1993) used survey data to select 18 schools in terms of their effectiveness and socioeconomic composition for longitudinal study (see also earlier work by Brookover et al., 1979). Here, the Irish case-study also uses survey data of all schools in Ireland to select twelve schools for this longitudinal study.

The Irish database is a rich source of both quantitative and qualitative information from both school personnel and students. Originally there were 12 schools in the first year of the study. However, two of these twelve case-study schools discontinued their involvement in the study between first and second year. In order to capture diversity across different school contexts, two additional schools were asked to participate in the second year (and subsequent waves) of the study. These schools were chosen in line with the three dimensions originally used to select the schools for the study of the first year students. However, because these two schools were not involved in the first year of the study some data is missing for these students, including their achievement upon entry to secondary school. Therefore, there are two distinct versions of the database used in the research for this thesis. Chapter five uses information

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from the twelve schools that were participating in the study at the end of lower secondary schooling in order to capture information about their academic self concept. Therefore the models in chapter five do not include prior achievement. Though, where important these models including prior achievement are included in Appendix A and Appendix B. In Chapter six which assesses access to the curriculum, it was important to be able to control for prior ability and therefore, the original twelve schools in the study were used (as a result no variable measured after first year, such as academic self-rating is included in the analysis).

The analysis using multilevel models to estimate the effects of individual and school level variables. At the higher level there are only twelve schools therefore the results have to be interpreted with caution due to the small number of cases. The suppression of one or two cases, particularly the cases of schools that track and have below average achievement (i.e. Dixon St. and Hay St. schools) may change the results from the models. The data was 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.

Students during lower secondary education are experiencing a whole range of psychological and physiological changes which impact on their life experiences (Erikson, 1968; Cotterell, 1996). A complete analysis of these student's experiences would require an analysis that includes their family life, neighbourhood context and peer relations outside of the school. Even though these aspects are missing from both the PISA 2006 and Irish case-study data, this study does have a relevant contribution by focussing on student's experiences of school life which has a crucial role in their lives and longer term implications for adult life.

Furthermore, what may appear to be school composition effects, using either the PISA 2006 data or the Irish Longitudinal data, may simply reflect the aggregate of individual characteristics that are not fully captured by the individual variables in the model. Hauser (1970) maintained that some contextual effects may actually be a statistical artefact; they are the result of underspecified mathematical models due to the absence of other individual variables or may be associated with other variables in the equation that have been imperfectly measured. However, since a completely specified micro model represents only an ideal, the presence of contextual effect terms can serve as a clue to missing individual level explanatory mechanisms.

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Chapter Two: Review of the Literature

When examining the issue of differential educational outcomes we have to understand the context in which it takes place, why and how are educational outcomes unequal? Therefore, the objective of this chapter is to review the literature that explores the issue of educational inequality of opportunity in modern industrial societies. The first section begins by reviewing macro-level sociological theories of inequality in society including the functionalist, conflict and interaction theory perspectives. The second section turns to a more in-depth examination of the role of education systems in producing inequality in society and discusses the various perspectives that have developed in this area. The subsequent section looks at more quantifiable explanations of unequal educational opportunities. The final sections address the differentiating function of education during lower second level schooling, which results in unequal opportunities, through between-school and within-school differences.

2.1 Classic Sociological Theory of Inequality and Education

It is universally accepted by sociologists that all societies are unequal in the sense that people do not have equal power, prestige, wealth or opportunities, though there are varying degrees to which societies are stratified. Social stratification refers to the division of a society into layers of people who have unequal amounts of scarce but desirable resources, unequal life chances and unequal social influence (Beteille, 1985). Inequality in society can be argued to be a necessity of the division of labour in order to increase the general productivity. Social stratification is a result of the heterogeneity of people as there are differences in individual abilities or characteristics, however, it is also argued that social stratification is a system that reproduces advantages of some people over the interests of others.

The following sections start by providing a broad overview of stratification in society and an explanation of the role of education in contributing to societal stratification. There are two major points of view, firstly a conservative thesis which defends social inequality as inevitable as held by functionalist theorists, stemming from Durkheim and Spencer. Secondly, there is a radical anti-thesis which opposes inequality in society by claiming it to be unnecessary and unjust which is represented by conflict theorists. Conflict theory stems from the writings of both Marx and Weber. Both functionalist and conflict theory perspectives reflect truths in society and education systems, however, they only offer a partial account of inequality in society. Interaction theory has arisen as an attempt to examine the reproduction

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of inequality at a micro level in contrast to macro functionalist and conflict theories but tends to neglect higher order effects and focuses too much on intention of the interaction.

2.1.1 Functionalist Theory

Durkheim and Spencer were important early functional sociologists and their ideas were later developed by Davis and Moore, among others. The core of functionalist theory is that social inequality is a necessity of differential rewards for positions based on the scarcity of personnel and functional importance. Advanced complex societies require that technical skills be differentiated, specialised and coordinated into rational goal oriented bureaucracies. Some occupations are more important than others for the functional integration of societies. As there are a limited number with the skills to perform these jobs, functional theory argues that higher wages are required to motivate them; social inequality is functionally necessary as a result.

According to functionalist theory, schooling is the primary institution that can help create a meritocratic society where ability and effort are rewarded rather than privilege. It was theorised that due to an expansion in educational opportunities, an improvement in the situation of disadvantaged groups would result, as upward mobility in the education system would be increased. In this system schools would be the main mechanism of filtering students for particular roles by sorting and selecting the most able students for the highest positions in society.

Durkheim saw the goal of education systems as two-pronged, however, and his interpretation from a functionalist perspective, was that education not only differentiates students to fulfil certain roles but also transmits the morals, discipline and values that are necessary for a united society, to students within the education system.

Evidence shows that numerous assumptions of functionalist theory have held true as schools are playing a more important role in upward mobility than in the past and the expansion of schooling has resulted in some increase in opportunities for children from lower social backgrounds, particularly in primary and lower secondary school completion rates (Raftery & Hout, 1993; Cobalti, 1990; Garnier & Raffalovich, 1984; Hauser & Featherman, 1976). However, as will be discussed in further detail in section 2.2.1, despite a large increase in educational opportunities in the last century, the functional theory argument that this would

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result in a sharp decrease to the disadvantage of lower social background students was overstated.

For meritocracy to result, from a functional perspective, it is often assumed that early cognitive ability is distributed equally between all social classes, especially if we are to argue that there is equality of opportunity. However, the issue of cognitive ability is an extremely contentious one. Some researchers, such as Jensen (1969), argue that heritability of IQ is over 0.7 of the within-race IQ variability, meaning that IQ is largely inherited. Bouchard and McGue, 1981 found that correlations of IQ between parents and offspring rang somewhere between 0.42 and 0.72, the higher figure referring to average parental vs. average offspring IQ. A committee of highly respected researchers convened by the American Psychological Association concluded that by late adolescence, heritability is around .75 (Neisser et al, 1996).

However, there is a growing body of evidence which suggests large environmental effects on IQ, particularly when we look at the 'Flynn Effect' which shows larges gains in IQ over time (Flynn, 1984, 1987). Research has shown that neither IQ nor the genetic inheritance of IQ is the only mechanism accounting for intergenerational income correlations (Bowles & Gintis, 2002). Sorensen and Hallinan (1984) found that intelligence or ability changes when students are given equal access to high-quality instruction. If IQ is inherited but to some degree is also largely open to influence from environmental factors, then it is difficult for functional theorists to argue that cognitive ability is equally distributed throughout society and to further assert that, therefore, everyone has an equal chance of occupying the positions they deserve on merit.

The functionalist model can also be criticised for overstating its assertion that it is ability and effort that are rewarded in education and neither teachers, nor ability tracking, nor the nature of the curriculum have an additional impact on the relative chances of students from lower social backgrounds. However, it does provide a useful perspective by which to consider educational systems when we think about schools preparing students for particular functions in society.

2.1.2 Conflict Theory

Functional theory was dominant in the sociological interpretation of the effects of schooling until the early 1970s when it began to be contested by a new interpretation, although the ideas

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behind this new interpretation have been argued since Marx. Conflict theory views society as being composed of opposing social groups with different aspirations, differential access to life chances and gain different social rewards (Furze & Healy, 1997). Even where an apparent consensus exists this is built on a potential conflict, thus, those with control over resources that are considered to be culturally of value will always have an economic advantage over those who desire access to those resources.

The anti-thesis of functional theory is that schools are not leading to just rewards and a meritocratic society, but are reinforcing and reproducing existing societal inequalities. Conflict theorists argue that schools do not reward intelligence objectively; rather schools use various methods to convince disadvantaged students that they do not have the skills or the ability to obtain higher positions and this reinforces the position of dominant privileged groups. In this way, Connell and White (1989) argue, education systems are as much an authority of social privilege as a transmitter of knowledge. Therefore, from a conflict theory perspective, schools serve to reproduce the existing stratification system in society, maintaining the interests of the dominant privileged groups over others.

2.1.3 Marxist Perspective

Marx argued that stratification was rooted overwhelmingly in capitalist economic production and that unequal class power would always lead to struggle and conflict between classes. Marx saw capitalism as dividing society into owners of the means of production and people who could only sell their labour. This theory of society divided into two classes was the basis of modern stratification theories that developed. Marx pioneered modern studies of class and stratification by showing that even where the 'free-enterprise system' gave individuals opportunities that earlier economies had not, people's life chances were still largely determined by their class position.

Marxist theory supports the conflict paradigm in that it views schools as teaching the compliant, conforming values and attitudes that are needed for a compliant workforce rather than in the cognitive skills they teach. The most well known Marxist interpretation of schooling is Bowles and Gintis's 1976 book "Schooling in Capitalist America" whose central thesis was that schools serve the interests of the capitalist order in modern society. Schools reproduce the values and personality characteristics necessary in a repressive capitalist society. By the early 1990s there was a turn away from social reproduction arguments even though

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inequality remains a central aspect of modern society. More recently there has been a return to some of these ideas and there has been a revival of Marxist educational theory through the writings of Cole and Hill (1995), Rikowski (1996) and others. Furthermore, Bowles and Gintis (2002) argue that the main scientific findings from Schooling in Capitalist America remain plausible and valid in today's analysis of inequality of educational opportunity.

2.1.4 Weberian Perspective

The Weberian perspective takes power into account, where functionalist theory did not, in explaining inequality in society. Although Marx had taken power into account, Weber argued that Marx had looked at power as only one of the ways in which economic stratification was maintained. There are other sources of power other than the ownership of the means of production and power should be seen as an independent dimension of stratification in itself, not merely as a support for economic stratification. Weber recognised the power of status and party to interfere with 'pure' market mechanisms in generating social inequalities but related his writings to those of Marx by viewing education as a process that produces a disciplined labour force that is exploited by the elite.

Furthermore, systems of stratification in modern societies can not be fully explained by wealth and power. Factors involving culture must also be taken into account, both as a source of stratification and as a dimension of inequality in themselves (Bourdieu, 1964). Culture as an explanation of differential educational opportunities is discussed in more detail in section 2.2. Weber argues that education systems reflect the forms of dominance and authority in those societies, therefore a society's educational ideals and institutions serve the ideological functions by maintaining and legitimating the societal structure of dominance and power.

2.1.5 Interaction Theory

Traditionally both functionalist and conflict perspectives tend to take a macro-level view of society and of the role of educational systems in reproducing stratification within society. Interaction theories arose in response to a need for a greater focus on the individual, the individuals' view of the system and their interactions within the educational system.

Ballantine (1997) defines interaction theories as theories that take account of the fact that "individuals sharing a culture are likely to interpret and define many social situations in similar ways because of their similar socialisation, experiences and expectations. Hence,

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common norms evolve to guide behaviour. However, differences also exist based on individuals' experiences, social class and status." This approach is utilised by sociologists, such as Bourdieu, who focus on interactions generally between groups such as peers, teachers etc, and student attitudes within the education system, educational achievement, students' self-concepts and aspirations. Many of these studies focus centrally on the analysis of students themselves and the ways in which different attitudes either promote or hinder educational success (Furlong & Edwards, 1977; Warrington, Younger & William, 2000; Younger & Warrington, 2002).

Critically, interaction theory principally considers only one variable, the individual, and although institutions and structures in society are recognised, these are viewed as social constructions that result from interactions and shared understandings among individuals rather than as macro-level factors that influence individual interactions and relations. Therefore, the approach can be described as often being shallow and only from the perspective of the individual. However, interaction theory explores power relations on the micro-level which offers an important variable to the understanding of how actors within education systems experience differentiation and stratification.

2.1.6 New perspectives

New perspectives have emerged as a reaction to the 'macro' perspectives of functional and conflict theories which have neglected to put an emphasis on interactions within the educational system. Their main argument is that micro level analysis of interactions such as labelling theory[1] and exchange theory[2] is needed for a greater understanding of educational systems. Although the main advocates, including Bernstein and Bourdieu, appear to be offering an alternative perspective, it seems to be a combination of macro and micro approaches rather than a new approach in itself. Bernstein (1974) argues that the structural class and power relations of the system (at the macro level of analysis) and the interaction educational processes of the school at the micro level need to be integrated.

[1] Labelling theory is concerned with how the identity and behaviour of an individual is influenced by how that individual is categorised and described by others in their society. In the case of education this refers to the labelling of students by teachers and there is evidence that students behave well or badly depending on teacher expectations.

[2] Exchange theory is based on the assumption that there are costs and rewards involved in our interactions; reciprocal interactions bind individuals and groups with obligations. (Ballantine, 1997).

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Bourdieu also tries to bridge the gap between the macro level education structure and micro level everyday practices using his concepts of habitus, field and capital. Reflecting previous perspectives, the role of the education field and the school system, according to Bourdieu, is to advance the interests of the dominant classes and this is arguably due to the transmission and learning of cultural values in the education system.

2.1.7 Conclusions

Functional theory views schools as institutions that lead to a meritocratic society where ability and effort are rewarded and valued rather than privilege and status. However, this theory is disputed by conflict theorists who contend that schools preserve the privilege of the dominant classes and reinforce existing societal inequality. Both theories go too far in either direction to explain inequalities, schools are not simply institutions that reward only ability and effort, but nor are they institutions where characteristics such as social background, are only considered and rewarded. There is some truth in both theories and both are useful when considering how schools are involved in reproducing stratification in society. Any theory of inequality in educational opportunity must consider both the idea of schools as rewarding ability and effort but also as sites of conflict where status and privilege have an influence on students' opportunities and this combination has become common in the sociology of education. Consideration also has to be given to micro-level explanations of inequality, which come under the umbrella of interaction theory and attempt to place every day interactions in the explanation of the reproduction of inequality in the education system.

As previously mentioned many sociologists have argued that education is the key variable when researching stratification in society. From this perspective, this thesis will examine the role of stratification within the education system in offering students differentiated educational opportunities. It will combine theories on the macro and micro levels by using hierarchical data which allows the analysis to look at differentiation within schools, between schools and between education systems.

The social theory sections have raised numerous questions, such as how educational systems continue to create differentiated educational outcomes? The theoretical background of the research project incorporates core elements from the various perspectives outlined in the first two sections to answer this question. From a functional perspective schools differentiate students in order to socialise students into particular roles in society and an important function

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of schooling is to transmit the morals and values of a society to these students. However, in supporting a conflict theory perspective, this thesis does not agree with the functionalist assessment that society is meritocratic and that ability and effort are rewarded solely in education without considering the role of the education system, the school as an institution or the curriculum in shaping student outcomes. The thesis will show that intelligence is not rewarded objectively, rather that particular groups of students maintain a distinct advantage over other students due to their position in a differentiated school or schooling system.

Considering these perspectives, the research looks at differentiation during lower second level schooling through the lens of both functionalist and conflict theory perspectives. The research examines the functional role of schools and education systems in sorting students through such practices as differentiating students into distinct school types and tracks. The assumption of functionalist theory, that those with ability are rewarded, is explored by examining the role of differentiation during second level education. By evaluating how the mechanisms of differentiation contribute to differentiated outcomes for particular groups of student the research also tests the assumptions of conflict theory that some groups are unequally advantaged or disadvantaged. The analysis will examine the link between social origins and educational outcomes during lower secondary education in order to address the assertion of conflict theory that schools are reinforcing and reproducing societal inequalities and rewarding students on aspects other than ability. There is not a definitive answer as to which theory is right, as schools have a filtering function somewhat based on ability as envisaged by functionalist theory, but also reward those from the dominant social class group and reinforce inequalities, as put forward by conflict theorists. Therefore, this research aims to use both perspectives to give a more balanced perspective and utilise the strengths of both approaches.

2.2 Inequality of Educational Opportunity at the Education System Level

This chapter has examined general theories of inequality in educational opportunities but how, in practice, do education systems and schools actually offer unequal opportunities? As mentioned at the beginning of the chapter, according to functionalist theory, social inequality is a necessity of differential rewards for positions based on the scarcity of personnel and functional importance. Advanced complex societies require that technical skills be differentiated, specialised and coordinated into rational goal oriented bureaucracies. In this context educational systems can be described as institutions that provide differentiated technical skills and socialisation.

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Many argue that differentiation in the school system has consistently mirrored and or reinforced stratification in society (Bourdieu & Passeron, 1990; Lynch, 1989; Morrow & Torres, 1994). However, education systems could also be the means to realising a more equitable distribution of social status and economic resources. Schools can be viewed as the primary agents in providing for equality of opportunity. The following sections examine theories of equalising educational opportunities and also attempt to offer some explanations of persistent educational inequality. These theories take account of the primary and secondary effect of social background on educational inequalities.

2.2.1 Expansion of the educational system

Throughout the twentieth century there was an expansion of educational systems in all industrial societies. This expansion has enabled a significantly larger proportion of children from different social backgrounds to complete primary and secondary education and has offered more possibilities to attend third level. In almost all industrial societies there is complete enrolment at primary school level and some lower secondary school level (Shavit & Blossfeld, 1993). It was expected that there would be a significant drop in the impact of social background on educational opportunity due to this expansion. Boudon (1974) theorised that if school participation rates increased over time, then inequalities in educational opportunities would decline as children from lower socioeconomic backgrounds would have the opportunity to increase their participation rates by more percentage points than those from higher backgrounds whose rates are already high and therefore constrained by ceiling effects.

However, research (Shavit & Blossfeld, 1993; Featherman & Hauser, 1978) has consistently shown that it is not the case that educational success has equalised for students from differing social backgrounds. Educational opportunities for low-status groups have increased enormously, but very large differences between groups of students in their rates of success at school remain. However, more recent evidence from Breen et al (2009, 2010) questions the *persistent inequality* in education that previous researchers found. They found that social class disadvantages in educational careers have declined in the eight countries (Sweden, the Netherlands, Britain, Germany, France, Italy, Ireland and Poland) they investigated. However, there were differences in the degree of the decline between countries and countries also still vary in the amount and shape of gender disparities in educational attainment. Furthermore, Breen et al. (2010:16) found that "although class and gender inequalities have declined, gender differentials in class inequalities have remained constant…The overall decline in

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gender inequality seems to have had no implications for the pattern of gender differences within classes."

Therefore, according to new evidence increasing educational opportunities may be associated with declines in inequality of educational opportunity but has not resulted in the disappearance of inequalities between individuals of different social origins in their success at school. The gaps may have narrowed significantly, however social class differences remain and the patterns of gender differences within classes also remain consistent. This research has raised the question of why and how educational systems continue to create differentiated educational outcomes which can be examined from various perspectives.

2.2.2 Maximally Maintained Inequality

The theory of Maximally Maintained Inequality (MMI) was put forward by Raftery and Hout (1989) and is characterised as a more radical version of reproduction theory. The theory asserts that the effect of social origin at all levels of education does not change except when the enrolment of advantaged groups is already so high at a given level that further expansion is only feasible by increasing the opportunity of disadvantaged groups to make the transition. In other words, when higher social class students have reached the 'ceiling' of educational enrolment, students from lower socioeconomic backgrounds then have the opportunity to make the transition. Maximally maintained inequality classifies education as a tool by which the dominant social classes restrict access to desirable occupations from the other social classes. It is only when the dominant social class is replaced by the lower classes that it could be expected that the educational system will open up to those in this lower and less privileged group.

2.2.3 Effectively Maintained Inequality

The effectively maintained inequality (EMI) perspective hypothesises that socioeconomically advantaged actors secure for themselves, and their children, some degree of advantage wherever advantages are commonly possible (Lucas, 2001). If a certain level of schooling becomes universally common, the socioeconomically advantaged will maintain an advantage by obtaining a higher level of schooling; on the other hand, if differences in the quality of schooling are common the socioeconomically advantaged will obtain advantage by seeking the best quality of education. This perspective is in agreement with maximally maintained inequality theory, in that as long as a particular level of schooling is not universal, the

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socioeconomically advantaged use their capacities and advantage to secure that level of schooling. However, effectively maintained inequality theory further expands the original theory by claiming that once a level of schooling becomes close to being universal the socioeconomically advantaged use differences in the quality of schooling at that level of education and utilise their advantage to secure the same level of schooling but also secure a better quality education. The central implication of the effectively maintained inequality perspective is that even when there are nearly universal levels of schooling, a student's background will affect differences in kind.

Both effectively maintained inequality and maximally maintained inequality perspectives predict social background effects to be nontrivial at levels of education that are not universal. Furthermore, both effectively maintained inequality and maximally maintained inequality perspectives highlight class competition between families, but maximally maintained inequality suggests competition will be non-existent for any level of education that is universal. In contrast, effectively maintained inequality implies that for levels of education that are universal, competition will occur around the quality of education attained. Effectively maintained inequality implies that background-related inequality will be consequential despite educational expansion.

2.2.4 Institutional perspective

From an institutional perspective the institution in which an individual lives, through socialisation and learning, shapes the very values and desires of that individual. Rules, institutional, structural arrangements and procedures are argued to be far from neutral in their impact; they tend to favour some interests in society over others.

The educational system provides a given set of rules and procedures regulating admission, selection, behaviour and learning. Some theories have pointed out the role of the structure within the educational system in constraining the freedom of individual school choices. Educational institutions have been referred to by Spring (1976) as society's 'sorting machine.' Organisational characteristics of schools have the effect of channelling students into differentiated educational paths and further life chances. In this perspective, the organization, the procedures and the content of the school system are very important factors in the explanation of the unequal distribution of education (Kerckhoff, 1995). Furthermore, as an

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institution in itself, tracking can be seen as preserving the privileges of some students by placing students in distinctly stratified groups.

2.2.5 Conclusions

In modern industrial societies, education is a formal, structured and socialising tool. Schools have a formal and informal role in teaching both a formal curriculum and the 'hidden curriculum.' They also play an important part in reproducing societal norms and culture, reproducing the socioeconomic system and power relations and are selective in filtering students. These various functions do not offer equal opportunities for all students. Reflecting macro theories of inequality, it is proposed that those with a higher socioeconomic background, power and dominant culture benefit most, even when taking cognitive ability into consideration.

The effects of social background in education systems occur in at least two ways. Firstly, they determine who completes a level of education if completion of that level is not nearly universal. Secondly, they determine the kind of education students will receive within levels of education that are nearly universal. Either way, social background advantages appear to work effectively and continuously to secure for the children from higher social backgrounds advantaged locations of their own.

This thesis uses a combination of perspectives such as effectively maintained inequality theory and an institutional perspective to look at differentiation during lower second level schooling. The thesis uses the theory of effectively maintained inequality as a starting point and from this perspective attempts to quantify the difference in the quality of schooling and how this advantages particular groups of students. An institutional perspective looks at these differences in the quality of schooling and curricular differentiation at the school level. A main emphasis throughout the research is an institutional perspective which argues that educational systems and schools shape students short term and longer term experiences. As argued previously, organisational characteristics of education systems and schools have the effect of channelling students into differentiated educational paths and further life chances. It is the view of this thesis that these organisational characteristics of education systems and schools differentiate students upon entry to second level education and that they are far from neutral in their selection or in their impact, which results in unequal educational opportunities for particular groups of students.

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2.3 Inequality of Educational Opportunity at the School Level

> Sanctions, tracking and levelling, economics, power, sorting and selection, and dependency; these school policies generally favour advantaged students (Calabrese, 1989, p187)

As outlined in section 2.1 there are various perspectives and theories that attempt to explain stratification and inequality in society. However, Lucas (1999) argues that all theorists who attempt to describe peoples locations in society have had to deal with the 'school' as an institution structuring inequality. Stub (1975: 137) argues that "in studying social life sociologists rely heavily on factors related to the stratification of society; and education ranks high on the list of stratification variables." Inequality is seen as being constructed through the interplay of, social structures that advantage those with wealth and power, and cultural ideologies that cast privilege as merit and agency that is ultimately self-defeating for those who challenge the dominant structure and cultural norms. Therefore the school plays a fundamental role as one of these social structures and as an institution that transmits cultural ideologies.

2.3.1 Cultural Capital Theory

From a cultural perspective, as agencies of cultural transmission, schools are charged with reproducing in the minds of the young the central ideas, values and cultural emphasis of a society. Cultural capital theory was first advanced by Bourdieu (1964) and contends that children from families with a low level of parental education are likely to lack those abilities normally transmitted by the family that are valued and rewarded by schools. Academic success is determined by being familiar with the cultural world that a school is in. Consequently, selection in schools favours children from those families that already possess dominant cultural advantages. Schools present the culture of the dominant class as merit. Culture acts as a mediator in the reproduction of inequality as schools embody and reward the culture of the advantaged classes as inborn intelligence and as 'educated.' Cultural approaches also help us locate individuals in a social context in which their values, aspirations and associations are formed and in which their choices are given meaning.

One way in which the dominant culture succeeds in offering differentiated opportunities to children is through what Jackson (1968) labelled the 'hidden curriculum.' The hidden

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curriculum can be defined as the norms and values that are implicitly, but effectively, taught in schools.

> "The hidden curriculum is what is taught by school, not by any teacher. However enlightened the staff, however progressive the curriculum, however community-oriented the school, something is coming across to the pupils which need never be spoken…they are picking up an approach to living, and an attitude to learning" (Meighan, 1986: p66).

The 'hidden curriculum,' therefore, clearly advantages students that possess the dominant cultural traits of society. Indeed, conflict theorists would argue that the 'hidden curriculum' is a tool of social control and reproduces the social class of students, with Hargreaves (1978) arguing that working class students learn through the hidden curriculum that they are 'written off' within the educational system.

As mentioned earlier, it was believed that one of the main functions of schooling was to effectively offer equal education opportunities. However, data shows that schooling was not able to fulfil this function adequately. Boudon (1974) argues that it is very difficult to envisage a school system that could erase the inequalities for which differences in family cultural background are responsible. However, Boudon (1974) argues that cultural effects are not the only explanation and that even with other factors, such as social background being equal; people will make different choices due to their position in the stratification system (Breen & Goldthorpe, 1997). Although, it is then argued, that actors are making rational choices in terms of their education, these decisions are not made in isolation as the parameters of their decisions are constrained by their situation within the stratification system. Institutional arrangements offer choices and actions for some groups of students and constrain them for other groups.

The previous discussion of the relationships between cultural values and achievement are best summarised in figure 2.1. Cultural values in education tend to be those valued by those from higher socioeconomic backgrounds. In turn, these dominant cultural values inform both the formal and hidden curriculum as well as a direct effect of socioeconomic status on the curriculum offered. Student achievement is reliant on what is learned through both the formal and informal curriculum and is also directly related to the students' socioeconomic background.

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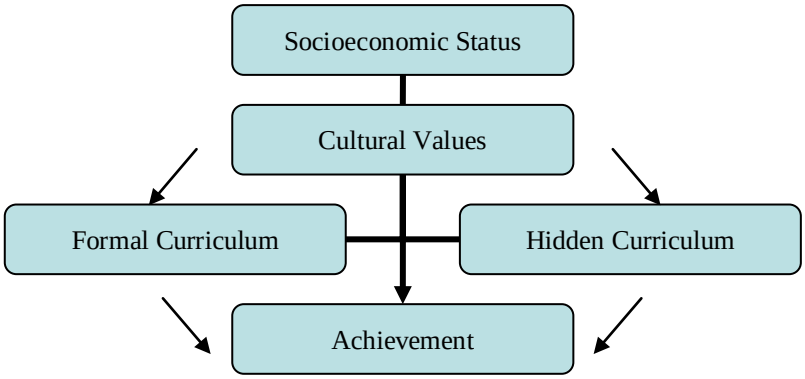
Figure 2.1: Relationship between cultural values, socioeconomic background and academic achievement.



Source: author's own figure

2.3.2 Segregation

> The social composition of the student body is more highly related to achievement, independent of the student's own social background, than is any school factor.- Coleman et al., 1966, p. 325.

A third important factor to consider when we are talking about inequality in education is segregation in terms of both residential segregation and school segregation and also raises the issue of free school choice. Segregation exists in the form of student body composition in schools that results from differential selections processes (Coleman et al., 1981). Among the first to demonstrate school composition effects was Wilson (1959) who illustrated that students in higher socioeconomic composition schools were more likely to intend going to university than otherwise would be expected given their own socioeconomic background and academic performance. With the release of the influential Coleman report (Coleman et al., 1966) the effects of school composition on student achievement began to receive widespread notice. The grouping of high socioeconomic status students in a school appears to create conditions that are associated with higher educational achievement than would be expected from individual socioeconomic status alone. In some cases the correlation between school composition and academic achievement has been stronger than the individual socioeconomic status (OECD, 2004, Sirin, 2005).

In 2000 (p. 167) Teddlie, Stringfield and Reynolds reviewed many international studies and concluded that "there is, in fact, a compositional effect." Some argue that there is a direct compositional affect on student achievement through peer influence and school climate (Wells & Crain, 1997). Kreft (1993:125) concludes that it is probable that "the influence of

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the student body is crucial to the creation and maintenance of a beneficial school climate." Others have shown that it is the correlations between school composition and other school factors that result in differential academic achievement rather than the influence of a direct peer effect. School socioeconomic composition may indirectly affect achievement growth in secondary school by influencing what is available in certain schools in terms of processes and opportunities. In other words, that school-level aggregates of pupil level characteristics may only be proxies for variable that are actually school processes. Lower socioeconomic composition schools more often have less material and fiscal resources (Tate, 1997); have fewer qualified teachers (Berliner, 2001; Darling-Hammond, 2007); have lower teacher expectations of student academic capability (Rumberger & Parlady, 2005); have less positive relationships between teachers and students (OECD, 2005); more co-operation between teachers (Opendakker & Van Damme, 2001); require less homework (Rumberger & Parlady, 2005); have greater discipline problems, which in turn reduce the amount of 'time on task' within the classroom (Kahlenberg, 2001; Thrupp, 1999, Willms, 1999) and also offer a less demanding curriculum (Anyon, 1981; Thrupp, 1999).

However, Thrupp(1995) warns that we cannot be sure of the direction of causal influence between school composition and successful school processes. There may be measurement error (Gray et al., 1990) or the correlation may mean that school processes are causing school composition; school composition is causing successful school processes; or that possibly some third variable is causing both. Therefore Rumberger & Parlady's (2005) assertion that school characteristics such as academic climate and teacher expectations explain all of the estimated effects of socioeconomic composition on student achievement have to be interpreted with caution in terms of causality.

Other studies (Erikson, 1994, Garner & Raudenbush, 1991; Brooks-Gunn, Duncan and Aber 1997) stress the additional effects of social context on educational attainment beyond school composition, such as living in a poor neighbourhood. Colclough & Beck's (1986) work also stresses that there is segregation in the American education system due to economic segregation in the communities that students come from and has the effect of channelling students into particular social class outcomes. The issue of segregation has become essentially an issue of race segregation in educational sociology literature in the United States in contrast to Europe where social class has remained the issue in the discussion of school segregation (Dronkers & Levels, 2007). Cole and Hill (1995) argue that there is a need to re-establish

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social class as opposed to ‘race’ as the central category in further research on educational inequality and this is a central focus in this thesis.

2.3.3. Differentiation between and within schools

Lucas (1999) argues that a theory of stratification lies at the heart of most sociological theory and an understanding of the role of education systems in maintaining stratification in society is essential for any theory of social stratification. A crucial element of this understanding is stratification or differentiation within the education system. Students are offered differential educational opportunities both between and within school which are unequal. These inequalities include resources, working conditions and teacher quality as well as more hidden inequalities in various forms of differentiation. From an institutional perspective there are three core forms of differentiation or stratification within western industrial education systems, differentiation into distinct school types, differentiation into schools with different compositions and within-school stratification in the form of curricular differentiation.

Research to date has focussed on each of these strands without much consideration for interactions between these mechanisms. Furthermore, much research in this area is based on the analysis of single-country case studies. One piece of research in this area that takes account of these various mechanisms of differentiation and their influence on educational opportunity is Colclough & Beck’s (1986:464) paper. Their paper asks “whether the rates of class reproduction vary according to the structure of education, and if so, which educational structures have the most important effects in determining class location?” Colclough & Beck (1986) found that between 56 and 76 percent of male students reproduced their class status when they examined three key determinants of reproduction: public versus private schooling, socioeconomic community of the schools, and curriculum tracking within the schools. The authors claim that tracking is the most important mechanism in the process of reproducing social class status with students from a manual class background being over twice as likely to be placed in a vocational track and those in the vocational track having an 89% chance of being channelled into a manual class destination.

However, there are fundamental flaws in Colclough & Beck’s (1986) analysis of the mechanisms of stratification within education that this thesis wishes to address. Although it appears from their analysis that curriculum assignment, in terms of different tracks, is the key determinant of social class location, the analysis does not include any control for prior ability,

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therefore, logically their analysis is unsurprising; that those in the vocational track are located in manual class destinations. It is difficult to argue that this is solely an effect of curriculum placement but may reflect ability rather than the track the student is in. Another weakness is the division of school types into a dichotomy of private versus public schools which does not reflect the degree of differentiation in other schooling systems outside of the United States. Their analysis lacks cross-national comparability due to its single country analysis.

However, other authors have done a better job by controlling for prior ability. Gamoran (1992d) uses the American dataset "High School and Beyond" to control for prior ability scores when examining tracking effects whilst also controlling for school composition effects. Despite being able to draw more valuable conclusions from that work, the single country analysis does not allow us to explore how these mechanisms operate in different national context. This thesis looks at these mechanisms in a more comprehensive manner by exploring both cross-national differences and further exploring those mechanisms using Irish case-study data which allows us to control for prior ability.

2.4 Inequality of Educational Opportunity at the Individual Level

There are numerous perspectives as to which mechanisms produce unequal outcomes in and around education. Neither conflict theory nor functionalist theory focus on the individual within the education system and only offer macro-level views of social relations within the education system. There are micro-level theories concerning the individual within the education system and this perspective explores individual characteristics and interactions in explaining educational opportunity. There are many aspects at the individual level that are associated with inequality of educational opportunity such as immigrant status, cognitive ability, academic effort, gender, socioeconomic background etc. Here the focus is on cognitive ability and the role of socioeconomic status in the explanation of educational inequality.

2.4.1 Cognitive Ability

Erikson and Jonsson (1996) refer to five main categories of explanations of social differentiation in ability, the first of which is the genetic transmission of ability, or IQ. This explanation of the social differentiation in ability is outlined in the controversial book "The Bell Curve" (Herrstein and Murray, 1994). The authors propose that it is genetically low intelligence that leads to inferior status, and as a result, inequality is 'natural' and almost

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certainly inevitable in an unfettered market. However, this theory has been contested by many researchers including Fischer et al. (1996) and most relevant studies do not provide any evidence for genetic differences between different groups of students accounting for differences in student achievement (Nisbett, 1998).

Fischer et al. (1996) refute the Bell Curves' assertion that inequality is a natural and inevitable consequence of intelligence operating in a free market in their book "Inequality by Design". Instead, they argue, there are other key determents rather than intelligence alone that explain inequality in relation to social classes. They contend that both an individuals' social milieu in terms of their family, neighbourhood, school and community and secondly, social policy, shape the rewards individuals receive for their position in society, significantly influence the positions people have in life and the value attached to those positions. To illustrate their position the authors use an interesting metaphor; "the rewards that contestants gain in the race for success are determined by the rules of the race, not only the personal traits of the racers. Even who wins or loses is determined more by the nutrition and training than by their natural speed." Applying this metaphor to the concept of intelligence means that it is not natural 'intelligence' alone that determines educational outcomes, but schools themselves within education systems that have an effect on outcomes and learning.

Both theories, The Bell Curve and Fisher et al's book Inequality by Design, put forward different sides of the ability debate and both contain truths. Individual differences in intelligence do contribute to differential outcomes; however individual differences in outcomes are also substantially influenced by environmental factors such as family background and education. As Hurn (1993) argues, measures of IQ are good predictors of school attainment; however there is evidence that exposure to better curriculum and better access to education influence IQ measures (Sorensen & Hallinan, 1984). Bowles and Gintis's (2002) research has shown that when we look at inheritability of IQ and intergenerational income correlations, we do not find the kind of results we would expect if the inheritability of IQ were the only mechanism accounting for these income correlations between the generations. Their analysis demonstrates that society is not a simple form of meritocracy where only intelligence determines success at school or in the competition for high status occupations.

> "There is no apparent trend in the estimated importance of cognitive performance as a determinant of earnings, casting some doubt on the widely-held view that the

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> cognitive skill is becoming increasingly important as a determinant of economic success" (Bowles & Gintis, 2002:7).

These effects on occupational status are direct and indirect, direct in that those with a high IQ are likely to be in higher occupational positions regardless of their educational attainment; however there is an indirect effect through education, with those with a high IQ and higher educational levels in high occupational positions.

2.4.2 Socioeconomic background

Another factor that is considered when researching inequalities in education is parental background, in terms of their occupation and education, and there is a vast array of literature that describes the relationship between students' socioeconomic status and their educational achievement (Coleman, 1990; Adams, 1994; Grinion, 1999; Cooper, 1998). This relationship between social background and educational attainment is not a simple one and should be described as a process that develops over time. McPartland & Dill (1982:86) claim that small initial differences in achievement or ability become accentuated over time "producing a cumulative schooling experience that results in a greater dependency between social origins and academic performance with each additional year in the system."

Rothman's (2003) analysis of the Longitudinal Surveys of Australian Youth (LSAY) claims that within the same school, a student from a higher socioeconomic background will achieve better test results than a student from a lower socioeconomic background. Evidence from cross-national surveys such as TIMMS and PISA illustrate that internationally there is a general trend showing a moderately strong association between achievement and socioeconomic status in the three domains of reading, mathematical and scientific literacy. Dornbusch & Ritter (1992) go as far as to claim that family processes are a better predictor of positive achievement and grades than all other variables, which echoes the early work of Coleman (1966) and Jencks (1972). The Coleman Report (1966) found that it was socioeconomic variables, such as the home background and the background of other students in the school, as the most important factors in determining a student's educational achievement. Jencks (1972) came to a similar conclusion as Coleman, that families are the major factor in determining students' achievement.

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Although previous literature shows a clear link between socioeconomic background and a range of educational outcomes we can not assume that the reason why children from low socioeconomic status families under-perform is solely due to their background. The influence of socioeconomic status is complex and intersects with other factors both at the school and individual level.

2.5 Inequalities at Second Level Education

As previously discussed, outcomes will always be unequal due to the diversity of human beings; however, the equality argument has to be placed in the context of equality of opportunities. Sen (1995:8) illustrates the concept of inequality of opportunities by describing it in terms of "two persons holding the same bundle of primary goods can have very different freedoms to pursue their respective conceptions of the good." In educational opportunity terms this could be envisaged as two students with the same cognitive abilities having differentiated educational opportunities due to constraining factors such as their track placement or access to the curriculum, or due to their own conceptions of their curricular or track placement (Boudon 1974, Breen and Goldthorpe 1997).

In this sense, there are three main arguments that relate to equalising educational opportunities, equal starting conditions, equal playing conditions and more radically, equal outcomes. Arguments against equal starting conditions were presented in earlier sections outlining the problems with presuming that society is meritocratic and that everyone has an equal starting condition due to an equal distribution in cognitive ability. Nor does this thesis support the radical thesis of equalising outcomes for everyone regardless of ability or effort. Instead, it is argued that society should 'level the playing field' so that all of those with relevant ability or talent will have equal opportunity to compete for positions. In terms of levelling the playing field in providing equal educational opportunities, Roemer (1998) describes this mechanism as compensating those with inferior bundles of internal goods, such as his innate ability, family background, neighbourhood, etc. with an extra dose of external resources. In other words, before the competition begins the playing field has to be levelled and opportunities equalised.

This thesis views the beginning of second level schooling as an important point to equalise opportunities, by levelling the playing field, as it is at this moment that schooling generally becomes significantly differentiated. The beginning of second level education offers unequal

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opportunities for students through the process of selection in terms of setting, tracking and the selection of students into distinct school types. Although, arguably, there are already unequal outcomes in primary education which are related to factors such as student background, second level education is an important stage to examine differentiation due to its more overt nature and the institutional perspective this thesis takes in examining school structures and educational opportunity. Figure 2.2 below outlines the three core explanations of educational differentiation at the secondary school level.

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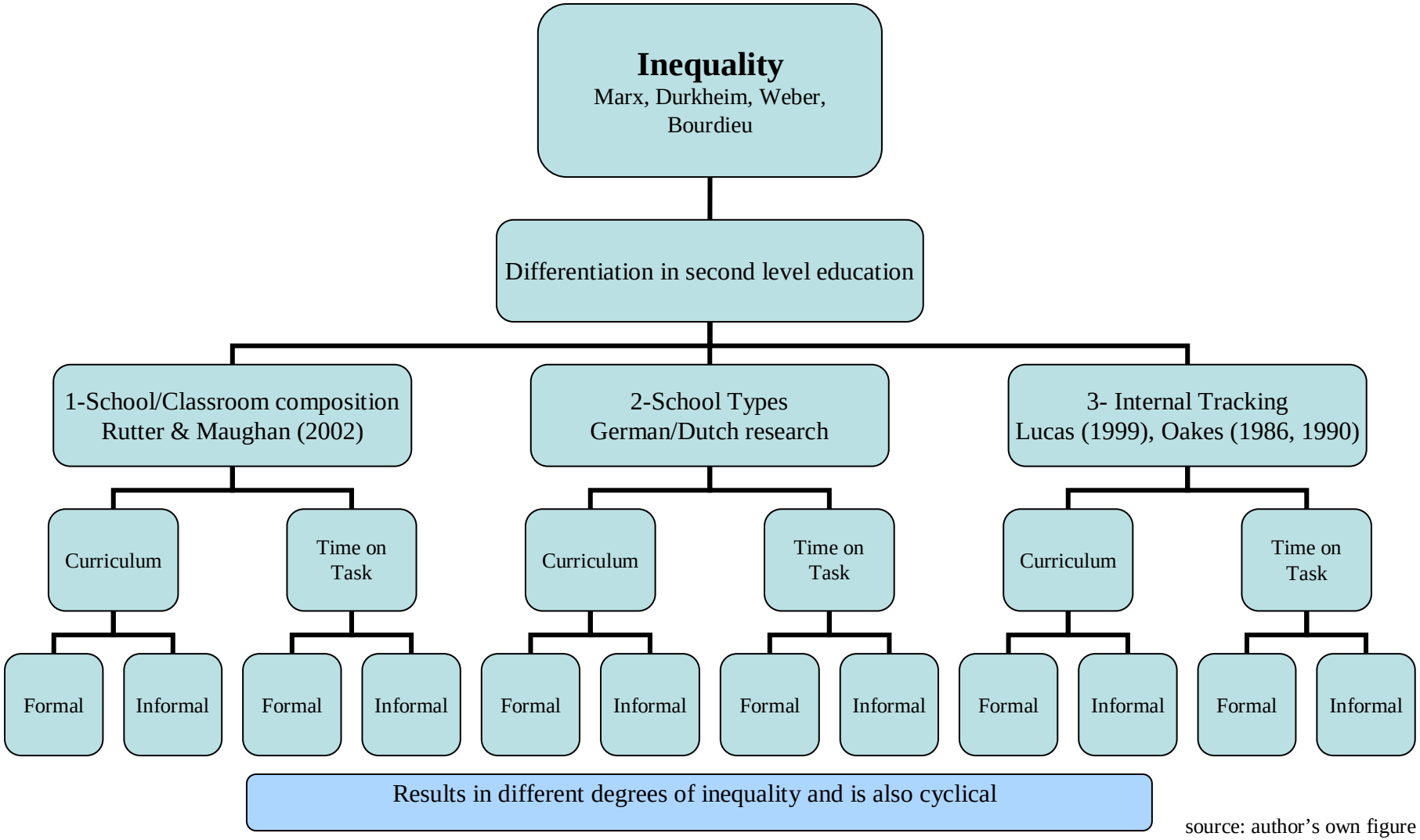
Figure 2.2: Structure of forms of inequality in second level education



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2.5.1 Between-School Differentiation (School/Classrooms composition)

The first school level factor is school or classroom composition, which is, the composition of the school or classroom in terms of whether there is a student population of disadvantaged students, minority students, students with learning difficulties etc. It is clear from previous research that there is a relationship between the composition of the school, and/or the classroom, and differentiated student opportunities (see section 2.3.2 for a more detailed discussion). A feature of all schools is the difficulty in getting students to work steadily and consistently at tasks in the classroom. Some researchers (such as Berliner, 1979) claim that as much as 50 percent of a teacher's time and energy is spent managing the classroom situation in terms of motivating students and disciplining disruptive students. Therefore, it can be said that the composition of the classroom has an important role to play in what is called 'time on task.' If a student is in a class where there is a lot of disruption clearly time on task is limited. Another example would be if there is a lot of repetition in instruction. Furthermore, there are obvious links between the composition of the class or school and the type of curriculum taught in the school, for example in a school that is mainly made up of students from a high social background the school may offer more academic subjects or at a higher academic level.

Hurn (1993) argues that because students' aspirations are shaped by their peers it is important to consider the school composition; lower class students may not have successful educational outcomes if they are attending schools with a high concentration of other low social class students. According to recent literature there are two effects that are at work. Large numbers of high status students concentrated together will raise aspirations and achievement and similarly, large numbers of low status pupils tends to have the opposite effect. However, there is another consideration in that students may suffer due to the competitive nature of being concentrated in a high status group of students. Meyer (1970: 63) argues, "the higher the academic worth of the other students in his school, the lower will be the academic worth of any given student; and consequently, the less likely he will desire, or feel encouraged, to go to college." Therefore, it is also theorised that attending a school with other high-achieving students may lower self-esteem and have a discouraging effect on educational aspirations and educational achievement.

In policy terms, McPartland & McDill (1982) conclude that student body composition has an important role in school effectiveness and suggests that policy should concentrate on this aspect in order to raise achievement and offer more equal opportunities.

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2.5.2 Between-school differentiation (School types)

The second school level factor to be considered is between-school differentiation in the form of distinct school types. This is a feature of many educational systems where there are varying 'types' of school; however it is stronger in some countries rather than others particularly in continental Europe. Research in this area has a tendency to examine the cases of Germany and the Netherlands where there are stronger more identifiable school types. Students are mainly differentiated at the school level into distinct school types rather than within schools as in the case for setting and tracking which operates at the within-school level. Attending one school or another has large consequences on a student's exposure to the curriculum and the time spent on task as the schools generally structure both their curriculum and time on task in different ways. In a highly stratified education system, the programme offerings are differentiated between the different types of secondary school.

Predictably, research that has looked at the degree to which countries have between-school differentiation has found greater inequality in educational opportunity for those in countries with highly differentiated education. Where educational paths remain more open and for longer, there is less differentiated achievement and greater access to college.

2.5.3 Within-School differentiation (Tracking/Setting)

As educational sociologists have attempted to explain the causes of differential academic achievement there has been a rising interest in identifying the internal structures operating within schools that may facilitate success for some students or reinforce failure in others (Ansalone, 2003). A main emphasis of this research has been internal differentiation within schools which is often referred to as 'tracking' or 'streaming.' Early studies in the area of tracking describe a rigid tracking system with general observable distinctions between general, vocational and academic education tracks within a general education system and this research has typically emanated from the United States (Gamoran & Berends, 1987; Oakes, Gamoran & Page, 1992). However, recent literature has begun to looking at more subtle and hidden ways by which students are differentiated within schools. Many education systems have moved away from structured 'tracking,' however in-school stratification remains through within-subject curriculum differentiation.

Tracking and setting are thought of as mechanisms of structuring inequality both through the curriculum and time on task. There are instructional differences by which students in the

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higher groups learn at a faster pace which in turn exposes them to more of the curriculum and therefore advantaging them over those in the lower groups. Tracking can contribute to unequal opportunities as the social contexts in different tracks vary. There are different norms and students may be socialised differently. Lastly, tracks may be seen as institutionalised entities in wider society. There is a common understanding of what it means to be in a low or high track and therefore people are treated differently on the basis of their track placement.

Studies have also shown a link between socioeconomic disadvantage and tracking. Previous studies show that characteristically, schools with a large intake of students from a low socioeconomic background are most likely to use tracking. Furthermore, it has been shown that students from lower socioeconomic backgrounds are more likely than their peers to be assigned to the lower tracks within these schools. Testing has been a primary method of placing students in tracks but this method can be detrimental to high educational standards and demanding curriculum, and it increases social stratification (Darling-Hammond, 1994). Internationally there has been considerable academic debate about the impact of ability grouping on a range of student outcomes (Oakes, 1985; Harlen & Malcolm, 1997; Ireson & Hallam, 2001) with the majority of the research claiming a negative effect of ability grouping on those in the lower tracks.

Research has shown that highly differentiated educational systems result in students' outcomes being more socially stratified (Ready, Lee & Welner, 2004). However, little research has looked at the links between school level differentiation and within-school differentiation. Most authors stress the importance of school composition, school type and tracking in creating and perpetuating social stratification, however there is little understanding of how these mechanisms work in practice and interact with each other.

2.5.4 Formal and Informal Structures

Related to all three of these systems of differentiating students are formal and informal structures. The structures are rules and norms within the school system which are on both a formal and informal level (Ballantine, 1997). There are links between differentiation and outcomes due to the advantage that some have in understanding the informal rules in the educational system; for example those students (or their parents) from higher socioeconomic backgrounds realise the importance of being placed in the higher ability class or, of choosing one school over another. Middle-class parents appear to be proactive both as individuals and

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as a class, maintaining differentiation structures in general and securing for their children the best positions within these differentiated structures (e.g. track placement or enrolment in certain school types). This is well documented in the case of socioeconomic advantage and track placement (Wells and Oakes, 1996; Wells and Serna, 1996). Socioeconomically advantaged parents can secure advantaged places for their children, not only because they may use a wide array of resources in a given instance, but perhaps more importantly, they have personal experiences that make it more likely they will be able to identify the critical instance when they should bring those resources to bear. Ball's research (2003) found this to be the case as middle class parents had a greater knowledge about potential schools for their children that included not only the schools reputation but also the schools composition in terms of its social mix and also its educational practices such as ability grouping which may favour their children.

2.5.5 Outcomes

The previous sections have described the three main explanations for differentiated outcomes between students depending on school organisation, composition and curricular differentiation. There are two distinct outcomes resulting from this differentiation that need to be considered. The first are cognitive outcomes, generally measured in terms of qualifications or student achievement and are most often described in the literature. More scarce in the literature are social/personal outcomes, but can be seen as just as important, especially in terms of the success of the 'hidden curriculum' as mentioned in earlier. Primarily academic achievement will be considered in this thesis, though social/personal outcomes will also be addressed in chapter five.

This work falls into the school effectiveness research tradition of refuting the "schools do not make a difference" interpretation attributed to the research outcomes presented by Jencks et al (1972). Jencks' (1972) argument was that schools played a minor role in long term outcomes in terms of educational achievement and occupational inequality, and argued that social/personal outcomes are a more important factor to look at in these circumstances. However, this thesis finds common ground with Jencks' (1972) assessment that it is important to examine within school relationships and experiences and to evaluate schools in terms of the effects they have on students and teachers at the time, or in other words to examine school life as an end in itself. This thesis hypothesises that the differences in both achievement and social/personal outcomes at the end of lower secondary schooling are likely to impact on

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further life chances such as occupational mobility, though it is not within the scope of this thesis to examine later life outcomes. Therefore, this thesis explores differences in student outcomes at the end of lower secondary schooling at the time these students are at school, but with a belief that the differences between and within schools impact students lives later in their schooling and occupational careers as well as at the current time. In doing so, this thesis aims to identify mechanisms that are leading to differentiated educational opportunity, particularly for students from lower socioeconomic backgrounds in keeping with school effectiveness research (Teddlie & Reynolds, 2001).

2.6 Summary

The previous chapter outlined the research aim and the research questions this thesis will attempt to address. This chapter has summarised the literature in the area of educational stratification and differentiation during the second level of schooling in order to situate the research questions in substantive theory. Theory can be observed on four distinct levels, societal, educational systems, school level and at the individual level. It is not the aim of this thesis to examine stratification on the societal level, but to look at stratification between educational systems, between schools and within schools and its effect on student outcomes.

Having now presented the background to the goals of the research, posed the main research questions, and reviewed the literature the next chapter turns to how the research was designed to ensure an exploration of the issues raised and answer the research questions posed. The chapter will also outline the data and variables used in the analysis.

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Chapter Three: Research Design and Data

3.1 How to Answer the Research Questions

This study uses a combination of both institutional and culture perspectives in looking at the mechanisms that structure inequality in second level schools, particularly as it is argued that culture is not a master theory but is better combined with institutional explanations. Culture can not be explored by one methodology alone, but is best approached through triangulation and combining different methods (Ross, 1997). Social scientists have come to abandon the choice between qualitative and quantitative data; they are concerned rather with a combination of both which makes use of the most valuable features of each. Single observations provide only a limited view on the complexity of human behaviour and of situations in which human beings interact. In the use of triangulation in this case, this thesis draws on both normative and interpretive techniques in combination.

Triangular techniques are suitable when a more holistic view of educational outcomes is sought and can be a useful technique where a researcher is engaged in case-studies where there is a particular example of complex phenomena. Triangulation is sometimes thought of as using qualitative techniques to validate the empirical findings, however, it is also a useful tool for deepening understanding about a certain phenomenon. This is particularly useful for this case as the aim is to having a deeper understanding of the mechanisms at work that produce inequality in schools. As Harker & Tymms (2004:197) argue, "if we are serious about the study of school effectiveness, there is a clear need for multiple approaches, involving qualitative and quantitative methods that look deeper." There are numerous triangulation methods and in this case the analysis makes use of methodological triangulation, which is the use of different methods on the same object of study, and also combined levels of triangulation which look at the individual and the organisation, in this case the school.

Phillips and Chen (2004) recognise the shortcomings of previous educational stratification research in that most research presents average outcomes for individual issues, such as the effect of tracking on educational outcomes, without identifying how stratification systems are working more generally and interplaying with each other. Simply examining between-school differences in terms of differentiated outcomes also obscures considerable variation within each type of school. They suggest that future research should employ a more holistic 'case-

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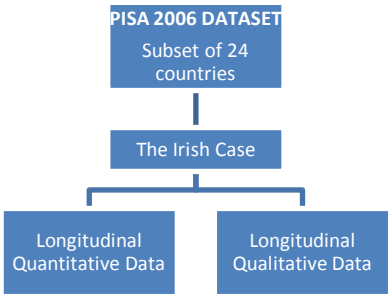
based' approach to studying school inequality as it would be more successful at identifying the worst overall educational experience and which would also be most useful in policy terms.

Hurn (1993) outlined the problems with school effects research and concludes that student ability, parental background and other factors have a powerful effect on student performance, independent of the characteristics of the school they attend. A combined approach that looks at not only the school level effects but also individual and composition effects is therefore valuable. Furthermore, Hurn (1993) stated that the larger the study, the more difficult it is to do justice to the subtlety and complexity of schooling and its effects on students. Hurn (1993) went further and claimed that case studies of individual schools over an extended time period can give a better insight to the mechanisms that are taking place at an individual and school level. Of course there are arguments both for and against small-scale studies. On the one hand, a smaller study can be more extensive and give us a greater understanding of mechanisms taking place in a way that a large scale survey of thousands of schools with cruder measures can not. However, it is far more difficult to generalise to the wider population in smaller-scale studies. Case studies do more than generating theoretical ideas. They can test theoretical propositions as well, and they can offer persuasive causal explanations. Theoretical frameworks, informed by previous thinking and research, provide a background against which case studies yield more telling results.

3.2 Design of the Research Project

As mentioned earlier the purpose of this research project is to have a greater understanding of the mechanisms of differentiation during lower second level schooling and the research proposes to use two sources of data in order to examine these relationships. The study utilises the benefits of both a large scale survey and also a smaller longitudinal case-study of schools within a research site, the latter triangulating both a qualitative case-study approach and quantitative analysis.

Figure 3.1: Structure of Cases and Data



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The Programme for International Student Assessment (PISA) is an internationally standardised assessment that was jointly developed by participating countries and administered to 15-year old in schools. The survey was implemented in 57 countries in 2006, assessing approximately 300,000 students. Tests are typically administered to between 4,500 and 10,000 students in each participating country. PISA assesses the knowledge and skills that students who are near the end of compulsory education have acquired. The areas covered by the survey include reading, mathematical and scientific literacy. The survey also includes information from school principals that includes topics such as school demographics, school policies in terms of selection, assessment and grouping of students, school climate and funding sources. Therefore, it is a particularly useful and extensive database incorporating individual and school level information. The PISA database of student and principal data as well as the codebooks and questionnaires are freely available to researchers and can be downloaded without restraint from the OECD website (www.pisa.oecd.org).

Firstly, a subset of countries from the Programme for International Student Assessment (PISA) database is used to look at overall between-school and within-school differences. The analysis compares highly differentiated educational systems, characterised by distinct school types, with those that are comprehensive, and those that although they do not differentiate their students into distinct school types, have a high level of within school differentiation. Furthermore, the analysis does not just look at the impact of institutional arrangements at the country level on individual students, but takes account of the school level. Chapter four examines if the way a country sorts its students for instruction magnifies school composition effects on student achievement.

The PISA data cannot offer a full explanation of the mechanisms of both tracking and school composition in producing unequal outcomes, particularly due to its cross sectional design. Therefore a database of case-study schools in Ireland is a second source of information to look more in-depth at the issues raised in the PISA data analysis. The Irish data is a unique source of information on how differentiation processes work and the data also display the necessary characteristics to look at these differentiation processes. A particular advantage of this data is its longitudinal nature and therefore the ability to assess student outcomes with baseline information from their entry to a differentiated second level system. Why is Ireland a good research site in this case?

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At around the age of 12, young people in Ireland make the transition from primary to secondary school. There is a considerable degree of school choice exercised by students and their parents in the transition to secondary education; around half of the cohort does not attend their nearest or most accessible school. There are three school sectors at secondary level: voluntary secondary schools, vocational schools and community/comprehensive schools. The sectors differ in their organisational structures but are included within the same curriculum and assessment framework. However, important differences are evident in their student intake, with vocational schools having a more working-class and lower ability intake than the other sectors. Furthermore, single-sex schooling remains relatively prevalent within the Irish context, with 36 per cent of secondary students attending single-sex schools.

From a comparative perspective, the Irish educational system is highly standardised in terms of both curriculum and assessment. At lower secondary level, a three-year junior cycle programme culminates in students' first State examination, the Junior Certificate exam. Although there are three sectors in the Irish educational system, these do not offer distinct tracks, as in the Dutch or German case, and as mentioned previously all schools are included in the same curriculum and assessment framework. However, the ways in which the curriculum is offered within schools is differentiated. Approximately 30% of secondary schools use traditional track placements and assign student based on entrance examinations. In all schools, regardless of whether they employ rigid tracking, subjects can be taken at one of three levels with foundation, ordinary and honours levels in Irish, English and Mathematics, and ordinary and honours levels in all other subjects which can be described as 'setting'. Junior Certificate performance influences student access to particular subjects and subject levels at upper secondary level as well as being associated with employment chances for those who enter the labour market directly. As has just been outlined, the Irish educational systems characterises the three ways through which students can receive differentiated education, through different school types (those that place students into distinct tracks within the school and those that do not), through within school curricular differentiation (setting) and through school composition (socioeconomic background, gender etc. due to free school choice) which makes it a unique case to analyse structural differentiation in any modern industrial education system.

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3.3 Definition of Tracking

There is often a level of confusion surrounding the terms 'tracking' and 'ability grouping' in terms of their definitions and what types of groupings they refer to. In this thesis I use 'tracking' to illustrate where students are divided into programmatic divisions at the country level and also for divisions of pupils into groups for all academic subjects at the school level in keeping with Gamoran's (1992c) definitions. Therefore, in highly differentiated educational systems within the PISA 2006 data students are 'tracked' due to their division into distinct school types which offer differential curricular programmes. In the Irish case a comparison is made between schools that rigidly track their students, i.e. where students are divided into groups and take all their subjects together as a track. 'Ability grouping' refers to divisions among students for particular subjects and in this case is referred to as 'setting'. This comes into play when discussing what levels students sit their Junior Certificate examination as students are placed in 'sets' for the particular subjects across all schools (tracked and non-tracked). In tracked schools generally students within a track are also within the same 'set' for their core subjects. In non-tracked schools which employ mixed base classes students do not take their subjects together in a rigid form of distinct groups based on perceived ability, however they are placed within a 'set' during the Junior Cycle for their core subjects. This generally takes place after the first year of the three year Junior Cycle programme.

3.4 Profile of the Countries from PISA 2006

Twenty-four countries were selected from the full dataset to be included in this analysis. Countries that represent a wide range of comparable societies were chosen. The countries selected are, in alphabetical order, Australia, Austria, Belgium, the Czech Republic, Canada, Denmark, Finland, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, the United Kingdom, the United States. Latin American or Asian countries were not selected, because of their different stages of social and economic development and their different educational traditions. Countries from the former Soviet Union (e.g., Russia or Baltic states) were also not included because their societies and their educational systems underwent major transformations after the breakdown of the Soviet communist regime in 1990s and is not the focus of the research presented here. The selection of countries reflects 'first-world' countries that have a similar historical and educational background in order to avoid any lack of equivalence of students and schools. Unfortunately in France, no data was collected on school-level variables from school principals are therefore France could not be included in the final dataset.

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3.4.1 PISA 2006 Variables

To test the hypotheses about how school factors mediate education system effects on student performance, the analysis uses variables at three levels (country, school and student).

Education system-level variables:

Differentiation of the Education System: This variable consists of two dummy variables; 'highly differentiated' and 'comprehensive' in comparison to 'internally differentiated' (see Table 3.1). To classify countries into these categories a number of characteristics of the countries was considered alongside documents from PISA, the OECD and Eurydice websites. In systems that are classified as 'comprehensive' students attend comprehensive schools, where access to post-secondary education is not formally predetermined by the choice of one track and where less than 65% of the schools within the country use ability grouping for some or all subjects within the school. Therefore, these systems can be characterised as not having distinct school types, offering a general curriculum and have low levels of within school ability grouping. 'Highly differentiated' systems, in contrast, divide students into separate schools and this division of students into distinct school types has taken place before the PISA assessment at age 15. These systems may or may not have high levels of within school ability grouping in addition to distinct school types. The middle category of 'internally differentiated' is defined as countries that do not have distinct school types earlier than the age of the PISA 2006 assessment (15) but either have distinct school types at age 15 and/or have high levels of within-school ability grouping for all or some subjects.

This division of countries differs somewhat from previous studies such as Shavit and Muller (1998) who also categorised educational systems into three groups in terms of their levels of differentiation. In their classification Australia, Sweden, the United Kingdom, and the United States have low-differentiated (or comprehensive) systems. This chapter classifies these countries together as being 'internally differentiated' as they all had very high levels of ability grouping for some or all subjects in schools within each country (see table 3.1). The classification of countries in this paper is closer to that of Buchmann & Dalton (2002) who classified Austria, Germany & Switzerland with the highest level of differentiation, the same as this paper. Norway, Spain and the United States were classified with the lowest level, somewhat similar in this case, with the exception of the United States. Although the classification of differentiation of educational systems indicated in this analysis is slightly different, the classification is fairly consistent with previous studies. Its inconsistency arises

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from the quest to explore systems that have high levels of within school ability grouping as distinct from both comprehensive schooling systems and highly differentiated systems.

Control variables at the education system level:

A number of controls were included at the country level, these included whether the country had a central exit exam at the end of secondary schooling (Fuchs & Woesmann, 2007), the percentage of the country's GDP spent on education and the number of years of compulsory education within each country. There were also aggregate variables from individual and school information. Two variables were aggregated from student level information; socioeconomic composition and the percentage of immigrant students. Three variables were aggregated from school level information; the percentage of private government independent schools, the percentage of private government dependent schools and the level of school competition.

Table 3.1: Degree of Educational Differentiation in each Country

Country	Differentiation	Separate Schools before age 15	Age of first selection	No of school types or distinct educational programmes available at age 15	% of schools in country not using any ability grouping	% of schools in country using ability grouping for some subjects	% of schools in country using ability grouping for all subjects
Norway	Comprehensive	No	16	1	55.7%	40.9%	3.4%
Finland	Comprehensive	No	16	1	51%	46.5%	2.6%
Poland	Comprehensive	No	16	1	41.6%	53.4%	5%
Spain	Comprehensive	No	16	1	33.7%	53.2%	13.1%
Ireland	Internally differentiated	No	15	4	1.8%	90.9%	7.3%
Portugal	Internally differentiated	No	15	3	43.9%	39.9%	16.2%
Greece	Internally differentiated	No	15	2	52.1%	47.4%	.5%
UK	Internally differentiated	No	16	1	1.4%	89.4%	9.2%
Australia	Internally differentiated	No	16	1	5.6%	88.5%	5.9%
US	Internally differentiated	No	16	1	12.7%	80.1%	7.2%
Canada	Internally differentiated	No	16	1	14%	72.7%	13.4%
Denmark	Internally differentiated	No	16	1	15.2%	78.7%	6.2%
Sweden	Internally differentiated	No	16	1	25.9%	67.5%	6.6%
Austria	Highly differentiated	Yes	10	4	48.7%	44.7%	6.5%
Germany	Highly differentiated	Yes	10	4	52.2%	38.1%	9.7%
Belgium	Highly differentiated	Yes	12	4	52.8%	26%	21.2%
Slovakia	Highly differentiated	Yes	11	5	29.1%	55.6%	15.3%
Hungary	Highly differentiated	Yes	11	3	31.7%	65.1%	3.2%
Czech Republic	Highly differentiated	Yes	11	5	32.2%	59.2%	8.6%
Netherlands	Highly differentiated	Yes	12	4	19.5%	31.4%	49.2%
Switzerland	Highly differentiated	Yes	12	4	15.9%	45.7%	38.4%
Luxembourg	Highly differentiated	Yes	13	4	22.6%	35.5%	41.9%
Slovenia	Highly differentiated	Yes	14	3	29.1%	55.6%	15.3%
Italy	Highly differentiated	Yes	14	3	46.7%	32.9%	20.4%

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School level variables:

School mean SES: to indicate the overall socioeconomic status of the school, the average of family SES among students attending the same school is calculated.

Within school ability grouping: Principals in the PISA 2006 survey were asked to indicate the school's policy for organising instruction for students with different abilities. Schools were coded as grouping students by ability into different classes for all subjects, for some subjects or for none of their subjects. Subsequently there are two dummies included in the analysis, those who group students for all subjects and those who do not group students by ability for any subjects; the omitted category for comparison is schools that group students by ability for some subjects.

Educational resources: An index of the quality of schools' educational resources which was computed on the basis of seven items measuring the school principal's perceptions of potential factors hindering instruction at school. For the wording of these items consult table 16.54 (p340) of the PISA 2006 Technical Report (OECD, 2009).

Student-teacher ratio: The student-teacher ratio was obtained by dividing the school size by the total number of teachers. The number of part-time teachers was weighted by 0.5 and the number of full-time teachers by 1.0.

Teacher shortage: The Index on teacher shortage was derived from four items measuring the school principal's perceptions of potential factors hindering instruction at school. Similar items were used in PISA 2000 and 2003.

School type: The analysis distinguishes between private independent schools and private government-dependent schools in comparison to public schools. Public schools are controlled and managed by a public education authority or agency, government-dependent private schools are controlled by a non-government organisation, or with a governing board not selected by a government agency, and receive more than 50% of their core funding from government agencies. Lastly, government-independent private schools are controlled by a non-government organisation, or with a governing board not selected by a government agency, and receive less than 50% of their core funding from government agencies.

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School competition: is a dummy variable created from the Principal question which asks how much schooling is available to students in their location, with 1 being at least one other school and 0 being no other schools.

School selectivity: School principals were asked about admittance policies at their school and how selective they were in terms of students' academic record and the recommendation of feeder schools. An index of school selectivity was computed and from this a dummy was created for schools that said at least one of these factors is a pre-requisite for student admittance (1) or these factors were not considered, only one factor was considered or given high priority (0).

School-level controls: Included in the analysis is school size (the PISA 2006 index of school size contains the total enrolment at school based on the enrolment data provided by the school principal), the location of the school, and the percentage of immigrant students attending the school as a percentage of immigrant students at the country level.

Individual-level variables

Score on Reading, Mathematics and Science test: To measure student's educational performance reading, mathematical and scientific literacy were used as a combined dependent variable. Reading literacy is defined in PISA as 'the ability to understand, use and reflect on written texts in order to achieve one's goals, to develop one's knowledge and potential, and to participate effectively in society' (OECD, 2006). In order to measure the student's reading proficiency, different tasks have been designed, which can be organised into five levels of increasing proficiency. Furthermore, the scales represent three major aspects or purposes of reading, which are: retrieving information from a variety of reading materials, interpreting what is read and reflecting upon and evaluating what is read. Mathematical literacy is defined as: 'the capacity to identify, understand the role that mathematics plays in the world, to make well-founded judgements and to use and engage with mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen.' Mathematical literacy could be divided into four concepts, i.e. quantity, space and shape, change and relationships and uncertainty (OECD, 2006). An individual's scientific knowledge and use of that knowledge to identify questions, to acquire new knowledge, to explain scientific phenomena, and to draw evidence based conclusions about science-related issues, understanding of the characteristic features of science as a form of human knowledge and

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enquiry, awareness of how science and technology shape our material, intellectual, and cultural environments, and willingness to engage in science-related issues, and with the ideas of science, as a reflective citizen.

For reading, math and science, the observed item responses have been used to construct five plausible values for each student by means of Item Response Modelling. Plausible values are not test scores, but random numbers drawn from a distribution of scores that could be reasonably assigned to each individual (OECD, 2006). They provide an unbiased estimate of the answers on all reading, mathematics and science literacy items. The mean score on the five plausible values for each indicator was calculated and then combined to create the dependent variable 'score[3].'

Academic Location: Academic location comprises of two components, grade and school programme due to the importance of the relationship these two variables have with student achievement (for a more detailed discussion on the relationships between grade and achievement, and school programme and achievement see Marks, Creswell and Ainley, 2006:113). Grade was scored relative to the modal grade of the country meaning that if students were in the modal grade, they were assigned a score of zero, if one grade above a score of one and so on. Information on school programme was obtained from the PISA student questionnaire which asked students what type of programme they were in at school. The resulting sheaf variable, which is a combination of these two factors, is continuous, assigning scores to students on the basis of the effects of grade and a categorical measure of school programme on a combined measure of student achievement. The variable is standardised to a mean of 0 and a standard deviation of 1. Effects of 'academic location' should be interpreted as the average change in 'score' for one standard deviation difference in academic location.

Student Socioeconomic background: This is measured by a composite variable comprising of home possessions, the higher parental occupation and the higher parental education expressed as years of schooling. This variable is named ESCS within the PISA 2006 dataset (see the PISA 2006 Technical Report (OECD, 2009) for further details).

[3] In PISA 2006, in the United States an error in printing the test booklets, in which the pagination was changed and instructions for some reading items directed students to the wrong page, may have affected student performance. Reading performance data for the United States are therefore excluded from the PISA database. The variable 'score' for students in the US is their combined average of Maths and Science.

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Other individual variables: The analysis includes gender and 5 categories of immigrant status & language at home as controls in the models. Differences in achievement between non-native students and native students have been illustrated in previous work using PISA datasets (Levels & Dronkers, 2008; Levels, Dronkers & Kraaykamp, 2008). Therefore, immigrant status and language at home are entered as a series of dummies in comparison to the omitted category of native whose language at home is the same as the country or of the PISA 2006 assessment. Unfortunately family structure could not be controlled for in the models as this information was not collected as it had been in previous PISA assessments.

Missing values

Missing values were imputed in order to include the maximum number of cases in the analysis. Since the missing rates were not high for most of the variables (less than 5%), a simple imputation approach was used to circumvent the problem of missing data. Predictors at the individual and school level were imputed using a dummy variable adjustment (Cohen & Cohen, 1985). As a first step of the imputation a missing dummy variable was created for all variables with missing values regardless of whether a variable was continuous, categorical or dichotomous. A missing dummy was set to 1 if the data were missing on that variable. Secondly, missing values were imputed for continuous variables. Missing values were replaced by the weighted school average of the variable. In the case where all the data on the respective variable were missing in one school the weighted country mean was imputed. When a missing value was replaced by the country or school mean, the weights were proportional to the sampling probability. Categorical variables were re-coded into a set of dummy variables. For each category or for combined categories, a dummy variable was created with the value of 1 if the observation belongs to the respective category and 0 otherwise. Missing values in dummy and dichotomous variables were replaced by 0.

Method and Weighting

To explore macro-level system effects, school effects and individual effects on student achievement, this analysis employs three-level hierarchical linear models (HLM) using a full maximum likelihood procedure. This approach is used as it is able to take into account the specific data structure of the PISA 2006 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 & Raudenbush, 1992; Hox, 2002), in this case students are nested in schools which are nested in countries. All

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continuous variables in the model are grand-centred, and all interaction terms are computed using grand-centred variables where appropriate.

For the multilevel analysis, data files were weighted at the student level with 'normalised student final weights,' which were computed based on the student final weights in the PISA 2006 dataset. The student final weights were normalised at the international level including 24 of the 57 participating countries to 1- make the sum of the weights across the 24 countries equal to the number of students across the countries in the dataset, 2- maintain the same proportion of weights as in the student final weights within each country; and 3- ensure that each individual country's contribution to the analysis is equal by introducing a country factor (i.e. the sum of the weights within each country is the same for all 24 countries).

These selections and handling of cases with missing values resulted in 197,504 students with valid measurement of the relevant variables in 7,324 schools in 24 countries. Although the N at the highest level (country) is not large, we have enough units at the highest level to make reliable estimates in a random coefficient model (Snijders & Bosker, 1999, pp. 43-44).

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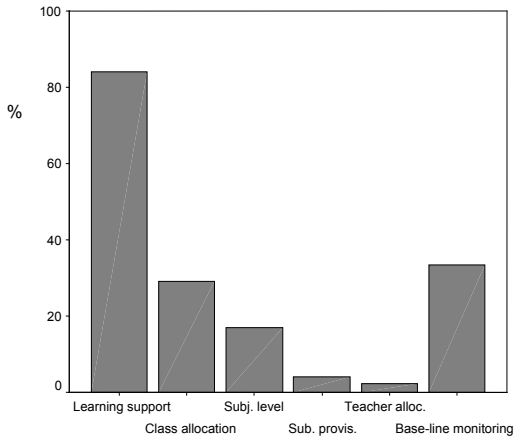
3.5 Profile of the Irish Case-study Schools

A postal survey of all secondary school principals in Ireland was carried out in 2002. The questionnaire covered issues relating to school structures, grouping of students, ability grouping procedures and subject choice. There was a high response rate (78 per cent) to the survey with the total number of 567 principals participating in the survey.

The postal questionnaire found that schools use a variety of pre-and post entry ability tests and the majority of schools use various standardised tests. A considerable proportion of schools (42%), however, have opted for their own tests in Mathematics, English, Irish and other subjects. In total, twenty-six different types of tests were mentioned by school principals. Around half of schools use pre-entry tests, over a quarter use post-entry tests, eighteen per cent of schools test students both before and after school entry while a small number (6%) of schools do not use ability tests. The most important reason given by principals for carrying out ability entry tests is the identification of students who may require learning support, followed in frequency by providing baseline data for on-going monitoring of students' achievement and allocating students to base classes (see Figure 3.2).

Figure 3.2: Reasons given for using ability tests



Schools may vary in the way in which they allocate students to base classes. They may employ tracking whereby students of similar assessed ability are grouped into classes, ranked from 'higher' to 'lower.' They may use banding, a somewhat looser form of tracking, 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

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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.

The majority (70%) of schools surveyed used mixed ability base classes in first year with 16 per cent using banding and 14 per cent streaming. Ability-based differentiation (that is, the use of either banding or streaming) in first year is more prevalent in schools with more than 200 students. Its prevalence also varies by school type, being most common in vocational and community/ comprehensive schools and least common in coeducational and girls' secondary schools. Such differentiation is also more common in disadvantaged status than non-disadvantaged status schools (52% compared with 21%). Interestingly, the use of ability-based differentiation increases with the proportion of students with literacy difficulties; 13 per cent of schools with fewer than 5 per cent with such difficulties use streaming/banding compared with two-thirds of those where more than 45 per cent of students have literacy difficulties.

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 who have mixed ability classes use 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 the schools, however by the Junior Certificate year all students have to be preparing for a particular level of examination.

On the basis of the information collected through the principal postal survey, a ‘theoretical sample’ of approximately 900 students in 12 case study schools was selected in terms of three main dimensions, the school’s approach to ability grouping, subject choice and approach to integrating first year students. In terms of ability grouping there was highly differentiated tracking in half the schools and within-subject curriculum differentiation (or setting) in the remaining half. The sample also achieved a mix of schools in terms of sector, gender mix, disadvantaged status and region. A profile of the schools is outlined in table 3.2.

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Table 3.2: School Profiles (Fictional Names)

	School type	*Social mix*	*School size*	*Timing of subject choice*	*Base class*
Dawson Street	Community/ comp.	Mixed	Medium	Pre-entry	Mixed ability
Barrack Street	Girls' secondary	Working-class	Small	Pre-entry	Mixed ability
Dixon Street	Vocational	Working-class	Large	Taster programme	Tracked
Park Street	Boys' secondary	Mixed	Large	Pre-entry	Tracked
Hay Street	Vocational	Working-class	Small	Pre-entry	Tracked
Fig Lane	Fee-paying coed	Middle-class	Large	Taster programme	Mixed ability
Argyle Street[4]	Community/ comp.	Mixed	Large	Taster programme	Tracked
Harris Street[5]	Girls' secondary	Middle-class	Large	Taster programme	Mixed ability
Lang Street	Vocational	Working-class	Small	Pre-entry	Tracked
Dawes Point	Boys' secondary	Working-class	Small	Pre-entry	Tracked
Belmore Street	Girls' secondary	Mixed	Large	Taster programme	Mixed ability
Wattle Street	Boys' secondary	Mixed	Small	Pre-entry	Mixed ability
Wentworth Place[6]	Boys' secondary	Mixed	Large	Taster programme	Tracked
Wynward Road[7]	Girls' secondary	Mixed	Small	Taster programme	Mixed ability

There are five separate waves in the study (two in first year, one in second year, one in third year and one in the year following their Junior Certificate to determine their results and programme placement for upper secondary school). Two of the twelve case-study schools discontinued their involvement with the project between first and second year (between wave 2 and 3). In order to capture diversity across different school contexts, two additional schools were asked to participate in the further waves of the project. Chapter five utilises a database that includes the final twelve schools (n=893) in the project as it includes attitudes to school in the final year of second level schooling. In chapter six it was vital to include base line information about student prior achievement, therefore the chapter utilises a database of the

[4] This school was added to replace one of the two schools that did not continue with the longitudinal project after the first year of the study (Wentworth Place).
[5] This school was added to replace one of the two schools that did not continue with the longitudinal project after the first year of the study (Wynward Road).
[6] This school discontinued its involvement in the longitudinal project after first year, though information is available as to the Junior Certificate achievement of the students in this school. It was replaced by Argyle St. for the remainder of the project.
[7] This school discontinued its involvement in the longitudinal project after first year, though information is available as to the Junior Certificate achievement of the students in this school. It was replaced by Harris St. for the remainder of the project.

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original twelve schools and matches examination data to those twelve schools (n=905). The total n for students in all fourteen schools for whom we have achievement scores in the Junior Certificate at the end of lower secondary schooling is 1176.

Within each of the schools, in-depth interviews were conducted with key personnel involved with each year group. The key personnel included school principals, guidance counsellors; year heads for each year, class tutors and in the first year of the study other key personnel such as learning support and resource teachers, counsellors and chaplains.

Self-completion questionnaires were administered to incoming first-year students in the case-study schools in September 2002. Nationally standardised reading and computation tests were also administered to first-year students to provide a baseline for assessing academic progress over first year. Nationally standardised reading and computation tests were administered again at the end of the first academic year. Focus group interviews were also conducted with all classes of students.

In order to look at changes in students' views over the course of the Junior Cycle, self-completion questionnaires were administered again at the end of first year, March of second year, January of third year and March of the year following the Junior Certificate which the author was involved in designing and analysing. Focus groups were carried out by the author with groups of students at these intervals during the Junior Cycle. Exam data from the state exam at the end of the three year lower secondary schooling, the Junior Certificate, is also available. Survey evidence looks at student outcomes in terms of academic success and also their social psychological experiences of school.

As mentioned earlier, this design aims to make use of both empirical evidence of the mechanisms that structure inequality, and also qualitative information to really get an in-depth understanding on the micro level of how these mechanisms work. Key personnel in the school describe during the interviews, the structures for differentiating students within the school. The schools characteristically differentiate students either through rigid tracking and/or curriculum based differentiation. The student voice is particular useful for understanding their experience of differentiation in terms of tracking and access to the curriculum.

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Although this database of quantitative and qualitative information from twelve case-study schools has been examined in previous publications, the focus of the research was very different in the way the data was examined, the work concentrated on the general experience of students making the transition to second level education and their progression through lower secondary school. Therefore, to date, the data has been underexploited, particularly in exploring relationships between schools and within schools. The following section describes some of the main variables that are included in the analysis.

3.5.1 Irish Variables

The Irish longitudinal database is rich with quantitative and qualitative information from key personnel in the schools, but in particular from the students themselves. Some important dimensions are the curriculum, school climate and experiences of learning. Students were placed in formal tracks (top, middle and bottom) in half of the case-study schools. Students in these formal tracks typically take all their subjects together as a class and therefore are 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.

All of the schools, regardless of their use of formal tracking, used 'setting' where students were placed into different levels (honours, ordinary and foundation) for the core compulsory subjects of Mathematics, English and Irish. Students take on average 10 subjects for the Junior Certificate examination, a compulsory nationally standardised state examination at the end of their lower secondary school education (Year 3). Those in the tracked schools generally take all 10 of these subjects together as a class; though there is some flexibility in the 'set' they are in for their core subjects, or in other words what level they sit their exam paper. In the non-tracked schools students are not placed in homogenous groups for all 10 of their subjects, however 'setting' is used where students are placed into a 'set' for each of their core subjects. Subject taking patterns have longer term consequences because of the close relationship between the subject levels taken for the Junior Certificate and access to subject level within the senior cycle of upper secondary school (Millar and Kelly, 1999; Smyth and Hannan, 2002). Although it is not possible to fail the Junior Certificate overall, generally schools will not permit students to take a Leaving Certificate (the requirement for college entry) subject at honours level if they did not receive at least a honours level 'C' at Junior Certificate.

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School climate was explored through student's perceived interactions with their teachers, with their peers and how they felt about school. In order to explore student satisfaction with their schooling experience a scale variable was created from the items that are contained in variables 'liking school', 'liking teachers', 'positive interaction with teachers', 'negative interaction with teachers' and 'feelings of isolation.' The scale includes 25 items and result in a Cronbach's alpha of 0.85 and is described in more detail below.

Importantly, information on the track students were assigned to was also collected as well as the level that students took their core subjects of Maths, English and Irish and the overall number of honours level papers. Students also gave quantitative and qualitative opinions on their experiences of ability grouping within their school. Qualitative staff perspectives on grouping practices and access to the curriculum were also collected.

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 3.3). 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 dependent variables of overall Junior Certificate grade point average, math grade and English grade were calculated using this method.

Table 3.3: 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

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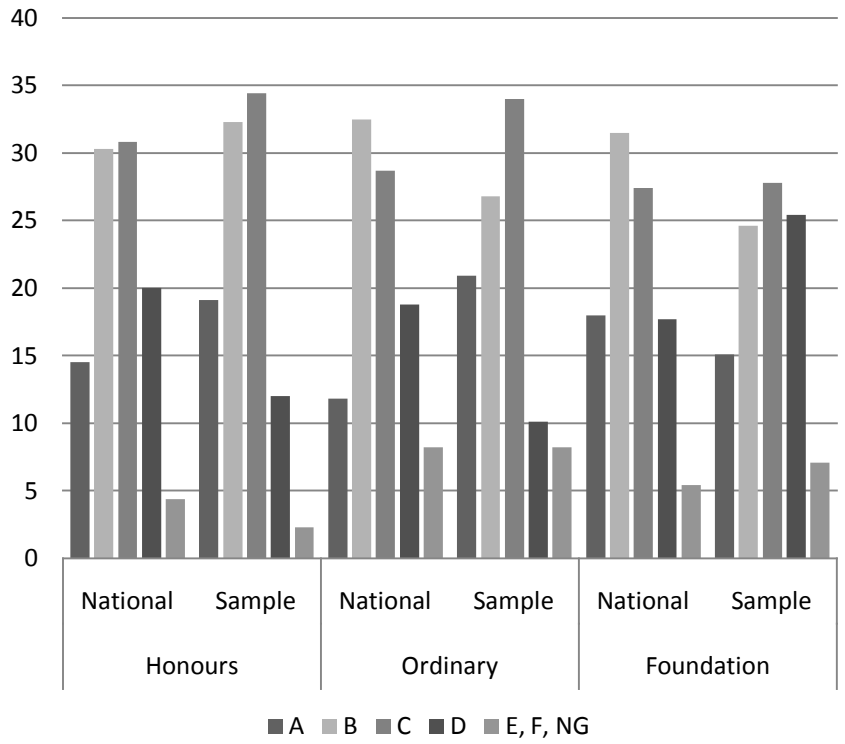
The breakdown of Mathematics and English achievement is given in the following two figures. A comparison of the national statistics and the results for the case-study schools in the sample is given. In 2005, failure rates in mathematics ordinary level were commented upon as being a cause for concern[8]. At honours level failure rates fell and were almost half of the failure rates at ordinary level in mathematics. Among the case-study schools students scored the most A grades at the ordinary level. The greatest number of pass grades (grade D) was among those taking foundation level.

Figure 3.3: Junior Certificate Mathematics results by level and grade achieved. National and Sample statistics 2005.



The achievement in English among the case-study schools closely mirrors the achievement of the national cohort of students who sat the Junior Certificate examination in 2005. Failure rates were lower in English than for Mathematics. However, 'A' grades are also considerably lower with most student achieving 'B' or 'C' grades.

[8] Donnelly, K (2005, September 14) 'Major strides in Junior Cert grades now levelling off'. *The Irish Independent* Retrieved from www.independent.ie

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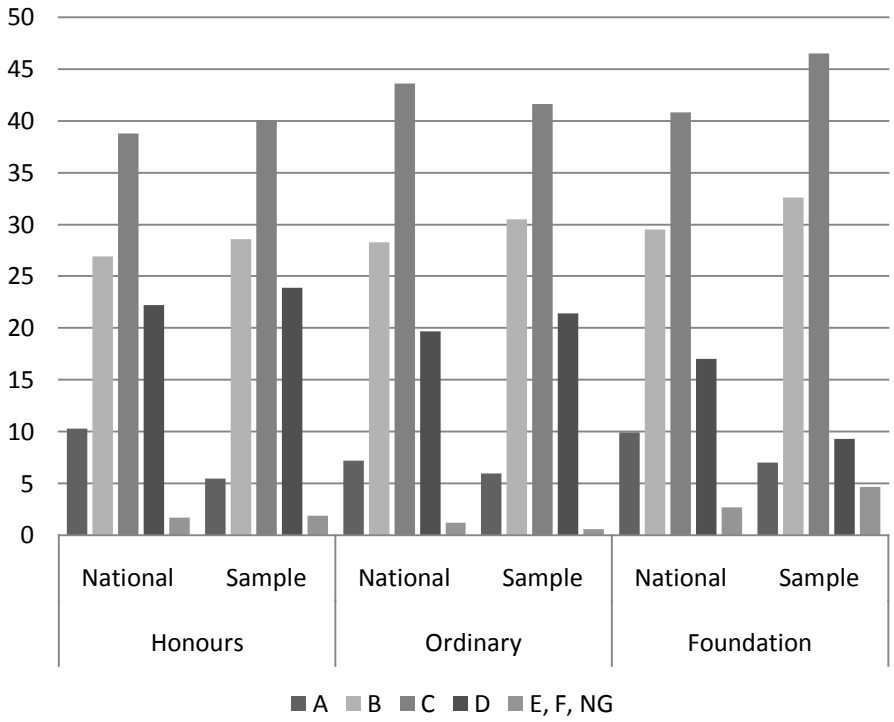
Figure 3.4: Junior Certificate English results by level and grade achieved. National and Sample statistics 2005.



Data from the student surveys were used to construct the independent variables. The predictor variables include social class background, gender, attitudes to school, academic self-rating, level of examination paper and track assignment. A description of each is below.

Social Class Background. This is a continuous variable derived from the dominant social class position of the pupil's parents. Students were asked upon entry to second level schooling what occupations their parents held. These responses were then coded using the International Standard Classification of Occupation of the International Labour Office (ICO, 1990) and further collapsed into seven categories based on the Erikson, Goldthorpe and Portocarero (EGP) class schema. Unfortunately, parental education is not included in the dataset due to the unreliability of asking students of such a young age (12) what their parental education is. The minimum and maximum values for Social Class background are 1 and 7 and are based on the 9 point scale used by Harker & Tymms in their 2004 paper 'The Effects of Student Composition on School Outcomes', School Effectiveness and School Improvement, 15:2 p177-199. Harker and Tymms code the occupations in the following manner 9-Professional; 8-Lower Professional; 7-White collar; 6-Farmer; 5-Skilled; 4-Semi-skilled; 3-Unskilled; 2-Beneficiary; 1-Unemployed. The variable in this study is coded very similarly, 7-Higher

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Professional; 6-Lower Professional; 5-White collar (Non-Manual); 4-Farmer; 3-Skilled; 2-Semi-skilled or Unskilled; 1-Unemployed.

Medical Card Holder: 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 they earn less than €266.50 a week. Remembering that the current[9] 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.

Ethnicity. This is measured with two separate variables. The first, nonnat, is a dichotomous variable derived from whether the student has a parent that was not born in Ireland. The second dichotomous variable, traveller, is derived from whether the student is a member of the travelling community, 1 for traveller and 0 for non-traveller. These variables were included in the original models in but found to be non-significant and did not improve model fit and therefore are excluded from the final results analysed in the chapter.

Gender. A dichotomous variable, 1 for female and 0 for male.

Attitudes to school. 4 different continuous variables, likes school, likes teachers, positive interaction and negative interaction were combined into an overall measure of how satisfied students were with their school experience.

> Likes School: I find school-work in this school really interesting, I am excited about being at this school, I like being at this school, I usually feel relaxed about school, I look forward to coming to school most days, I like school better than most other students in this school. These items have a Cronbach's alpha of 0.807.
>
> Likes Teachers: I think most of my teachers are friendly, my teachers would help me if I had a problem with my schoolwork, I could talk to at least one of my teachers if I had a problem, most of the time there is a good working atmosphere in the class, I like most of my teachers. These items have a Cronbach's alpha of 0.762.

[9] As of October 2008

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Positive Interaction with Teachers: You have been told that your work is good by a teacher, you have asked questions in class, a teacher has praised you for answering a question, you have been asked questions in class by the teacher, you have been praised by a teacher because your written work is well done. These items have a Cronbach's alpha of 0.779.

Negative Interaction with Teachers: Scale from 2 items, you have been given out to by a teacher because your work is untidy or not done on time, you have been given out to by a teacher for misbehaving in class. These items have a Cronbach's alpha of 0.762.

Academic Self-rating. This variable is a continuous variable based on a number of attitudinal questions posed to students in the survey as to how they thought they were doing academically. The following items where used to construct the scale; I think I am doing well at this school, I think the work is quite easy at this school, I think I am working hard at this school, I am able to do my school-work as well as most other students, I do better at school-work than most other students in my class, I'm quite pleased with how my school-work is going, I have trouble keeping up with my school-work. These items have a Cronbach's alpha of 0.791.

Table 3.4 below shows the means and standard deviations for the achievement measures of students at the beginning and at the end of lower secondary schooling

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Table 3.4: Academic achievement variables, means and standard deviations within each case-study school.

Variable Name	Entry Math Score	Entry Reading Score	JCgpa	JC Math	JC English	No. honours papers
Dawson St	15.95 (6.08)	34.26 (13.68)	6.58 (1.84)	5.78 (2.40)	6.37 (2.28)	5.27 (3.61)
Lang St	13.10 (4.05)	26.89 (13.30)	5.46 (1.49)	3.71 (3.12)	5.34 (1.73)	2.39 (2.78)
Argyle St			7.40 (1.72)	6.68 (2.47)	7.12 (2.06)	6.14 (3.10)
Barrack St	13.30 (5.41)	25.00 (10.00)	6.11 (1.20)	4.41 (2.16)	5.80 (1.59)	3.45 (2.06)
Harris St			8.04 (1.18)	7.50 (1.72)	8.20 (0.94)	7.27 (2.19)
Dixon St	10.08 (4.78)	20.03 (8.80)	4.62 (1.85)	2.55 (2.01)	5.43 (2.12)	2.39 (3.07)
Park St	18.95 (6.63)	37.23 (13.17)	7.15 (1.54)	6.74 (2.09)	7.44 (1.87)	7.02 (3.22)
Hay St	13.00 (5.20)	26.38 (13.32)	5.10 (1.10)	3.83 (1.90)	3.83 (1.42)	0.50 (1.01)
Fig Lane	19.56 (6.29)	42.39 (14.23)	7.62 (1.22)	6.99 (2.20)	7.64 (1.52)	7.94 (2.39)
Wentworth Place	18.16 (6.36)	35.78 (13.03)	6.71 (1.68)	5.64 (2.50)	6.47 (1.79)	5.50 (3.76)
Wynward Road	17.80 (7.52)	37.99 (14.69)	7.57 (1.33)	6.67 (2.03)	7.83 (1.52)	6.44 (3.79)
Dawes Point	13.73 (5.62)	28.87 (12.48)	6.31 (1.56)	5.46 (2.00)	5.31 (2.18)	4.60 (3.40)
Belmore St	18.62 (6.61)	34.90 (14.60)	7.61 (1.51)	6.83 (2.41)	7.62 (1.57)	6.46 (3.10)
Wattle St	19.20 (7.42)	43.06 (14.32)	6.63 (1.95)	6.25 (2.66)	6.92 (1.90)	4.98 (3.68)
Total	16.96 6.84	34.83 (14.69)	6.98 (1.76)	6.12 (2.57	6.93 (2.02	5.80 (3.52)

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3.5.2 Irish Case-Study Characteristics

The previous table shows the overall means and standard deviations of the academic achievement indicators for all schools.. Due to the small number of schools it is useful to build a picture of each individual school. The following section describes the main characteristics of the schools in terms of the main dimensions.

Profile of each school: (Fictional Names)

School 1, Dawson Street:

This is a medium size school with a mixed social class intake and does not use formal tracking. It is a coeducational school with an approximately average composition of non-national students and students from a traveller background. Students in this school achieved a Junior Certificate grade point average that is close to the sample mean and their prior achievement was also close to the sample mean. 40% of students in this school aspired to a college degree when they were in their third year of secondary schooling, just under the average of 47%, however only a third of the sample proportion were in the academic track for Senior Cycle. Dawson Street had approximately average levels of misbehaviour, liking school, liking teachers; time spent on homework and feeling there was a positive classroom climate.

School 2, Lang Street:

This is a small size school with a working-class social class intake and formally tracks students for instruction. It is a boys' school with an approximately average composition of non-national students but with an above average composition of students from a traveller background (14.7% compared to an average of 4.2%). Students in this school achieved a significantly lower Junior Certificate grade point average and their prior achievement was also much lower than the average. 32.4% of students in this school aspired to a college degree when they were in their third year of secondary schooling, below the average of 47%, however only 87.9% were in the academic track for Senior Cycle, but this is most likely to reflect school practice in offering courses rather than actual student choice. Lang Street had one of the highest levels of misbehaviour, lowest levels of liking school and liking teachers; the least time spent on homework and had more feelings there was a negative classroom climate by the end of lower secondary schooling. Overall these factors give the impression of a negative overall school climate.

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School 3, Argyle Street:

This is a large school with a mixed social class intake and formally tracks students for instruction. It is a coeducational school with an approximately average composition of non-national students and students from a traveller background. Students in this school achieved a significantly higher Junior Certificate grade point average however this school joined the study in year 2 and therefore there is no information for their prior achievement. Half of the students aspire to a college degree in their third year of secondary schooling, with 82% also being in the academic track for Senior Cycle. Argyle Street had average levels of misbehaviour and average levels of liking school. Students in this school had one of the highest levels of liking teachers; spent more time on homework and had average levels of feeling there was a negative or positive classroom climate.

School 4, Barrack Street:

This is a small school with a working-class social class intake and does not formally track students for instruction. It is a girls' school with an above average composition of non-national students (28%) and an approximately average composition of students from a traveller background. Students in this school achieved just below the average Junior Certificate grade point average despite having one of the lower levels of prior achievement. 35% of the students aspire to a college degree in their third year of secondary schooling, with 90% also being in the academic track for Senior Cycle. However, once again the proportion of students in the academic track reflects school practices in what courses they offer their students rather than student choice. Barrack Street had low levels of misbehaviour, average levels of liking school, liking teachers and time spent on homework. Students in this school were both low in their levels of feeling there was a negative classroom climate and high in feeling there was a positive classroom climate.

School 5, Harris Street:

This is a large school with a middle-class social class intake and does not formally track students for instruction. It is a girls' school with a less than average composition of both non-national students (5%) and students from a traveller background. Students in this school achieved a higher than average Junior Certificate grade point average. Nearly two-thirds of students in this school aspired to a college degree in their third year of secondary schooling, with all students also being in the academic track for Senior Cycle. However, once again the proportion of students in the academic track reflects school practices in what courses they

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offer their students rather than student choice. Harris Street had low levels of misbehaviour, average levels of liking school and liking teachers. Students in this school spent more than average time on homework. Students in this school had average levels of feeling there was a negative or positive classroom climate.

School 6, Dixon Street:

This is a large school with a working-class social class intake and formally tracks students for instruction. It is a coeducational school with an approximately average composition of non-national students and an above average composition of students from a traveller background (17%). Students in this school achieved a lower than average Junior Certificate grade point average and also had one of the lowest levels of prior achievement. A third of the students aspire to a college degree in their third year of secondary schooling, with two-thirds also being in the academic track for Senior Cycle.

Dixon Street had the highest levels of misbehaviour, low levels of liking school, average levels of liking teachers and one of the least amounts of time spent on homework. Students in this school were both high in their levels of feeling there was a negative and positive classroom climate. This may reflect the case that students generally have more interactions with their teachers, both positive and negative, or it may reflect the fact that the school tracks its students; with those in the higher stream reporting a more positive climate and those in the lower stream reporting a more negative climate.

School 7, Park Street:

This is a large school with a mixed social class intake and formally tracks students for instruction. It is a boys' school with an approximately average composition of both non-national students and students from a traveller background. Students in this school achieved an above average Junior Certificate grade point average and also had one of the highest levels of prior achievement. Almost half (43%) of the students aspire to a college degree in their third year of secondary schooling, with three-quarters also being in the academic track for Senior Cycle.

Park Street had average levels of misbehaviour. However, the students in this school had lower levels liking school and liking teachers by the end of lower secondary schooling. Students were about average in the time they spent on homework. Students in this school had

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average levels of negative class interactions with their teachers, but were low in their levels of feeling there was a positive classroom climate.

School 8, Hay Street:

This is a small school with a working-class social class intake and formally tracks students for instruction. It is a coeducational school; however there is only a very small proportion of females in the school. The school has an above average composition of non-national students (27%) and no students from a traveller background. Students in this school achieved a lower than average Junior Certificate grade point average and also had one of the lowest levels of prior achievement. Less than 4% of the students aspire to a college degree in their third year of secondary schooling and an academic track for Senior Cycle was not offered in this school due to its vocational status.

Hay Street had average levels of misbehaviour, liking teachers and feeling there was a negative or positive class climate/interaction with teachers. Students spent one of the least amounts of time on homework and had high levels of liking school. Students in this school had average levels of negative and positive class interactions with their teachers/classroom climate.

School 9, Fig Lane:

This is a large school with a middle-class social class intake and does not formally track students for instruction. It is a coeducational school with an approximately average composition of both non-national students and students from a traveller background. Students in this school achieved an above average Junior Certificate grade point average and also had one of the highest levels of prior achievement. Two-thirds of the students aspire to a college degree in their third year of secondary schooling, with all students also being in the academic track for Senior Cycle. However, once again the proportion of students in the academic track reflects school practices in what courses they offer their students rather than student choice.

Fig Lane had average levels of misbehaviour. Students in this school were more positive in their attitudes towards liking school and liking teachers by the end of lower secondary schooling. Students spent about average time on homework. Students in this school were both low in their levels of feeling there was a negative classroom climate and high in feeling there was a positive classroom climate.

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School 10, Dawes Point:

This is a small school with a working-class social class intake and formally tracks students for instruction. It is a boys' school with a below average composition of non-national students and an approximately average composition of students from a traveller background. Students in this school achieved average Junior Certificate grade point averages despite having one of the lower levels of prior achievement. A quarter of the students aspire to a college degree in their third year of secondary schooling, with nearly two-thirds of all students also being in the academic track for Senior Cycle.

Dawes Point had high levels of misbehaviour, however it had average levels of liking school, liking teachers, and they spent about average time on homework. Students in this school were also average in their levels of feeling there was a negative or positive teacher interaction/classroom climate.

School 11, Belmore Street:

This is a large school with a mixed social class intake and does not formally track students for instruction. It is a girls' school with an average composition of both non-national students and students from a traveller background. Students in this school achieved average Junior Certificate grade point averages and also had average levels of prior achievement. Just over half (52%) of the students aspire to a college degree in their third year of secondary schooling, with three-quarters of all students also being in the academic track for Senior Cycle.

Belmore Street had the lowest levels of misbehaviour. Students in this school had average levels of liking school and liking teachers. At both the beginning and end of lower secondary schooling they spent slightly more time on homework than students in other schools. Students in this school also had low levels of reporting a negative interaction with their teachers/classroom climate.

School 12, Wattle Street:

This is a relatively small school with a mixed social class intake and does not formally track its students for instruction. It is a boys' school with an average composition of both non-national students and students from a traveller background. Students in this school achieved average Junior Certificate grade point averages despite having prior achievement levels that were much higher than the average. Just under half (48%) of the students aspire to a college

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degree in their third year of secondary schooling, with all students also being in the academic track for Senior Cycle. Once again this is most likely to do with curriculum offered at the school level rather than individual

Wattle Street had average levels of misbehaviour, liking school and liking teachers. In third year they spent less time on homework than students in other schools. Students in this school also had low levels of reporting a positive interaction with their teachers/classroom climate.

School 13: Wentworth Place

This is a large school with a mixed social class intake and formally tracks students for instruction. It is a boys' school with lower than average composition of both non-national students and students from a traveller background. Students in this school achieved average Junior Certificate grade point averages and average achievement levels upon entry to secondary school. In first year of secondary school, Wentworth Place had average levels of liking school and liking teachers. They spent the average amount of time on homework in first year and were also average in their levels of feeling there was a negative or positive classroom climate.

School 14: Wynward Road

Wynward Road is a small school with a mixed social class intake and does not formally track students for instruction. It is a girls' school with average levels of non-national students, however it had above average numbers of students from a traveller background. Students in this school achieved above average Junior Certificate grade point averages and had slightly above average entry level scores. In first year of secondary school, Wentworth Place had average levels of liking school and their teachers. They spent above the average amount of time on homework. They were average in their levels of feeling there was a negative or positive classroom climate in first year.

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Chapter Four: Differentiation and inequality of educational opportunity in Educational Systems

This chapter builds on previous comparative work that addressed the issue of educational inequality of opportunity depending on the degree of stratification within different education systems (Treimen & Yip, 1989; Muller & Karle, 1993; Shavit & Blossfled, 1993; Erikson & Jonsson, 1996; Filmer & Pritchett, 1999; Shavit et al, 2007 & Pfeffer, 2008). The chapter examines the 'sorting' mechanisms of school socioeconomic composition & ability grouping in highly differentiated, internally differentiated and comprehensive education systems. The results highlight the importance of including school factors in the debate of educational inequality of opportunity for students in different education contexts.

The reproduction of inequality is a central concern of sociologists. Research has shown that variation in school socioeconomic composition contributes to inequality in educational achievement. However, the effect of school composition and its 'sorting' effect may vary across countries. One reason the composition effect may vary across countries is that countries vary in the way they sort students for instruction during second level education. The focus of this chapter is whether the use of tracking magnifies composition effects. It contributes to research on school composition effects and research that has focused on the impact of educational differentiation on the achievement of students within different national education systems; two mechanisms that have rarely been considered together.

4.1 School Factors/Characteristics

Within countries there has been a debate between the relative importance of individual and school factors since the Coleman Report (Coleman et al, 1966) in the United States and the Plowden Report (Peaker, 1971) in the United Kingdom. These reports concluded that individual family background was more important than school factors in determining children's educational achievement. Much research has concentrated, since these reports, on establishing the relative importance of individual versus school effects.

Borrowing from both the economic and organisational definitions of school effectiveness (Scheerens & Bosker, 1997) the concept here is of schools as organisations that have particular processes to turn inputs into outputs (see School Factors in Figure 4.1). Inputs to a school include the prior characteristics of pupils, whereas outputs include pupil achievement.

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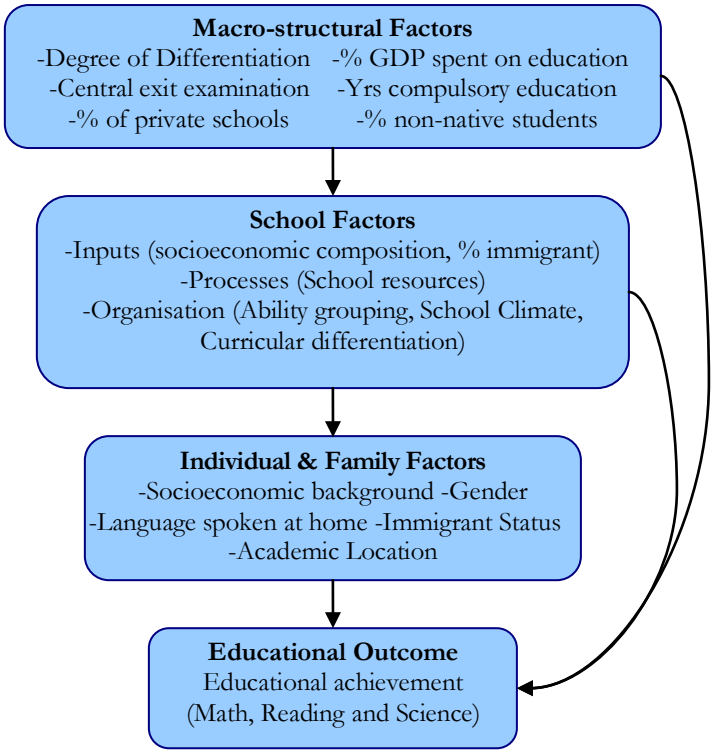
The transformation process within a school is composed of a number of factors which include teaching and learning methods, curriculum choices and organisational conditions that make it possible for pupils to learn.

Two aspects of school effectiveness are under examination in this chapter, the socioeconomic composition of the school (an input, see Figure 4.1) and ability grouping (organisation, see Figure 4.1). There is a long documented relationship between the socioeconomic composition of the school students attend and student achievement. Research has also explored the relationship between individual characteristics and the practice of ability grouping either in distinct school types or placement into different tracks or sets within schools. The following sections outline the background of these two aspects of educational inequality.

Figure 4.1: A complete model of Macro, School and Individual effects on educational achievement



4.1.1 School composition

Much research has shown that characteristics of family background are related to educational outcomes (since Blau & Duncan, 1967; Jencks et al, 1972, Jencks et al, 1979, Hauser & Sewell, 1986). Previous research has also identified a link between differences in achievement scores and differences in the composition of the student body within the schools. There is a well-established and clear effect of prior achievement on current achievement and accounts

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for a large proportion of the variability in achievement. However, evidence shows that when we look at two pupils with similar prior achievement scores but attending different schools, the difference in these scores can be predicted depending on the average scores of the other pupils in their schools. Numerous studies have shown that the mean socioeconomic background of a school has an impact on student achievement over and above the effect of individual student's family socioeconomic background (Gamoran, 1992; Willms 1986, 1992).

The Organisation for Economic Co-operation and Development (OECD) (2005) used the Programme for International Student Assessment (PISA) 2000 data to look at how the socioeconomic composition of schools affects achievement from a comparative perspective. In line with research mentioned above, the report concluded that the school average socioeconomic status had a statistically significant impact on student performance in reading literacy in all but four countries (Denmark, Finland, Iceland and Korea). Furthermore, school composition effects far outweighed the impact of other policy-amenable characteristics. Together with individual characteristics, school socioeconomic composition explained on average 69 per cent of schools effects, in comparison to the 6 per cent explained by policy amenable school characteristics.

The results from these studies show the strong link between the socioeconomic composition of the school and student performance and achievement. However, studies have not shown whether this strong relationship between school composition and student achievement is the same across educational systems. Composition effects may vary across countries as countries vary in the way they sort their students for instruction.

4.1.2 Grouping Practices:

Breen & Jonsson (2005) highlight the importance of looking at the degree of tracking and the type of tracks as an institutional factor, as many studies support the hypothesis that early division of pupils into ability groups or tracks increases inequality (Kerckhoff, 1986; Gamoran, 2004; Oakes, Gamoran & Page, 1992). Most recently Horn (2009) illustrated this argument using PISA data and concluded that the early age of selection in some countries has a close link with high inequality of opportunity. The following section of this paper now turns to how education systems differentiate their students for instruction and explores these arguments further.

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Research has explored achievement and inequality in distinct school types (Hargreaves, 1967; Ammermuller, 2005; Dustmann, 2004), in distinct tracks (Rosenbaum, 1976; Metz, 1978; Oakes, 1985; Gamoran, 1992; Gamoran et al., 1995) and placement into sets (or curricular differentiation; Lucas, 1999). Although these all represent different ways to differentiate students into ability groupings, many of the arguments for and against ability grouping are basically the same. For many years, students, teachers, and field researchers have reported that more learning occurred in higher academic school types, tracks and sets. Furthermore, when students were divided for instruction by ability the gap in achievement tended to become wider and wider over time. The degree of this inequality varies depending on the implementation of ability grouping; however research suggests that all types of ability grouping result in unequal educational opportunity.

4.2 Differentiation in Education Systems

Educational institutions have been referred to by Spring (1976) as society's 'sorting machine.' Organisational characteristics of schools and education systems have the effect of channelling students into differentiated educational paths and further life chances. All industrialised countries use organisational mechanisms to sort students into hierarchically arranged categories, but these mechanisms vary in both their nature and also in their timing. Hopper (1968:30) argued that "the structure of educational systems, especially those within industrial society, can be understood primarily in terms of the structure of their selection processes." Systems can be identified as those that use separate school types to stratify students, those that have a high level of within school/internal stratification without distinct school types, and systems that are comprehensive with low levels of within school differentiation. Early in the debate on the impact of how countries sort their students for instruction, Turner (1960) contributed to the discussion by theorising the differences in education selection between contest mobility and sponsored mobility systems. Turner (1960: 863) described comprehensive education systems as 'contest mobility' and described the object as being "to train as many as possible in the skills necessary for elite status so as to give everyone a chance to maintain competition at the highest pitch." Turner labelled highly selective systems as being 'sponsored mobility' and the objective of such systems is to "indoctrinate elite culture in only those presumably who will enter the elite, lest there grow a dangerous number of 'angry young men' who have elite skills without elite station."

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In an effort to explain the cross-national variation in educational inequality, the degree of stratification within the education system has been shown to be influential. Studies have revealed the variability across countries in the magnitude of family background effects on student outcomes (Buchmann & Hannum, 2001) and furthermore, the way in which a country sorts students for instruction increases educational inequality (Hanushek & Woesmann, 2006). Findings from Breen & Jonsson, 2000; Mare 1993; and Shavit & Blossfeld 1993, suggest that comprehensive school reform in countries with previously highly stratified education systems reduced inequality of educational opportunity. However, Breen & Jonsson (2005) in their review of inequality of opportunity in a comparative perspective, suggest the need to "draw on evidence from more countries."

The OECD (2005) report "School Factors Related to Quality and Equity, Results from PISA 2000," which utilised data from PISA 2000, is one example where evidence was drawn from wide range of countries. Results from PISA 2000 indicate the relevance of the structure of secondary education in each participating country (OECD, 2001). The OECD (2005:62) used age of selection as an indicator of institutional differentiation and considered its effect on student achievement. The results found that education systems with the lowest degree of differentiation achieved "the highest mean student performance in reading literacy." Hanushek & Woesmann (2006) also found evidence that early tracking reduced mean performance using the PISA 2000 data.

What about equity? Who gains and who loses within these educational systems? When equity was measured as the correlation between parents' occupational status and student performance the results in the OECD (2005:56) report indicated that in countries with early selection, the correlation between students' socioeconomic background and students' performance was stronger. These findings supported Kerckhoff's (1995) argument that the effects of family socioeconomic status on educational outcomes were stronger in highly differentiated systems of education. Analysis of PISA data by Marks, Cresswell & Ainley (2006) reinforced this finding that countries with highly tracked systems tended to show stronger relationships between socioeconomic background and achievement. Pfeffer (2008:556) looked at which nations were most successful in reducing the influence of family background on educational attainment by using the International Adult Literacy Survey and found that "rigid education systems with dead-end educational pathways appear to be a hindrance to the equalisation of educational opportunities." Evidence from Hanushek &

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Woesmann (2006) showed that increased inequality within highly differentiated education systems was a result of students in the lower percentiles losing more than the gain amongst students in the upper ones. Lower performers suffered more in highly differentiated systems, resulting in a decreased mean performance.

A number of authors have used PISA data to explore differences in student achievement dependent on school contexts in different countries. Dronkers & Robert (2008) used 3 level models to explore differences in student achievement in public and private schools in different countries. Levels & Dronkers (2008) studied the outcomes of immigrant pupils by exploring country origin and destination effects and ethnic and socioeconomic student composition of schools.

Other work has explored individual socioeconomic background and school factors together in different national contexts, such as Heyneman and Loxley's research in the early 1980s, and more recently the work of Baker et al. (2002) and Baker & LeTendre (2005). However, these comparative studies explored the amount of economic development at the national level in explaining the relationship between socioeconomic background, school factors and student achievement. A major drawback of this work is that other institutional features of educational systems were not explored in how they relate to these relationships, in particular the degree of differentiation at the education system level which is of interest here.

Previous analyses did not focus on how the relationship between school composition and student achievement may vary depending on how a country sorts their students for instruction. Rather, the focus was on particular groups of students such as those attending private schools, or immigrant students in socioeconomically segregated schools. What we do not know is whether the way countries sort students for instruction magnifies school composition effects.

4.3 The Research Aim

Most conclusions researchers have drawn from previous research on school effects has been assumed to be 'universally' applicable from case-studies. The problem is that this work has generally drawn on case studies of single countries concentrating on the link between individual and school effects (such as the review of American literature on school effects by Hallinan, 1988). It had a limited comparative aspect and did not take into account that school effects may be different depending on how a country sorts students for instruction. In the

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limited studies that had a comparative perspective, the research focused on the effect of institutional features of educational systems on individual characteristics without much consideration for school effects.

Ridell (1989:484) was critical of the methodology of school effects research as it involved the "misapplication of a single-level model to a reality that is clearly hierarchical." Much work in the area of school effectiveness has since used hierarchical models in order to address the issue, however even these models were underspecified models as they used information at the country and individual level but omitted information at the school level or were single country analysis. Therefore, any conclusions about system level effects may be incorrect due to the lack of school level factors in the model.

Where comparative research explored socioeconomic composition effects on student achievement in different countries, the consideration was how these effects varied due the country's wealth or state of development (Heyneman & Loxley, 1982, 1983; Baker et al., 2005; for a review see Buchmann & Hannum, 2001). This research needs to be broadened to include the degree of stratification at the system level in order to explore further how school composition effects may contribute to educational inequality.

Comparative research can enhance our understanding of how micro-level processes of educational stratification are contingent on macro-level institutions. It is very well possible the relationship between socioeconomic school composition and student achievement is consistent across different education systems. Furthermore, it is also possible the effect of within school ability grouping on achievement found in previous studies is the same across education systems.

Therefore, the focus of this chapter is to address this gap in our knowledge of how school composition effects vary depending on the degree of stratification within the education system that they take place. The research draws on both educational differentiation research and school effectiveness literature in order to examine this issue. Kerckhoff (1995:324) describes a fourth generation of stratification research, "one in which the roles of institutional arrangements in the shaping of stratification processes are systematically taken into account." This chapter addresses the question of how educational inequality is affected by institutional structures, and therefore forms part of this current 'fourth generation' of comparative

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stratification research (Treiman & Ganzeboom, 2000). By using a comparative method to look at issues of educational stratification, it also ties in with major sociological comparative work that has been done before, and attempts to expand on that knowledge (Husen, 1967; Treiman and Yip, 1989; Muller and Karle, 1993; Shavit and Blossfeld, 1993; Erikson and Jonsson, 1996; Filmer & Pritchett, 1999; Shavit et al., 2007).

4.4 Hypotheses

In summary, previous research has shown that school effects in terms of ability grouping and school composition has an impact on student achievement. It has also been shown that how countries sort their students for instruction has an effect on the inequality of opportunity. The question therefore, is whether the relationship between student achievement and school composition differs depending on how students are sorted for instruction within a country? Based on the literature and keeping the main research question in mind, the following three hypotheses are derived.

Students have already been sorted into distinct tracks between schools in highly differentiated systems. Previous research suggests that selection according to achievement is analogous to selection according to socioeconomic background. Therefore we would expect to see students in higher socioeconomic composition schools in highly differentiated systems outperforming others. In comprehensive education systems there is less selectivity between schools, therefore school composition effects will be less significant with an achievement advantage for those in lower socioeconomic composition schools compared to their counterparts in highly differentiated educational systems.

> *Hypothesis 1: School composition effects vary depending on how students are sorted for instruction. School composition effects will be more significant in highly differentiated education systems with an achievement advantage for those in higher socioeconomic composition schools compared to their counterparts in comprehensive education systems.*

Referring back to Turner's (1960) definitions of comprehensive education systems as 'contest mobility' and highly selective systems as being 'sponsored mobility' we expect to find differences in the gaps between high and low individual socioeconomic status within schools depending on how students are sorted for instruction within a country. If highly differentiated systems are to be viewed as 'sponsored mobility' we expect to see smaller gaps between high and low socioeconomic status students within the same school as Turner (1960) argues that

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this type of system facilitates considerable mobility for children from lower socioeconomic backgrounds.

> *Hypothesis 2: Within schools the gap between high and low individual socioeconomic status is expected to be bigger in comprehensive systems in comparison to a small gap in highly differentiated education systems.*

Students have already been sorted into distinct tracks between schools in highly differentiated systems, therefore it is expected that tracking and/or ability grouping within these schools will have a smaller effect on student achievement.

> *Hypothesis 3: Ability grouping effects within schools vary depending on how students are sorted for instruction within countries. Ability grouping within schools is expected to be more significant for differences in student achievement in comprehensive education systems.*

4.5 Data and Method

The analysis presented in this chapter is based on the most recent Programme for International Student Assessment (PISA) 2006 survey organised by the Organisation for Economic Co-operation and Development (OECD). The collection of this data aimed to provide internationally comparable evidence on the performance of 15-year-old students in all of the OECD countries and some partner countries. The project investigated achievement in reading, mathematics and science among some 57 countries in 2006, assessing approximately 300,000 students. Details on the data, tests and sampling procedure are available in the PISA technical reports (OECD, 2009). Twenty-four countries that represented comparable modern industrial societies were selected from the full dataset to be included in this analysis. Countries that represent a wide range of comparable societies were chosen[10].

To test the hypotheses about how school factors mediate education system effects on student performance, I need variables at three levels (country, school and student).

[10] See chapter three for a full description of the countries chosen in the analysis.

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Table 4.1: Descriptive Statistics of Variables included in the Models

Variable Name	Description	Mean	S.D.
Country Level			
SYS% GDPspentonEd	% of National GDP spent on education	5.29	1.11
SYSYrsofCompEd	Number of years of compulsory education	10.42	1.32
SYSExitExam	Country has a centralised standardised central examination upon leaving school	0.64	0.44
SYSESCS	socioeconomic composition of the national student body	0.07	0.24
SYS%Immigrants	% of non-native students at the national level	12.12	8.57
SYS%PrivDep	% of Private Government Dependent schools at the national level	14.08	20.35
SYS%PrivIndep	% of Private Government Independent schools at the national level	1.93	2.24
SYSSchCompetition	% of schools in a country that have 1 or more schools within the same area	0.73	0.16
School Level			
School Organisation			
SCHAbgrAllSubjects	School that uses ability grouping for all subjects	0.13	0.34
SCHAbgrSomeSubjects	School that uses ability grouping for some subjects	0.54	0.50
SCHNoabgr	School that does not use ability grouping	0.33	0.47
SCHGovIndepPriv	Government Independent Private School	0.02	0.14
SCHGovDepPriv	Government Dependent Private School	0.14	0.34
SCHHigh selectivity	School with high academic selectivity	0.17	0.37
SCHSch Size	Size of the school	7.02	5.02
SCHSch competition	School has 1 or more other schools in the area	0.71	0.46
School Inputs			
SCHESCS	Socioeconomic composition of the school	0.07	0.53
SCHImmig%	% of immigrant pupils at the school as a % of immigrants in the national population (of 15 year olds)	100	135.03
SCHBig City	School is in a big city (more than 1,000,000 people)	0.08	0.27
SCHCity	School is in a city (more than 100,000, less than 1,000,000)	0.19	0.39
SCHTown	School is in a town (more than 15,000, less than 100,000)	0.36	0.48
SCHSmall Town	School is in a small town (more than 3,000, less than 15,000)	0.25	0.43
SCHVillage	School is in a village (less than 3,000 people)	0.10	0.30
School Processes			
SCHStudentTeacherRatio	Student Teacher Ratio	12.54	4.22
SCHTeacherShortage	Teacher Shortage	-0.08	0.93
SCHSchedresources	School educational resources	0.05	0.95
Individual Level			
INDAcademic Location	Academic Location (Grade + Programme)	1.98	0.71
INDESCS	Socioeconomic background of pupil	0.07	0.93
INDFemale	Female=1	0.49	0.49
IND1st**GenSameLang**	1st Generation Immigrant that speaks the same language at home as the country or language of test	0.02	0.13
IND2nd**GenSameLang**	2nd Generation Immigrant that speaks the same language at home as the country or language of test	0.03	0.16
INDNativeDifferentLang	Native Student that speaks a different language at home to that of the country or language of test	0.01	0.08
IND1st**GenDifferentLang**	1st Generation Immigrant that speaks a different language at home to that of the country or language of test	0.03	0.16
IND2nd**GenDifferentLang**	2nd Generation Immigrant that speaks a different language at home to that of the country or language of test	0.02	0.14
INDMissingNative	Dummy indicating immigrant/native status was missing	0.02	0.14
INDMissingSamelang	Dummy indicating language at home was missing	0.04	0.20

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4.5.1 Education system-level variables:

Differentiation of the Education System: This variable consists of two dummy variables, 'highly differentiated' and 'comprehensive' in comparison to 'internally differentiated' (see Table 4.2). To classify countries into these categories a number of characteristics of the countries was considered alongside documents from PISA, the OECD and Eurydice websites. In systems that are classified as 'comprehensive' students attend comprehensive schools, where access to post-secondary education is not formally predetermined by the choice of one track and where less than 65% of the schools within the country use ability grouping for some or all subjects within the school. Therefore, these systems can be characterised as not having distinct school types, offering a general curriculum and have low levels of within school ability grouping. 'Highly differentiated' systems, in contrast, divide students into separate schools and this division of students into distinct school types has taken place before the PISA assessment at age 15. These systems may or may not have high levels of within school ability grouping in addition to distinct school types. The middle category of 'internally differentiated' is defined as countries that do not have distinct school types earlier than the age of the PISA 2006 assessment (15) but either have distinct school types at age 15 and/or have high levels of within-school ability grouping for all or some subjects.

This division of countries differs somewhat from previous studies such as Shavit and Muller (1998) who also categorised educational systems into three groups in terms of their levels of differentiation. In their classification Australia, Sweden, the United Kingdom, and the United States have low-differentiated (or comprehensive) systems. This thesis classifies these countries together as being 'internally differentiated' as they all had very high levels of ability grouping for some or all subjects in schools within each country (see table 4.2). The classification of countries in this thesis is closer to that of Buchmann & Dalton (2002) who classified Austria, Germany & Switzerland with the highest level of differentiation, the same as this thesis. Norway, Spain and the United States were classified with the lowest level, somewhat similar in this case, with the exception of the United States. Although the classification of differentiation of educational systems indicated in this analysis is slightly different, the classification is fairly consistent with previous studies. Its inconsistency arises from the quest to explore systems that have high levels of internal or within school ability grouping.

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Table 4.2: Degree of Differentiation in each Country

Country	Differentiation	Separate Schools before age 15	Age of first selection	No of school types at age 15	% schools in country not using any ability grouping	% schools in country using ability grouping for some subjects	% schools in country using ability grouping for all subjects
Norway	Comprehensive	No	16	1	55.7%	40.9%	3.4%
Finland	Comprehensive	No	16	1	51.0%	46.5%	2.6%
Poland	Comprehensive	No	16	1	41.6%	53.4%	5.0%
Spain	Comprehensive	No	16	1	33.7%	53.2%	13.1%
Ireland	Internally differentiated	No	15	4	1.8%	90.9%	7.3%
Portugal	Internally differentiated	No	15	3	43.9%	39.9%	16.2%
Greece	Internally differentiated	No	15	2	52.1%	47.4%	0.5%
UK	Internally differentiated	No	16	1	1.4%	89.4%	9.2%
Australia	Internally differentiated	No	16	1	5.6%	88.5%	5.9%
US	Internally differentiated	No	16	1	12.7%	80.1%	7.2%
Canada	Internally differentiated	No	16	1	14.0%	72.7%	13.4%
Denmark	Internally differentiated	No	16	1	15.2%	78.7%	6.2%
Sweden	Internally differentiated	No	16	1	25.9%	67.5%	6.6%
Austria	Highly differentiated	Yes	10	4	48.7%	44.7%	6.5%
Germany	Highly differentiated	Yes	10	4	52.2%	38.1%	9.7%
Belgium	Highly differentiated	Yes	12	4	52.8%	26.0%	21.2%
Slovakia	Highly differentiated	Yes	11	5	29.1%	55.6%	15.3%
Hungary	Highly differentiated	Yes	11	3	31.7%	65.1%	3.2%
Czech Republic	Highly differentiated	Yes	11	5	32.2%	59.2%	8.6%
Netherlands	Highly differentiated	Yes	12	4	19.5%	31.4%	49.2%
Switzerland	Highly differentiated	Yes	12	4	15.9%	45.7%	38.4%
Luxembourg	Highly differentiated	Yes	13	4	22.6%	35.5%	41.9%
Slovenia	Highly differentiated	Yes	14	3	29.1%	55.6%	15.3%
Italy	Highly differentiated	Yes	14	3	46.7%	32.9%	20.4%

Other characteristics of the education system:

Any association between how a country sorts its students for instruction and student achievement may be due to a number of other characteristics of the education system. The models attempt to control for other features of education systems. Fuchs and Woesmann (2007) found the presence of a central exit exam at the end of secondary schooling to be associated with student achievement. Educational achievement can also be expected to be determined by the amount of time spent on teaching and learning. The teaching and learning time an educational system can provide is dependent on its resources. Therefore, the percentage of the country's GDP spent on education and the number of years of compulsory education within each country was also included in the analysis.

There were also aggregate variables from individual and school information. Two variables were aggregated from student level information; socioeconomic composition of the national student body (labelled SYSESCS in the models) and the percentage of immigrant students among the 15 year olds. Three variables were aggregated from school level information; the

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percentage of private government independent schools, the percentage of private government dependent schools and the level of school competition which have also been shown to be associated with student achievement (Dronkers & Robert, 2008).

4.5.2 School level variables

School mean SES: to indicate the overall socioeconomic status of the school, the average of family SES among students attending the same school is calculated. The importance of school composition for student achievement is discussed in the introduction to this chapter.

Within school ability grouping: principals in the PISA 2006 survey were asked to indicate the school's policy for organising instruction for students with different abilities. Schools were coded as grouping students by ability into different classes for all subjects, for some subjects or for none of their subjects. Subsequently there are two dummies included in the analysis, those who group students for all subjects and those who do not group students by ability for any subjects; the omitted category for comparison is schools that group students by ability for some subjects.

As previously mentioned, the quality of education offered to students is an important determinant in student achievement. Therefore, the models include a number of school factors in order to control for differences in school quality. These include the schools educational resources, the student-teacher ratio (which is likely to affect teaching and learning time), and teacher shortage.

Educational resources: an index of the quality of schools' educational resources which was computed on the basis of seven items measuring the school principal's perceptions of potential factors hindering instruction at school. For the wording of these items consult table 16.54 (p340) of the PISA 2006 Technical Report (OECD, 2009).

Student-teacher ratio: The student-teacher ratio was obtained by dividing the school size by the total number of teachers. The number of part-time teachers was weighted by 0.5 and the number of full-time teachers by 1.0.

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Teacher shortage: The Index on teacher shortage was derived from four items measuring the school principal's perceptions of potential factors hindering instruction at school. Similar items were used in PISA 2000 and 2003.

School type: The analysis distinguishes between private independent schools and private government-dependent schools in comparison to public schools. Public schools are controlled and managed by a public education authority or agency, government-dependent private schools are controlled by a non-government organisation, or with a governing board not selected by a government agency, and receive more than 50% of their core funding from government agencies and lastly, government-independent private schools are controlled by a non-government organisation, or with a governing board not selected by a government agency, and receive less than 50% of their core funding from government agencies.

School competition: is a dummy variable created from the Principal question which asks how much schooling is available to students in their location, with 1 being at least one other school and 0 being no other schools.

School selectivity: School principals were asked about admittance policies at their school and how selective they were in terms of students' academic record and the recommendation of feeder schools. An index of school selectivity was computed and from this a dummy was created for schools that said at least one of these factors is a pre-requisite for student admittance (1) or these factors were not considered, only one factor was considered or given high priority (0).

Other school-level characteristics: Included in the analysis is school size (the PISA 2006 index of school size contains the total enrolment at school based on the enrolment data provided by the school principal), the location of the school, and the percentage of immigrant students attending the school as a percentage of immigrant students at the country level.

4.5.3 Individual-level variables

Score on Reading, Mathematics and Science test: To measure student's educational performance reading, mathematical and scientific literacy are used as a combined dependent variable. Inclusion of the United States is important for the analysis. However, due to an administration error the reading literacy scores for all students in the United States were not

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valid. Therefore, for the purposes of the analysis the scores from mathematics and science are combined together for the United States. For all other countries the combined score includes reading, mathematics and science. Reading literacy is defined in PISA as "the ability to understand, use and reflect on written texts in order to achieve one's goals, to develop one's knowledge and potential, and to participate effectively in society" (OECD, 2006). In order to measure the student's reading proficiency, different tasks have been designed, which can be organised into five levels of increasing proficiency. Furthermore, the scales represent three major aspects or purposes of reading, which are: retrieving information from a variety of reading materials, interpreting what is read and reflecting upon and evaluating what is read. Mathematical literacy is defined as: "the capacity to identify, understand the role that mathematics plays in the world, to make well-founded judgements and to use and engage with mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen." Mathematical literacy could be divided into four concepts, i.e. quantity, space and shape, change and relationships and uncertainty (OECD, 2006).

An individual's scientific knowledge and use of that knowledge to identify questions, to acquire new knowledge, to explain scientific phenomena, and to draw evidence based conclusions about science-related issues, understanding of the characteristic features of science as a form of human knowledge and enquiry, awareness of how science and technology shape our material, intellectual, and cultural environments, and willingness to engage in science-related issues, and with the ideas of science, as a reflective citizen. For reading, math and science, the observed item responses have been used to construct five plausible values for each student by means of Item Response Modelling. Plausible values are not test scores, but random numbers drawn from a distribution of scores that could be reasonably assigned to each individual (OECD, 2006). They provide an unbiased estimate of the answers on all reading, mathematics and science literacy items. The mean score on the five plausible values for each indicator was calculated and then combined to create the dependent variable 'score[11].'

Academic Location: Academic location is comprised of two components, grade level and school programme, due to the importance of the relationship these two variables have with

[11] In PISA 2006, in the United States an error in printing the test booklets, in which the pagination was changed and instructions for some reading items directed students to the wrong page, may have affected student performance. Reading performance data for the United States are therefore excluded from the PISA database. The variable "score" for students in the US is their combined average of Maths and Science.

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student achievement (for a more detailed discussion on the relationships between grade and achievement, and school programme and achievement see Marks, Creswell and Ainley, 2006:113) . Grade was scored relative to the modal grade of the country meaning that if students were in the modal grade, they were assigned a score of zero, if one grade above a score of one and so on. Information on school programme was obtained from the PISA student questionnaire which asked students what type of academic programme they were in at school. The response categories corresponded to OECD's (1999) International Standard Classification of Education (ISCED). This classification separates academic, vocational and work preparation programmes. For these analyses students were classified into four groups: lower non-academic (ISCED 2B, 2C), higher non-academic (ISCED 3B, 3C), lower academic (ISCED 2A) and higher academic (ISCED 3A). The resulting sheaf variable, which is a combination of these two factors, is continuous, assigning scores to students on the basis of the effects of grade and a categorical measure of school programme on a combined measure of student achievement. The variable is standardised to a mean of 0 and a standard deviation of 1. Effects of 'academic location' should be interpreted as the average change in 'score' for one standard deviation difference in academic location.

Student Socioeconomic background: This is measured by a composite variable comprising of home possessions, the higher parental occupation and the higher parental education expressed as years of schooling. This variable is named economic, social, cultural status (ESCS) within the PISA 2006 dataset (see the PISA 2006 Technical Report (OECD, 2009) for further details).

Other individual variables: Gender is included as well as 5 categories of immigrant status & language at home as controls in the models. . Differences in achievement between non-native students and native students have been illustrated in previous work using PISA datasets (Levels & Dronkers, 2008; Levels, Dronkers & Kraaykamp, 2008). Therefore, immigrant status and language at home are entered as a series of dummies in comparison to the omitted category of native whose language at home is the same as the country or of the PISA 2006 assessment. Unfortunately family structure, which has been shown to influence student outcomes (de Lange, Dronkers & Wolbers, 2009) could not be controlled for in the models as this information was not collected as it had been in previous PISA assessments.

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Missing values

Missing values were imputed in order to include the maximum number of cases in the analysis. Since the missing rates were not high for most of the variables (less than 5%), a simple imputation approach was used to circumvent the problem of missing data. Predictors at the individual and school level were imputed using a dummy variable adjustment (Cohen & Cohen, 1985). As a first step of the imputation a missing dummy variable was created for all variables with missing values regardless of whether a variable was continuous, categorical or dichotomous. A missing dummy was set to 1 if the data were missing on that variable. Secondly, missing values were imputed for continuous variables. Missing values were replaced by the weighted school average of the variable. In the case where all the data on the respective variable were missing in one school the weighted country mean was imputed. When a missing value was replaced by the country or school mean, the weights were proportional to the sampling probability. Categorical variables were re-coded into a set of dummy variables. For each category or for combined categories, a dummy variable was created with the value of 1 if the observation belongs to the respective category and 0 otherwise. Missing values in dummy and dichotomous variables were replaced by 0. There was no missing socioeconomic status information for the countries included in the analysis. Furthermore, the coefficients of the missing dummy variables that contributed significantly to the models are included in the tables of results.

Method and Weighting

To explore macro-level system effects, school effects and individual effects on student achievement, this analysis employs three-level hierarchical linear models (HLM) using a full maximum likelihood procedure. This approach is used as it is able to take into account the specific data structure of the PISA 2006 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, 1992; Bryk & Raudenbush, 1992; Hox, 2002), in this case students are nested in schools which are nested in countries. All continuous variables in the model are grand-centred, and all interaction terms are computed using grand-centred variables where appropriate.

For the multilevel analysis, data files were weighted at the student level with ‘normalised student final weights,’ which were computed based on the student final weights in the PISA 2006 dataset. The student final weights were normalised at the international level including 24

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of the 57 participating countries to 1- make the sum of the weights across the 24 countries equal to the number of students across the countries in the dataset, 2- maintain the same proportion of weights as in the student final weights within each country; and 3- ensure that each individual country's contribution to the analysis is equal by introducing a country factor (i.e. the sum of the weights within each country is the same for all 24 countries). These selections and handling of cases with missing values resulted in 197,504 students with valid measurement of the relevant variables in 7,324 schools in 24 countries. Although the N at the highest level (country) is not large, we have enough units at the highest level to make reliable estimates in a random coefficient model (Snijders & Bosker, 1999, pp. 43-44).

4.6 Results

Education System, School and Individual Factors Models:

Model 0: Without any control (Intercept only model).

Using the Davis & Scott, 1995 method of defining intraclass correlations at the school and country level a model without any independent variables has a total variance of 8698.47 (54 % of the variance is at the student level, 40% is at the school level and 6% at the country level) and the deviance/log likelihood is 2249942.5. The amount of variation at each level almost mirrors the amount of variation in the Dronkers & Robert (2008) study using PISA 2000 data.

Model 1: Macro-System level factors

As the association between how a country sorts its students for instruction and student achievement is central to the research question of this chapter the data was first modelled with information at the country level. The first model of table 4.3 illustrates that there is a difference of 50 (37.57 + 12.14) points in student achievement between comprehensive and highly differentiated education systems. This negative association may be related to other factors not included in this model and is not presumed to be a causal relationship. There is no significant statistical difference in student achievement between highly differentiated and internally differentiated schooling systems. Including education system factors in the first model accounts for 4% of the total variance in student achievement scores. In summary, when we considered country level effects on their own we can see there is a significant difference in the average performance of students between countries that have a comprehensive education system and those that choose to either highly differentiate their students into separate school types or those that have a high occurrence of differentiating their students to different tracks

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within schools. It is interesting that the average achievement between countries that highly differentiate and those that internally differentiate is not significantly different.

Model 2: School level factors

The second aim of the research is to explore school composition effects on student achievement in different contexts. The second model begins by looking at average school effects in explaining the variance in student achievement. The results show that schools that use ability grouping for all subjects have significantly lower student achievement in comparison to schools that either do not utilise ability grouping or utilise it only for some subjects within the school. Interestingly, there was no statistical difference in student achievement between schools that do not ability group their students, and those that use ability grouping for only some subjects. As we would expect from previous literature higher socioeconomic composition of schools is positively associated with student achievement, as is the effect of a school being highly selectivity in its intake. Once again these results have to be interpreted with caution. These contextual effects may represent systematic differences in individual behaviour across environment that has not been accounted for by explanation in terms of individual characteristics (Hauser, 1974).

Model 3: Individual level factors

Model 3 considers the usual effects of the social characteristics of students and their family background on student achievement. As is consistent with previous studies the results here illustrate that students from higher socioeconomic backgrounds have higher achievement, as well as native students, boys and those in higher academic locations.

Model 4: Education System level factors, controlling for school factors

In model 4, school factors are considered in controlling for system level effects. Does the average achievement difference between countries that differentiate their students in various ways remain when we include school factors into the model? The results show the importance of allowing for school factors in explaining the higher scores of students in comprehensive schooling systems. By including school level factors, the score points difference between comprehensive and highly differentiated education systems is reduced from 50 points to 35 score points, however this is still highly significant difference in student achievement between those in highly differentiated education systems and those in comprehensive education systems. Furthermore, once we add school factors to the model, no other system level effects

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remain significant in determining student achievement. Therefore, the main effect of how a country sorts its students for instruction remains, though other country level differences are accounted for by differences between schools.

Model 5: Educational and system level factors, controlling for individual level factors.

Model 5 is the usual but incomplete model that has been used in much comparative research on the effect of educational system differentiation on student achievement and does not account for school level factors. It simply considers the association of how a country sorts its students for instruction with student achievement controlling for individual student characteristics. By not including the school factors we can see that points score differences between the different educational systems are very different. There is only 1 point difference between highly differentiated and internally differentiated systems, and there is a nearly 31 point difference between internally differentiated and comprehensive schooling systems. Clearly, individual characteristics are very important in accounting for differences in student achievement in different education systems, but this must be combined with information about school factors.

Model 6: The complete model with education system level factors, controlling for both school and individual level factors.

The final model in table 4.3 includes information at all three levels, the country, school and individual. Firstly, comprehensive education systems are associated with overall higher average achievement compared to education systems that highly differentiate or internally differentiate their students; 27 points on average. This result is not a new finding and has been found in previous research as discussed at the beginning of this chapter. There is very little difference in achievement between highly differentiated systems and systems utilising internal differentiation (less than half a point score difference).

Highly differentiated schools (i.e. schools that use ability grouping for all subjects) also have lower mean achievement, net of other school factors. However the difference in achievement scores between different types of ability grouping at the school level is a lot smaller than that between different types of educational systems.

The complete model also illustrates again the importance of including school level factors. The socioeconomic composition of the school is related to the largest change in achievement

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scores for students. For every unit increase on the index of students' socioeconomic background, students score 16 points more. However, for every unit increase on this index at the school level in terms of school socioeconomic composition, students score 43 points more (controlling for their own socioeconomic background). Putting this in context, if the effects for one unit of standard deviation is calculated then the school composition effects are still larger than individual socioeconomic status but the effects are more similar (23 versus 15).

However, these results do not tell us whether these school effects are different depending on the education system they take place in. We know that being in a higher socioeconomic composition school is associated with higher achievement, but is this association stronger depending on the degree of differentiation at the education system level?

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Table 4.3: Macro-system level, School level and Individual effects on student achievement.

	System Level	School Level	Individual Level	System & School	System & Individual	Complete
Model:	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Predictor						
Intercept	433.24	493.72	501.30	449.14	453.29	460.75
	(31.02)***	(5.33)***	(3.58)***	(25.50)***	(29.97)***	(24.40)***
Country Level						
SYSComprenhensive	37.57 (14.32)*			26.19 (12.24)*	30.53 (13.65)*	26.88 (11.73)*
SYSInternal Diff	Ref			Ref	Ref	Ref
SYSHighly Differentiated	-12.14 (7.86)			-8.51 (8.13)	-1.31 (6.58)	-0.35 (0.97)
SYS%GDPspentonEd	2.75 (3.37)			0.85 (3.35)	1.38 (3.00)	0.87 (3.21)
SYSYrsofCompEd	-3.40 (4.23)			-5.06 (3.54)	-4.59 (3.64)	-5.45 (3.38)
SYSExitExam	-0.80 (8.55)			-1.92 (7.76)	-6.52 (5.69)	-7.34 (7.42)
SYSESCS	39.04 (18.26)*			-28.06 (18.29)	26.75 (14.26)	-8.33 (17.50)
SYS%Immigrants	0.84 (0.62)			-0.06 (0.43)	0.37 (0.36)	0.02 (0.41)
SYS%PrivDep	0.25 (0.08)*			0.26 (0.15)	0.23 (0.07)**	0.26 (0.15)
SYS%PrivIndep	-3.19 (1.59)			-1.69 (1.89)	-1.79 (1.39)	-1.35 (1.81)
SYSSchCompetition	80.41 (42.33)			53.99 (32.88)	66.42 (40.48)	53.95 (31.48)
School Level						
School Organisation						
SCHAbgrAllSubjects		-6.22 (2.49)*		-6.16 (1.50)***		-5.17 (1.34)***
SCHAbgrSome		Ref		Ref		Ref
SCHNoabgr		5.73 (3.29)		5.70 (1.09)***		1.78 (0.98)
SCHGovIndepPriv		-25.63 (8.91)**		-25.71 (3.28)***		-16.38 (2.93)***
SCHGovDepPriv		-0.97 (3.00)		-1.03 (1.62)		-0.82 (1.44)
SCHHigh selectivity		22.31 (3.05)***		22.39 (1.38)***		11.56 (1.24)***
SCHSch Size		1.44 (0.44)***		1.44 (0.13)***		0.99 (0.11)***
SCHSch competition		2.31 (1.54)		2.24 (1.12)*		0.96 (1.00)
School Inputs						
SCHESCS		82.83 (4.86)***		82.92(1.06)***		43.39 (0.97)***
SCHImmig%		-0.05 (0.01)***		-0.05 (0.01)***		-0.02 (0.00)***
SCHBig City		Ref		Ref		Ref
SCHCity		-5.60 (2.83)*		-5.58 (1.99)**		-3.98 (1.77)*
SCHTown		-1.46 (3.98)		-1.43 (1.91)		-1.21 (1.70)
SCHSmall Town		4.62 (4.29)		4.61 (2.02)*		3.21 (1.80)
SCHVillage		11.39 (4.35)**		11.36 (2.29)***		10.18 (2.05)***
School Processes						
SCHStudentTeacherRatio		0.63 (0.36)		0.64 (0.13)***		0.66 (0.12)***
SCHTeacherShortage		-3.90 (1.78)*		-3.84 (0.56)***		-2.84 (0.50)***
SCHSchedresources		-0.03 (0.97)		0.02 (0.51)		0.05 (0.46)
Individual Level						
INDAcademic Location			0.71 (0.03)***		0.71 (0.03)***	0.66 (0.00)***
INDESCS			17.69 (1.73)***		17.68 (1.73)***	16.33 (0.19)***
INDFemale			-0.59 (1.54)		-0.59 (1.54)	-0.69 (0.30)*
IND1st**GenSameLang**			-10.75 (4.17)**		-10.75 (4.17)**	-10.52 (1.13)***
IND2nd**GenSameLang**			-12.93 (2.52)***		-12.93 (2.52)***	-12.69 (0.95)***
INDNativeDifferentLang			-24.87 (2.81)***		-24.87 (2.81)***	-24.02 (1.80)***
IND1st**GenDifferentLang**			-29.64 (4.09)***		-29.64 (4.09)***	-29.29 (0.95)***
IND2nd**GenDifferentLang**			-23.30 (3.79)***		-23.30 (3.79)***	-23.07 (1.08)***
INDMissingNative			-36.64 (3.71)***		-36.64 (3.71)***	-36.44 (1.08)***
INDMissingSamelang			-31.43 (3.66)***		-31.43 (3.66)***	-31.16 (0.78)***
Random part						
σ^2_e (individual)	4637.28	4644.49	3935.94	4644.46	3935.92	3938.65
σ^2_{u0} (school)	3499.61	1166.12	1493.46	1166.45	1493.66	918.42
σ^2_{v0} (country)	169.77	361.39	269.82	143.97	140.93	132.67
Deviance	2249915.0	2243017.9	2212944.5	2242993.5	2212929.4	2209984.9

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

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The central question of this chapter is whether the relationship between school composition and student achievement differs depending on how a country sorts its students for instruction. The previous models have shown that the relationship between how a country sorts its students for instruction and student achievement remains when we control for school factors and individual characteristics but does not tell us anything about interaction effects. We are interested in knowing who wins and who loses depending on how students are differentiated.

Before the models of these cross-level interactions of interest are discussed it is helpful to look at some raw data graphs that illustrate the relationship between individual socioeconomic background, school socioeconomic composition and how differentiated the education system is. Figures 4.2, 4.3 and 4.4 below illustrate that the relationship between school composition and achievement looks different depending on the educational system the relationship takes place in, though it does not control for any other features of the country, school or individual. School composition appears to matter more in highly differentiated education systems compared to comprehensive education systems. Furthermore, the gaps between individual socioeconomic background appear wider in comprehensive systems compared to highly differentiated systems. The range achievement also varies depending on how differentiated educational systems are.

The following interaction models look at the relationships illustrated in these graphs but have the advantage of controlling for other individual characteristics, school level factors and other features of the countries educational system.

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Figure 4.2: Highly Differentiated Systems

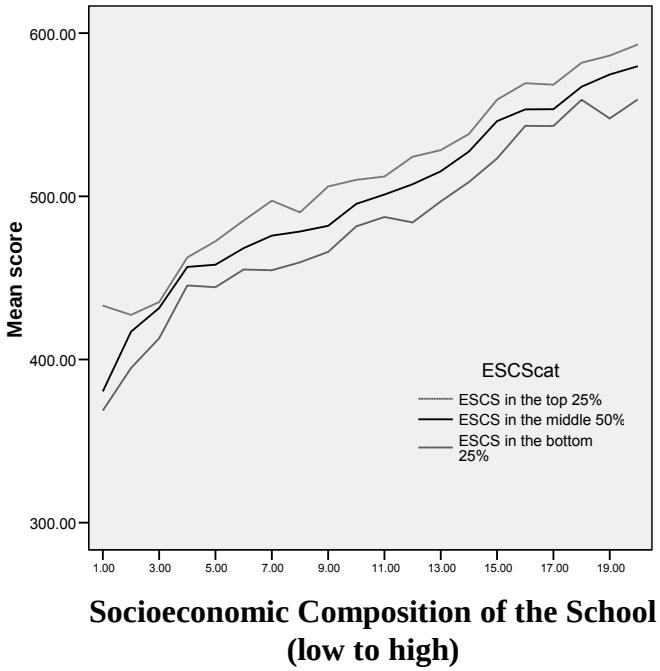


Figure 4.3: Internally Differentiated Systems

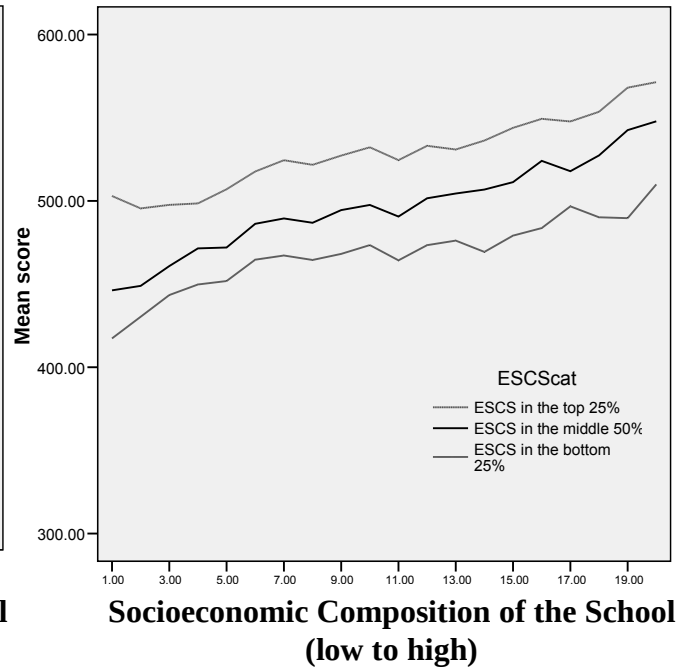
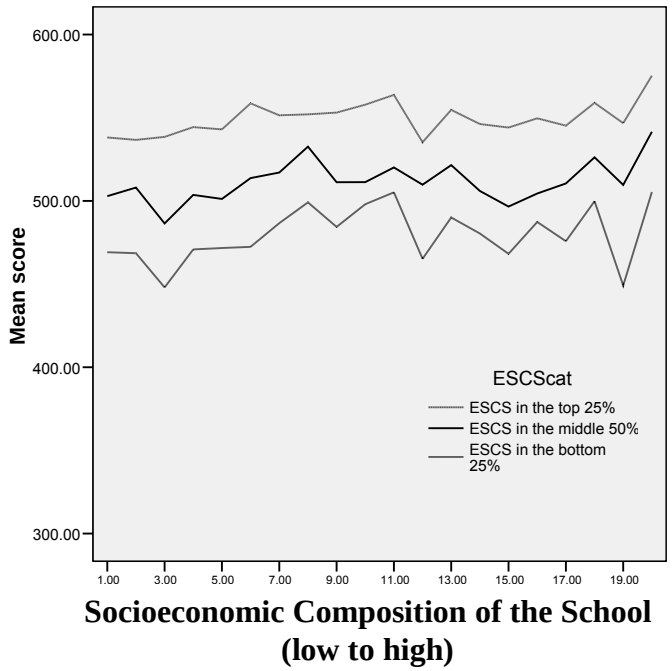


Figure 4.4: Comprehensive Systems



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Models of Cross-level interactions:

Model 1: Social Background * Education System Differentiation

The first model in table 4.4 explores inequality within education systems by examining the relationship between social background characteristics and education system differentiation. Being in a school with a high socioeconomic composition interacts positively with the degree of differentiation at the education system level as we expected in hypothesis 1. In highly differentiated systems, students in high socioeconomic composition schools have a distinct advantage in terms of achievement, over both those in lower socioeconomic composition schools within that system, and also over students in all school types in comprehensive education systems. Those in lower socioeconomic composition schools in comprehensive education systems hold an advantage over their counterparts in highly differentiated systems due to the lack of importance of school composition for student achievement within comprehensive school systems.

Therefore, we can conclude that school composition effects in highly differentiated education systems result in much greater educational inequality in comparison to school composition effects in comprehensive school systems. The relationship between school composition and student achievement does differ depending on how countries group their students for instruction.

The relationship between individual socioeconomic status and differentiation at the education system level is the opposite of what we might expect from previous research. On average, students from higher socioeconomic backgrounds are achieving better results if they are in a comprehensive education system rather than either internally differentiated or highly differentiated education systems. Students from higher socioeconomic backgrounds only have an advantage in highly differentiated educational systems if they are attending a high socioeconomic composition school, in the case that they are not, they actually have significantly lower achievement compared to their counterparts in less differentiated education systems. This is likely to be due to the fact there is not the same variance in achievement scores across schools in comprehensive systems.

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Table 4.4: Three Level Models including cross-level interactions

	Complete (no interactions)	Social Background * System Differentiation	Ability Grouping * System Differentiation	Social Background, Grouping * System Differentiation	All social background & Differentiation Effects
Model:	Model 6	Model 1	Model 2	Model 3	Model 4
Predictor					
Intercept	460.75 (24.40)***	464.68 (24.39)***	467.17 (24.58)***	468.89 (24.52)***	465.79 (24.58)***
Country Level					
SYSComprenhensive	26.88 (11.73)*	25.09 (11.69)*	25.24 (11.86)*	24.96 (11.80)*	25.83 (11.83)*
SYSInternally Differentiated	Ref	Ref	Ref	Ref	Ref
SYSHighlyDifferenciated	-0.35 (0.97)	-0.77 (7.77)	-5.58 (7.88)	-5.01 (7.84)	-4.91(7.86)
SYSESCS	-8.33 (17.50)	-1.77 (17.45)	-11.29 (17.61)	-1.83 (17.53)	1.60 (17.57)
School Level					
SCHAbgrAllSubjects	-5.17 (1.34)***	-4.82 (1.32)***	-5.69 (2.48)***	-6.32 (2.44)***	-5.94 (2.42)*
SCHAbgrAll*SYSComp			5.15 (4.99)	6.44 (4.90)	7.04 (4.87)
SCHAbgrAll*SYShighdiff			0.93 (3.01)	2.35 (2.96)	2.55 (2.94)
SCHSomeAbgrouping	Ref	Ref	Ref	Ref	Ref
SCHNoabgr	1.78 (0.98)	1.30 (0.98)	-3.29 (1.93)	-2.25 (1.89)	-2.20 (1.88)
SCHNoabgr*SYSComp			0.49 (2.81)	-1.42 (2.76)	-1.46 (2.74)
SCHNoabgr*SYSHighdiff			9.89 (2.32)***	7.64 (2.28)***	7.34 (2.27)**
SCHESCS	43.39 (0.97)***	31.41 (1.44)***	44.06 (0.98)***	29.26 (1.46)***	29.84 (1.45)***
SCHESCS*SYSComp		-12.67 (2.68)***		-12.75 (2.69)***	-13.13 (2.67)***
SCHESCS*SYSHighDiff		27.15 (1.77)***		32.21 (1.81)***	33.46 (1.80)***
Individual Level					
INDESCS	16.33 (0.19)***	21.45 (0.29)***	16.21 (0.19)***	21.15 (0.29)***	22.07 (0.32)***
INDESCS*SYSComp		2.60 (0.53)***		2.13 (0.54)***	2.92 (0.55)***
INDESCS*SYSHighlyDiff		-12.48 (0.40)***		-11.87 (0.41)***	-11.82 (0.42)***
INDESCS*SCHAbgrAll					0.81 (0.56)
INDESCS*SCHNoabgr					-3.43 (0.41)***
INDESCS*SCHESCS					3.66 (0.32)***
INDAcaLoc	0.66 (0.00)***	0.66 (0.01)***	0.76 (0.01)***	0.76 (0.01)***	0.76 (0.01)***
INDAcaLoc* SYSComp			0.06 (0.02)***	0.05 (0.02)**	0.04 (0.02)**
INDAcaLoc*SYSHighlyDiff			-0.18 (0.01)***	-0.17 (0.01)***	-0.19 (0.01)***
INDAcaLoc*SCHAbgrAll					0.06 (0.02)***
INDAcaLoc*SCHNoabgr					0.01 (0.01)
INDAcaLoc*SCHESCS					0.01 (0.01)
Random part					
σ^2_e (individual)	3938.65	3912.39	3927.59	3904.71	3901.79
σ^2_{u0} (school)	918.42	895.06	930.09	891.34	876.97
σ^2_{v0} (country)	132.67	131.76	134.19	132.81	133.60
Deviance	2209984.9	2208547.7	2209524.8	2208146.3	2207904.0

These models include all controls in table 4.3 (see Appendix D for the coefficients of the controls)

These relationships between individual socioeconomic background, school socioeconomic composition and differentiation at the education system level were illustrated in figures 4.2, 4.3 and 4.4. Figure 4.5 now illustrates the modelled data and shows the differences in achievement scores for students from different socioeconomic backgrounds in different socioeconomic composition schools in different education systems controlling for the other factors in the final model. There are three main distinctions between the different education

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systems and the relationship between socioeconomic background and achievement within each education system. Firstly is the importance of school composition in each education system. Secondly is the achievement gap between the top 25% and the bottom 25% of individual socioeconomic background in different education systems. Lastly, we take a look at the range of achievement scores in each education system.

The interpretation of these interaction between how countries differentiate their students for instruction on the one hand and socioeconomic status at the student and school levels on the other need to be interpreted in light of the other. The results show that differentiation at the system level accentuates compositional effects (the positive interaction between school socioeconomic composition and highly differentiated education systems in table 4.4). However, the pattern is less extreme for high socioeconomic status students; that is highly differentiated systems do less to magnify compositional effects for high socioeconomic status students as compared to low socioeconomic status students (the negative interaction between individual socioeconomic status and system differentiation in table 4.4). Comprehensive systems do less to reduce compositional effects for high socioeconomic status students.

Importance of School Composition

Figure 4.5 below illustrates that the relationship between school composition and achievement is statistically different depending on the educational system the relationship takes place in, as previously discussed. The gap in achievement between schools at either end of the socioeconomic school composition spectrum is substantial in highly differentiated educational systems; there is a steep slope in achievement depending on the socioeconomic composition of the school. There is a distinct lack of a slope in terms of school socioeconomic composition and achievement in comprehensive systems in comparison to highly differentiated education systems. Those in lower socioeconomic composition schools are achieving similar results to those in higher socioeconomic composition schools. Systems with internal differentiation fall somewhere in the middle, there is a relationship between school composition and achievement but it is not as strong as that in highly differentiated systems as is illustrated by the steepness of the slope.

Gap in achievement depending on individual socioeconomic background

There is a relatively narrow gap in achievement between the bottom and top 25% of individual socioeconomic background in highly differentiated systems. The gap is almost

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non-existent in low socioeconomic composition schools and is only slightly bigger in the higher socioeconomic composition schools. It is a combination of school composition and being 'selected' that are the more important factors in determining achievement in these systems. Interestingly, even though there is a weak relationship between school composition and achievement in comprehensive schooling systems, there is a larger gap between the top and bottom individual socioeconomic background. This gap is also somewhat smaller in lower socioeconomic composition schools and slightly larger in higher socioeconomic schools as is found in highly differentiated education systems. Students in education systems with high levels of internal differentiation but no external differentiation, look more like those in comprehensive education systems in terms of the gap between the top and bottom socioeconomic background students.

Referring back to Turner's (1960, p861) description of sponsored mobility and contest mobility education systems is helpful in describing these patterns. He describes the contest mobility system, or what would be described here as the comprehensive or internally differentiated education system, as avoiding "any sharp social separation between the superior and inferior students and to keep the channels of movement between courses of study as open as possible." In doing so, it may disguise the degree of separation between the elite and lower social classes as there is not an obvious distinction between schools, but rather it is within schools that the elite hold an advantage. On the other hand, sponsored mobility, as its name suggests, "embodies the logic of sponsorship, with early selection of those destined for middle-class and higher-status occupations, and specialized training to prepare each group for its destined class position." Turner (1960) argues that this type of system facilitates considerable mobility for children from lower socioeconomic backgrounds. The results here appear to support that argument in so far as that when students do get 'selected' into the higher socioeconomic schools within highly selective systems, there is very little advantage for those from higher socioeconomic backgrounds over those from lower socioeconomic backgrounds confirming hypothesis 2. Therefore, it can be argued that those from higher backgrounds hold an advantage within schools in comprehensive and internally differentiated education systems, and hold an advantage between schools in a highly differentiated education system.

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Range in achievement in each system

The range in achievement also varies depending on the type of educational system. Achievement is lowest in low socioeconomic schools in highly differentiated systems. Those students (regardless of their social background) in low socioeconomic composition schools in highly differentiated systems are scoring approximately 70 points lower than the lowest 25% SES students in low SES schools in internally differentiated systems and over 140 points lower than the lowest 25% SES students in low SES schools in comprehensive systems.

Students in low socioeconomic composition schools in internally differentiated systems achieve higher than those in highly differentiated systems, but are still achieving lower scores than those in low socioeconomic composition schools in comprehensive systems (a difference of approximately 70 points between the lowest 25% SES students in both systems).

Although the lowest achievement is found in low socioeconomic schools in highly differentiated systems, achievement is also highest in high socioeconomic composition schools in highly differentiated systems and this high achievement is not only among high socioeconomic background students, but also for those from lower socioeconomic backgrounds. The top 25% of socioeconomic background students in the highest socioeconomic schools in internally differentiated systems are scoring just about the same as the lowest 25% SES students in high SES composition schools in highly differentiated educational systems. Students from all backgrounds in comprehensive schooling score lower than those students in high socioeconomic composition schools in highly differentiated systems. Because the numbers attending lower socioeconomic schools is always larger in any given society, and students in lower socioeconomic schools in comprehensive education systems do not achieve as poorly as their counterparts in highly differentiated systems, there is an overall positive mean achievement for the average student in a comprehensive education system.

It is particularly interesting that the gap in achievement for students in high socioeconomic composition schools depending on how a country sorts its students for instruction is relatively small compared to the gap between low socioeconomic composition schools in different systems. This also illustrates why there is an overall positive mean for those in comprehensive systems as the loss for those in low socioeconomic composition schools in highly

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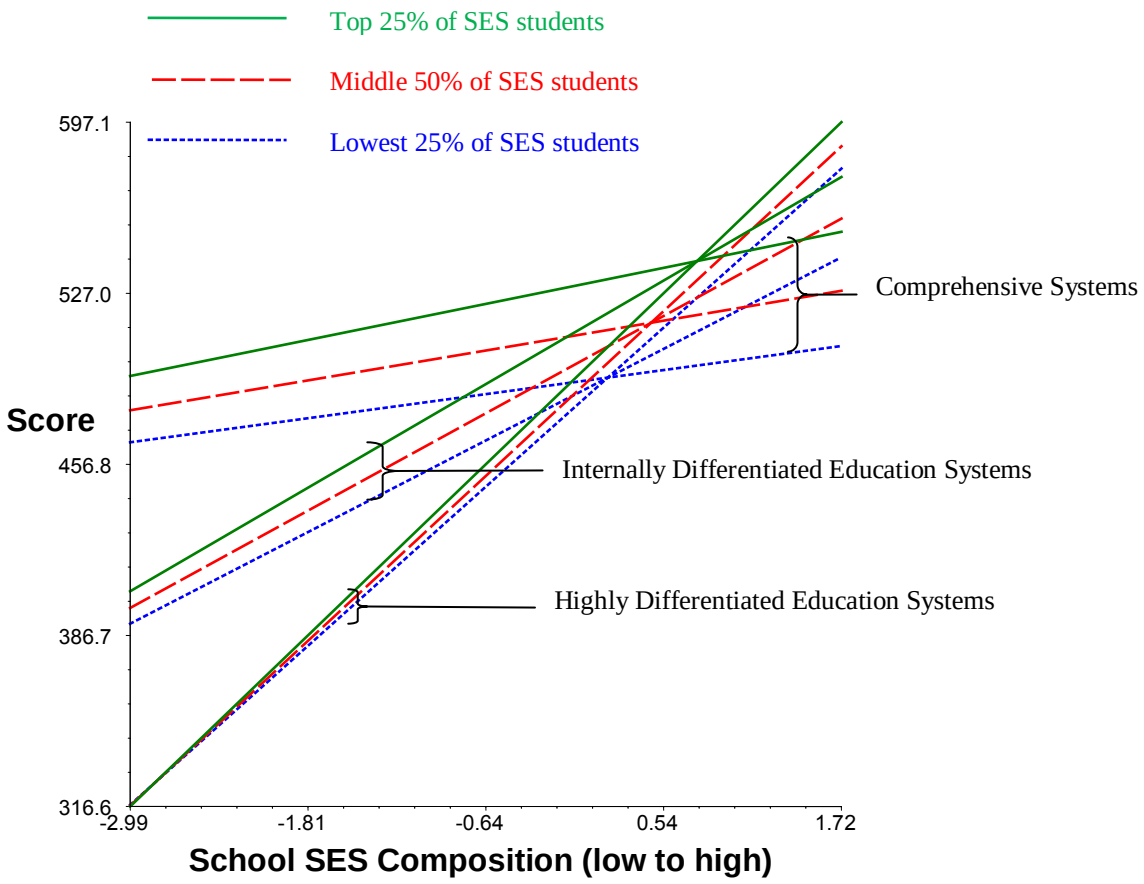
differentiated education systems is much greater than the gain at the top in those systems in comparison to comprehensive education systems.

Figure 4.5: Student achievement, Socioeconomic background, School socioeconomic composition and educational system differentiation



Model 2: Ability grouping * Education system differentiation

Proponents of ability grouping at all levels (education system or school) argue that more effective teaching can be maintained with students who are in placed in homogenous groups within broad schools on the basis of their academic ability and therefore, we could expect that the presence of more effective teaching for these 'doubly homogenous' groups would lead to better educational quality for all and higher overall achievement. However, the results from the final model in table 4.4 show that both highly differentiated education systems and a high degree of ability grouping within the school are associated with lower mean achievement for the average student. What we now want to know is how differences in ability grouping at the school level results in varying student achievement depending on how that country sorts

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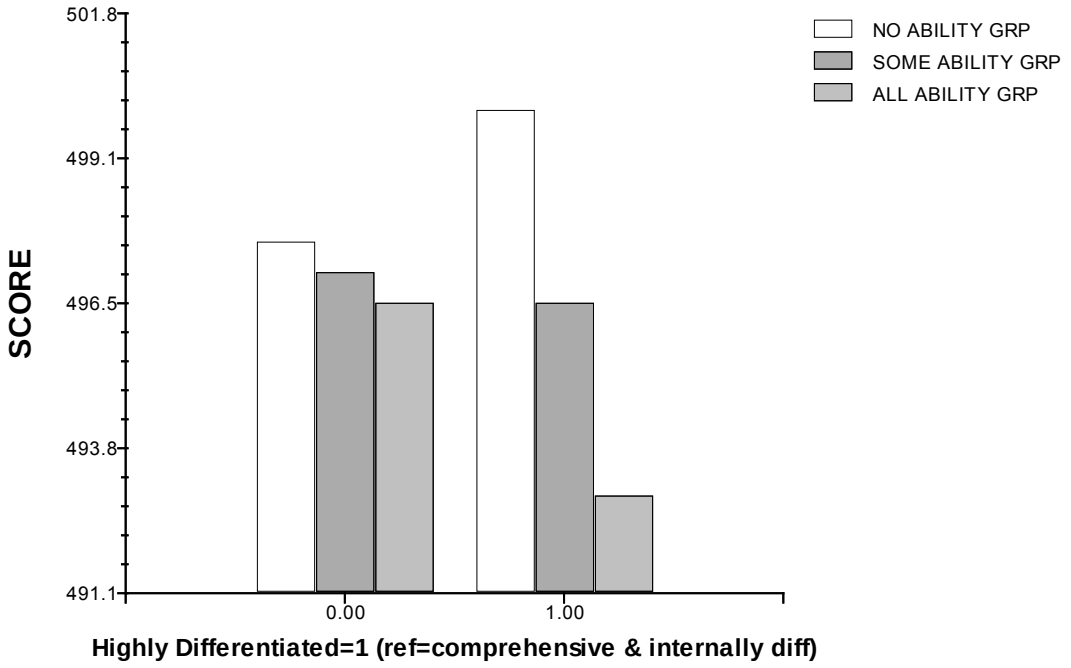
students for instruction. Model 2 of table 4.4 attempts to confirm hypothesis 3 that "Ability grouping within schools is expected to be more significant for differences in student achievement in comprehensive education systems. Students have already been sorted into distinct ability groups between schools in highly differentiated systems, therefore it is expected that ability grouping within these schools will have a smaller effect on student achievement."

The results in model 2 of table 4.4 give surprising results. For the main part, the relationship between ability grouping within schools and student achievement is the same no matter how education systems sort students for instruction. However, students that are in schools where there is no ability grouping actually do slightly better in education systems that are highly differentiated compared to those in schools with no ability grouping in comprehensive or internally differentiated education systems. Figure 4.6 below illustrates the relationship between ability grouping at the school level and education system differentiation.

Figure 4.6: Differential effects of ability grouping practices in different education systems.



Model 3: Combination of interaction effects in Model 1 & 2.

Model three combines the interaction effects of Model 1 and Model 2. The results show hardly any change in the coefficients when combining the models, and no change in the levels of significance.

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Model 4: All interaction effects.

The final model includes the interactions from Model 1 and Model 2. The model also controls for other cross-level interaction effects. Unsurprisingly, there is an interaction between individual SES and the socioeconomic composition of the school which means that those from higher social class backgrounds have higher achievement in higher socioeconomic composition schools. There is also a negative interaction between an individual students' SES and schools with no ability grouping for any students illustrating that students from higher social backgrounds do worse in schools with no ability grouping, however this negative effect is relatively small in comparison to other effects (a difference of only 3 score points).

4.7 Conclusions

In summary, students in comprehensive schooling systems have higher overall average achievement which appears to reflect students in lower socioeconomic composition schools not losing out as much as those in low socioeconomic composition schools in highly differentiated education systems. Also, it is interesting that there is very little difference in the average achievement of students in highly differentiated education systems and internally differentiated education systems. It suggests that both between-school and within-school ability grouping in education systems is negatively associated with average student performance, though it is unclear from this chapter what causes this association. Furthermore, within education systems, students in schools that use ability grouping for all subjects also have lower mean achievement than students attending schools with ability grouping for only some subjects or no subjects. Also, within schools that utilise ability grouping, it is the students from lower socioeconomic backgrounds that lose out. The effect of ability grouping within schools on student achievement did not vary considerable depending on how countries differentiated students for instruction. However, in highly differentiated systems there was a slight advantage for those in schools that did not use within school ability grouping. This relationship between ability grouping and differentiation at the education system level could be explored further in future research.

Inequality of opportunity at the individual level is not as we might expect from the evidence in previous research. Students from a higher socioeconomic background actually achieve less in highly differentiated education systems than their counterparts in comprehensive systems, unless they are in high socioeconomic composition schools. Therefore, although inequality in educational opportunity is greater in highly differentiated systems, it is mediated through

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school composition effects. However, there is a very small individual social background effect within schools in highly differentiated education systems.

The degree of differentiation of the education system determines the level to which the social class composition of the school becomes a crucial element in the achievement of students. Placement into a higher socioeconomic school is a more significant condition for achievement in highly differentiated systems. In comprehensive systems, achievement is very similar across schools with different socioeconomic compositions; therefore there is an advantage for those in lower socioeconomic composition schools in this system compared to those in low socioeconomic schools in highly differentiated education systems. On the other hand, individual socioeconomic background has a stronger effect on achievement within schools within comprehensive education systems.

Interestingly, although average student achievement varied greatly depending on the school socioeconomic composition in highly differentiated education systems, within schools the gap in achievement between students from the top and the bottom socioeconomic backgrounds was relatively narrow in comparison to students in comprehensive systems and internally differentiated systems. It appears there is greater between-school equity within comprehensive education systems, but within-school equity is higher in highly differentiated systems. Therefore, it may be more difficult to enter higher socioeconomic composition schools in highly differentiated education systems, but once students are within that school their individual background effect is not as strong.

4.8 Policy Implications

These findings all have policy relevance, especially considering the widespread debate about the move towards comprehensive education systems. The sorting effect in highly differentiated education systems appears to narrow the gap in achievement between high and low socioeconomic background students that are within the same socioeconomic composition school. If students are sorted into higher or lower socioeconomic composition schools, the importance of their individual background is no longer as important as the effect of the composition of the school. As there is less sorting in comprehensive education systems, the school composition appears to be not as important for student achievement, but within schools the students' individual socioeconomic background becomes an important factor for their achievement.

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However, this larger effect of the student's individual socioeconomic background is counteracted by the large gap in achievement depending on the school socioeconomic composition in a highly differentiated system which appears to be driving the inequality of educational opportunity within those systems. Comprehensive systems may be more equitable and also have higher mean achievement for the average student but this appears to be because of the gain of those in the lower socioeconomic composition schools. There are also greater numbers of students in lower socioeconomic schools and as the students in these schools are scoring higher on average in comprehensive systems, this is pulling up the average achievement score in comparison to those in highly differentiated systems.

How do we put value on the pay off between equity and overall achievement? This chapter has been valuable in identifying who is winning and who is losing depending on how a country sorts its students for instruction. On the one hand, if we want greater between-school equality and higher overall achievement we may want to point to comprehensive education systems. However, the payoff is greater within-school inequality in terms of socioeconomic background and a loss of achievement at the very top. On the other hand, if we want greater within-school equality and for particular students to excel at the top than we may opt for highly differentiated education. However, the payoff is greater between-school inequality, and the gap in achievement for those in the bottom socioeconomic composition schools being substantially bigger than the gain at the top.

The results in this chapter raise more questions. Does sorting inevitable lead to students at the bottom losing more than the gain at the top? Can comprehensive education somehow achieve the high scores students in high socioeconomic composition schools are achieving in highly differentiated systems without sorting students? Education systems that move towards being comprehensive education systems may equalise educational opportunity somewhat, but what this chapter illustrates is that stratification among schools in terms of their socioeconomic composition is a serious issue in highly differentiated systems while individual background remains strong within schools of a comprehensive system. This issue may need to be addressed separately from a simple move towards comprehensive education, as students may still be sorted into stratified schools within these systems on the basis of socioeconomic background.

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Further work needs to be done comparing students in high socioeconomic composition schools in highly differentiated systems to comparable students in comprehensive systems to see if it is possible determine their higher achievement beyond a 'sorting' effect. Additional work of a comparative nature is called for; furthermore, this chapter illustrates the importance of looking at how school factors have varying effects on the inequality of educational opportunity depending on how countries sort their students.

This chapter has highlighted the importance of looking at school composition and differentiation of students together when we consider differences in student achievement. The next chapter turns to taken a more in-depth look at the issue of differentiation and school composition within the Irish educational system.

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Chapter Five: Differentiation and inequality of educational opportunity between schools

5.1 Introduction

The previous chapter looked at the issue of differentiation as a characteristic of educational systems. Findings from the analysis highlight the importance of school characteristics in mediating the effects of educational system differentiation on student achievement. This chapter attempts to move down a rung on the theoretical ladder to take a closer look at the issue of differentiation between schools within the Irish educational system. At this level we look at differences between schools in terms of whether they differentiate students into distinct tracks for instruction. The following chapter will then move down to the level of the exploring track placement and curricular differentiation within schools. As outlined in the previous chapter, differentiation at the educational system level is explored by using the PISA 2006 data. At the school level of analysis the Irish-case study data is utilised, as this data is more suitable for looking at the issue of between-school differences. Ireland is an interesting case for comparison purposes. The education system does not differentiate students into distinct school types before the age of fifteen; however there is a high degree of internal differentiation within schools therefore serving as an example of an 'internally differentiated' education system described in the preceding chapter.

Previous national and international research has shown the importance of individual student characteristics on educational outcomes. It is proposed that those with particular characteristics, such as coming from a higher social class background, have significantly more positive outcomes, even when taking prior ability into consideration. Although this thesis attempts to establish this phenomenon, the grounds of the research has an institutional perspective and therefore argues that over and above individual characteristics, the school also plays a role in shaping students short-term and long-term experiences. The previous chapter examines the role of differentiation between education systems in offering unequal educational opportunities. This chapter addresses the second research question by looking at between-school differences in scholastic and non-scholastic student outcomes. Therefore, this chapter attempts to answer the following question:

> Does the differentiation of students in the form of tracking, school socioeconomic composition and the academic competitive environment of a school result in unequal outcomes for particular groups of students?

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As mentioned previously, the focus here is at the school level and how organisational practices and characteristics at the school level offer differentiated educational opportunities. Does being in a formally tracked or non-tracked school have an association with a student's scholastic and non-scholastic outcomes? Furthermore, does being in a school with a concentration of students from lower social backgrounds also influence student outcomes above their individual characteristics? What role does the academic confidence of students within a given school play in creating unequal outcomes? As already argued in chapter one, previous tracking research has looked at how ability grouping produces unequal outcomes for different groups of students, however this generally has not taken account of school level differences in terms of school types or school composition[12]. The aim here is to combine three school level factors, whether the school uses formal tracking, socioeconomic composition of the school, and how academically confident the students are within a school to look at differences in student outcomes.

Borrowing from both the economic and organisational definitions of school effectiveness (Scheerens & Bosker, 1997) the concept here is of schools as organisations that have particular processes to turn inputs into outputs. Inputs of a school include the students that have particular given characteristics. Outputs include student attainment at the end of schooling and the transformation process within a school is composed of a number of factors which include teaching and learning methods, curriculum choices and organisational conditions that make it possible for pupils to learn. The chapter focuses on the relationship between school characteristics in terms of how they differentiate students (inputs) and outputs which is measured here in terms of both scholastic and non-scholastic student outcomes at the end of lower secondary schooling.

A number of school practices have been shown to affect student achievement: tracking practices, decision-making practices, including teacher and parental involvement in decision-making (e.g. Lee & Smith, 1993, 1995; Lee, Smith & Croninger, 1997; Morgan & Sørensen, 1999); teacher expectations & efficacy, as well as their instructional practices (Carbonaro & Gamoran, 2002; Lee, Smith & Croninger, 1997); and the social and academic climate of schools as reflected by measures such as the number of advanced academic courses taken by

[12] Composition effects in this chapter are primarily social class composition effects. Ethnicity effects are not included as there were no significant differences between Irish students and non-Irish students.

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students, and the amount of homework that they do (Lee & Smith, 1993, 1995; Lee, Smith & Croninger, 1997).

5.2 Tracking

Studies have shown a link between socioeconomic disadvantage and tracking. Previous studies show that characteristically, schools with a large intake of students from a low socioeconomic background are most likely to use tracking. Furthermore, it has been shown that students from lower socioeconomic backgrounds are more likely than their peers to be assigned to the lower tracks within these schools. Here, the analysis allows us to compare schools that chose to track their students for instruction and schools that do not. This chapter attempts to marry both tracking and composition effects in order to have a greater understanding of between-school differences in academic and non-academic outcomes for students during their lower secondary schooling. We compare the average achievement of students in tracked and non-tracked schools whilst controlling for other institutional characteristics of those schools, most importantly school social class composition and the academic competitive environment of the school. This determines if there is an average achievement difference between tracked and non-tracked schools, and if this can be accounted for by other features of those schools. Furthermore, it is important to look at the differential achievement of students within both settings. As already mentioned, those from lower socioeconomic backgrounds are more likely to find themselves in the lower tracks. Here, the thesis explores who wins and who loses within tracked situations, if those from lower socioeconomic backgrounds are disadvantaged in tracked schools compared to their peers.

5.3 School Composition

Students react to their peers as well as to school structures; and schools in turn react to the composition of the student body. Previous research has identified a link between differences in achievement scores and differences in the composition of the student body within the schools. There is a well-established and clear effect of prior achievement on current achievement and accounts for a large proportion of the variability. However, evidence shows that when we look at two pupils with similar prior achievement scores but attending different schools, the difference in these scores can be predicted depending on the characteristics of the other pupils in their schools. Such a peer effect, it is argued, should be an important covariate in models that seek to account for group and individual performance differences.

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Hurn (1993) also highlights student peer effects and argues that as student's aspirations are shaped by their peers it is important to consider the social class composition of the school; students from lower socioeconomic backgrounds may not have successful educational outcomes if they are attending schools with a high concentration of other students from lower socioeconomic backgrounds. According to recent literature large numbers of high status students concentrated together will raise aspirations and achievement due to a number of various factors. There is a possible peer group effect when higher status students are concentrated together, and this concentration can also allow for both more teaching and learning time within the classroom and access to a different curriculum offer. Similarly, large numbers of low status pupils tend to have the opposite effect in terms of disruption of teaching and learning time and a more limited access to the curriculum.

The previous chapter illustrated the importance of school socioeconomic composition effects depending on how the country sorts its students for instruction. In this case Ireland is an 'internally differentiated' education system. Therefore, it is hypothesised that school composition effects will be strong, in line with the findings from the previous chapter.

5.4 Tracking and Socioeconomic Composition

There is an association between social class composition and tracking, with tracked schools having a lower social class composition. It is possible that schools track their students in response to the social class composition of its students. Schools that track their students in Ireland are often characterised by having a low socioeconomic demographic. Furthermore, schools may track their students due to perceptions about their abilities. There is a negative correlation between tracking and ability upon entry in the Irish case-study schools (-0.44), suggesting that perhaps schools track due to the overall lower ability level of their students. A main argument given for tracking by school personnel is not the average student ability per se, but the range in abilities.

The data does not support this theory as tracked schools have actually less variation in the entry scores of their students in comparison to the non-tracked schools at the beginning of lower secondary education as illustrated by figures 5.1 and 5.2 below. However, schools may feel that either because they have a low socioeconomic composition or because the overall ability level is low, they will track their students to give those students with a higher academic ability an advantage in terms of achievement by separating them from other students. This

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would explain why we see the correlation between socioeconomic composition and tracking in Ireland. This may also be true in other countries depending on the nature of the education systems within those countries. This association between the mean socioeconomic background and whether the school uses ability grouping or not can also be seen in countries such as the UK, Australia, Canada, Italy and Norway when we look at the mean socioeconomic composition of schools that do not use ability grouping, use some ability grouping and use only ability grouping using the PISA 2006 data. However, in some countries, such as the United States, the mean socioeconomic background of schools that use ability grouping for all subjects is the highest. This may be due to other distinct characteristics of those schools, such as schools that track a lot also are in the private sector.

Figure 5.1 Variation in Mathematics entry scores between tracked & non-tracked schools

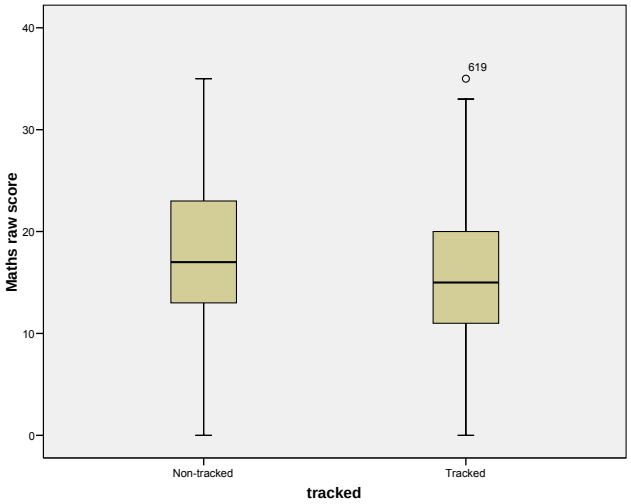
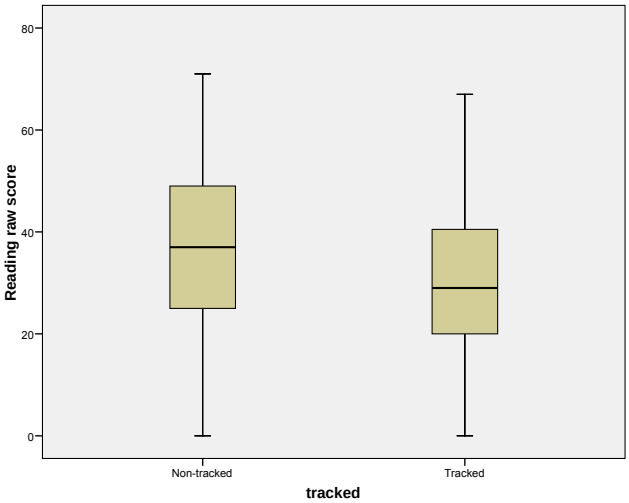


Figure 5.2 Variation in Reading entry scores between tracked & non-tracked schools



5.5 Academic Competitiveness in School

There is, however, another consideration in that students may suffer due to the competitive nature of being concentrated in a high status group of students. Meyer (1970: 63) argues, "the higher the academic worth of the other students in his school, the lower will be the academic worth of any given student; and consequently, the less likely he will desire, or feel encouraged, to go to college." Marsh (1984, 1987) hypothesised that students compare their own academic ability with the academic abilities of their peers and use this social comparison impression as one basis for forming their own academic self-concept. This composition effect occurs when equally able students have lower academic self-concepts if the compare themselves to more

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able students, and higher academic self-concepts if they compare themselves with less able students. In these situations it would be hypothesised that academic self-concept will be correlated positively with individual achievement but negatively related to class-average achievement. Marsh (1987:292) argued "for at least some children, the early formation of a self-image as a poor student may be more detrimental than the possible benefits of attending a high-ability school." Therefore, it is also theorised that attending a school with other high-achieving students may lower self-esteem and have a discouraging effect on educational achievement independently of social class status.

There is a possibility that the statistical procedures, which indicate the existence of a compositional effect, are misleading and are 'phantom effects' (see Hutchinson, 2007). This has been variously referred to as 'mopping up variance at the second level, inadequately specified models etc.' It has been written about by several writers, but is often ignored by theorists who often seem to assume the effect exists. Although this chapter looks at compositional effects, it is important to keep in mind that the variance will inevitably include an element of 'phantom effects.' Furthermore, compositional effects are often found to be small, but this may be due to the stringent requirement that the aggregate characteristic of a student group significantly predicts student outcomes as well as or better than an array of individual characteristics. Therefore, compositional effects have to be interpreted with caution, though theoretically we would expect to find some peer effect as students are not in isolation to each other and common sense would have us believe there is some effect of the students' surroundings.

5.6 The Research Aim

Previous research has shown that differentiating students into tracks and/or schools of varying socioeconomic compositions results in unequal outcomes and opportunities for students. Furthermore, peer effects, in how students rate themselves academically also affect the achievement of individual students. The central concern of this thesis is to examine links between the differentiation of students and their outcomes during lower secondary education in order to examine the assertion of conflict theory that schools are reinforcing and reproducing societal inequalities. The research sets out to understand if those from a higher socioeconomic background benefit the most. Therefore, firstly the research explores the average achievement of students in tracked and non-tracked schools controlling for other aspects of the school. Secondly, the research addresses whether students from higher

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socioeconomic backgrounds maintain an advantage in tracked schools when we take other forms of differentiation into account.

5.7 Hypotheses

In summary, previous research has shown that school effects in terms of tracking, the socioeconomic composition of a school and the competitive environment of a school have an impact on student achievement. The question therefore, is who gains and who loses when we consider these factors together? Based on the literature and keeping the main research question in mind, the following three hypotheses are derived.

> *Hypothesis 1: Inequality of educational opportunity is stronger in schools that track their students compared to non-tracked schools, controlling for socioeconomic composition.*
>
> *Hypothesis 2: School socioeconomic composition is significantly important for student achievement as was observed in the previous chapter. However, as can be observed in figure 4.5, there is a growing gap between students from high and low socioeconomic backgrounds as school composition increases. Therefore, we expect those from higher socioeconomic backgrounds to have significantly better outcomes in schools with a higher socioeconomic composition .*
>
> *Hypothesis 3: Those from higher socioeconomic backgrounds benefit more in schools with a higher composition of those who are academically confident controlling for their own levels of academic confidence*[13].

5.8 Data and Method

Data from the database which was developed for a review of the Junior Cycle in Ireland (2002-2006) was used for this part of the analysis. This review, which was designed by the Economic and Social Research Institute (ESRI) and funded by the National Council for Curriculum and Assessment (NCCA), employed a two-step sampling procedure to select a theoretical sample of 900 students in 12 case study schools. This chapter utilises data on the final twelve case-study schools by combining information gathered in the third year of the longitudinal study with the exam results of those students.

This thesis examines differentiation effects in a multilevel fashion which involves individual students nested within schools. In this chapter the effect of being nested in schools is examined by looking at the differences between schools in terms of individual and school level effects. The subsequent chapter will include track placement and curricular

[13] As it may be argued that hypothesis 3 is partly explained by the higher academic confidence of those of higher socioeconomic backgrounds and the lower confidence of those from lower socioeconomic backgrounds.

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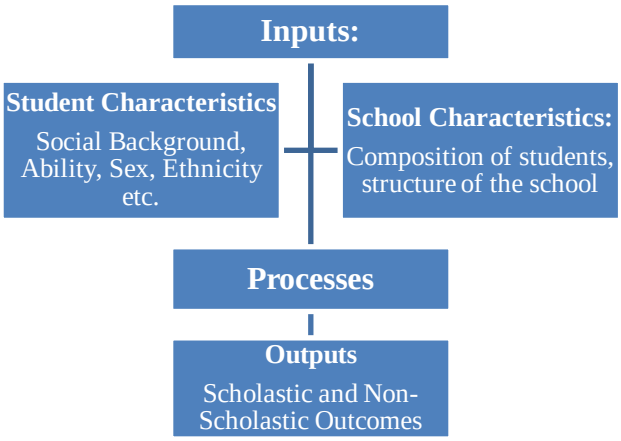
differentiation in order to examine within-school differences. As described in both the economic and organisational models of school effects, variables can be described in terms of inputs, processes and outputs. At the school-level in this analysis, inputs include the compositional characteristics of the student body (in terms of their socioeconomic background and how academically confident they are) and the structural characteristics of the school. The output variables in this chapter are divided into scholastic and non-scholastic outcomes.

Figure 5.3: Inputs, Processes and Outputs.



Analyses in this chapter focus on aggregate exam performance rather than the grades achieved in individual subjects as the output variable. The main aggregate variable is a combination of the three core compulsory subjects (Irish, English and Mathematics) and the optional subjects students take for the Junior Certificate exam (nearly 80% of the sample took 10 subjects for the Junior Certificate exam). Only students who had taken more than four subjects are included in the analysis, though this excludes less than one per cent of the student cohort. 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 an Honours level paper. Students who failed an examination paper were allocated a score of zero.

Allocation of Junior Certificate Grade Point Averages.

	Honours 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

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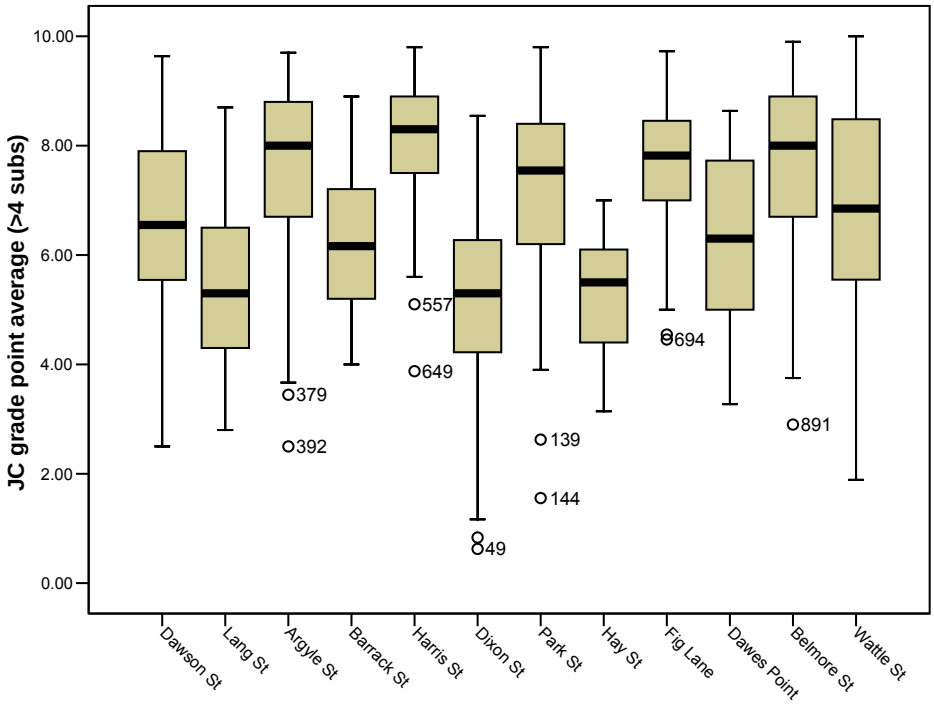
In determining non-scholastic outcomes a scale variable was created from 25 items that students were asked in the questionnaire. These items are an overall scale of the items included in 'liking school', 'liking teachers', 'positive interaction with teachers', 'negative interaction with teachers' and 'feelings of isolation.' The aim was to create an overall scale that would encompass their overall feelings of satisfaction in school which would give some indication of the school climate. For a more detailed description of this variable and the items it includes there is a further description in chapter three.

5.9 Results- Scholastic Outcomes

In order to explore whether there are differences between the case-study schools in terms of overall student achievement in the Junior Certificate exams, it is helpful to examine their achievement scores in a comparative box-plot (figure 5.4). As can be seen from figure 5.4 there is a variation between the schools in terms of pupil Junior Certificate grade point average.

Figure 5.4: Differences in Junior Certificate Grade Point average between the schools.



First of all the intercept only model was examined, on both the individual level and then on the two levels (individual and school) to determine if a two-level model was appropriate to analyse the data. Unsurprisingly, the model fit is better for the two-level model therefore indicating that a two-level model was more appropriate. The model without any independent variables has a total variance of 3.10 and the deviance/log likelihood is 3240.9. The interclass

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correlation equals 0.30. Thus, 30% of the variance of the Junior Certificate grade point average scores is at the school level (however, this 30% also includes a partial phantom effect as mentioned in the introduction to this chapter).

5.9.1 Tracked and Non-Tracked Schools

Many of the key personnel in the case-study schools that utilised mixed ability base classes saw the advantage of having mixed ability base classes as being that the weaker students benefited from being mixed with academically stronger pupils which is illustrated by the quote below.

> By having them in mixed ability classes they are, the weaker ones will hopefully learn a bit from the stronger ones and might even be a little bit motivation because there are students who are doing that little bit better than them. (Fig Lane, coeducational, non-tracked, middle class composition)

On the other hand, an argument from many personnel in schools that utilised tracking was that it would enable those academically stronger to excel and give those who are weaker academically to obtain special attention.

> The advantage I suppose is that the better group can advance without being held back, if you one could put it like that and the group which has difficulties then is a smaller group, so it gets easier then from the teachers point of view to deal with a smaller group of students is better. (Dawes Point, boys, tracked, working class composition)

This raises the question, which system is better for average student academic achievement at the end of lower secondary schooling? Are there significant differences in the overall performance of students between schools that use tracking and those that do not? The box-plot in figure 5.5 below shows the difference in Junior Certificate grade point average for those in non-tracked schools on the left and those in tracked schools on the right. It is clear from this figure that those in schools that use tracking have a lower Junior Certificate grade point average compared to students in schools that do not track their students[14]. We do not know if this difference is significant and which groups of students benefit or lose out in

[14] The box-plot is also interesting in comparison to the box-plot of entry level scores. For entry level ability, there was actually more variance in scores in schools that did not utilise tracking. However, in looking at the achievement scores at the end of lower secondary schooling, there is greater variation in achievement in the tracked schools. This may be another possible indicator that tracking has a differentiating effect on student achievement. These issues will be explored more in the next chapter.

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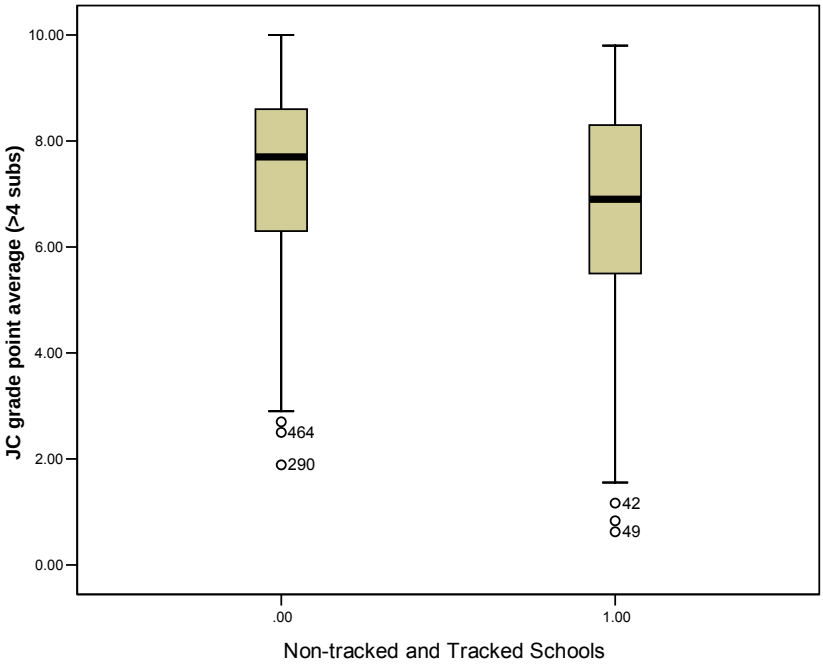
tracked schools and which groups of students win or lose in schools that do not track their students for instruction.

Figure 5.5: Differences in Junior Certificate Grade Point average between Non-Tracked and Tracked Schools.



In order to explore the differences between tracked and non-tracked schools the following models look at these differences controlling for individual characteristics and the socioeconomic composition of the school. The models begin with the school level characteristic of whether the school uses tracking in differentiating its students. The reason for building the models in this way has a theoretical basis. The aim is to explore school level influences. We begin by posing the question: is the lower Junior Certificate grade point average in schools that use tracking significantly lower than the Junior Certificate grade point average in schools that do not use tracking? The results in the first model indicate that being in a formally tracked school has an overall significant negative association with students Junior Certificate grade point average outcomes (p=0.02). The difference we can observe between tracked and non-tracked schools in figure 5.5 is slightly significant and shows a one grade difference between tracked and non-tracked schools.

Model 2 introduces individual level characteristics, gender and social class. The negative relationship between attending a tracked school and Junior Certificate achievement remains, however the relationship is only barely significant when we take individual characteristics

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into account (p=0.04). Unsurprisingly there is a strong relationship for both gender and social class, and differences in Junior Certificate grade point average, with girls and those from higher social class backgrounds achieving higher grade point average scores.

Model 3 shows the importance of school social class composition. Being in a school with a higher concentration of students from higher social backgrounds has a positive relationship with a higher Junior Certificate grade point average in accordance with the literature. Furthermore, this effect is over and above any individual social class effect. When we add social class composition effects of the school we can also see that the difference in grade point average between tracked and non-tracked schools is no longer significant. This would suggest that much of the achievement gap between tracked and non-tracked schools is due to the lower socioeconomic composition of tracked schools.

Cross-level interactions were added in models 4 to 7 in Table 5.1. Model 4 finds no significant cross-level interactions between school tracking and individual characteristics of gender and social class meaning being in a tracked school has the same effect on boys and girls and on all social classes.

It is interesting that the social class composition effect hits all social classes in the same way, as shown in Model 5, meaning that students from all social class backgrounds are equally advantaged when in a school with a higher concentration of high social class students. Higher social class students do not have any more of an advantage when in a school with a higher concentration of higher social class students. Similarly, they are not any more disadvantaged when in a school with a higher concentration of students from lower social class backgrounds. Students in higher socioeconomic composition schools do better than those in lower socioeconomic schools. Furthermore, boys do better in keeping up with girls in higher socioeconomic composition schools compared to lower socioeconomic composition schools, though this is not statistically significant.

Model 6 includes all individual level characteristics, school composition effects and cross-level interactions.

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Table 5.1: School Tracking, Individual and School Level Effects on Junior Certificate Grade point average Achievement, N=812

Model: *Fixed Part*	*M1: +School Tracking*	*M2: + Individual Characteristics*	*M3: + Composition Effects*	*M4: + Tracking Interactions*	*M5: + Social Class Composition Interactions*	*M6: + All interactions*
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	7.17 (0.34)***	6.96 (0.28)***	6.91 (0.18)***	6.96 (0.19)***	6.84 (0.18)***	6.83 (0.17)***
Tracked	-1.00 (0.49)*	-0.63 (0.38)*	-0.09 (0.25)	-0.18 (0.37)	0.04 (0.25)	-0.05 (0.40)
Female		0.43 (0.15)**	0.47 (0.14)***	0.41 (0.18)*	0.60 (0.17)***	0.57 (0.23)*
Social Class		0.20 (0.03)***	0.19 (0.03)***	0.19 (0.04)***	0.17 (0.03)***	0.16 (0.04)***
School Social Class			0.65 (0.14)**	0.64 (0.14)***	0.65 (0.21)***	0.63 (0.23)**
Tracked*Female				0.16 (0.29)		0.01(0.30)
Tracked*Social Class				0.01 (0.06)		0.02 (0.06)
Sch Social Class*Female					-0.28 (0.16)	-0.28 (0.16)
Sch Social Class*Social Class					0.03 (0.03)	0.03 (0.03)
σ^2_e (Student)	2.17	1.98	1.98	1.98	1.98	1.98
σ^2_{u0} (School)	0.68	0.37	0.10	0.10	0.09	0.09
Deviance	3231.9	2889.6	2876.4	2876.1	2872.7	2872.6

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

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In summary, these models look at the differences between tracked and non-tracked schools. From the results we could conclude that there are differences between tracked and non-tracked schools in terms of the grade point averages their students achieve in the Junior Certificate state examination. However, these differences appear to be due to individual characteristics, such as gender, social class and school compositional effects, particularly the social class composition of the school.

5.9.2 Academic Self-Rating

Some of the key personnel in the case-study schools thought that a potential consequence of tracking students is a diminished confidence of the students in their own skills, particularly in the lower ability groupings.

> Certainly I think in first year I wouldn't label them so early. There is the whole thing of the self fulfilling prophecy there (Fig Lane, coeducational, non-tracked, middle class composition)

> Sometimes I wonder about grouping the children that have the least ability together. Because they inevitably present with behaviour problems as well. They have a very poor self image because they know they are the lowest class. And it's almost like a self fulfilling prophecy. If I am classed as being no good I will act no good. (Lang St, boys, tracked, working class composition)

On the other side of the coin, those in a formally non-tracked system mentioned that this raised the confidence and motivation of all students.

> Pupils that are socially fine would tend to label themselves if they were put into a grade that would seem to be remedial. Their confidence in mixed ability is good. (Barrack St. School, girls' school, non-tracked, working class composition)

> The better students tend to motivate and lead the weaker student and the most important thing I think is that if they are streamed, you tend to stigmatise that group and some individuals in particular and that seems to stay with them for life. (Wattle St, boys, non-tracked, mixed social class composition)

This section of chapter five includes possible peer effects in explaining the relationship between school tracking and lower average achievement. Peer effects, we might expect, will be stronger in tracked schools, due to the nature of the homogeneous groupings, and as a result may lower the achievement of some students. Presumably students in tracked schools could be described as more likely to be little fish in big ponds and may be more likely to feel academically inferior in comparison to their peers when placed in a clearly hierarchical structure of grouping.

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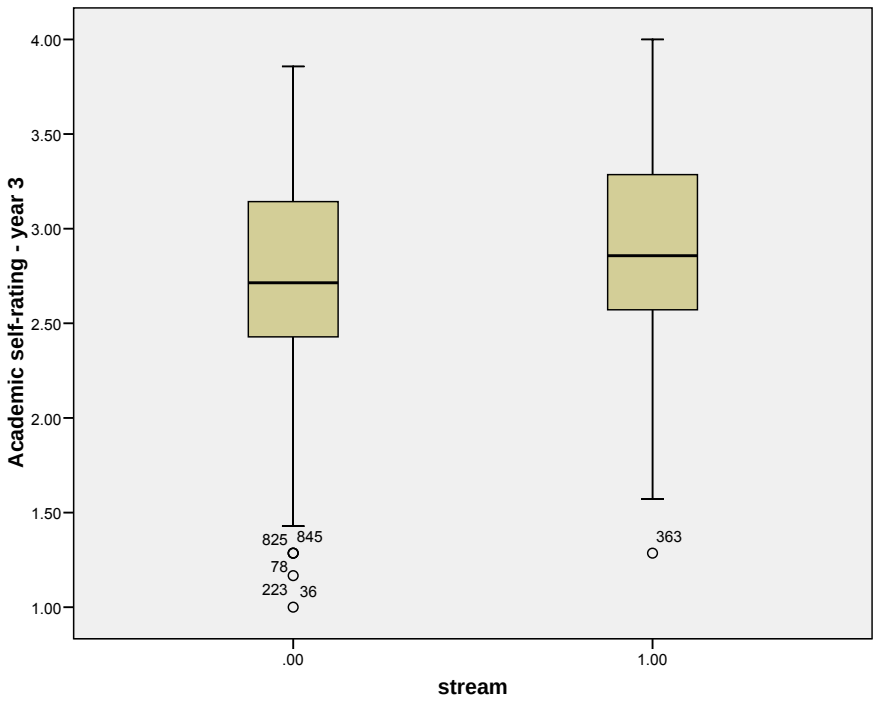
To study this issue, the analysis uses information on how students rate their own academic ability by the end of lower secondary schooling. The analysis looks at 'academic self-rating' which is a scale variable based on how the students felt they were doing academically (for a more detailed description see chapter three). A number of questions arise based on how students rate themselves academically. It is likely to be positively associated with student achievement in the Junior Certificate. However, is the relationship between a students academic self-rating and their achievement different depending on whether they attend a tracked or non-tracked school? Does the composition of the school in terms of being concentrated in a school with others that rate themselves positively or negatively relate to achievement?

The box-plot in figure 5.6 below shows the difference in the academic self-rating for those in non-tracked schools on the left and those in tracked schools on the right. It is clear from this figure that those in schools that use tracking appear to have a higher academic self-rating on average compared to students in schools that do not track their students, contrary to the expectations of the key personnel above. What is the relationship between academic self-rating, tracking and Junior Certificate achievement?

Figure 5.6: Differences in Academic Self-Rating between Non-Tracked and Tracked Schools.



Model 1, which only includes tracking as an explanation for the variation in achievement scores, is repeated in order to be compared with the next set of models. Model 2 shows again

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how gender and social class are positively associated with Junior Certificate grade point average. Furthermore, having a higher academic self-rating is also positively associated with a higher Junior Certificate grade point average. It is unsurprising that those who have confidence in their academic ability also achieve higher scores in the Junior Certificate.

Model 3 adds compositional effects into the previous model. Social class composition has a significant positive relationship with Junior Certificate achievement, as already mentioned. Interestingly, pupils in schools where there is a higher mean academic self-rating score significantly lower Junior Certificate grade point averages. This appears to support the literature mentioned in the introduction (Meyer, 1970) that argues that it is better to be a big fish in a small pond rather than a small fish in a big pond. It is important for pupils to have confidence in their own academic ability, but being concentrated with other students with high confidence in their ability appears to have a negative effect on pupils' scores.

Table 5.2: School Tracking, Individual and School Level Characteristics, and Academic Self-Rating Effects on Junior Certificate Grade point average Achievement, N=812

Model:	*M1: +School Tracking*	*M2: + Individual Characteristics*	*M3: + Composition Effects*
Fixed Part			
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	7.17 (0.34)***	6.99 (0.29)***	6.85 (0.17)***
Tracked	-1.00 (0.49)*	-0.76 (0.40)*	0.13 (0.28)
Female		0.42 (0.14)**	0.44 (0.13)**
Social Class		0.18 (0.03)***	0.17 (0.03)***
Acadrate		1.03 (0.09)***	1.03 (0.09)***
School Social Class			0.64 (0.13)***
School Acadrate			-3.26 (1.75)*
Random part			
σ^2_e (Student)	2.17	1.72	1.72
σ^2_{u0} (School)	0.68	0.43	0.15
Deviance	3231.9	2775.3	2770.5

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

Cross-level interactions were added in models 4 to 8 in table 5.3 below. Model 4 explores tracking interactions with gender, social class and the individuals academic self-rating. As can be seen from the results there are no significant tracking interactions. It is particularly interesting that there is no relationship between an individuals academic self-rating, being in a tracked school and their achievement in the Junior Certificate examinations. Therefore, the

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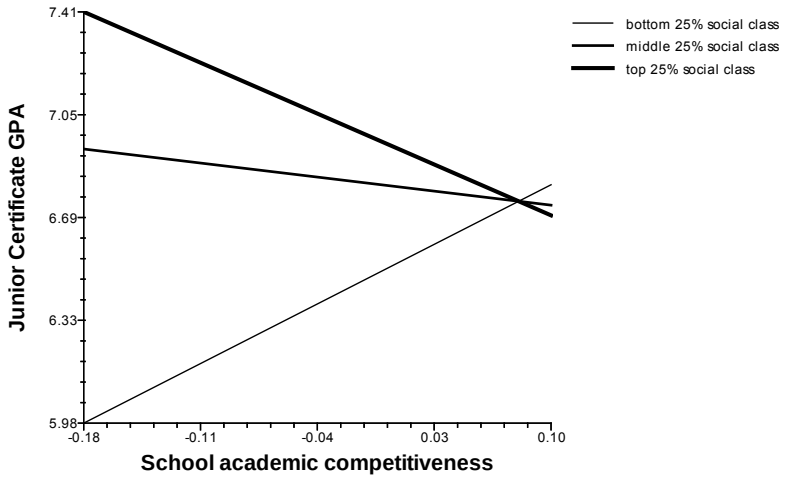
relationship between an individual student's academic self-rating and their achievement does not differ significantly between tracked and non-tracked schools.

Model 5 then explores the social class composition of the school and its interactions with gender, social class and the individuals academic self-rating. Once again, there appear to be no significant interactions between the social class composition of the school and individual level characteristics in terms of achievement in the Junior Certificate examinations.

Interactions between the average academic self-rating of the school and individual characteristics of gender, social class and individual academic self-rating are set out in Model 6. The results show a significant negative association between the interaction of the school level academic self-rating and the individual's social class with Junior Certificate grade point average. We know from the previous models that social class is positively related to academic achievement. Furthermore, those in schools with higher academic confidence have are hindered by the academically competitive environment. However, this is not the case for all students. This interaction term suggests that those from low socioeconomic backgrounds are achieving more in academically competitive schools and those from higher social backgrounds are doing better academically in schools that are less competitive. Figure 5.7, which is based on the modelled data, more accurately describes the relationship between academic achievement and academic competitiveness in schools for students from different social backgrounds.

Figure 5.7: Academic achievement and academic competitiveness among different social classes.



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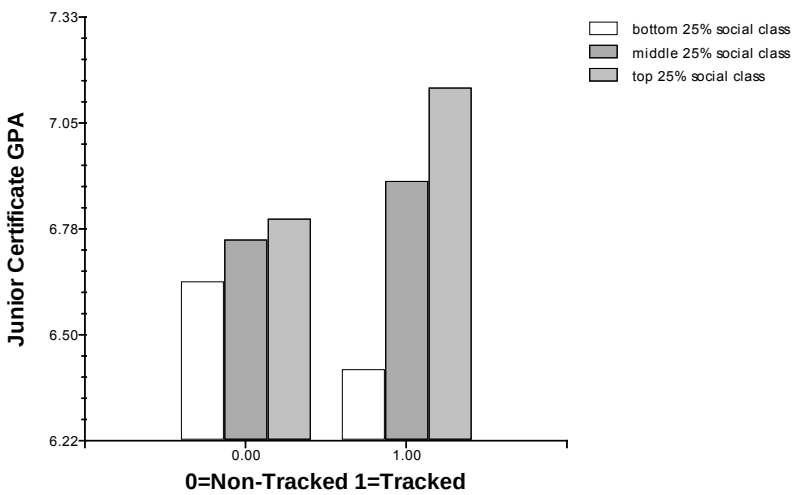
Model 7 includes all interaction terms, significant and non-significant. The final model in Model 8 includes only significant interaction terms and main effects. The model displays the relationship between an individual's social class, the type of school they attend and Junior Certificate achievement. Although tracking has an overall negative association with student achievement due to its overall lower socioeconomic composition, within tracked schools those from higher social class backgrounds have a more positive association with achievement than those from lower social class backgrounds confirming the first hypothesis. In other words, there is evidence of inequality of opportunity as those from lower social backgrounds have a disadvantage in schools that track. This is particularly well illustrated in figure 5.8 where we can see the differential achievement of students from different social backgrounds in tracked and non-tracked schools (controlling for gender, academic confidence, school social class composition and school academic competitiveness).

It may be argued that the differential achievement seen in figure 5.8 is due to prior ability as it is not controlled for in these models that utilise the full dataset of 12 schools at the end of lower secondary schooling. Therefore, the results of this model were assessed in a model of the 10 schools (n=535) at the end of lower secondary schooling that had prior achievement scores for students. The results show that even controlling for prior ability, the pattern of inequality in educational opportunity hold within tracked schools and are shown in Appendix A.

Figure 5.8: Academic achievement among different social classes within tracked and non-tracked schools.



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Student achievement is higher in higher socioeconomic composition schools and gives the same advantage to all students regardless of sex, individual social background or how they rate themselves academically. Therefore, the second hypothesis which is based on findings from the previous chapter, that school composition would benefit students from higher social class backgrounds does not hold in this case. Being in a school with students who rated themselves highly academically has a large negative effect on student achievement, more than three grades for every unit increase in academically competitive schools. However, this effect was only slightly significant. Those from higher social backgrounds appear to suffer the peer effect of attending schools with a higher composition of students that rate their academic abilities highly and students from lower social backgrounds appear to 'catch up' to their better off peers in academically competitive schools. These results were not found to hold when examining achievement among students in 10 schools with prior ability scores, however this may be due to the small number of cases rather than as a result of controlling for prior ability and would be best explored with a larger sample of students.

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Table 5.3: School Tracking, Individual and School Level Characteristics, Academic Self-Rating and Interaction Effects on Junior Certificate Grade point average Achievement. N=812

Model: *Fixed Part*	*M4: + Model 3 + Tracking Interactions*	*M5: + Model 4 + Social Class Composition Interactions*	*M6: + Model 4 + School Academic Rating Interactions*	*M7: +All interactions*	*M8: + Only significant interactions*
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	6.53 (0.25)***	6.45 (0.24)***	6.51 (0.24)***	6.44 (0.27)***	6.51 (0.23)***
Tracked	0.13 (0.37)	0.18 (0.35)	0.10 (0.37)	0.16 (0.40)	0.10(0.34)
Female	0.44 (0.17)**	0.52 (0.16)*	0.38 (0.16*)	0.50 (0.27))	0.43 (0.13)**
Social Class	0.15 (0.04)***	0.16 (0.02)***	0.15 (0.03)***	0.05 (0.05)	0.05 (0.04)
Acadrate	1.03 (0.13)***	1.03 (0.09)***	1.01 (0.10)***	1.01 (0.17)***	1.04 (0.09)***
School Social Class	0.65 (0.16)**	0.75 (0.19)**	0.65 (0.16)**	0.77(0.19)**	0.67 (0.15)***
School Acadrate	-3.13 (2.15)*	-3.12 (2.20)	-3.90 (2.40)	-3.46(2.31))	-3.79(2.17)
Tracked x Female	-0.02 (0.27)			-0.03 (0.30)	
Tracked x Soclass	0.06 (0.05)			0.20 (0.07)**	0.20 (0.06)**
Tracked x Acadrate	0.03 (0.19)			0.06 (0.22)	
SchSoclass x Female		-0.18 (0.16)		-0.15 (0.18)	
SchSoclass x Soclass		0.02 (0.03)		0.02 (0.03)	
SchSoclass x Acadrate		-0.06 (0.11)		-0.03 (0.12)	
SchAcadrate x Female			-0.59 (1.85)	-0.39 (1.95)	
SchAcadrate x Soclass			-0.95 (0.36)**	-1.59 (0.44)***	-1.65 (0.43)***
SchAcadrate x Acadrate			-0.35 (1.38)	-0.83 (1.65)	
σ^2_e (Student)	1.72	1.72	1.71	1.70	1.69
σ^2_{u0} (School)	0.15	0.15	0.17	0.15	0.14
Deviance	2777.5	2779.9	2760.0	2764.0	2758.0

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

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5.10 Results- Non-Scholastic outcomes

Results from previous international studies have demonstrated that the quality of interaction between students and teachers has a significant impact on student outcomes, including self-esteem (Croninger and Lee, 2001; Gutman & Midgley, 2000; Battistich et al, 1995; Shouse, 1996). The school and classroom environment not only influence student's feelings about themselves but studies have shown that students who report caring and supportive interpersonal relationships in school have more positive academic attitudes and values as well as being more satisfied with school (Battistich et al, 1995; Solomon et al, 2000; Shouse, 1996). These students are also more engaged in academic work (Marks, 2000; Ryan and Patrick, 2001; Solomon et al, 2000).

A sense of belonging is promoted when students have a feeling of being supported, respected and included by the teachers (Gutman and Midgley, 2000). Students are particularly positive about teachers who consult them, are fair, who make them feel important and who treat them in an adult way (Demetriou et al., 2000). On the other hand, an absence of positive social relationships and contacts with teachers "denies students resources that help them develop positively" (Croninger and Lee, 2001, p. 569).

Promoting this sense of belonging is not only important for student self-esteem and motivation, but ultimately their academic outcomes. Croninger and Lee (2001) found that students' beliefs about how much they were supported by their teachers reduced the probability of dropping out by nearly half. Other research (Fraser, 1994, Klem and Connell, 2004) found a relationship between teacher support, engagement and academic achievement.

The quality of teacher-student relationships has been found to be an important predictor of academic and non-cognitive outcomes among students in Ireland and internationally (Croninger and Lee, 2001; Smyth, 1999). This section has two distinct parts, firstly examining the relationship between achievement and student satisfaction with their school experience and secondly, looking at between-school differences in determining student satisfaction with school experience. The first part looks at how satisfaction with one's schooling experience is associated with student outcomes, and the second part examines student satisfaction as an outcome in itself.

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Key personnel in the case-study schools highlighted the atmosphere and support on offer to students within their schools. Many personnel remarked on the importance and value of this 'informal' atmosphere within the school. Clearly, to personnel working within the schools, the school climate is an important factor as well as general teaching and learning skills.

> There's also an atmosphere in the school too of, I don't know whether pupils perceive it, but I've been to many schools in my time in terms of in-service and all, and I would say there's a huge caring atmosphere within the school. (Barrack St. School, girls' school, non-tracked, working class composition)

> The relationship among teachers and pupils is very good and the quality of relationships have always been good and I think that is a huge plus. (Dawes Point, boys', tracked, working class composition)

> I think this school is very good, that there are some very good support structures, I'm just wondering what the students would say about that themselves…I suppose we could always do more, but you know I think it's fairly good. (Dawson St, coed school, mixed ability, mixed social class composition)

> The kids do know that the staff are very willing to help them…they do know that we're there…and I think they actually see us as being very open to help them…I think they actually do see that here, maybe more so than in other schools, they actually know that there is somebody there to help…I think see us as being there to actually help them as well as being there to discipline them and to do X, Y and Z. (Fig Lane, coeducational, non-tracked, middle class composition)

> There's quite a lot of supports, the classes are small, the teachers are very helpful, the relationship among teachers and pupils is very good and the quality of relationships have always been good and I think that is a huge plus. The way that you know what I mean, even that friendly atmosphere the students will comment on, you know what I mean, now I think that's hugely important (Dawes Point, boys, tracked, working class composition)

So firstly, is there a relationship between a student's satisfaction with their school experience and their achievement in the Junior Certificate examinations at the end of their lower secondary schooling? Furthermore, are there particular individual and school level characteristics that are associated with how satisfied a student is with their school experience, i.e. are students in tracked schools more satisfied or less satisfied?

To explore students' satisfaction with their schooling experiences a scale variable was created from the items that are contained in variables 'liking school', 'liking teachers', 'positive interaction with teachers', 'negative interaction with teachers' and 'feelings of isolation.' The

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scale includes 25 items and result in a Cronbach's alpha of 0.85. For more information about the items included in this scale variable see a more full description in chapter three.

How satisfied students are with their school experience does have a positive association with their achievement in the Junior Certificate examinations as the results in table 5.4 below show. However, how happy the aggregate population of the school is with its school experience does not appear to be associated with achievement. It is important to be satisfied with your own schooling experience, but the results suggest that school climate in terms of a general level of satisfaction at the school level is not positively associated with achievement.

Table 5.4: School Tracking, Individual and School Level Characteristics, and Satisfaction with School Experience on Junior Certificate grade point average, N=812

Model: *Fixed Part*	*M1: +School Tracking*	*M2: + Individual Characteristics*	*M3: + Composition Effects*
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	7.17 (0.34)***	6.99 (0.28)***	6.92 (0.18)***
Tracked	-1.00 (0.49)*	-0.64 (0.38)*	-0.10 (0.24)
Female		0.38 (0.15)**	0.45 (0.14)***
Social Class		0.20 (0.03)***	0.19 (0.03)***
Satisfaction		0.42 (0.13)***	0.41 (0.13)***
School Social Class			0.66 (0.14)***
School Satisfaction			-1.01 (1.05)
Random part			
σ^2_e (Student)	2.17	1.96	1.96
σ^2_{u0} (School)	0.68	0.37	0.10
Deviance	3231.9	2878.8	2865.5

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

As the results above show, being more satisfied with one's school experience by the end of lower secondary schooling is associated with higher achievement, although this can not be proved to be a causal relationship. It may be the case that those who are more academically able and achieve higher scores are then more satisfied with their school experience rather than a positive schooling experience resulting in higher achievement scores. A model which controls for ability upon entry to second level schooling (for the 10 schools that maths and reading scores at entry to secondary education are available, n=535) shows that an individual's satisfaction with school is still positively associated with his or her Junior

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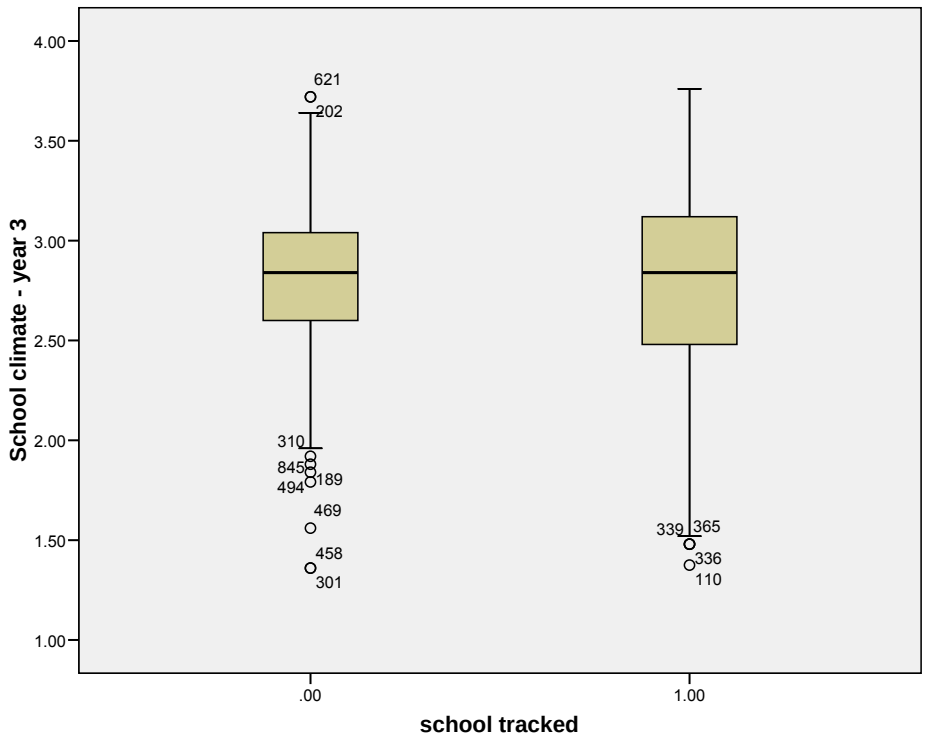
Certificate achievement (see Appendix B). Therefore, even when we control for those who were more academically able at the beginning of second level schooling, the positive relationship between-school satisfaction and grade point average remains suggesting a possible independent effect. It is worthwhile to look at what individual and school level characteristics are associated with student satisfaction with school during the final year of their lower secondary school education. In policy terms we know that being satisfied with school is more likely to lead to greater achievement outcomes for students, therefore it would be of relevance to know which schools are most effective in promoting student satisfaction at school.

5.10.1 Tracked and Non-Tracked Schools

Firstly, the simple box-plot in figure 5.9 shows that there is little difference in the mean student school satisfaction between schools that track and those that do not. However, the box-plot does show that there is more variance in the levels of student satisfaction in schools that track their students, arguably due to the differentiated nature of the classroom situation in schools that track. Whereas in schools that are not tracked students have more similar levels of satisfaction and therefore are more homogenous.

Figure 5.9: Differences in Student Satisfaction with School between Non-Tracked and Tracked Schools.



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Now that we have looked at the association between student's satisfaction with their school experiences the analysis turns to between-school differences by using the 'satisfaction' variable as the dependent variable and exploring how individual and school level characteristics are associated with student satisfaction. In what types of schools are students more satisfied with their school experience? Is there an association between tracking and student satisfaction? Is there a school composition effect as can be found for achievement? And if there are tracking and composition effects which groups of students are most likely to be positive about their schooling experience at the end of lower secondary schooling?

As table 5.5 below shows, girls appear to have a greater overall satisfaction with their school experience than boys. There does not appear to be any significant social class or school social class composition differences in terms of satisfaction. The next set of models goes on to explore cross-level interactions; however the results do not show any significant cross-level interactions. Therefore, there appears to be little difference between tracked schools or the social class composition of the school when it comes to how satisfied students are with their school experience on average. There are no differences between boys and girls in tracked and non-tracked schools, in higher or lower social composition schools. Furthermore, the results suggest there are no differences between the social class background of students, the type of school they attend in terms of tracking and composition and their levels of satisfaction with school.

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Table 5.5: School Tracking, Individual and School Level Effects on Satisfaction of Students with School Experience n=818

Model: *Fixed Part*	*M1: +School Tracking*	*M2: + Individual Characteristics*	*M3: + Composition Effects*	*M4: + Model 3 + Tracking Interactions*	*M5: + Model 4 + Social Class Composition Interactions*	*M6: + Final Model*
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	2.80 (0.04)***	2.72 (0.05)***	2.72 (0.04)***	2.75 (0.05)***	2.71 (0.04)***	2.75 (0.05)***
Tracked	-0.02 (0.06)	0.02 (0.06)	0.05 (0.06)	-0.09 (0.09)	-0.01 (0.09)	-0.01 (0.08)
Female		0.12 (0.04)**	0.12 (0.04)**	0.07 (0.05)	0.13 (0.05)**	0.09 (0.06)
Social Class		-0.01 (0.01)	-0.01 (0.01)	0.00 (0.01)	-0.05 (0.04)	-0.02 (0.05)
School Social Class			0.04 (0.03)	0.04 (0.03)	0.02 (0.06)	0.02 (0.06)
Tracked*Female				0.13 (0.08)[15]		0.13 (0.08)
Tracked*Soclass				-0.02 (0.01)		-0.02 (0.02)
SchSoclass*Female					-0.02 (0.04)	-0.01 (0.05)
SchSoclass*Soclass					0.01 (0.01)	0.01(0.01)
σ^2_e (Student)	0.16	0.15	0.15	0.15	0.15	0.15
σ^2_{u0} (School)	0.01	0.01	0.01	0.004	0.005	0.004
Deviance	901.4	804.8	803.1	798.4	802.1	798.2

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

[15] The coefficients and standard errors are the same for this interaction term even when the other tracked interaction term is not included in the model (tracked*soclass).

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5.10.2 Academic Self-Rating

The next set of models looks at students academic self-rating in order to examine the 'peer effect' and explore whether being in a school with a higher concentration of students with confidence in their academic skills is associated with the individual students satisfaction with school. As table 5.6 illustrates, it is unsurprising that those with more confidence in their academic ability also have higher levels of satisfaction with their school experience. However, being in a school with a composition of students with either higher or lower confidence in their academic ability is not significantly related to satisfaction with their school experience. Interestingly, when academic self-rating is added to the model not only is students' own social class related to their satisfaction with school, but also the social class composition of the school. Though this is significant it does not result in a large difference in student scores.

Table 5.6: School Tracking, Individual and School Level Characteristics, and Academic Self-Rating Effects on Satisfaction with School Experience N=818

Model: *Fixed Part*	*M1: +School Tracking*	*M2: + Individual Characteristics*	*M3: + Composition Effects*
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	2.80 (0.04)***	2.73 (0.04)***	2.74 (0.04)***
Tracked	-0.02 (0.06)	-0.03 (0.06)	-0.01 (0.06)
Female		0.12 (0.03)***	0.12 (0.03)***
Social Class		-0.02 (0.001)**	-0.02 (0.001)**
Acadrate		0.48 (0.02)***	0.48 (0.02)***
School Social Class			0.06 (0.03)*
School Acadrate			0.30 (0.38)
Random part			
σ^2_e (Student)	0.16	0.10	0.10
σ^2_{u0} (School)	0.01	0.01	0.004
Deviance	901.4	424.3	420.2

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

The models in the following table (table 5.7) explore the cross-level interactions between individual and school-level characteristics (tracking, gender, social class and academic self-rating) in terms of individual students' satisfaction with their school experience in their final year of lower secondary schooling. Model 4 explores tracking interactions with gender, social class and the individuals academic self-rating. As can be seen in the table there is a significant interaction between individuals academic self-rating and tracking in terms of their satisfaction

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with school. It appears that those with a higher academic self-rating that attend tracked schools are positively associated with a higher satisfaction with school. This is interesting when we compare it to the same table for their Junior Certificate achievement (Model 4 in table 5.3) as there was no association between tracking, academic self-rating and achievement in the Junior Certificate. Furthermore, it is interesting that there is no difference between the social classes in how satisfied they are between tracked and non-tracked schools. Even though lower social class students are losing out academically in tracked schools, they do not appear to be significantly less satisfied with school compared to their peers in non-tracked schools.

Model 5 and Model 6 then explore the social class composition and the overall academic self-rating of students in the schools and interactions with gender, social class and the individuals academic self-rating. However, there appears to be no significant interactions between individual characteristics and the social class and academic confidence composition of schools in terms of satisfaction with school. These results also dismiss hypotheses two and three that students from higher socioeconomic backgrounds would benefit more in higher socioeconomic schools and schools were there is a higher concentration of students who rate their academic ability higher.

Model 7 includes all interaction terms, significant and non-significant. The final model in Model 8 includes only significant interaction terms and main effects. The main story these models tell is that girls, students from lower social backgrounds and those who are confident in their academic ability are most satisfied with their school experience. Girls score 0.12 more on the satisfaction with school scale than boys. A one unit change in academic self-rating is associated with a 0.42 unit increase in school satisfaction. Social class is only associated with a -0.02 decrease in satisfaction.

Satisfaction with school does not differ significantly depending on whether the school tracks, the socioeconomic composition of the school or the academic self rating of students in a school. None of the school factors appear to influence student satisfaction. However, there is an interaction between tracking and academic self-rating for student satisfaction, meaning that within tracked schools students with a greater confidence in their academic ability are significantly more satisfied with school than those that do not have much confidence in their academic ability.

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Table 5.7: School Tracking, Individual and School Level Characteristics, Academic Self-Rating and Interaction Effects on Satisfaction with School Experience. N=818

Model: *Fixed Part*	*M4: + Model 3 + Tracking Interactions*	*M5: + Model 4 + Social Class Composition Interactions*	*M6: + Model 4 + School Academic Rating Interactions*	*M7: +All interactions*	*M8: + Only significant interactions*
Predictor	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)	Coefficient (st. error)
Intercept	2.76 (0.04)***	2.74 (0.04)***	2.74 (0.04)***	2.76 (0.05)***	2.74 (0.04)***
Tracked	-0.05 (0.08)	-0.01 (0.06)	-0.01 (0.06)	-0.05 (0.09)	-0.02 (0.08)
Female	0.09 (0.04)***	0.12 (0.04)***	0.11 (0.04)*	0.07 (0.06)	0.12 (0.03)***
Social Class	-0.02 (0.01)*	-0.01 (0.01)	-0.02 (0.01)*	-0.02 (0.01)*	-0.02 (0.01)*
Acadrate	0.42 (0.03)***	0.49 (0.02)***	0.48 (0.02)***	0.38 (0.04)***	0.42 (0.03)***
School Social Class	0.06 (0.03)	0.06 (0.04)	0.06 (0.03)	0.06 (0.03)	0.06 (0.03)
School Acadrate	0.38 (0.38)	0.33 (0.39)	0.38 (0.51)	0.43 (0.54))	0.28 (0.39)
Tracked x Female	0.07 (0.06)			0.07 (0.07)	
Tracked x Soclass	0.01 (0.01)			0.01 (0.02)	
Tracked x Acadrate	0.14 (0.04)***			0.18 (0.05)***	0.14 (0.04)***
SchSoclass x Female		-0.02 (0.04)		-0.01 (0.04)	
SchSoclass x Soclass		-0.004 (0.007)		-0.001 (0.01)	
SchSoclass x Acadrate		-0.03 (0.03)		-0.01 (0.03)	
SchAcadrate x Female			-0.02 (042)	-0.14 (0.44)	
SchAcadrate x Soclass			0.05 (0.09)	-0.01 (0.10)	
SchAcadrate x Acadrate			0.12 (0.33)	-0.60 (0.39)	
σ^2_e (Student)	0.10	0.10	0.10	0.09	0.10
σ^2_{u0} (School)	0.004	0.004	0.004	0.004	0.004
Deviance	407.2	418.8	419.8	404.6	409.5

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

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5.11 Conclusions

The aim of this chapter was to look at tracking and school composition effects in conjunction with each other in terms of both student scholastic and non-scholastic outcomes. This section attempts to pull together the results from the models in order to explain between-school differences in terms of whether schools track their students or not and also the composition of the school, particularly in terms of social class composition. A word of caution is that we should always bear in mind that the effects seen above include an element of phantom effects, as discussed in the introduction to this chapter. Furthermore, the results found here with particular respect to school composition effects, may indicate other unmeasured processes at work. The associations between tracking, school composition and student outcomes may be related to other factors not included in these models. The associations can not be concluded to be causal relationships. However, the hypothetical perfect multilevel model does not exist and the following conclusions are based on the best specified models available for this data.

Tracked schools have a lower average achievement in the Junior Certificate at the end of lower secondary schooling, similar to the results in the previous chapter which found that differentiation at the education system level is also associated with a lower average achievement level. However, this lower achievement can be explained by the individual characteristics of the students, and most importantly the socioeconomic composition of the school. Therefore, it is really the fact that these schools have a lower socioeconomic composition (and the unobserved factors associated with low socioeconomic composition) rather than their policy of tracking students that leads to an overall lower average student achievement in the Junior Certificate. Furthermore, the results suggest in schools that do track it advantages students from a higher social class background over those from lower social backgrounds resulting in an inequality of educational opportunity. Students from lower social backgrounds are doing significantly worse in tracked schools compared to their peers. This has long term implications for these students as access to curriculum during upper secondary school is strongly tied to achievement at the end of lower secondary schooling, which has a cumulative effect for those seeking college entry.

Being satisfied with your schooling experience is positively associated with school achievement, as would be expected (even after controlling for prior achievement). However, school level factors do not appear to be significantly related to how satisfied students are with

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school on average. Although the average satisfaction of students with school does not differ significantly between schools that track and those that do not, within tracked schools students that are more confident in their academic ability are more satisfied than those with less confidence.

Previous literature presents two theories on how the composition of the school is related to student performance. The first assertion is that large numbers of high social status students concentrated together will raise aspirations and achievement due to various mechanisms such as access to the curriculum and more time on task (Rumberberger & Parlady, 2005). Similarly, a large number of low social status pupils tends to have the opposite effect. The results in this chapter appear to support this theory and show that being in a school with a higher concentration of students from higher social class backgrounds has a positive relationship with Junior Certificate achievement.

Furthermore, the analysis in this chapter finds that this advantage of being in a school with a concentration of students from higher social class backgrounds benefits students from all social class backgrounds equally. In other words, those from a higher social class background do not benefit any more by the school composition effect than those from a lower social class background. The importance of school socioeconomic composition is consistent with the results from the PISA data in the previous chapter. Ireland was classified within the analysis as an 'internally' differentiated education system. Although the relationship between achievement and social class composition of the school is not as strong as highly differentiated education systems there is a relationship between school composition and achievement (see figure 4.5). However, the gap between the top and bottom social background status students appears to widen as the socioeconomic composition of a school increases when we look at internally differentiated systems. However, the evidence here suggests this is not the case in Ireland, the advantage of higher socioeconomic composition schools appears to be fairly consistent across students from all social backgrounds.

The second theoretical perspective is that students may suffer due to the competitive nature of being concentrated in a high social status group of students. The theory has a solid basis; however, this chapter argues that the flaw is in assuming that higher social status students are necessarily competitive and presumably of higher intelligence. Therefore, this chapter follows in Marsh's research tradition of looking at student academic self-concept and includes what it

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believes to be a more accurate measure of this negative peer effect; how confident students themselves are in their own academic abilities regardless of their actual ability or social class.

As could be expected, the results find that students in schools where there is a higher mean academic self-rating achieve significantly lower Junior Certificate grade point averages suggesting a possible negative peer effect when students are concentrated in a group of students with confidence in their academic ability. However, when interaction terms were added to the model it appears that this school composition effect in terms of academic self-rating has a negative effect on students from higher social backgrounds. Students from lower socioeconomic backgrounds actually have higher Junior Certificate grade point averages in more academically competitive schools. All students, regardless of their individual social background benefit from being in a school with a concentration of students from higher social class backgrounds and this can not be explained by controlling for school academic competitiveness.

This chapter set out to explore both tracking and composition effects in conjunction with each other in order to have a better understanding of how both of these mechanisms worked in the differentiation of students during lower secondary schooling. Both scholastic and non-scholastic student outcomes were explored during the analysis. When we look at the final model for student achievement in the Junior Certificate examination we can see that there is no significant difference in the achievement of students in tracked and non-tracked schools. Much of the tracking effect disappeared once the socioeconomic composition of the school was included. Socioeconomic composition is an important explanatory variable in looking at student achievement. For every unit increase in the social class composition of a school we would expect a two-third of a grade increase in Junior Certificate achievement. Clearly, the social class composition of the school has a strong association with student outcomes, with those in higher social class composition schools having higher achievement on average. This may be due to a direct peer effect or an indirect effect such as better resources and educational quality as discussed in chapter two.

In summary, all students from all social class backgrounds benefit the most from being in a school with a higher social class composition when it comes to individual achievement scores. Tracking has a negative association with achievement scores, but this is primarily due to the socioeconomic composition of students within tracked schools.

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It is possible that tracking and socioeconomic composition are inextricably linked. We saw in the previous chapter that countries that highly differentiate or internally differentiate their students have a stronger relationship between achievement and school composition. This may be due to the nature of differentiating students into homogenous groupings. As presented at the beginning of this chapter there is a strong association between tracked schools also being schools with lower social class compositions, and it may be a feature of differentiated education systems that this relationship exists and therefore it is difficult to conclude if it is the organisation of students in schools on the basis of tracking or social composition that is 'causing' the lower achievement of students. The evidence in this chapter suggests the overall lower average achievement in tracked schools is due to their lower social class composition.

Even though average achievement did not differ significantly between tracked and non-tracked schools, there are important differences between the types of schools for students from different social backgrounds. There is evidence of inequality of educational opportunity within tracked schools as students from lower social backgrounds do significantly worse compared to their counterparts in non-tracked schools. Although de-tracking schools may not result in a significant change in the average achievement of the students within the school without tackling the issue of social class composition, it may offer a more equal opportunity of achievement for lower social class students within those schools.

5.12 Policy Implications

In policy terms, McPartland & McDill (1982) conclude that student body composition has an important role in school effectiveness and suggest that policy should concentrate on this aspect in order to raise achievement and offer more equal opportunities. Although the evidence from this analysis appears to support this policy direction, in real terms it is almost impossible to influence the student body composition in schools. It is also possible that it is not the direct effects of composition that have a negative relationship with achievement and school satisfaction outcomes. However, these effects may be indirect effects through the differentiated nature of the quality of teaching methods within the classroom. From a policy perspective one has to be cautious about recommending changing the composition of the school as it may not be this effect alone that is working to create differential outcomes, but rather reflects other processes at work. It is probable that this effect works through the mechanisms described in chapter two, schools with a higher social class composition are more likely to spend time on task, have better teachers and resources etc.

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Although it may be difficult or impossible to influence the student body composition, policies that target schools based on their composition such as resources, teaching training and raising expectations may be successful in order to make some headway in compensating for student composition. These policies would tackle what goes on within schools behind closed doors rather than by reorganising students in school behind those doors.

In practical terms, from a policy perspective, it would be easier to influence school tracking policies. Students on average are doing the same academically in tracked and non-tracked schools once we control for socioeconomic composition. Tracked schools are doing worse on average because of their lower socioeconomic compositions. As previously mentioned, it is difficult to reassign students on the basis of socioeconomic composition of a school. However, if the aim is to equalise educational opportunity, tracked schools are not being successful in this endeavour. Students from lower socioeconomic backgrounds are achieving significantly lower compared to their counterparts in non-tracked schools. Policies which de-track schools have the merit of reducing the inequality of opportunity as the results here show that within tracked schools those from lower social backgrounds have a distinct disadvantage and therefore would benefit from being in a non-tracked school.

These concerns raise considerable questions about the mechanisms of differentiation within schools, both those that track and those that do not. Although there is inequality of educational opportunity in schools that track, it tells us little about how and why there is differential achievement in tracked schools. How is inequality in educational opportunity in tracked schools related to track placement and access to the curriculum? The following chapter takes a more in-depth look at the mechanisms of differentiating students within schools by looking at both of these aspects of organising students within schools. Furthermore, it takes a longer view by including students' prior ability upon entry to secondary schooling as a control for achievement at the end of lower secondary schooling.

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Chapter Six: Curricular Differentiation and inequality of educational opportunity within schools.

6.1 Introduction

The previous chapter looked at the issue of differentiation at the school level and explored social class compositional effects, peer effects in academic competitiveness and tracking effects between schools. The results appear to show the importance of these factors in shaping student experiences both academically and socially in the school context. This chapter moves further down a rung on the theoretical ladder and explores the issue of differentiation within schools themselves. This chapter investigates differences in achievement dependent on track placement and curricular differentiation. At this level we look at differences between schools in terms of how they differentiate students into different classes both through formal track placement and levels that subjects are taken for the Junior Certificate examination (curricular differentiation or setting). At the school level of analysis in the previous chapter the Irish-case study data was utilised and will be utilised again here.

As already discussed, it is proposed that students with particular characteristics, such as coming from a higher socioeconomic background, have significantly more positive outcomes, even when taking prior ability into consideration. The previous chapters examined the role of differentiation between education systems and also between schools in offering differentiated educational opportunities. Before any explanatory variables were added to the model in the previous chapter, 30% of the differences in Junior Certificate grade point average scores could be accounted for by school level differences meaning that 70% of the variation in student scores was within schools rather than between schools. By the final model in table 5.3, 90% of the variation in Junior Certificate grade point average between schools had been explained by including individual characteristics and characteristics at the school level. Now this chapter tackles the rest of the variation in order to understand the variation of student achievement within schools.

This chapter addresses the third research question by looking at the role of track placement and curricular differentiation in differential student outcomes while controlling for their prior ability. Therefore, this chapter attempts to answer the following question:

> What role does access to the curriculum play in explaining differences in achievement depending on how a school sorts its students for instruction?

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6.2 Does Tracking Affect inequality?

This chapter builds on previous stratification work that addressed the issue of educational inequality of opportunity depending on the tracking practices of schools (Oakes, 1985; Kerckhoff, 1986; Gamoran & Berends, 1987; Gamoran et al, 1995; Betts & Shkolnik, 2000; Boaler, et al, 2000; Ansalone, 2003). This chapter explores both track placement and access to the curriculum in terms of student achievement in the Irish Junior Certificate examination. The analysis involves comparing students who have been separated into tracks with those who have not been separated into formal group placements. This chapter also incorporates the level of the examination paper in exploring how access to examination papers may lead to differential effects of grouping for students. This chapter 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 they sit the examination rather than simply their track placement, illustrating the influence of more hidden differentiation of students within Irish schools.

Educational sociologists have suggested that they way schools sort their students for instruction may explain some of the differential achievement of students. Early studies in the area of tracking described a rigid tracking system with general observable distinctions between general, vocational and academic education tracks within a general education system and this research primarily emanated 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 & Bartholomew, 2004). Many education systems have moved away from structured 'tracking', however in-school differentiation remains through within-subject curriculum differentiation. The literature to date has tended to concentrate on tracking, in the sense that where 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 chapter attempts to go further in exploring both track placement and curricular differentiation 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.

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6.3 Tracking and Curricular Differentiation

How do opportunities such as curricular programmes and instructional experiences affect student achievement? Some argue that students in academic 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 tracking adds to inequality when placement in a high-status track permits students to gain more than if they had been assigned to a lower track. For many years, students, teachers, and field researchers have reported that more learning occurs in higher tracks (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 socioeconomic levels. Earlier research in the United States found that lower tracks contained a disproportionate number of students of low socioeconomic status (Reglin, 1992). Social class and race were also significant determinants of track position in the United Kingdom (Bennett, 1986; Hallinan, 1991; Kershaw, 1992; Oakes, 1990; Persell, 1992).

Previous studies which compared high, middle, and low tracks at schools with formal tracking to heterogeneous groups at schools that did not use formal tracking found that tracking 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 & Shkolnik, 2000) but the evidence suggests that grouping practices, in the United States and the United Kingdom at least, harmed the lower grouped students and gave those in the top group an advantage.

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 in explaining the differential effects found in tracking research, as it is likely that lower tracks 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. Thus, the deficit in curriculum implemented in lower-track 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,

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serves the purpose of distributing the opportunity to learn among students as access to levels is differentiated. Both group placement and access to higher 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.

6.4 Tracking and Curricular Differentiation in Ireland

Wiliam & Bartholomew (2004) describe how, within secondary schools in the United Kingdom, tracking 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 tracking or 'setting' was superimposed on tracking. 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%.

Some research has already been carried out in the Irish context on a number of the factors affecting student achievement at the Junior Certificate level. A national study of second-level schools indicated significant variation between schools in performance levels, even when 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 track 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 focussed on track 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 track, even when controlling for these initial scores, indicating 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 chapter includes this important aspect of setting in determining how students would fare in different grouping settings once the level of examination they took is controlled for.

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6.5 Access to the Curriculum

So how were decisions made regarding examination level in the case-study schools? Based on the qualitative information collected during the study from both teachers and students, table 6.1 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 what levels students took their subjects, both in tracked and non-tracked schools. However, it was more overt in tracked schools as more often students were preparing for a particular level from day one and decisions were made on the basis of their track placement.

> We group from the beginning and we therefore set the focus for each of those groups to achieve at certain levels
> Principal, Lang St, Boys School, Tracked, 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 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 students decision at the end of the day. Principal, Wentworth Place, Boys School, Tracked, 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, Tracked, 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 steams is that it's chosen for them, they are all told that they are doing Pass… Its automatic almost in the A1, A2, part of B1 and then as you go down the house say for example the B2's and the C1's the majority would be taking pass subjects. Guidance Counsellor, Park St., Boys School, Tracked, Mixed social class composition.

In non-tracked settings key personnel were more likely to describe students making decisions about their level with advice and input from their subject teachers. Although both tracked and non-tracked schools generally describe subject levels being chosen mainly in second year, as illustrated by the above quotes, students in tracked schools are more likely to be preparing for a particular level earlier, even if the actual formal decision of the level is decided later. In mixed schools there was more of a description of students being in mixed common level

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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 its import then for the middle grouping…that they could be too quickly be put into foundation level classes and its 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 St, Coeducational, Non-tracked, 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, Coeducational, Non-tracked, Middle-class composition.

Students in most of the case-study schools mainly described how examinations or performance at school determined what level they would take the Junior Certificate examinations at. There was also recognition among the students of the disadvantage for those assigned to lower level classes. If students are preparing for lower level papers within their classes then they will likely never have the opportunity to take a higher level paper.

> -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 track class, Hay St, Coeducational, Tracked, Working-class composition.

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Table 6.1: School Profiles and Choice of Examination Level

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

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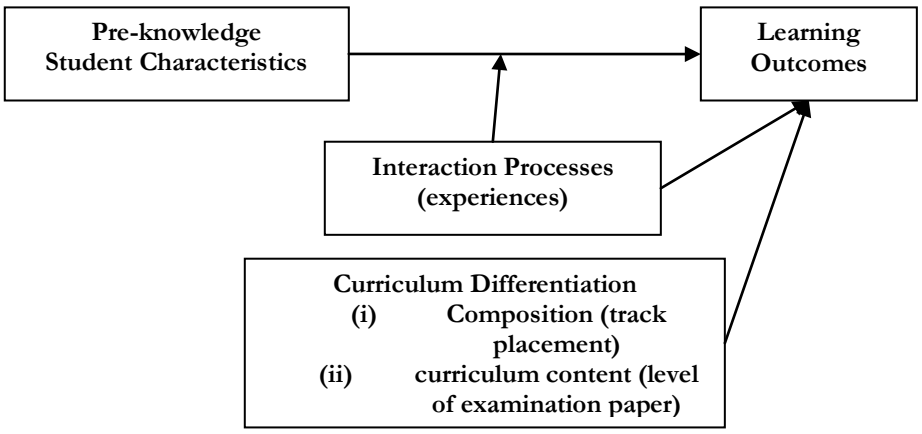
6.6 The Research Aim

Terwel (2005:659) describes curriculum differentiation as an institutional mechanism that offers students stratified opportunities by creating differences in content and methods and selectively assigning student to these different opportunities. Much research in this area either looks at 'track placement' or curricular differentiation in 'course taking.' Here the data allows us to look at both track placement and curricular differentiation in order to examine the differentiation in opportunity students receive. We know from previous research that being placed in a particular track has a positive or negative association with a student's Junior Certificate achievement. However, does differential achievement between tracks remain once we take account of what level examination paper they sat? The analysis attempts to distinguish the relationship between formal tracking and achievement through differentiated access to higher level exam papers.

Borrowing from Terwel's (2005) longitudinal multi-level model (see figure 6.1) the concept here is of how differentiation (track placement and curricular differentiation) is associated with learning outcomes (student achievement) taking account of student characteristics. This chapter, like previous research, lets us compare students placed in high, middle and low tracks with students in non-tracked schools. The analysis includes the level that students sat their examinations at the end of lower secondary schooling as a factor in differential achievement for students in different tracked situations. The addition of this factor allows us to explore if the advantage of some groups of students over others is in part due to curricular opportunities through access to higher level examination papers.

Figure 6.1: Terwel's (2005) Longitudinal Multi-Level Model.



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

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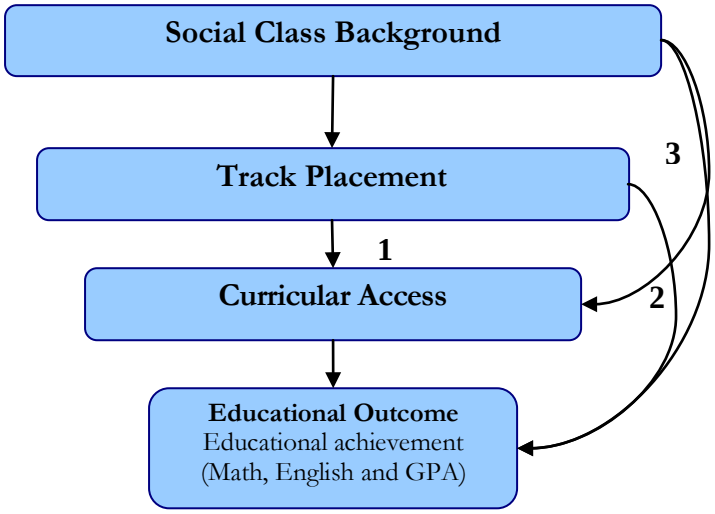
6.7 Hypotheses

In summary, previous research has shown that tracking 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**), track placement is associated with curricular access as different tracks are offered either a separate curriculum or differential access to elements of the curriculum either through curricular offers for different tracks or through teaching practices of teaching to a certain level within a track. Secondly (**2**), track placement has a direct effect on educational outcomes through other mechanisms such as peer effects and time on task. Social class background (**3**) may influence access to the curriculum that a student receives directly due to such factors as their own perceived ability and teacher perception of their capabilities.

Figure 6.2: Social Background, Tracking, Curricular Access and Educational Outcomes.



source: authors own figure

Based on the literature and keeping these relationships in mind, the following three hypotheses are derived.

> *Hypothesis 1: Differentiation of students into tracks within a school results in differentiated access to the curriculum in comparison to schools that do not track their students.*
>
> *Hypothesis 2: Students in the top track have an achievement advantage in part due to their access to the curriculum which results in them sitting higher level papers.*
>
> *Hypothesis 3: Students from higher socioeconomic background have an achievement advantage in part due to their access to the curriculum which results in them sitting higher level papers.*

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6.8 Data and Method

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 to explore school practices in relation to lower secondary provision. 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 tracking, dimensions hypothesised to influence the transition to secondary education and student experiences thereafter. The twelve schools in the study vary in terms of their sector and size as well as the gender and social mix of students. This chapter utilises data on these original twelve case-study schools by combining information gathered in the first year of the longitudinal study with the exam results of those students at the end of third year.

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 that the students sat the examination paper. Table 6.2 looks at three groups of students, those in the top 25% of entry level scores, the bottom 25% and the middle 50%. The table illustrates the percentage of students in the honours, ordinary and foundation level sets at the end of lower secondary schooling depending on their entry level performance. The table shows that a higher percentage of those in the bottom 25% of entry scores in tracked schools took lower level papers compared to their counterparts in non-tracked schools. However, the numbers of students in the top 25% of entry level scores took approximately the same percentage of higher level papers in both types of schools.

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Table 6.2: Percentage of top 25%, middle 50% and bottom 25% of entry level scores that took different levels of examination paper for Junior Certificate.

	No	*Top 25% at entry*	*Middle 50% at entry*	*Bottom 25% at entry*	*Overall*
Tracked School Mathematics	355				
Honours Level	118	85%	26%	5%	33%
Ordinary Level	176	15%	66%	54%	50%
Foundation Level	61	0%	8%	41%	17%
Non-Tracked School Mathematics	469				
Honours Level	230	84%	36%	15%	49%
Ordinary Level	199	16%	57%	60%	42%
Foundation Level	40	0%	7%	25%	9%
Tracked School Reading	343				
Honours Level	175	92%	55%	22%	51%
Ordinary Level	148	8%	44%	63%	44%
Foundation Level	20	0%	1%	15%	5%
Non-tracked School Reading	457				
Honours Level	336	100%	74%	28%	74%
Ordinary Level	110	0%	25%	64%	24%
Foundation Level	11	0%	1%	8%	2%

Table 6.2 compared the top, middle and bottom groups of entry level scores in tracked and non-tracked schools. Table 6.3 compares the percentages of student that took different levels of examination papers depending on their track placement. Overall the table illustrates that tracked schools appear to have offered more differentiated access to papers supporting hypothesis 1. Those in the top track had slightly more access to higher level papers in Mathematics compared to those in non-tracked classes, and took more higher level subjects on average compared to any other group. Similarly, those in the bottom track almost exclusively took ordinary and foundation level papers. In non-tracked classes there was slightly less access to higher 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 tracks in tracked schools; however the level of papers in mixed schools more closely resembled the pattern of those in the top track.

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Table 6.3: Percentage of tracks that took different levels of examination paper for Junior Certificate.

	Mixed	*Top Track*	*Middle Track*	*Bottom Track*
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

Academic achievement

The study contained measures on students' mathematics and reading abilities at their 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 Math 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 honours level paper. A score of zero was allocated to those who received an E, F or NG grade (see table 6.4). 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).

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 as the dependent variable while

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controlling for prior achievement in mathematics and reading at the beginning of secondary education.

Table 6.4: Allocation of Junior Certificate Grade Point Averages.

	Honours 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 math score and the school reading score are variables that results 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 they earn less than €266.50 a week. Remembering that the current[16] 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). Student's gender was also used in the analysis.

Tracking

Schools in Ireland may vary in the way in which they allocate students to base classes. They may employ tracking whereby students of similar assessed ability are grouped into classes,

[16] As of October 2008

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ranked from ‘higher’ to ‘lower.’ They may use banding, a somewhat looser form of tracking, 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 tracks or bands (high, middle and bottom) in half of the case-study schools in this analysis. Students in these formal tracks typically took all their subjects together as a class and therefore are 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 who 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 the schools, however by the Junior Certificate year all students had 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 tracked 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, or in other words what level they sat their exam paper. In the non-tracked 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. The variable descriptions are included in table 6.5 below for the variables included in the analysis.

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Table 6.5: Descriptions of variables used in the analysis

Variable	***Description***
Tracking:	
Mixed	Whether the school adopts mixed base classes (1) or tracked base classes (0)
Top track	Dummy variable for being in the top track =1
Middle track	Dummy variable for being in the middle track =1
Bottom track	Dummy variable for being in the bottom track =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	Maths 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 Math 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 Math 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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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. 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, 1992; Bryk & Raudenbush, 1992; Hox, 2002), in this case students are nested in schools. 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, we have just enough units at the highest level to make reliable estimates in a random coefficient model (Snijders & Bosker, 1999, pp. 43-44).

6.9 Results

To explore achievement differences between formally tracked and non-tracked schools, Table 6.6 presents means 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 depending on which level students took their examination paper. Surprisingly, the mean entry test scores seem to be mainly comparable between the two types of schools between the 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-tracked schools achieving higher test scores in all comparable sets to those in tracked schools. It is particularly 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 tracked schools compared to those in non-tracked schools (just over a 2 point difference). However, by the end of lower secondary school, the lowest level English group in non-tracked schools caught up and just about outperformed those taking the same level in tracked schools that initially had on average higher reading scores than them.

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Table 6.6: Student achievement across different levels in tracked and non-tracked schools.

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

The highest mean mathematics entry level scores were in the honours set in tracked and non-tracked 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 tracks 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 tracks 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 considering the results.

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6.9.1 Access to Higher Level Examination Papers

The descriptive table 6.3 illustrated that those in the top track took more higher level subjects on average compared to any other group. Therefore the first set of models looks at the number of higher level papers as the dependent variable. The first column shows that although there were 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 tracks, bottom tracks with those in the middle track. Students in mixed base classes are taking more honours level papers, though it is not statistically significant. Those in the top track are taking significantly more honours level papers, and those in the bottom track are taking significantly less higher level papers compared to those in the middle track. 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 track is 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 track are taking significantly more honours level papers than those in the middle and bottom tracks. However, those in the bottom track are not taking considerably less honours level papers once we control for prior achievement. In conclusion, within tracked schools those in the top track have a distinct advantage in terms of the number of honours level papers they are taking even when we control for their social class and prior achievement. This confirms hypothesis one that the differentiation of students into tracks within a school results in differentiated access to the curriculum as those in the top track get more access to honours level papers even after controlling for prior ability.

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Table 6.7: HLM model of the number of higher level papers taken

	Student Characteristics	*School Level Characteristics + Group Placement*	*Achievement*	*Social Background*[17] *Interaction*	*Prior Achievement Interaction*
Model:	1	2	3	4	5
Fixed Part					
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 Track		2.39 (0.39)***	1.17 (0.34)***		
Bottom Track		-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)***
Soclass*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 higher level papers depending on social class background and entry level achievement in tracked and non-tracked schools. When we control for other student and school factors we can see in column four that there are no significant differences between tracked and non-tracked schools in the gap between high and low socioeconomic status students. As discussed in the previous chapter, it is theorised that tracked schools may be utilising tracking in response to the overall lower

[17] This model was also analysed for an interaction between being a medical card holder and whether the school used tracking or not and was also not found to be significant. Also, there was no significant interaction between social class and the socioeconomic composition of the school.

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socioeconomic composition of their incoming students. They may be trying to give students from a higher socioeconomic 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 is happening more often in tracked schools compared to non-tracked schools.

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

6.9.2 Math Achievement

Model 0: Without any control (Intercept only model).

Using the Davis & Scott, 1995 method of defining intraclass correlations a model of math achievement in the Junior Certificate without any independent variables has a total variance of 7.16 (75 % of the variance is at the student level and 25% is at the school level) and the deviance/log likelihood is 4168.1. The variance at the school level is considerably lower compared to the variance at the school level found in the PISA 2006 dataset. This is likely to be a result of the differing nature of the education systems under examination. A high proportion of schools in the PISA dataset are in countries where the education system is highly differentiated. Therefore, schools are distinctly different from each other as students are sorted into distinct school types. The average achievement in a vocational school as opposed to an academic school could be expected to vary significantly. Therefore, it is

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unsurprising that a large amount of variance in student achievement in the PISA 2006 dataset is between schools. However in the Irish case schools are not differentiated into distinct school types offering distinct curriculum. Therefore it is reasonable to assume that the variance in achievement between schools would not be as large as between schools in the PISA 2006 dataset.

Model 1: Student characteristics

The first model of table 6.8 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 mathematic achievement 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[18].

Including individual background characteristics in the first model accounts for 54% 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 that 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 a half a grade on the scale of Junior Certificate achievement.

Model 2: School Level Factors

The second model in table 6.8 introduces school level variables, the social class composition of the school, the proportion of medical card holders and the school mean entry level math 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. As might be expected, being in a school with a higher mean entry level math score has a positive association with individual achievement in the Junior Certificate mathematics examination.

[18] 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 small hold farmer and farmers with bigger enterprises are categorised in the same way when the response to the occupation question was "farmer."

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The variable 'mixed' is also introduced at this level indicating whether the school employs mixed base classes (1) or formally tracks its students (0). When comparing the average student in a tracked 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 tracks 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 track. Although the variable 'mixed' was at the school level in the previous model, due to the addition of the track dummies, this variable now represents students in mixed base classes. The results show that those in the top track score significantly higher in the Junior Certificate mathematics examination in comparison to those in the middle track after controlling for school and student characteristics as well as prior achievement. However, students in the middle track do not score significantly different from those in either the bottom track or those 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 track 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 mathematic achievement introduces the level students sat the mathematics examination. Interestingly, when this control variable is introduced to the model we see that comparable students in the top track and also those in mixed base classes score significantly higher in mathematics compared to those in the middle track, approximately half a grade higher[19]. An interaction term between the level of paper and social class of the student was also included in the model but was found not to be significant (honours paper*social class - 0.02, 0.05, foundation paper*social class 0.01, 0.06) or result in a change of the coefficients in the model and therefore was excluded from the final model. Including all these factors in the

[19] 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).

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final model results in 97% of the variance in Math achievement between schools being explained and 56% of individual level variance.

Table 6.8: Math Achievement in the Junior Certificate examination and Tracking.

	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)
Mixed[20]		0.25 (0.23)	0.47 (0.29)	0.62 (0.27)*
Top Track[21]			0.50 (0.24)*	0.43 (0.21)*
Bottom Track[20]			-0.11 (0.29)	0.44 (0.26)
Honours Paper[22]				2.17 (0.15)***
Foundation Paper[21]				-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*

[20] This is a school level variable, whether the school uses mixed base classes (1) or not (0). In Models 3 & 4, due to the dummy nature of the variable and inclusion of track placement this variable changes to indicate that students are in a mixed base class.
[21] Reference group is the middle track class.
[22] Reference group is Ordinary Level paper.

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So what do these results tell us about tracking 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 track and those in mixed base classes are scoring almost the same amount more than comparable students in the middle track, there is hardly any difference between those in the top track and the mixed base class (even though those in mixed base classes do not score significantly higher than those in the middle track). Furthermore, there appears to be a suppressor effect when we consider the results in model 4. If we control for the level that students sat the Mathematics exam, the coefficients suggest that the advantage of those in the top track is decreased, in other words the advantage of the top track is mainly due to their access to higher level papers. 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 what level students took their examination papers at, those in mixed base classes do the best, more than half a grade better than comparable students in the middle track. Those in the top track also do significantly better than those in the middle track. Although the top track do not score as well as those students in mixed base classes the difference in scores between them is not statistically significant.

On the other hand, the disadvantage of students in the bottom track may also be due to the level they sit the examination paper. Although not statistically significantly different from those in the middle track, the difference in scores between the middle track and those in the bottom also appears to be due to the middle track sitting higher level papers.

The evidence does seem to indicate that although students in the top track do gain an advantage over those in the middle and bottom tracks, 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. Where their advantage lies is in having access to higher level papers. However, it is hard to conclude what might be driving this result, are students in the top track wasting the opportunity, or are schools that employ mixed base classes doing a better job?

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6.9.2 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.

Model 0: Without any control (Intercept only model).

The model of English achievement in the Junior Certificate without any independent variables has a total variance of 4.58 (72 % of the variance is at the student level and 28% is at the school level) and the deviance/log likelihood is 3714.4 which is very similar to that of Math 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 were mixed with no significant differences between the social class background 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 tracks 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 tracks in English achievement are introduced in Model 3 in Table 6.9 below. The reference category is students in the middle track. The results here show that those in the bottom track score significantly lower in the Junior Certificate English examination compared to those in the middle track (over half a grade lower). However, those in the top

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track or those in mixed base classes do not score significantly higher or lower than students in the middle track 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 students sat the English paper in order to see if the difference in English scores between those in the bottom track and those in the middle track can be explained by the level students sat their the exam paper. There are no significant differences between those in the middle track and those in the bottom track once the level they sit the exam paper is controlled for, suggesting the advantage of the middle track is due to the fact they sat higher papers in comparison to their counterparts in the bottom track. Interestingly, when we introduce this control variable we see that comparable students in the top track score significantly lower in English compared to those in the middle track, almost half a grade lower, suggesting the advantage they have in achievement may be due to access to higher level papers. An interaction term between the level of paper and social class of the student was also included in the model but was found not to be significant (honours paper*social class 0.03, 0.04, foundation paper*social class -0.03, 0.09) or change any of the coefficients in the model and therefore was not included in the final model shown. Including all these factors in the final model results in 96% of the variance in English achievement between schools being explained and 54% of individual level variance.

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Table 6.9: English Junior Certificate Achievement and Tracking.

	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	6.60 (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)
Mixed[23]		0.48 (0.40)	0.34 (0.40)	-0.14 (0.28)
Top Track[24]			0.04 (0.21)	-0.43 (0.18)*
Bottom Track[23]			-0.57 (0.24)*	-0.23 (0.21)
Honours Paper[25]				1.87 (0.12)***
Foundation Paper[24]				-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*

[23] This is a school level variable, whether the school uses mixed base classes (1) or not (0). In Models 3 & 4, due to the dummy nature of the variable and inclusion of track placement this variable changes to indicate that students are in a mixed base class.
[24] Reference group is the middle track class.
[25] Reference group is Ordinary Level paper.

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

6.9.3 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.

Model 0: Without any control (Intercept only model).

A model of overall achievement in the Junior Certificate without any independent variables has a total variance of 3.31 (74 % of the variance is at the student level and 26% 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 background of students in their achievement[26]. However, those with medical cards score

[26] 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

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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% 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 tracks its students (0). In schools with higher prior mean mathematics and reading scores, students achieved 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 tracked school. This finding echoes the findings in the previous chapter.

Model 3: Group Placement

The next model, model 3, looks at the differences between the tracks in order to explore differential achievement depending on track placement rather than simply the average effects between tracked and non-tracked schools. The reference category is students in the middle track. Model 3 presents some interesting results: there appears to be no significant difference between the middle track and the top track or between the middle track and the bottom track in terms of their overall Junior Certificate achievement, however those in mixed base classes score significantly higher than those in the middle track. This is particularly interesting as we saw at the beginning of this section that those in the top track had the greatest access to higher

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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.

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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 tracks in terms of overall Junior Certificate achievement. It appears that the advantage of those in mixed base class schools disappears once we control for the fact they sat more papers at the higher level in the Junior Certificate compared to those in the middle track.

An interaction term between the level of paper and social class of the student was also included in the model but was found not to be significant (no of honours paper*social class 0.01, 0.01) or change any of the coefficients in the model and therefore was not included in the final model. This was also found to be the case for Math achievement and English achievement. Therefore, it appears that students taking more honours level papers have higher achievement and this effect is not stronger for students from higher social backgrounds. These findings do not confirm the third hypothesis of this chapter, that access to higher level papers would advantage those from higher social class backgrounds more than those from lower social backgrounds who are also taking higher level papers. However, as we saw in table 6.7, although students from higher social backgrounds do not take more higher level papers once we control for prior ability, students that are not medical card holders do take more higher level papers. Therefore access is still unequal, even if achievement is the same between the two groups once they are taking the same level of paper.

Including student background characteristics, school factors, group placement and the level that students sat the examination accounts for 65% of the total variance in overall student achievement in the Junior Certificate. This is a considerably high amount of explained variance which may be due to the fact the measures took place in a relatively short period (from first year to third year). In the schools selected, mean performance is highest among those with higher entry level scores and those who take a greater number of honours level papers. The results suggest that differential achievement between tracks may be due to access to higher level papers for the Junior Certificate examination in the Irish case.

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Table 6.10: Overall Junior Certificate Grade Point Average Achievement and Tracking.

	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)
Mixed[27]		0.58 (0.26)	0.58 (0.21)*	0.36 (0.17)
Top Track[28]			0.25 (0.15)	0.07 (0.11)
Bottom Track[10]			-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*

[27] This is a school level variable, whether the school uses mixed base classes (1) or not (0). In Models 3 & 4, due to the dummy nature of the variable and inclusion of track placement this variable changes to indicate that students are in a mixed base class.
[28] Reference group is the middle track class.

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6.10 Conclusions

This chapter 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 track score the highest math 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 students took their Mathematics exam, students in the mixed base classes actually do the best in Mathematics achievement.

Students in mixed base classes and those in the top track do not have a statistically significant advantage over those in the middle track in English examination achievement. Furthermore, once the level of the English examination paper is controlled for, those in the middle track actually score significantly higher than those in the top track. Those in the bottom track do significantly worse in their English examination, however, the results suggest that this is likely due to their limited access to the curriculum.

The results for Mathematics, English achievement and overall Junior Certificate grade point average show between group differences but there is not a significant difference in achievement between those in tracked schools and those in non-tracked schools that employ mixed base classes.

Within tracked schools, the top and bottom tracks do not differ significantly in their overall achievement in the Junior Certificate from those in the middle track. Those in mixed base classes, however, do significantly better. This advantage amongst comparable students in mixed base classes disappears once we take account of the number of higher level exam papers.

In summary, for the most part mixed bases classes in non-tracked schools have an advantage in the overall Junior Certificate achievement which is associated with their exposure to the curriculum. They also have an advantage in English achievement which is associated with the level they sit the English exam paper. Furthermore, those in mixed base classes would perhaps gain an advantage if they had more access to higher level exam papers in

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Mathematics. However, any conclusions about access to higher level papers have to interpreted with caution. Students are at the risk of failing higher papers as well as having the opportunity to score higher. Therefore, it is not simply the level of the paper per se that determines achievement, but a combination of the level and other unobserved variables that may be associated with the level such as teacher quality and expectations. Nevertheless, we can conclude that the advantage for some tracks over others is associated with the level they sit their Junior Certificate exam papers which is likely to be associated with other unobserved variables. Although the advantage did not always lie with the top track, as was predicted by hypothesis 2, the differences between students in different group placements were associated by their access to the curriculum for the most part.

Although the results were not included in the final models, the data was originally modelled with a consideration for whether there was an interaction between the level of paper a student sat and their socioeconomic background on achievement. It is particularly important here to mention that the result did not confirm the third hypothesis of this chapter, access to higher level papers would particularly advantage those from higher social class backgrounds. Once students gain access to the curriculum all students regardless of their social background gain the advantage in terms of their achievement

6.11 Policy Implications

The results in this chapter 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 tracks learn more than the students placed in other programmes, even when prior differences in achievement at controlled (Alexander & McDill, 1976; Oakes, 1985). The evidence here suggests that the key to any success of the top track is their access to higher level papers but that they are not taking full advantage of that access. The analysis shows that those in the top track are taking significantly more higher level papers compared to those in the middle track and those in the bottom track even after we control for entry level ability. However, by the end of lower secondary schooling, despite students in the top track having greater access to higher level papers, this does not always translate into a significant achievement advantage over those in the middle track.

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The implication is that students in the top track are not always gaining an achievement advantage that we might expect considering their access to higher level papers. Students in the top track are not achieving a significantly higher overall Junior Certificate grade point average or scoring higher in English compared to the middle track. However, the top stream always has an advantage over those in the bottom stream even after controlling for prior achievement

Having access to higher level papers is giving those in the top track a significant advantage over other tracks in tracked schools in terms of mathematics achievement. On the other hand, those in non-tracked schools would actually have the highest achievement in mathematics if they had better access to higher level papers. A word of caution as to how this is interpreted is important. It may not be the solely the direct effect of the level of the paper that is associated with differential achievement. Rather, the level of the paper is also correlated with other factors, particularly teacher expectations. The associations are not intended to be interpreted in a causal sense, rather as an element of the processes taking place in tracked and non-tracked schools. Perhaps in the case of mathematics those in the top track are gaining a distinct advantage by being assigned to the honours curriculum earlier than those in non-tracked schools. However, we do not see the same achievement advantage in English or for overall Junior Certificate achievement. We are not observing the amount of an achievement gain we might expect given their access to higher level papers.

As was discussed in the previous chapter it is possible that schools are tracking students in response to the student socioeconomic 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 track appear to be only barely competing with those students from non-tracked schools in their achievement at the end of lower secondary schooling. The pay off is students in the top track 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 tracks who achieve significantly lower due to their lack of access to higher papers even after controlling for their prior ability. Comparable to the inequality of educational opportunity we find at the country level when countries track early, tracking access to the curriculum early may be leading to inequality of educational opportunity without much of an observable gain in achievement for those in the top track.

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These findings do not make for easy policy making. As was concluded in chapter four, dismantling the tracking structure will not necessarily result in greater equality within those countries as students may still be sorted into stratified schools on the basis of socioeconomic background. In this case it is perhaps a reaction of the socioeconomic composition of the school to track students into distinct tracks and to differentiate access to the curriculum. It does not appear to result in a significant gain for those in the top track, and it does appear to be at the cost of those in the lower tracks. Even though the models control for the socioeconomic composition of the school, it is difficult to disentangle tracking and school composition effects.

The results leave us with a counterfactual. What would happen to schools with lower socioeconomic composition if they had not tracked their students? Would their average score converge to that of schools that do not track, or would the scores sink down further? Even if tracked schools were to move towards a non-tracked system it is difficult to say whether it would result in a gain amongst those in the bottom track and not result in a loss among those in the top track. It certainly appears that separating students into a top track is not resulting in any achievement advantage compared to those in non-tracked classes, but perhaps those students would no longer be able to compete with students in non-tracked settings if they were not tracked and given better access to the curriculum. The results in this thesis suggest that it is unlikely that students that are currently losing out in tracked schools would not experience a rise in their achievement scores. When we control for the prior achievement those in the bottom track do significantly worse compared to their counterparts in non-tracked schools. When we also include what level students are taking for the Junior Certificate examination this disadvantage disappears in mathematics and English achievement although there is still a significant disadvantage in overall Junior Certificate achievement. This suggests that much of the disadvantage of those in the bottom track for English and mathematic achievement compared to their peers in non-tracked schools is associated with their access to the curriculum. Therefore, de-tracking paired with an emphasis on better access to the curriculum among low achievers without taking away the access to the curriculum among high achievers may offer those schools a chance to rise their overall achievement. More work will need to be done in this area to tease out this issue of social class composition and tracking, such as a longitudinal exploration of schools that have transitioned from being tracked schools to being non-tracked and how their students fare in terms of access to the curriculum

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and any achievement advantages especially as these variables encompass other factors such as teacher expectations and educational resources.

The one conclusion we can make in terms of policy is for students regardless of their track or background is to have better access to the curriculum. This may come in the form of raising teacher expectations of students, particularly the lower achievers in low socioeconomic schools/tracked schools. 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. This aspect needs to be explored with further work examining who has access to higher level papers, how 'setting' decisions are made, both at the individual and school level and how access to the curriculum is related to teacher expectations. Hidden differentiation is clearly as important in this context as more traditional methods of stratifying students within schools.

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Chapter Seven: Conclusions

The objective of this thesis is "to contribute to the research debate on how differentiation within education systems contributes to societal stratification through differentiated educational opportunities". The introduction chapter depicted what we already know from previous research in order to illustrate what this thesis aims to understand. Earlier research has demonstrated various elements that contribute to inequality of educational opportunity such as differentiation within an educational system, differentiation within a school, variation in school socioeconomic composition, variation in academic competitiveness and access to the curriculum. The thesis looked at these areas to go beyond what we knew and to look at how these elements mattered in, and are related to, different contexts. School composition has an effect on achievement, but does this differ depending on how a country sorts its students? Do tracked and non-tracked schools differ in achievement when we take account of school composition? What role does the curriculum play in explaining differences in achievement depending on how a school sorts its students for instruction? Most importantly, who wins and who loses when we look at access to the curriculum, tracking, school composition and how countries sort their students for instruction? What can we say about equity and inequality in educational opportunity? Finally, what are the policy implications of the findings when thinking about educational reform?

These mechanisms of differentiating students during lower secondary schooling do not operate in isolation from each other. School factors such as school composition, tracking policies and curriculum offers can not be separated from each other in boxes of separate effects. We must take a broader view of these mechanisms in offering access to education. In countries that highly differentiate their students, curricular offers will also be highly differentiated between schools. Those in vocational schools are not just separated by the school type, but by what access they have to the curriculum within those schools. School composition and curricular access are also associated with each other. School composition and curricular offers within that school can be viewed as the two sides of the same coin. School composition is likely to affect student achievement through both a peer effect, but also due to educational resources in general, variation in teaching time and quality and differential curricular offers. It is important to keep in mind those mechanisms of both tracking and school composition affect student achievement through differentiated curricular offers when making sense of the findings here.

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7.1 Average effects of differentiation

The thesis asks what the average effects are for pupils and attempts to determine what the differential effects are by looking at how students are sorted for instruction within countries and within schools. In summarising the results in this thesis this chapter begins by discussing average effects and then looks at the differential effects for particular groups of students.

The analysis in this thesis illustrates some unsurprising average effects for students which we would expect from the literature on educational achievement and student and school characteristics. On average students achieve higher scores in comprehensive education systems consistent with previous research (OECD 2005, Hanushek & Woesmann, 2006). The average achievement in schools that do not use tracking is also higher (according to both the PISA 2006 data and the Irish data). Students generally have higher achievement in higher socioeconomic composition schools which has also been found to be the case in single country analysis (Opdenakker, & Van Damme, 2001, Gamoran, 1992; Willms, 1986, 1992). Given better access to the more advanced curriculum, student achievement is higher as would be expected. Prior achievement is a good predictor of achievement at the end of lower secondary schooling. Finally students who are confident in their academic ability and students that are satisfied with their school experience also show higher achievement scores on average.

7.2 Differential effects for particular groups of students

However, the aim of this thesis was to explore differential effects because the above mentioned results refer only to the **average** student. However, what might be true for the average student is not necessarily true for different groups of students. Therefore the research questions were designed to explore who wins and who loses depending on differentiation practices in education. We knew from previous research that school composition affected student achievement and those in higher socioeconomic composition schools generally held an achievement advantage. Research had also shown that family background had a stronger effect on educational outcomes in highly differentiated educational systems (Kerckhoff, 1995) leading to greater educational inequality of opportunity with an advantage for those from higher socioeconomic backgrounds (Horn, 2009). What role does the socioeconomic composition of schools play in this educational inequality of opportunity depending on how students are sorted for instruction within a country? Furthermore, what type of differentiation mechanisms lead to a more favourable outcome for the greater number or in other words a maximisation of achievement for ‘the greater good’?

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It appears that previous research findings which found that within highly-differentiated education systems, students from higher socioeconomic backgrounds have an achievement advantage over those from lower socioeconomic backgrounds is actually associated with their concentration in higher socioeconomic composition schools. High socioeconomic status students in high socioeconomic composition schools in highly differentiated education systems score the highest achievement scores at around 40 points more than those in comprehensive countries. However it is at the cost of a substantial loss of around 140 points in achievement amongst students that are concentrated in lowest socioeconomic composition schools in highly differentiated systems in comparison to comprehensive education systems.

This does not mean there is not any equity to be found in countries that highly differentiate their students for instruction however. Within schools characterised by the same socioeconomic composition, all students regardless of their own socioeconomic background are equally advantaged or disadvantaged by that composition. Therefore, where lower socioeconomic status students do manage to be concentrated in higher socioeconomic composition schools, they academically achieve similar scores in comparison to their better-off peers within that school and this offers some mobility to lower socioeconomic status students.

School composition does not appear to have the same differentiating effect in comprehensive education systems and achievement looks far more equitable between schools regardless of their socioeconomic composition. The cost of this equitability across schools appears to be the loss of achievement for those in the top socioeconomic composition schools. Students in comprehensive education systems never achieve as high as those in high socioeconomic composition schools in highly differentiated systems. Among high socioeconomic status students in high socioeconomic composition schools, those in comprehensive education systems are scoring approximately 40 points less than those in highly differentiated systems, and approximately 20 points less than those in internally differentiated systems. However, this is counterbalanced by the difference in achievement for students in low socioeconomic composition schools. Among low socioeconomic status students in low socioeconomic composition schools, those that are in comprehensive education systems are scoring more than 70 points more than those in internally differentiated systems, and more than 140 points more than those in highly differentiated systems. It is clear to see the gain at the top for those

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in high socioeconomic composition schools in both types of differentiated education systems is far smaller than the loss for those in the lowest socioeconomic composition schools.

Although there appears to be greater equity between schools in comprehensive education systems, this ignores within-school equity. There is a very consistent gap in achievement within schools for students from different social backgrounds that we do not observe in countries that differentiate their students for instruction. Students from higher socioeconomic status backgrounds consistently do better than those from lower socioeconomic status backgrounds regardless of the composition of the school in comprehensive education systems.

How a school groups its students for instruction and offer different curricula also impacts students differentially. Inequality of educational opportunity is evident within schools that track their students for the purpose of instruction. Lower social class status students lose out compared to those in non-tracked schools, and higher social status students gain an advantage. Students who have lower ability scores upon entering second level schooling suffer in their access to the curriculum in tracked schools compared to their lower ability counterparts in non-tracked schools. Those allocated to the top track have significantly more access to a more advanced curriculum even after controlling for their prior achievement compared to those in lower tracks. Students from lower social backgrounds gain an achievement advantage in academically competitive schools compared to when they are not. However this only serves to bring their academic levels on par with those from higher social backgrounds who suffer from being in academically competitive schools.

7.3 Maximising achievement for a minority or the majority?

There are two arguments to be made in relation to achievement depending on how students are sorted for instruction. Firstly is the distance in scores between students from the same socioeconomic status backgrounds that are placed in schools with different socioeconomic compositions in different education systems. The second argument concerns the maximisation of achievement for the largest number. In the first case, we compare students from the same socioeconomic background between the types of education systems. When we compare high socioeconomic status students in high socioeconomic composition schools we can see they have the greatest achievement in highly differentiated systems. Likewise, when we compare low socioeconomic status students in low socioeconomic composition schools they do best in comprehensive systems. It may be that some countries value an achievement advantage at the

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top, whereas others evaluate an achievement advantage at the bottom as being more important. However, how do we achieve the maximisation of achievement for 'the greater good'? In this case the argument is that the overall number of lower socioeconomic status students in lower socioeconomic composition schools is nearly always larger than the number of higher socioeconomic composition schools with higher socioeconomic status students. Therefore when we examine the three different education systems, highly differentiated education systems do the best job at maximising the achievement for the few who are high socioeconomic status students in high socioeconomic composition schools. Comprehensive education systems do a significantly better job at maximising the achievement of the greater number of students who are not in higher socioeconomic composition schools but are in lower socioeconomic composition schools and therefore having an overall higher level of average achievement.

In summary students within comprehensive education systems have greater equity across schools and maximise the achievement of the greater number of students. The payoff is not achieving the high scores for a small minority of students in the top socioeconomic composition schools in comparison to differentiated education systems. There is also greater within-school inequality. Students within differentiated education systems have greater equity within schools and a slight advantage for a minority in higher socioeconomic composition schools. The substantial cost is a loss in achievement for the majority of students within that country who are not in these higher socioeconomic composition schools which leads to an overall lower average achievement.

7.4 Findings from a theoretical perspective

At the beginning of this thesis the theoretical foundation was laid. The research set out to examine the functional role of schools and education systems in sorting students through such practices as differentiating students into distinct school types and tracks. The analysis also studied the link between social origins and educational outcomes during lower secondary education in order to examine the assertion of conflict theory that schools are reinforcing and reproducing societal inequalities and rewarding students on aspects other than ability. Does the practice of differentiating students into distinct school types and tracks with distinct curriculum levels effectively maintain inequality through differences in schooling that advantage particular groups of students?

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The results of the analysis in this thesis really combine the functionalist perspective and the conflict theory perspective. Differentiated schooling and differentiated access to the differentiated curriculum clearly has a functional role to play in ultimately differentiating students into particular roles in society. The differential achievement among students in different tracks and within and between schools (depending on how students are sorted for instruction in a country) indicates that from a functionalist perspective students are being prepared for different roles in society via the differentiated curriculum and differentiated social contexts. However, the results in this thesis also indicate that from a conflict theory perspective, status and privilege (social background) have an influence on educational opportunities and the role students are being selected into. Therefore, it is clear from the findings here that schools have a filtering function as envisaged by functionalist theory (though the extent of this filtering function varies depending on how students are sorted for instruction), but also reward those from the dominant social class group and therefore reinforce societal inequalities.

The thesis finds some evidence to support the theory of effectively maintained inequality that socioeconomically advantaged actors secure for themselves, and their children, some degree of advantage wherever advantages are commonly possible (Lucas, 2001). Students from lower social backgrounds have a distinct disadvantage in their achievement at the end of lower secondary schooling in schools that differentiate their students into distinct tracks, whereas those from higher social backgrounds gain an advantage. Furthermore, access to the curriculum is inextricably linked to the tracking practices of a school. Placement in a particular track determines the curriculum on offer for the most part and results in some students gaining access to higher level exam papers and others not. The sorting effect of tracking practices appears to widen the gap in achievement between track placements due to their access to the curriculum. These effects may also be differential depending on the composition of students within each track placement.

It is difficult to disentangle tracking and school composition effects. The results here show that schools with lower socioeconomic compositions tend to utilise tracking in sorting their students for instruction and that the overall lower average achievement within those schools can be attributed to this factor. Although it is not within the scope of this thesis to answer questions about why some schools choose to track and others do not, it may be that tracked schools are trying to give the minority of students with a higher ability level from higher

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social class backgrounds an achievement advantage by separating them from other students for instruction. This, in turn gives them better access to the curriculum and educational opportunity in order to compete with similar students in schools with higher socioeconomic compositions. The results from the empirical analysis support the hypothesis that schools that track are giving significantly better access to the curriculum to those who enter the school with higher mathematics scores, though there is not any empirical evidence that they give those from higher social backgrounds better access to the curriculum any more than schools that do not utilise tracking. However it may be difficult to separate those with higher mathematics scores from those from higher socioeconomic backgrounds and the evidence shows that those from higher social backgrounds have a distinct achievement advantage in their overall Junior Certificate achievement within tracked schools.

Giving better access to the curriculum to those with higher ability in tracked schools may be in response to the overall lower ability of students entering tracked schools. Clearly, ability matters more in tracked schools as those students get selected into the top track and in turn gain better access to the curriculum which in turn gives students in the higher track a greater achievement advantage over other students in tracked schools at the end of lower secondary school than can be explained by their initial ability. This illustrates McPartland and Dill's (1982) claim that small initial differences in achievement become accentuated over time that produces a cumulative schooling experience. The consequence is lower achievement for the majority not selected into the higher tracks compared to their counterparts in non-tracked schools. Interestingly, students in the higher track are not generally turning their better access to the curriculum into a 'real' achievement advantage except for in mathematics.

We can not say that de-tracking would definitively benefit lower social class students and the students who are currently in the lower tracks and suffering because of their lack of access to the curriculum without any cost for those in the top track. Dalin (1998), McLaughlin (1998) and Miles (1998) stress the variability of schools and suggest that educational reform policies do not always lead to the desired educational change we might expect in all schools. In this case it may be too difficult to separate the mechanisms of social class composition and the ability composition of the school from tracking effects. Nevertheless, if schools are tracking their students in order to give those at the top of the ability range an advantage in order to 'compete' with comparable students in other schools it is at a significant cost to those in the lower tracks. Policy should consider de-tracking these schools in order to encourage better

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access to the curriculum for the majority rather than a minority and therefore raise the overall achievement within those schools. Even if policy was not to de-track schools, the bottom line is that the focus should be on giving those in the lower tracks better access to the curriculum as the results in this thesis illustrate that much of the achievement deficit among those in lower tracks is due to their limited access to the higher curriculum. They are definitely losing out compared to their counterparts in non-tracked schools. It appears from the analysis here that non-tracked schools have better access to the curriculum for the majority rather than a minority and an overall higher average achievement as a result.

Effectively maintained inequality appears to be achieved in different ways depending on how countries sort their students for instruction. Although we can not control for prior ability, we can see that those from higher socioeconomic status backgrounds have higher achievement than those from lower socioeconomic backgrounds within schools in countries with comprehensive education. Higher socioeconomic status students in differentiated education systems have higher achievement as they are concentrated in schools that have higher socioeconomic composition. Therefore, although they do not hold an achievement advantage within the school, they do hold an advantage between schools of different socioeconomic compositions. However, these conclusions about differential effects in education systems for students from different socioeconomic backgrounds have to be interpreted with caution as they may be due to their higher prior ability which we are not able to control for in this thesis.

7.5 Policy implications from the findings

From a policy perspective the results from looking at both differentiation within countries and looking at differentiation within schools illustrates the payoff between offering an advantage to a minority or maximising achievement among the greatest number. What are schools and countries to do in choosing whether and how to differentiate students? Currently it appears that some schools and countries choose to differentiate their students and in doing so maximise the achievement of a minority of students who are at the ‘top’. On the other hand, students that are in non-tracked schools and students in countries that choose comprehensive education show a greater maximisation of achievement for the majority of students with only a relatively small loss of achievement for a small minority at the ‘top’. If countries and schools are to believe in having an overall higher average achievement with a maximisation of achievement for the majority of students then clearly rigidly differentiating students into distinct groups does not achieve that goal. However, if it is the aim of the country to be

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selective and offer an achievement advantage for a small minority of students that will result in achievement amongst those students slightly above all others then clearly differentiating students accomplishes this goal. It may be the case that countries and schools wish to have a dominant group with an advantage and a majority of students with fewer skills who are being prepared for lower status occupations. However, within tracked schools and within highly differentiated education systems this achievement advantage is relatively minor and results in greater inequality. If we are to believe in offering equality of opportunity, differentiating students which results in limited access to the curriculum and confines the options for academic success among the majority of students is less than desirable. The relatively small advantage in academic success among the minority is at a substantial cost for the majority. In this case, comprehensive schooling systems and non-tracked schools are doing a better job at maximising the achievement for the majority of students within those settings.

The introductory chapter to this thesis posed the question whether it is favourable to have an overall higher level of achievement despite a high level of inequality, or higher levels of equality despite an overall lower general achievement level? The findings illustrate that this is not the pay off for differentiating students. Overall achievement is higher for the majority of students when there is less differentiation within the country and within the school which is tied to greater access to the curriculum. Equality is actually associated with greater average achievement for the majority rather than a minority. If countries and schools are to de-track, there is no guarantee that there will not be a loss in achievement for the minority at the very 'top'; however it is likely to lead to an overall raising of the average achievement of students, particularly for the majority who are currently in the middle or at the bottom, who have limited access to the higher levels of the curriculum and are concentrated in lower socioeconomic composition schools.

The caveat would be that schools and countries may still use the mechanisms of differentiating students into different socioeconomic composition schools and tracks with consequences for access to the curriculum without employing formal 'tracking' structures and policy would have to address this issue. Reforming a currently highly differentiated education system would be difficult as the sorting mechanisms have resulted in school socioeconomic composition being highly correlated with achievement. From a policy perspective it is very difficult to reorganise schools based on their socioeconomic composition. However, after a move towards comprehensive education, policy could focus on compensating schools that

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have lower socioeconomic compositions with extra funding and resources, teaching resources and monitoring access to the curriculum and curricular offers within those schools in order to raise achievement among the majority of students.

This conclusion also holds true for schools that track their students. These schools also are characterised by lower socioeconomic composition. Rather than restructuring the composition of these schools it may be important to highlight how the mechanisms of differentiating students within these schools is limiting curricular options and achievement for the majority of students within the school. Currently, schools may be pouring their limited educational resources into the minority of those with most promise. Policy would also have to focus on compensating these schools that have lower socioeconomic compositions and an overall lower academic ability so these schools no longer maximise the achievement of a minority. Teacher education and resources for those schools in order to ensure more equitable access to the curriculum, particularly for those that are currently in the lower tracks would assist those schools in raising overall achievement. If the majority of students currently have less access to the curriculum and lower academic achievement than if they attended a non-tracked school, tracked schools are only an attractive option for a minority who will gain access to the top track. Reform to raise the overall academic achievement of the majority, even at a slight cost for a minority may in turn raise the average academic ability of students wanting to enter the school due to these improvements in the outcomes for the majority.

In conclusion, differentiated outcomes are associated with the sorting of students into track placements within schools or tracks within an education system. The analysis indicates this is likely to be due to the sorting mechanisms that result from differentiating students. Access to the curriculum is more differentiated in schools that track their students limiting options for the majority of students who are in the lower tracks. School composition is also more differentiated in education systems that sort their students into distinct school types or have high levels of within-school ability grouping which results in an overall achievement disadvantage for the majority and an achievement advantage for a small minority of higher socioeconomic status students. It appears from the results in the analyses carried out for this thesis that these mechanisms of sorting students benefit a small minority of students from higher socioeconomic backgrounds for the most part whereas more comprehensive education systems and schools are characterised by greater achievement for the majority and result in more equitable educational opportunity. If we are to move towards a more equitable

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distribution of educational opportunity we must look at how we sort students for instruction benefits a minority or a majority of students.

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Appendix A: School Tracking, Individual and School Level Characteristics and Junior Certificate grade point average controlling for Entry Level Scores. N=535 in 10 schools

1573.1Model: *Fixed Part*	
Predictor	Coefficient (st. error)
Intercept	6.66 (0.29)***
Tracked	-0.19 (0.57)
Female	0.29 (0.14)*
Social Class	-0.03 (0.04)
Academic Self-Rating	0.65 (0.09)***
Entry math score	0.06 (0.01)***
Entry reading score	0.05 (0.01)***
School Social Class	0.15 (0.21)
School Academic Rating	-1.13 (3.15)
SchAcademic Rating* Social Class	-0.75 (0.48)
Tracked*Social Class	0.15 (0.08)*
Random part	
σ2e	1.02
σ2u0	0.19
Deviance	1573.1

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

Appendix B: School Tracking, Individual and School Level Characteristics and Satisfaction with School experience on Junior Certificate grade point average controlling for Entry Level Scores. N=535 in 10 schools

Model: *Fixed Part*	
Predictor	Coefficient (st. error)
Intercept	6.75 (0.23)***
Tracked	-0.30 (0.35)
Female	0.24 (0.14)
Social Class	0.04 (0.03)
Satisfaction	0.47 (0.12)***
Entry math score	0.07 (0.01)***
Entry reading score	0.05 (0.01)***
School Social Class	0.06 (0.22)
School Satisfaction	-0.09 (1.39)
Random part	
σ2e	1.04
σ2u0	0.19
Deviance	1603.1

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

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Appendix C: Description of PISA 2006 Variables

	Country Level
YComp	***Comprehensive=1, reference category 'within-school stratification'***
YStrat	***Highly Stratified=1, reference category 'within-school differentiation'***
YESCS	***aggregate of ESCS***
YImmig	***% non native students***
Yed%GDP	***% of GDP spent on education***
YCompEd	***Yrs of Compulsory Education***
YCBEEE	***Central exit examination***
Y%PrivDep	***% Private Government Dependent schools in country***
Y%PrivIndep	***% Private Government Independent schools in country***
YSchComp	***Level of school competition in a country***
	School Level
SCHAbgrAll	***Use ability grouping for all subjects(ref ends up being schs that use ability grouping for some subjects in the school)***
SCHNoabgr	***Don't use ability grouping for any subjects in the school (ref ends up being schs that use ability grouping for some subjects in the school)***
SCHHisele	***High academic selectivity***
SCHESCS	***School ESCS aggregate***
SCHImmig%	***% of non-natives at school as a % of non-natives in the population***
SCHSchlcomp	***Level of school competition***
SCHGovIndep	***Dummy, school is Private Government Independent***
SCHGovDep	***Dummy, school is Private Government Dependent***
SCHSchSize	***School size***
SCHSTRatio	***Student teacher ratio***
SCHTCShort	***Teacher shortage***
SCHSCmated	***Schools educational resources***
SCHCity	***Omitted category (Big City, more than 1,000,000 people)***
SCHTown	
SCHSmallTown	
SCHVillage	
	Individual Level
AcaLoc	***Academic location (Grade+Programme)***
ESCS	***Socioeconomic Status***
Female	***=1***
1st GenLan	***1st Generation non-native, speaks same language as country at home***
2nd GenLan	***2nd Generation non-native, speaks same language as country at home***
NatNoLan	***Native, speaks different language of country at home***
1st GenNoLan	***1st Generation non-native, speaks different language of country at home***
2nd GenNoLan	***2nd Generation non-native, speaks different language of country at home***

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Appendix D: Cross-level interaction table including all variables in the model (Chapter Four Analysis using PISA 2006 data)

	*Social Background * System Tracking*	*Individual & School Tracking * System Tracking*	*Social Background, Tracking * System Tracking*	*All social background & Tracking Effects*
Model:	*Model 1*	*Model 2*	*Model 3*	*Model 4*
Predictor				
Intercept	*464.68 (24.39)****	*467.17 (24.58)****	*468.89 (24.52)****	*465.79 (24.58)****
Country Level				
YComp	*25.09 (11.69)**	*25.24 (11.86)**	*24.96 (11.80)**	*25.83 (11.83)**
YStrat	*-0.77 (7.77)*	*-5.58 (7.88)*	*-5.01 (7.84)*	*-4.91(7.86)*
YESCS	*-1.77 (17.45)*	*-11.29 (17.61)*	*-1.83 (17.53)*	*1.60 (17.57)*
YImmig	*-0.11 (0.41)*	*-0.01 (0.42)*	*-0.14 (0.41)*	*-0.13 (0.41)*
Yed%GDP	*0.84 (3.19)*	*0.24 (3.23)*	*0.43 (3.21)*	*0.38 (3.22)*
YCompEd	*-5.16 (3.38)*	*-5.02 (3.41)*	*-4.85 (3.39)*	*-5.19 (3.39)*
YCBEEE	*-4.98 (7.39)*	*-7.32 (7.47)*	*-4.05 (7.43)*	*-4.01 (7.44)*
Y%PrivDep	*0.22 (0.14)*	*0.26 (0.15)*	*0.21 (0.15)*	*0.21 (0.15)*
Y%PrivIndep	*-1.32 (1.80)*	*-1.53 (1.82)*	*-1.37 (1.81)*	*-1.28 (1.81)*
YSchComp	*47.30 (31.45)*	*48.21 (31.68)*	*42.95 (31.59)*	*45.37 (31.67)*
School Level				
XAbgrAll	*-4.82 (1.32)****	*-5.69 (2.48)****	*-6.32 (2.44)****	*-5.94 (2.42)**
XAbgrAll*YCOMP		*5.15 (4.99)*	*6.44 (4.90)*	*7.04 (4.87)*
XAbgrAll*YSTRAT		*0.93 (3.01)*	*2.35 (2.96)*	*2.55 (2.94)*
XNoabgr	*1.30 (0.98)*	*-3.29 (1.93)*	*-2.25 (1.89)*	*-2.20 (1.88)*
XNoabgr*YCOMP		*0.49 (2.81)*	*-1.42 (2.76)*	*-1.46 (2.74)*
XNoabgr*YSTRAT		*9.89 (2.32)****	*7.64 (2.28)****	*7.34 (2.27)***
XHisele	*10.46 (1.22)****	*12.58 (1.25)****	*11.12 (1.23)****	*10.89 (1.22)****
XESCS	*31.41 (1.44)****	*44.06 (0.98)****	*29.26 (1.46)****	*29.84 (1.45)****
XESCS*YCOMP	*-12.67 (2.68)****		*-12.75 (2.69)****	*-13.13 (2.67)****
XESCS*YSTRAT	*27.15 (1.77)****		*32.21 (1.81)****	*33.46 (1.80)****
XImmig%	*-0.02 (0.00)****	*-0.02 (0.00)****	*-0.02 (0.00)****	*-0.02 (0.00)****
XSchlcomp	*1.16 (0.99)*	*0.98 (1.01)*	*1.19 (0.99)*	*1.21 (0.98)*
XGovIndepPriv	*-11.02 (2.94)****	*-17.37 (2.94)****	*-10.32 (2.93)****	*-12.72 (2.92)****
XGovDepPriv	*-0.14 (1.42)*	*-0.85 (1.45)*	*-0.03 (1.43)*	*-0.33 (1.42)*
XSchSize	*0.98 (0.12)****	*1.00 (0.12)****	*0.98 (0.12)****	*0.97 (0.12)****
XSTRatio	*0.64 (0.11)****	*0.64 (0.12)****	*0.61 (0.12)****	*0.62 (0.12)****
XTCShort	*-2.69 (0.49)****	*-2.96 (0.50)****	*-2.77 (0.49)****	*-2.67 (0.49)****
XSCmated	*0.32 (0.45)*	*0.08 (0.45)*	*0.28 (0.45)*	*0.21 (0.45)*
XCity	*-3.47 (1.75)**	*-3.92 (1.79)**	*-3.29 (1.76)*	*-3.35 (1.74)*
XTown	*-1.06 (1.68)*	*-1.12 (1.71)*	*-0.89 (1.68)*	*-0.63 (1.67)*
XSmallTown	*3.05 (1.78)*	*3.30 (1.81)*	*3.14 (1.78)*	*3.29 (1.77)*
XVillage	*9.27 (2.03)****	*9.83 (2.06)****	*8.78 (2.03)****	*8.28 (2.01)****
Individual Level				
AcaLoc	*0.66 (0.01)****	*0.76 (0.01)****	*0.76 (0.01)****	*0.76 (0.01)****
AcaLoc* YCOMP		*0.06 (0.02)****	*0.05 (0.02)***	*0.04 (0.02)***
AcaLoc*YSTRAT		*-0.18 (0.01)****	*-0.17 (0.01)****	*-0.19 (0.01)****
AcaLoc*XAbgrAll				*0.06 (0.02)****
AcaLoc*XNoabgr				*0.01 (0.01)*
AcaLoc*XESCS				*0.01 (0.01)*
ESCS	*21.45 (0.29)****	*16.21 (0.19)****	*21.15 (0.29)****	*22.07 (0.32)****
ESCS*YCOMP	*2.60 (0.53)****		*2.13 (0.54)****	*2.92 (0.55)****
ESCS*YSTRAT	*-12.48 (0.40)****		*-11.87 (0.41)****	*-11.82 (0.42)****
ESCS*XAbgrAll				*0.81 (0.56)*
ESCS*XNoabgr				*-3.43 (0.41)****
ESCS*XESCS				*3.66 (0.32)****
Female	*-0.97 (0.30)**	*-0.82 (0.30)**	*-1.08 (0.30)**	*-1.15 (0.30)****
1st GenLan	*-10.79 (1.13)****	*-10.15 (1.13)****	*-10.46 (1.13)****	*-10.44 (1.13)****
2nd GenLan	*-13.65 (0.95)****	*-12.85 (0.95)****	*-13.75 (0.95)****	*-13.47 (0.95)****
NatNoLan	*-23.88 (1.80)****	*-24.04 (1.80)****	*-23.90 (1.79)****	*-23.82 (1.79)****
1st GenNoLan	*-30.83 (0.95)****	*-29.50 (0.95)****	*-30.96 (0.95)****	*-30.82 (0.94)****
2nd GenNoLan	*-25.47 (1.08)****	*-23.31 (1.08)****	*-25.54 (1.08)****	*-25.34 (1.08)****
Mnative	*-36.15 (1.08)****	*-36.35 (1.08)****	*-36.10 (1.08)****	*-36.09 (1.07)****
Msamelang	*-31.47 (0.78)****	*-31.37 (0.78)****	*-31.63 (0.77)****	*-31.49 (0.77)****
Random part				
σ^2_e	*3912.39*	*3927.59*	*3904.71*	*3901.79*
σ^2_{u0}	*895.06*	*930.09*	*891.34*	*876.97*
σ^2_{v0}	*131.76*	*134.19*	*132.81*	*133.60*
Deviance	*2208547.7*	*2209524.8*	*2208146.3*	*2207904.0*

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