The impact of housing tenure on secondary school pupils' educational attainment

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Abstract

Educational attainment is strongly associated with a person's life chances, and poorer children most often have poorer educational outcomes, thus entrenching inequalities. It is known that living in a deprived neighbourhood can have a detrimental impact on educational outcomes. Additionally, it has been found that having a high proportion of poor pupils within a school can have a negative impact on individual educational outcomes. In Glasgow, tenure mixing, which aims to break up areas of mainly social rented housing with owner occupation, has been an objective of regeneration policy. This thesis aims to look at whether mixed tenure policy has had an impact on individual pupil educational attainment in Glasgow.

A mixed methods approach was utilised. Firstly changes between two timepoints using data from Glasgow City Council, 2001 and 2011 Censuses, and Scottish Qualification Agency data were examined, focusing on educational attainment and housing tenure. Secondly, multilevel modelling was used to explore variations in educational attainment between neighbourhoods and schools in relation to housing tenure and other socioeconomic measures at each timepoint, as well as over time. Finally, semi-structured interviews were carried out with 15 teachers and pupils in two case study schools in Glasgow.

This research found that the proportion of owner occupied households in a pupil's neighbourhood had a significant impact on their educational attainment, over and above other individual, neighbourhood, school catchment area and school factors, suggesting that mixed tenure policy could have an impact on educational attainment in Glasgow. Owner occupation was seen by teachers as a way of increasing the numbers of 'aspirational' families in catchment areas. Without an influx of 'aspirational' pupils the scope for policies to raise attainment and reputation to take hold was viewed to be limited. Pupils were more likely to be negative about changes in the catchment areas, highlighting the slow pace of change, and felt that their schools and areas were stigmatised due to poor reputation.

This thesis illustrates the importance of taking into account the different contexts that may impact on a person's outcomes. It also highlights the role of policy to take a more holistic view of contextual influences.

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Author's Declaration

"I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution."

Printed Name: _____

Signature: _____

Abbreviations

COA   Census output area

GCC   Glasgow City Council

GIS   Geographic Imaging Software

NS-SEC   National Statistics Socio-economic Classification

SCQF   Scottish Credit Qualifications Framework

SES   Socioeconomic status

SIMD   Scottish Index of Multiple Deprivation

SQA   Scottish Qualifications Agency

VIF   Variance inflation factor

VPC   Variance partition coefficient

1 Introduction

1.1 Aim

The main aim of this thesis is to extend existing knowledge and understanding on the question:

Can mixed tenure housing policy make a difference to educational outcomes?

1.2 Rationale

Expanding our knowledge on what affects educational outcomes, specifically what improves them, is crucial as educational attainment impacts on factors such as health, well-being, life expectancy and earnings (Gregg and Machin, 2001). In terms of social justice, it is known that there are disparities between the educational attainment of those from affluent backgrounds and those from less affluent backgrounds, with background factors having the strongest influence on a pupil's educational outcomes. Not only is this the case for individual pupils, but it has been found that schools with a lower proportion of affluent pupils do worse in part because of the cumulative impact on the school that having a largely deprived pupil body has (Teese et al., 2007). The Marmot Review 'Fair Society Healthy Lives' outlines the importance of education on reducing inequalities and one of the policy recommendations included is to 'Ensure that reducing social inequalities in pupils' educational outcomes is a sustained priority' (Marmot et al., 2010). More recently, the Scottish Government has made reducing the educational attainment gap between more and less deprived children the focus of a new policy initiative in 2015 (Scottish Government, 2016b).

Between-school differences in educational outcomes have been much studied in the educational literature, with one line of enquiry being school effectiveness research - identifying factors that are associated with good schools and attempting to transfer these into schools that fare less well, leading to many school-based interventions and policies. There are many hundreds of school factors that have been identified as being associated with positive outcomes, and these include

factors such as strong leadership, positive academic expectations and requirements, high levels of pupil and parental involvement, structured programs, low level of coercion, orderly environment, shared sense of mission amongst staff, high teacher-pupil ratios, and small school size (Macbeath and Mortimore, 2001).

However, it does not necessarily follow that these processes are the cause *of* the school being 'good', but instead could be caused by the school having a higher proportion of high socioeconomic status (SES) pupils (Jencks, 1972). School context theory posits that the intake of pupils may impact on the schools' ability to successfully implement the processes that are associated with positive outcomes - the key factor is the mix of pupils that attend (Thrupp, 1998). School context has also been found to have an association with pupil outcomes - findings imply that students tend to benefit in terms of their educational attainment from being in a school with a high SES intake, beyond their individual SES (Thrupp, 1999, Lupton, 2005).

The idea of "neighbourhood effects", that living in a certain neighbourhood has an impact on an individual, over and above their background characteristics (Galster, 2012) are particularly associated with those living in poor neighbourhoods. In other words, concentrations of poverty have a detrimental effect on people's lives, over and above other factors. Neighbourhood effects have been found to have a small but significant impact on educational outcomes, with poorer areas having a negative impact on outcomes including educational attainment, years of schooling, and attending higher education (Garner and Raudenbush, 1991, Brooks-Gunn and Duncan, 1997). Therefore, one could posit that a child living in a deprived neighbourhood and also attending a school with a large proportion of deprived pupils may be doubly disadvantaged.

One place-based response to the effects of these concentrations of deprivation has been to break up areas of social rented mono-tenure by creating areas of mixed tenure housing, whether through policies such as 'Right to Buy', or newer policies such as mixed use developments with a mixture of housing for social renting and owner occupation. Though there have been criticisms of mixed tenure housing - not

least whether it is housing tenure mix that is the outcome, or whether it is a proxy for income (Tunstall and Fenton, 2006) - it has been adopted under a range of names in housing policy across the UK.

Glasgow, the largest city in Scotland, has a high concentration of deprived neighbourhoods - in 2012, almost a third (29.6%) of all of the data zones in the most deprived 15% across Scotland were located in Glasgow City (Scottish Government, 2012), despite it containing just 11% of the national data zones. One response to the concentrations of poverty and deprivation that have characterised Glasgow has been the enactment of multiple regeneration efforts on the city for much of the past 100 years (Crawford et al., 2007). In the last two decades, regeneration approaches in Glasgow have included objectives of producing or supporting mixed communities (Sautkina et al., 2012), on the premise that mixing in terms of income and housing tenure may reduce negative neighbourhood effects (Galster 2007). In the Glasgow context, the areas with high concentrations of deprivation also tend to have high levels of social rented housing (National Records of Scotland, 2013b), in part due to social rented properties being used to house those most vulnerable in society.

As would be expected in an area with a history of such wide ranging deprivation, Glasgow also consistently performs poorest out of all local authorities in Scotland in terms of educational attainment (Scottish Government, 2011c). Poverty has been found to have an impact on educational attainment through a range of mechanisms, both directly and indirectly linked to disadvantage (Blanden and Gregg, 2004). State schools in Glasgow work on a catchment area basis, and are very varied in terms of their intake, ranging from under 20% of pupils to almost 90% of pupils from the 15% most deprived areas. Unsurprisingly, there is also variation in how the schools perform, with some schools having less than 10% of their pupils attaining 5 or more level 5 (or credit) exams (a national exam measure in Scotland), while in other schools this is around 40%. As can be seen in Figure 1-1, there seems to be a strong correlation between deprivation and poor educational outcomes, with schools that have intakes of high deprivation doing less well.

Figure 1-1: Percentage of pupils from 15% most deprived areas plotted against percentage of pupils gaining >5 level 5 qualifications, for each Glasgow school
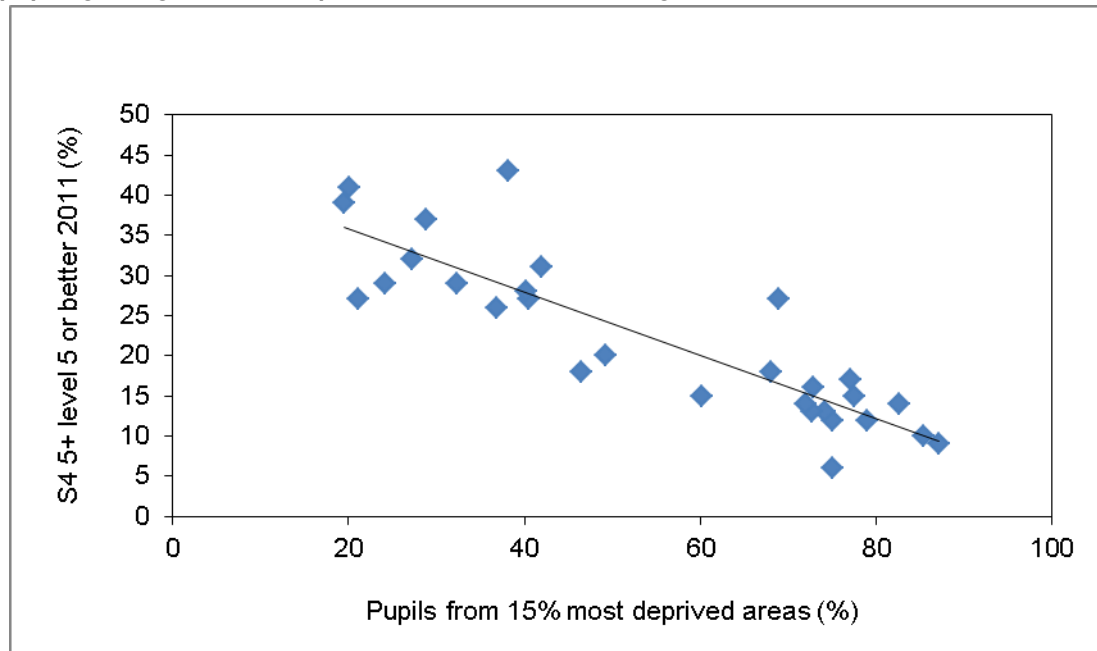
Source: Glasgow City Council and Scottish Government, compiled by author

Therefore, a pupil in a school whose intake had a high proportion of low SES pupils - for example, a school that took in a large mono-tenure social housing estate that had concentrations of deprivation - would have poorer outcomes than if they were in a more mixed school. In a city such as Glasgow, where place-based initiatives to de-concentrate areas of deprivation have been implemented for many years, the question arises: can mixed tenure housing policy make a difference to educational outcomes?

1.3 The project

As indicated at the start of this chapter, the research aims to answer the overarching question:

Can mixed tenure housing policy make a difference to educational outcomes?

Specifically, the research aims to answer the following three questions:

1. How have catchment areas and schools changed, focusing especially on housing tenure and educational attainment?

2. What explains individual educational attainment and changes in educational attainment, focusing especially on housing tenure?

3. How have changes in neighbourhoods, catchment areas and schools been experienced by staff and pupils?

This thesis draws on both education and housing theory and research in order to address the aim and research questions outlined above. To explore the questions in the context of Glasgow, it uses individual pupil level data on school pupils in the city, along with city socioeconomic data at two timepoints over a ten year period (2001 to 2011), as well as qualitative data. These data afford the opportunity to explore the association of individual educational attainment with indicators of social mix within the pupils' neighbourhood, school and catchment area, with a specific focus on housing tenure.

1.4 Summary of thesis

Chapter 2 gives a brief outline of the political and socioeconomic context of Scotland, moving on to look at the history and policy of education in Scotland, before focusing more specifically on schooling in Glasgow. It then outlines the history of and policy on housing in Scotland, focusing on mixed tenure housing policy, before looking at urban regeneration and the role of mixed tenure housing policy in Glasgow. It shows that both education and housing policy in Scotland in recent years have had a focus on reducing inequalities.

Chapter 3 explores the literature pertinent to the thesis. In order to address the aim of the thesis, the literature around educational attainment and mixed tenure housing is explored. The chapter begins by exploring the importance of educational attainment. The review then introduces a framework developed from Bronfenbrenner's ecological model to explore the different systems that influence a

child's educational outcomes, namely individual pupil and family, neighbourhood, catchment area and school. Each of these contexts is looked at in turn, along with the theory and existing evidence in relation to educational attainment, focusing specifically on the link with poverty. Finally, this chapter looks at regeneration, with a specific focus on mixed tenure housing initiatives, and explores the ways in which it could lead to improved educational attainment, through a variety of pathways at individual, neighbourhood, school and catchment area level.

Chapter 4 introduces the methodological framework that has been used in order to answer the research questions. It firstly sets out the rationale for using a mixed-methods, critical realist approach before moving on to locate the methods within the conceptual framework introduced in the previous chapter. It then looks at the quantitative methods used for research questions 1 and 2, firstly describing the sources of the data; how the data were managed; how variables were derived; and how the data were linked. It then discusses the statistical methods used and details the quantitative analysis undertaken. For research question 1 this chapter looks at the methods for exploring changes over time at a city, catchment area and school level; and for research question 2, an overview of the statistical analyses undertaken is provided, exploring how the structure of the data led to using multilevel modelling, and detailing how the models were built. The final section discusses the methods used in the qualitative part of the study for research question 3, namely semi-structured interviews with staff and pupils in two case study schools. This section looks at how the research was conducted in a practical sense, including the selection of schools; development of topic guides; ethical issues; and how the data were analysed.

Chapter 5 sets out the findings for research question 1, which asks how catchment areas and schools changed, focusing especially on housing tenure and educational attainment. The chapter is in two sections, with the first looking at how Scotland and Glasgow City overall changed between 2001 and 2011, as well as how the overall changes have been distributed throughout the catchment areas of the schools used in the analysis. This section focuses first on the variable of interest, housing tenure, and then looks at social class; level of education; employment

status; ethnic mix; family structure and deprivation. The data used are 2001 and 2011 census data and Scottish Index of Multiple Deprivation (SIMD) data, aggregated to catchment area level. The second section looks at how the schools themselves have changed in terms of the characteristics of their students, using aggregated individual pupil data from Glasgow City Council for 2003 and 2012. Specifically it looks at free school meal registration; ethnic mix; and overall educational attainment. Chapter 5 ends by looking in more detail at the catchments which had a rise in owner occupation between the two timepoints.

Chapter 6 sets out the findings from research question 2, looking at what explains individual educational attainment and changes in educational attainment, focusing especially on housing tenure. This chapter is in two parts: the results of the formative analysis, and the results of the final analysis. The formative analyses look at the associations of the explanatory variables with the outcome variable, individual educational attainment, and with each other, in a three level multilevel model. This section looks at the associations that pupil characteristics have with educational attainment, before examining the associations of housing tenure at both neighbourhood and catchment area level with educational attainment. Next, this section looks at how the neighbourhood, catchment area and school characteristics other than housing tenure impact on educational attainment, and also on variations in educational attainment between neighbourhoods and between schools, before moving on to explore how these characteristics impact the associations of housing tenure with educational attainment. The formative analyses are used to inform the construction of the final models for analysis. The section on the final analyses is in two parts. Firstly, three level multilevel models are used to look at the extent to which variation between neighbourhoods and schools in educational attainment at each timepoint can be explained by pupil, neighbourhood and catchment area/school characteristics, focusing specifically on housing tenure. Secondly, a four level multilevel model is used to explore whether changes in housing tenure over time can account for changes in educational attainment.

Chapter 7 gives an account of the findings from the third and final research question, which looks at how changes in catchment areas and schools have been

experienced. Firstly the two case study schools, Meadow Flats and Parkside, are described, and an outline of the staff and pupil participants is given. Then the qualitative data from each school are analysed, starting with the staff and then moving on to the pupils. Results are reported thematically, with the findings for each theme discussed in turn. Firstly, the views of staff on the historical context of the area, and the impact on residents are explored. Then, the changes they have experienced are discussed, focusing on the impact these have had on residents, the wider area and the school. Next, policies in mitigating the effect of the catchment areas are explored, before finally moving on to discuss the link between area change and the social mix of the schools. With the pupils, firstly their views on their home neighbourhood vs. the wider area are discussed, before moving on to explore their views on area change, and the impact of these changes on the school. This chapter ends with an initial discussion of the findings, and the introduction of a logic model outlining possible pathways between housing tenure diversification and school and pupil outcomes, based on the data gathered.

Chapter 8 brings all three sets of findings chapters together and discusses how they address the overall aim of the thesis, which is to look at whether mixed tenure housing policy can make a difference to educational outcomes. It firstly gives a summary of the purpose of the research, along with what and how this was done. It then gives a recap of the findings, alongside exploring how the thesis findings fit within existing literature. It then looks at the limitations and strengths of the research, before exploring the importance of the work and how the findings could impact on policy, before moving on to make some recommendations about further research. This chapter ends with a summary of the findings and final reflection on the thesis.

2 Context

2.1 Introduction

In a context such as Glasgow, education and the urban environment are inextricably linked, as the majority of young people attend the school in their locality. It is important therefore for research to examine how education and housing policies impact on the social and educational landscape of the city. This chapter will give a brief outline of the political and socioeconomic context of Scotland, moving on to look at the history and policy of education in Scotland, before focusing more specifically on schooling in Glasgow. It will then give a brief outline of the history and policy of housing in Scotland and Glasgow.

2.2 Scottish context

Scotland is a relatively small country in the north of the United Kingdom (UK), with a population of 5.4 million (National Records of Scotland, 2017). Historically administered by the UK government at Westminster, in 1998 the Scotland Act led to the creation of the Scottish Parliament in 1999, and meant that certain powers that were previously the responsibility of the Scottish Office were devolved to the Scottish Government. Matters which are devolved include education and training; housing; as well as environment; health and social services (Scottish Parliament, 2014).

Scotland has a relatively high number of people living in poverty - in 2015/16, over a quarter of children (26%) were in poverty (after housing costs). Interestingly, 70% of children in poverty lived in households where at least one person was working (Scottish Government, 2017b). Although poverty in Scotland overall is widespread, Glasgow is the poorest local authority. Using the 2012 Scottish Index of Multiple Deprivation (SIMD) measure, it can be seen that a third of all of the data zones in the most deprived 15% across Scotland were located in the Glasgow City Council area (Scottish Government, 2012). Glasgow is also the largest city in Scotland, with just over 11% (593,245 individuals) of the Scottish population residing in Glasgow

City in 2011 (National Records of Scotland, 2014). The city tends to have high levels of excess mortality and poor health, even compared to other similar post-industrial cities in the UK (Walsh et al., 2016).

2.3 Education in Scotland

Scotland more than the rest of the UK has a comprehensive model of schooling, with fewer private schools and most pupils attending the school within their neighbourhood of residence than England (OECD, 2007). The comprehensive model was introduced into the UK in 1965, and in Scotland as opposed to England, there has tended to be continuing civic and political support for the model (Howieson et al., 2017). In Scotland in 2016, just 4.1% of school pupils attended an independent, i.e. non-state school (Scottish Council of Independent Schools, 2016), compared with 7.0% in England in the same year, rising to 18.0% of pupils over 16 (Independent Schools Council, 2016).

The *Education Scotland (1872) Act* led to school being made compulsory for young people aged 5 – 13 in Scotland and also established common standards in education (Clark and Munn, 1997). By 1918, it was required that authorities make free secondary education available to all and by 1972 the leaving age had been raised to 16 (Anderson, 2008). The *Education (Scotland) Act* of 1981 included a 'parents' charter' which introduced the option of placement requests – parents being able to request that their child attend a school not in their catchment area (Pickard, 2008). In 1995 the United Nations Convention on the Rights of the Child gained legal status in Scotland via the *Children (Scotland) Act* (Ravet, 2008), and the *Standards in Scotland's Schools Act* in 2000 was the first time education was referred to as a right for children in the country (Lennon, 2008).

More recently the Scottish Government has made 'closing the attainment gap' the focus of its education strategy, as opposed to the broader 'raising attainment for all' which had preceded it. In 2006 the *More Choices, More Chances* strategy was introduced in order to lower the number of young people not in employment,

education or training (NEET) by widening access to post school opportunities (Scottish Government, 2006).

The Scottish Government also recognises the gaps between rich and poor citizens more generally. The *Achieving Our Potential* framework was introduced in 2008, with the aims of tackling poverty and income inequality in Scotland, including education. In 2015 the Scottish Attainment Challenge was introduced, with a particular focus on closing the poverty-related educational attainment gap (Scottish Government, 2017e). Part of the Challenge approach is the distribution of the Pupil Equity Fund - extra money for schools based on the proportion of pupils registered for free school meals. The money can be spent on any resources, provided it is used to improve outcomes for poorer pupils. However, head teachers must develop rationales for the spending 'based on clear contextual analysis which identifies the poverty related educational attainment gap in their schools and plans must be grounded in evidence of what is known to be effective at raising educational attainment for children in poverty' (Scottish Government, 2017c).

2.3.1 Between country differences in education

The Programme for International Student Assessment (PISA) is an international assessment of the skills of 15 year olds in maths, science and reading across all the Organisation for Economic Co-operation and Development (OECD) countries (Scottish Government, 2016a). The survey has been running since 2000 and is carried out every three years, most recently in 2015. The national scores for science in 2015 can be seen in Figure 2-1 below, showing that the Scottish score was slightly higher than both the OECD average, and the United Kingdom as a whole.

Figure 2-1: PISA countries ranked by strength of performance in science, 2015
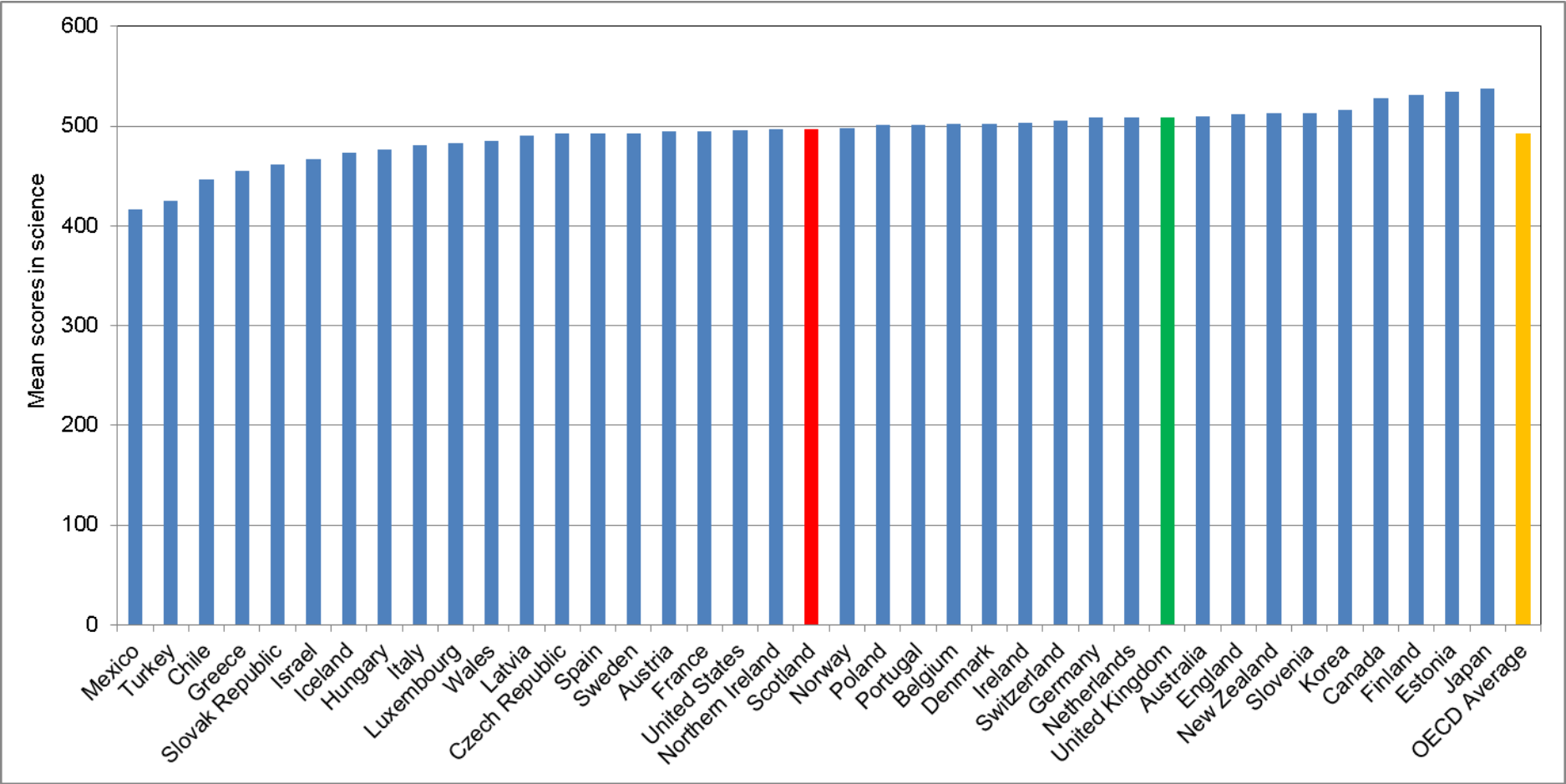
2.3.1.1   Differences by background

Within the PISA questionnaire is a section on the background of the pupil including questions on parental occupation and education, learning resources in the home and cultural possessions. From this, the Index of Economic, Social and Cultural Status (ESCS) is constructed, which can be used to look at the percentage of variation of scores explained by differences in social background. Figure 2-2 shows the countries that took part in PISA in 2015 along with the amount of variation in their science scores that can be explained by social background.

Figure 2-2: PISA countries ranked by strength of relationship between performance and Economic, Social and Cultural Status
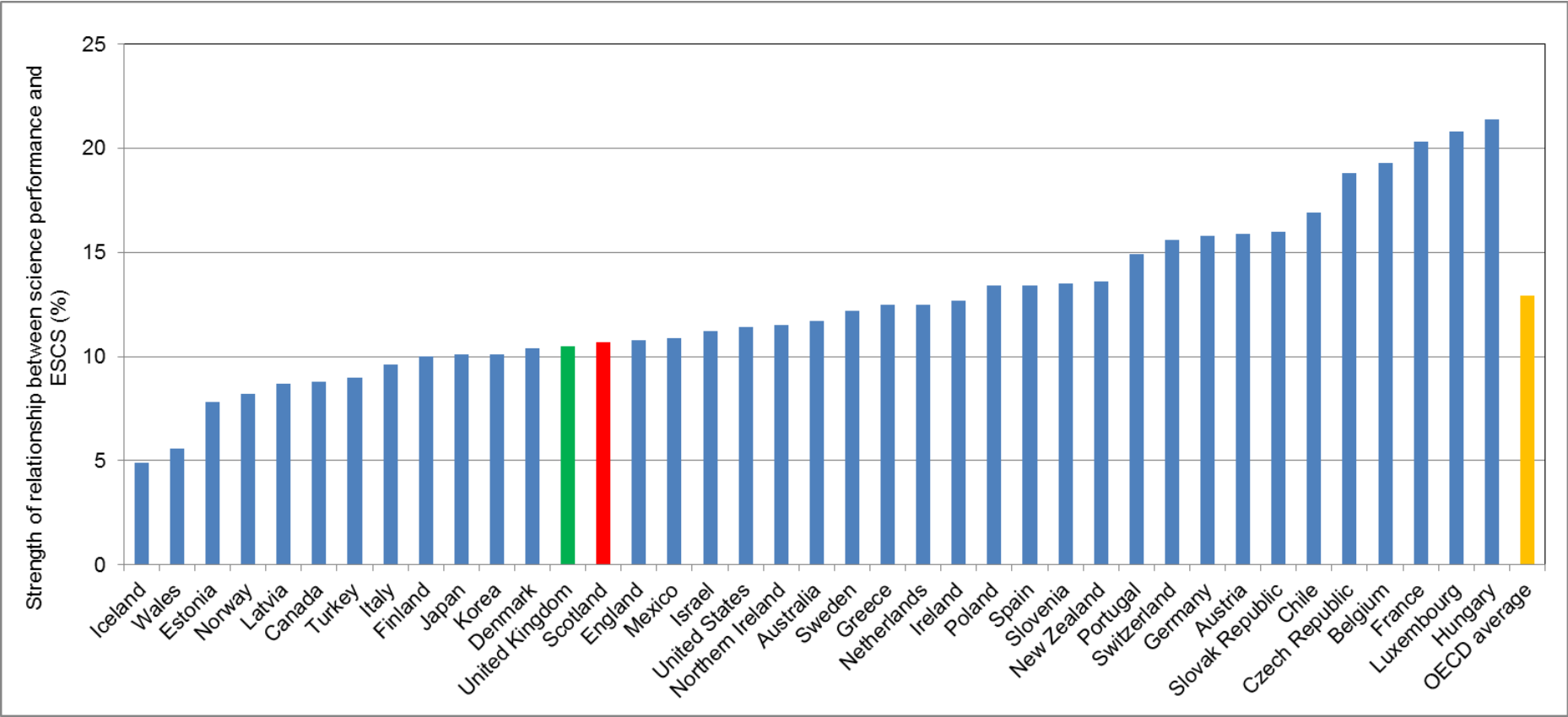
Source: Source: Scottish Government (2016a)

Of the 39 countries surveyed, Scotland is 26th with 10.7% of the variation in score explained by social background, slightly less than the OECD average of 12.9%. The social patterning of education is therefore not only apparent in Scotland and the UK, but in many countries across the world.

2.3.2 Schooling in Glasgow

Glasgow has 38 state secondary schools, with eight of these being Additional Support for Learning schools; 11 Roman Catholic Schools; 18 non-denominational schools and one Gaelic school (Glasgow City Council, 2013). Secondary schools in Glasgow range in size from the smallest at just over 300 pupils, to the largest at nearly 2000 pupils (Glasgow City Council, 2013). The intake of pupils between the schools varies quite considerably - in terms of pupils coming from the 15% most deprived areas in Scotland, the schools vary from just under 20%, to almost 90%, and the proportion of pupils receiving free school meals also varies, from just over 10% of pupils, to just over 60%.

Glasgow consistently performs poorest out of all local authorities in Scotland in terms of educational outcomes. In 2009/10, only 23% of S4 pupils in Glasgow City schools overall received 5 or more Scottish Qualifications Agency (SQA) Level 5 qualifications or better, compared to the Scotland-wide average of 37%. For the same academic year, 27% of school leavers in Glasgow went on to higher education, compared to the Scottish average of 36% (Scottish Government, 2011c). However, the educational outcomes *between* the schools within Glasgow also vary. The percentage of S4 pupils gaining five or more SQA Level 5, or Credit level, qualifications or better ranges in Glasgow from 6% to 43% (Scottish Government, 2011c)[1].

2.4 Housing policy in Scotland

Before the creation of the devolved Scottish Parliament in 1999, the housing policies of Scotland and the rest of the UK followed a similar trajectory, but with a greater reliance on social housing in Scotland (Kintrea, 2006). From

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[1] Until 2015, Standard Grades were the exams taken in the 4th year (S4) of Scottish secondary schools, when pupils were aged around 15 years. Pupils sat two exam papers for each subject – usually around seven subjects - either credit and general, or general and foundation. Credit level results were SQA Level 5, General were SQA Level 4, and Foundation SQA Level 3.

around 1940 up until the election of the Conservative government in 1979, central government allocated the majority of funds to build and manage new social housing to local authorities. From 1979, the UK government promoted home ownership and introduced the 'Right to Buy' policy in 1980 (Maclennan and O'Sullivan, 2013), which gave council tenants the legal right to buy their houses at a discount on the market price. In 1988 around half of Scots lived in public rented, or local authority, housing, by 2011 this had been reduced to under a quarter at 24% (Maclennan, 2008, National Records of Scotland, 2013c), compared to 18% in England and Wales (Office for National Statistics, 2013). The UK government has continued to promote owner occupation as the preferred tenure (Munro, 2007), and this has been echoed in Scotland with the promotion of shared equity and help to buy schemes to allow those on lower incomes to become owners (McKee, 2011), though Right to Buy was ended in Scotland in 2016 (Scottish Government, 2017f).

Social housing in Scotland is still not solely shaped by the Scottish government, as the Westminster government remains responsible for interest rates and social security including housing benefit (Maclennan, 2008). However, the Scottish Government has introduced new measures in terms of social housing. The *Housing (Scotland) Act* 2001 introduced reforms such as amending Right to Buy by increasing the length of residence needed to qualify and reducing the discount available (McKee, 2010). The Scottish Housing Quality Standard (SHQS) was introduced in 2004 as a measure to improve the quality of social housing (Maclennan, 2008). The 2011 Scottish Government strategy, *Homes Fit for the 21st Century*, outlined targets up until 2020, including that by 2015 'all social landlords must ensure that all dwellings possess all elements of the SHQS' (Scottish Government, 2011a: 2).

2.4.1 Housing in Glasgow

Levels of social renting in Glasgow are higher than Scotland as a whole, with 36.7% of households living in social rented accommodation in the city in 2011 compared to 24.3% Scotland wide (National Records of Scotland, 2013c). The housing tenure structure of Glasgow was for many years dominated by social rented housing, with steady rises from the 1960s to the 1980s. However, with the introduction of Right to Buy in the 1980s, the proportion of social rented

households started to fall, and the number of owner occupiers rose (General Register Office for Scotland, 2013). In March 2003, all council housing stock was transferred to Glasgow Housing Association, which then undertook an investment programme to improve the quality of the stock (Kearns and Lawson, 2008).

The last fifteen years especially have seen an unprecedented rise in the amount of people in the private rented sector, with a corresponding fall in owner occupation. This has been partly due to the global financial crisis limiting the options for those who wish to enter the owner occupation market, but also due to the decrease in available social rented stock, partly due to schemes such as Right to Buy, and partly due to lack of construction of new social housing against a backdrop of rising numbers of (particularly small) households (McKee and Hoolachan, 2015).

2.4.2 Mixed tenure housing policy

Mixed tenure housing policy in the UK is a place-based response to the idea that concentrations of poverty have a negative impact on people's lives, over and above other factors – so called neighbourhood effects (Galster et al., 2007). In the UK, these policies tend to take the form of aiming to break up mono-tenure social housing estates, through either changing the tenure of existing housing – for example Right to Buy – or by new builds, with a mixture of units intended for owner occupation, social rent, and more recently, mid-market rent.

With the advent of the New Labour era in the late 1990s, government began to focus on addressing social exclusion, often citing communities as a way in which individuals could be excluded (Bond et al., 2011). The trend for mixed community policy has continued, with a 2011 Communities and Local Government policy planning document stating that 'local Planning Authorities should ensure that the proposed mix of housing … reflects the proportions of households that require market or affordable housing and achieves a mix of households as well as a mix of housing tenure and price' (Communities and Local Government, 2011).

From the mid-2000s, the aim to produce change in a community's social or population mix was much more explicit than it had been previously. Around this

time, mixed tenure policies started to become a more essential part of housing policy in the UK (Tunstall and Lupton, 2010), and also saw the private sector becoming more involved in regeneration (Bailey et al., 2006). Along with this, the focus became the large-scale renewal of social housing estates, enacted through a Mixed Communities Initiative (Lupton et al., 2010, Fordham and Cole, 2009). In the UK and Scotland more specifically, mixed tenure was also ratified through planning guidelines that required a certain proportion of dwellings in other developments above a minimum size to be 'affordable' or socially rented units (Scottish Government, 2008, Communities and Local Government, 2011).

The Scottish Government has a long history of promoting mixed communities. In 2002, it was critical of 'low income only' areas (Scottish Executive Development Department, 2002), followed the next year by a statement that encouraged 'more diverse, attractive and mixed-use residential communities, in terms of tenure, demographic and income' (Scottish Executive Development Department, 2003: 20). *Homes for Scotland's People*, a 2005 Scottish Housing Policy Statement saw a call for a 'vibrant, mixed tenure housing system' (Scottish Executive, 2005: 5). The focus on mixed tenure policy has continued with the Scottish Government housing policy document for 2011-2020, *Homes Fit for the 21st Century*, which outlines the aim to 'adopt a tenure neutral approach, seeking sustainable choices for all rather than encouraging one particular tenure, and promoting mixed tenure communities' (Scottish Government, 2011a: 30).

2.4.3 Regeneration and mixed tenure in Glasgow

The built environment of Glasgow has been dominated by waves of demolition and rebuilding throughout the 20th century as successive authorities, local and national, tried to solve the city's housing problems (Pacione, 1995, Crawford et al., 2007). Starting in the 19th century, the surges in population that accompanied the rise in industrialisation led to overcrowding and slum conditions in inner city Glasgow which persisted into the 20th century. By the 1950s, Glasgow City Council, estimating that around 90,000 houses required demolition, had begun a programme of slum clearances. This led to the construction of New Towns of the Clyde Valley Regional Plan, such as East Kilbride and Cumbernauld. At the same time as mass demolitions were being

carried out within the city, new housing schemes were being built on the outskirts, such as Easterhouse, Drumchapel, Pollok and Castlemilk (Crawford et al., 2007). The 1970s saw the introduction of the Glasgow Eastern Area Renewal (GEAR) by the then Secretary of State for Scotland. GEAR was a change in policy direction as, though it focused on physical and environmental improvement, it also focused on economic regeneration (Pacione, 1985, Crawford et al., 2007). By the 1980s, a focus on public–private partnership in regeneration was visible in the policy direction, and the 1988 *New Life for Urban Scotland* initiative saw a greater emphasis on attracting private capital into urban renewal (Boyle, 1989).

The decades since have seen further attempts at regeneration in the city with the introduction of Social Inclusion Partnerships in the 1990s and more recently Community Planning Partnerships. Despite the myriad of attempts at regeneration, so far they have been 'deemed largely unsuccessful in achieving sustained improvements in physical, social and economic terms for their residents' (Crawford et al., 2007: 50) as reflected in the continuing widening gaps in health, income and quality of life between rich and poor residents.

Mixed tenure housing policy has been synonymous with regeneration in Glasgow since at least 2003 (Glasgow City Council, 2003), with the 2011-2016 Glasgow City Council Local Housing Strategy explicitly focusing on 'renewing neighbourhoods on a mixed tenure basis' (Glasgow City Council, 2011: 12). In 2005, Transforming Communities: Glasgow, a partnership between Glasgow City Council, the Scottish Government and The Wheatley Housing Group, began plans to create 'new sustainable mixed tenure communities' across eight transformational regeneration areas (Glasgow City Council, 2016b). Overall, 600 social rented homes have been planned across the transformational regeneration areas, alongside 6500 for sale or midmarket rent up to 2021 (Glasgow City Council, 2016b, Glasgow City Council, 2017b). However, the 2008 financial crash led to the stalling of planned private sector builds in Glasgow (Glasgow City Council, 2016a). As well as this, between 2001 and 2011, the private rented sector in Glasgow increased by 124.3%, well above the 85.6% rate of growth for Scotland (Glasgow City Council, 2017a).

2.5 Summary

This chapter has set out some of the socioeconomic and political context of Scotland, before moving on to look at the history and policy of education in Scotland, and focusing more specifically on schooling in Glasgow. It then outlined the history of and policy on housing in Scotland, before looking at urban regeneration and mixed tenure in Glasgow. It has shown that both education and housing policy in Scotland in recent years have had a focus on reducing inequalities. The ways in which both the neighbourhood and school context can affect educational outcomes will be discussed further in chapter 3.

3 Literature review

3.1 Introduction

The overall aim of the thesis is to explore whether mixed tenure housing policy can make a difference to educational outcomes. In order to address this aim, the literature around educational attainment and mixed tenure housing will be explored. These areas have been heavily researched, and there are vast amounts of literature to consider. The aim of this chapter is to provide a summary of the issues most important to the specific research questions. Drawing on both education and housing theory and research, this chapter will begin by exploring why educational attainment is important and how it is measured. The review will use a framework based on Bronfenbrenner's ecological model to explore the different systems that influence a child's educational outcomes, namely individual pupil, family, neighbourhood, school and catchment area. It will look at each of these contexts in turn, and explore the theory and existing evidence in relation to educational attainment. The chapter will then look at regeneration, with a specific focus on mixed tenure housing, and ways in which it could lead to improved educational attainment, through a variety of pathways at individual, neighbourhood, school and catchment area levels.

3.2 Why educational attainment?

Education impacts on a vast range of outcomes including health, well-being, life expectancy and social status. Individuals who do better at school are more likely to go on to further education and to have higher earnings as an adult (Gregg and Machin, 2001), while people with low educational attainment have a higher likelihood of being unemployed in their adulthood (Howieson and Iannelli, 2008). Those with university degrees also live longer and have better health than those without (Marmot et al., 2010). It can be suggested therefore, that doing well in education might be especially important to children from deprived backgrounds.

Universal education is treated by many theorists and policy makers as a way of creating a society that is more equal, the meritocracy model being based on the aim that 'social rewards should be distributed on the basis of merit rather than on inherited and undeserved social advantages and disadvantages' (Moore, 2004:

6), and that giving children from all backgrounds equal access to participate and succeed in education is an important goal in terms of equality (Marmot et al., 2010) and social justice. In recent years in the UK there has been a trend towards the idea of meritocracy in policy, that with hard work those who deserve to do well through their own merit will rise through the education system and become socially mobile, no matter what kind of background they come from (Themelis, 2008).

However, the links between education and social mobility are not straightforward. Not all children enter education with the same set of skills and therefore there may be differences in the level at which young people can access education (Croll and Attwood, 2013). Not only are those from more deprived backgrounds likely to do less well at school overall – this will be discussed in more detail below - but the gap between the educational outcomes of the highest and lowest socioeconomic status (SES) groups tends to widen over the school career (Ball, 2010). Those from lower SES groups are underrepresented within higher education institutions, and although this is in some part explained by poorer school outcomes (Croll and Attwood, 2013) they are also less likely to apply for and attend higher education courses, even if they receive the same qualifications as their more affluent counterparts (Forsyth and Furlong, 2003). Not only this, but in terms of subject choice, pupils from higher social class classifications are also more likely to take subjects that are more advantageous in terms of entry into higher education (Iannelli et al., 2016). This suggests that cultural and institutional factors also play a role in access to higher education (Forsyth and Furlong, 2003).

3.2.1 How educational outcomes are measured

Systems of education vary throughout the world, therefore there is no one standard measure for educational outcomes. In research into schooling, a wide range of measures have been used to capture educational outcomes, including, amongst others, attained grades, completing high school, attending college, years of schooling, educational aspiration, and occupational aspirations (Leventhal and Brooks-Gunn, 2000, Garner and Raudenbush, 1991, Biggart and Furlong, 1996, Furlong et al., 1996, Brooks-Gunn et al., 1993, Brooks-Gunn and Duncan, 1997, Duncan, 1994). In the UK, educational outcomes are most often

measured at school level through standardised national exam results. In England these exam results are GCSEs and A-levels, which are published in league tables that rank schools by performance, and in Scotland, Standard Grades and Highers (up until 2015 – in 2016 these were replaced with National certificates), though Scotland no longer publishes league tables.

3.2.2 What affects educational attainment?

There are many theories as to what can have an impact on a child's educational attainment, ranging from those that attribute differences to innate ability and genetics, to those that take a more contextual or structural approach. A commonly referred to example of the latter is Bronfenbrenner's (1989) ecological model of child development (as shown in Figure 3-1), which posits that no individual can be studied without considering the multiple environmental systems - microsystem, mesosystem, exosystem and macrosystem - in which they operate, of which neighbourhood is one, along with nuclear and extended families, peers, and institutions including schools (Brooks-Gunn et al., 1993).

Figure 3-1: Ecological Systems Model
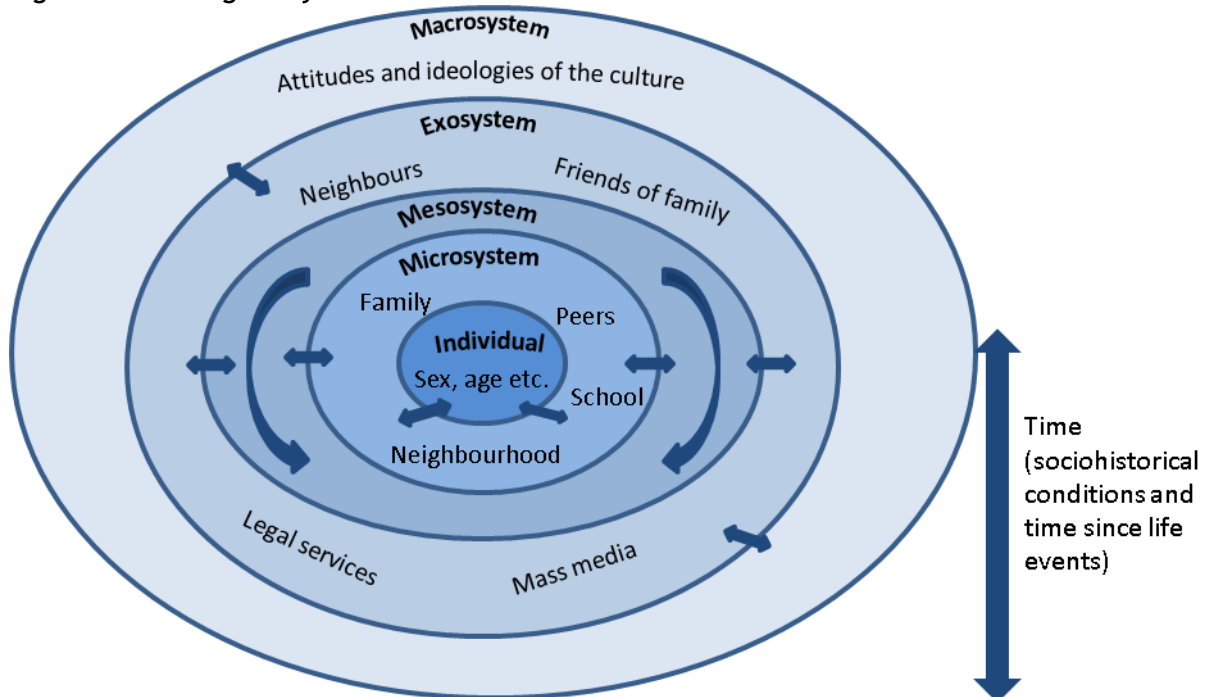
Source: adapted from Bronfenbrenner 1979

Pahl, in a similar vein to Bronfenbrenner, recognised that society must be understood with reference to the family, institutions and stratification, and that researchers must understand that opportunities were enabled or constrained by

what he called a "socio spatial socio ecological system" (Pahl, 1975). In short, a person, and their outcomes, must be examined along with the contexts in which they spend their life.

The remainder of this chapter will use a framework developed from Bronfenbrenner's ecological model – shown in Figure 3-2 - to explore in turn the theory and evidence about some of the different contexts that influence a child's educational outcomes, namely individual pupil and family, neighbourhood, catchment area and school.

Figure 3-2: Conceptual framework of pupil spheres of influence
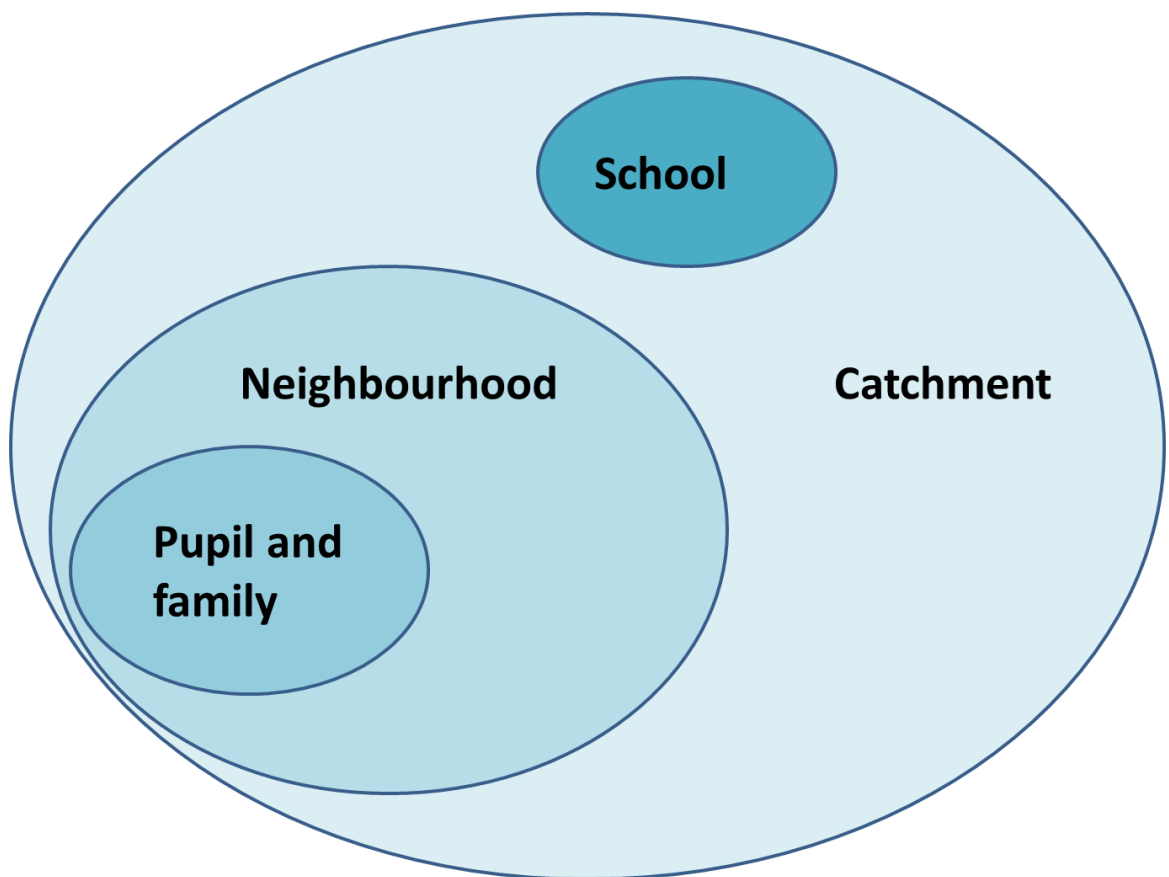
3.3 Individual pupil and family factors and educational attainment

Individual and family factors have a significant impact on the educational outcomes of a young person, through a variety of different pathways. For the

purposes of this review, they are discussed within the same section, as the links between the individual and the family context are strong.

The gender of a pupil has been found to have an effect on educational attainment, with girls outperforming boys in terms of exam results and entrance to higher education, though this has not always been the case (Buchmann et al., 2008). This pattern is repeated across the world, and various explanations have been given including gender construction, family interactions and teacher expectations (Hansen and Jones, 2011). However, it has also been found that controlling for ethnicity and class reduces the gender differences in education considerably (Connolly, 2006) suggesting that gender, ethnicity and class are linked in terms of their influence on educational attainment.

The impact of ethnicity on educational outcomes is not a simple relationship (Connolly, 2006). In the US for example, ethnicity affects years of schooling and educational attainment, with Black and Hispanic students having much poorer outcomes than their White or Asian counterparts (Hochschild and Shen, 2014). In the UK, being from a minority ethnic background is generally positively associated with educational attainment, with Asian and Chinese pupils doing especially well, but with Black students doing less well (Connolly, 2006).

At a family level, family structure has been found to influence a child's educational attainment, with pupils from single-parent households having been found to be less likely to stay on at school (Gregg and Machin, 2001) and to do less well in terms of exam scores than those from two parent households (Ermisch and Francesconi, 2001b). As well as this, children who are 'looked after' – those who are cared for by a local authority, either within the home or outside of it - tend to have poorer educational outcomes than those who are not, and also a higher level of special educational needs (Berridge, 2007).

The social class of the pupil's family also has a strong influence on educational attainment, with pupils from higher social classifications doing better (Erikson et al., 2005). Social class as defined by the National Statistics Socioeconomic Classification (NS-SEC) is of course a measure principally of employment status and income, however this term also tends to take into account factors such as

level of education – those in higher SES positions tend to have more education, and parents with higher levels of education tend to have children who do better at school (Davis-Kean, 2005, Duncan and Brooks-Gunn, 1999). There are several pathways in operation here, including that parental employment has an impact on educational outcomes, through material resources – which will be discussed in more detail in section 3.3.1 below (Ermisch and Francesconi, 2001a) - and through a strong association between parental and child attainment, through demonstration and encouragement (Brooks-Gunn et al., 1997).

Socioeconomic status is also linked to perceptions of parental involvement in school, and low aspirations of both pupils and parents in low-income families for young people have been shown to have an association with poorer outcomes. Some of the issues around education that have been identified are poorer families and pupils not having the capital to translate their aspirations into outcomes (Sosu and Ellis, 2014, St. Clair et al., 2013) and therefore opting for traditional, non-professional jobs where available (Seaman et al., 2006).

Home ownership also seems to have a small but significant effect on a pupil's educational outcomes (Dietz and Haurin, 2003, Bramley and Kofi Karley, 2007). This has been found to be because home ownership within an area helps build social capital – this and other types of capital will be discussed in more detail below - and that homeowners are more likely to be responsible (Bramley and Kofi Karley 2007). However, for young people growing up in social rented housing, their housing tenure during childhood has been found to be associated with negative outcomes in later life, including having no educational qualifications (Bramley and Evans, 2002).

3.3.1 Poverty, educational attainment and capital

There are many different types of capital – financial, cultural and social – access to which is influenced by levels of income and wealth, and in this section each will be looked at in turn, with specific reference to the association with education.

The correlation between poverty and poor educational outcomes is well established (Blanden and Gregg, 2004), with the most consistent and biggest

predictor of educational attainment being poverty (Goodman and Gregg, 2010). In 2004 in Scotland, 71% of young people from the highest SES background achieved 5 or more Standard Grades at SQA level 5 or better, compared with only 17% of those in the lowest SES group (OECD, 2007). Poverty is most often measured in educational research in the UK by whether or not a pupil is registered for free school meals. Although not a perfect proxy – there have been criticisms that it fails to capture the full range of pupils in deprived circumstances, both due to it being an opt-in measure (Iniesta-Martinez and Evans, 2012), and also for those not eligible, such as those in working households (Hobbs and Vignoles, 2007) - recent work has found that the predictive power of free school meals is only slightly lower than other measures of poverty (Ilie et al., 2017).

Blanden and Gregg outline factors which result from both indirect 'non causal' and direct 'causal' relationships between economic capital and educational attainment. 'Non causal' relationships are seen as 'linked to, but not caused by, income' (2004: 246), and include residential context associated with outcomes, which will be discussed in more detail in section 3.4.4, as well as child care quality; home environment; social activity; and school. 'Causal' relationships have the emphasis on 'direct financial investments in children's human capital' (Blanden and Gregg, 2004: 249), for example the provision of books and toys, and paying for tuition.

A 2013 Joseph Rowntree Foundation (JRF) report by Cooper and Stewart found that children who were poorer had worse outcomes not only due to characteristics correlated with poverty, but in part *because* they were poorer. There are two main theories to explain the worse outcomes of poorer children: firstly relating to the stress and anxiety caused by low income; and secondly through parental ability to invest in goods and services that further child development – the 'causal' relationships outlined above. The report showed that increases in parental income levels of children living in poverty directly led to increases in the educational attainment of the children. They found evidence based on calculations from experimental change studies to suggest that by increasing the income of the household for children who were in receipt of free

school meals by £7000, half of the educational attainment gap at key stage 2 (pupils aged 7 to 11) could be eradicated (Cooper and Stewart, 2013).

Physical and mental health, as well as social, emotional and behavioural issues can also impact on a pupil's educational outcomes, and are strongly linked to poverty (McPherson et al., 2014). Young people from poorer areas are more likely to be identified as having social, emotional and behavioural issues (Sosu and Ellis, 2014), and are more likely to have had a low birthweight, not been breastfed, and had a mother with postnatal depression, all of which can negatively impact on educational attainment (Goodman and Gregg, 2010).

It has long been theorised however that the gap in educational attainment between those in poverty and those not is reliant on more than simply financial capital. Besides this there is also cultural capital – cultural resources; and social capital – relationships between people in the family, schools and communities (McPherson et al. 2014).

Bourdieu suggested that middle class children do better in education because their process of socialisation bestows on them cultural capital – cultural resources that allow them to better access and succeed in schooling (Bourdieu and Passeron, 1990) – and therefore that 'schooling reproduces cultural capital amongst social classes' (Sadovnik, 2007: 11). These cultural resources are theorised to be passed on through habitus, a system of embodied definitions and dispositions – in other words norms that guide how individuals interpret and react to the world - which, in interacting with social structures, guide an individual's practice (Nash, 1990). The habitus of the school can be seen as more accessible therefore to individuals who have the cultural capital to understand the pervasive culture within the school. Participation in broader cultural activities within the family such as reading, listening to and playing music, and participation in formal culture such as attending galleries and the theatre, could lead to the development of the skills and knowledge that are needed to succeed in education - for example linguistic competence, cultural knowledge, and analytic and cognitive skills (Sullivan, 2001). Access to these types of activities is of course linked to financial capital. One important aspect of cultural capital for educational attainment seems to be reading, with one Dutch study finding that

parental reading has a positive effect on children's educational attainment (De Graaf et al., 2000).

Social capital has been defined as consisting of those elements of social networks that can bring about positive change, in terms of social economics and health (Kawachi et al., 1999). Social capital has been conceptualised as consisting of three basic elements: a social network; a cluster of norms, values and expectations that are shared by a group; and sanctions that maintain the norms and network (Halpern, 2005). For Putnam, the role of trust is central to social capital – the social networks and the norms of reciprocities that arise from the connections among individuals (Putnam, 2001). Bourdieu also conceptualised social capital in terms of networks, and the connection between people that can provide resource (McPherson et al., 2014), and ultimately as an instrument of reproduction, to maintain and reproduce group solidarity and preserve status (Dika and Singh, 2002). Coleman's definition relates to the resource of the social relationships that exist within and between families, and the communities they exist in (McPherson et al., 2014), and also seeks to explain variations in human capital, such as levels of parental education (Schuller and Field, 1998). Social capital can be thought of as existing at different levels, for example family social capital including things such as family structure; parental interest and monitoring; and community capital such as social support networks; quality of neighbourhood; civic engagement; and quality of school (McPherson, Kerr et al. 2014), illustrating that social capital can occur at the micro, meso and macro levels (Morgan, 2011).

In terms of the relationship between social capital and education, at family level, this can be seen in the emotional relationship between parents and children, and the amount of time parents directly invest in their child's learning (Schuller and Field, 1998, Halpern, 2005). At a community level this could be represented as the reciprocal monitoring of children by the parents of peers, increasing adherence to norms that are associated with school performance (Schuller and Field, 1998).

The impact of all three of these types of capital – financial, cultural and social – has implications on the individual pupil in terms of their educational attainment, and also in terms of their family, neighbourhood, and school.

3.4 Neighbourhood factors and educational attainment

The idea of a person's surroundings exerting influence on their life is not a new one. As far back as the 1940s, researchers were 'placing their theoretical emphasis on the characteristics of places rather than people' (Kawachi and Berkman, 2003: 133). In recent years there has been renewed interest in the study of place, in part because of the belief that place has an important effect on the structure of inequality, in both social and economic terms (Buck, 2001) and on the persistence and reproduction of inequality (Atkinson and Kintrea, 2004). In the UK, the government's Social Exclusion Unit had as the central objective of its 2001 National Strategy Action Plan that 'within ten to twenty years, no-one should be disadvantaged by where they live' (Buck, 2001). This type of policy illustrates the belief that a person's neighbourhood has an effect on their life chances, including participation and achievement in education and employment, and health outcomes, and that some people are disadvantaged by their neighbourhood (Atkinson and Kintrea, 2001) and excluded from taking part fully in society (Forrest and Kearns, 2001).

The definition of neighbourhood effects, or area effects – the two are used interchangeably throughout the literature – depends somewhat on the epistemological leanings of the researcher (Atkinson and Kintrea, 2004). An overall definition is that they are 'independent, separable effects on life chances that [arise] from living in a particular neighbourhood' (Atkinson and Kintrea, 2004: 438). From a more quantitative perspective, the emphasis lies more on the measurable aspect of the phenomenon – e.g. how much the neighbourhood affects individuals (Atkinson and Kintrea, 2001). The overwhelming view from the many comprehensive reviews of the existing evidence is that there are small but significant effects of neighbourhoods on individuals, over and above the influence of background characteristics (Jencks and Mayer, 1990, Blasius et al., 2007, Sellstrom and Bremberg, 2006, Brooks-Gunn et al., 1993, Ellen and Turner, 1997, Buck, 2001, Galster, 2012).

3.4.1 What is a neighbourhood?

The 'neighbourhood' of neighbourhood effects is not a fixed unit of measurement, and neither is the medium in which it is measured. As with the definition of neighbourhood effects, the definition of neighbourhood depends to some extent on the researcher's epistemological beliefs. Though Jencks and Mayer go with a 'geographical rather than social' definition (1990: 112), Kearns and Parkinson view the neighbourhood as functioning on three levels – home area, locality and urban district or region – encompassing both social and geographical elements. As can be seen in Figure 3-3 below, this person-centred model outlines the predominant function of each 'scale' of neighbourhoods, and also the mechanisms by which they function (2001). Neighbourhoods can be seen as part of a social identity, and in this way they are comparative – an individual with adequate resources can use their chosen neighbourhood as a focal point from which to enhance their social positioning (Bridge, 2001), while those who are unable to choose their neighbourhoods may find that their social positioning is decided for them (Kearns and Parkinson, 2001).

Figure 3-3: Scales of neighbourhood
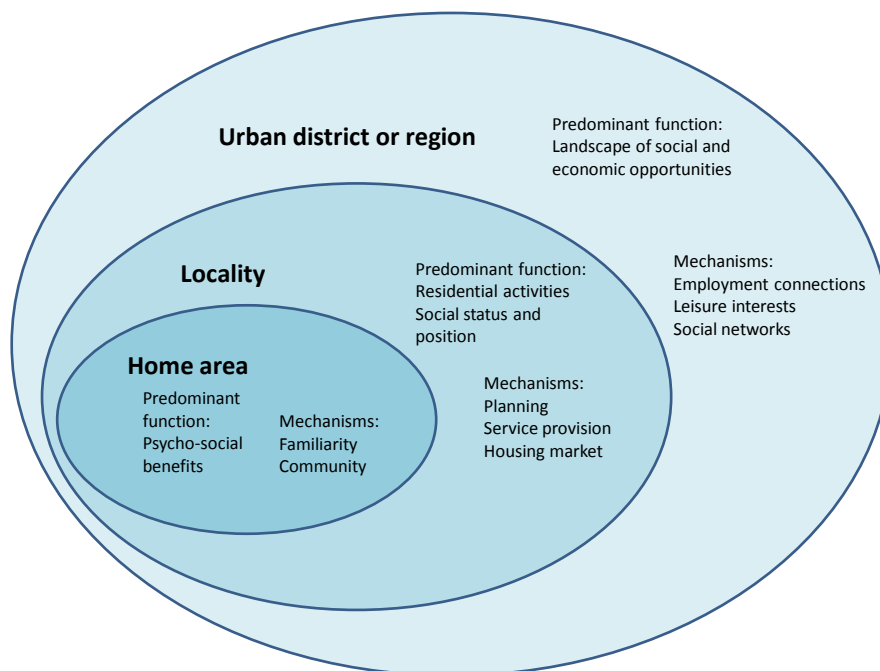
Source: Adapted from Kearns and Parkinson, 2001

Lupton outlines the idea of neighbourhood from a qualitative perspective: firstly, that the concept of neighbourhood is not a purely geographical concept, but also includes the people living in the place, and that it is 'the interaction of people and place that creates neighbourhood effects' (2003a: 4). Secondly, that neighbourhoods are not fixed and their characteristics are subjective – that is, experienced by inhabitants in different ways. Thirdly, that neighbourhoods are shaped by, and therefore must be seen alongside, other places - that they should not be viewed as an isolated unit (2003a). Galster echoes this definition: 'whatever 'neighborhood' is, it undoubtedly has distinct social, economic and psychological meanings and exerts various effects at multiple geographic scales' (Galster, 2009: 23).

The neighbourhood is also an arena in which theories of social capital are played out (Forrest and Kearns, 2001): for poorer people, the local community may play a more important social role than for their more affluent counterparts, as for better off residents, the neighbourhood is just one of the arenas in which they have social ties (Woolcock and Narayan, 2000). Therefore, for less affluent residents, the neighbourhood has more often served as an arena for the 'close-knit and intensive stock of "bonding" social capital that they can leverage to "get by"' (Woolcock and Narayan, 2000: 227) rather than as a platform for the more "diffuse and extensive" (Woolcock and Narayan, 2000: 227) "bridging" social capital that enables people to "get on" (Kearns and Parkinson, 2001).

There has been a long history of research on 'neighbourhood' and 'area' in the US coming to the fore in the 1920s (Sykes, 2011), where the effects of poverty on inner city areas have been extensively studied, often through educational outcomes (Jencks and Mayer, 1990). The current wave of popularity of researching neighbourhood effects has been traced back to the release of the book *The Truly Disadvantaged* in 1987 by William Julius Wilson (van Ham et al., 2012b), which was critical of racial explanations of an underclass in the inner-city, and of policies which aimed to change the values and behaviour of those living in deprived circumstances, and suggested concentrating on the neighbourhood level rather than on the individual (Wilson, 2012).

US neighbourhood effect studies have often focused on race, and research has tended to focus on dispersal, or moving low income families out of areas of deprivation and into more affluent areas and tracking their progress. One example of this is the Gautreaux Program in Chicago, where families were given rental vouchers to move out of public housing in poor neighbourhoods, with a 10 year follow up indicating that young people who had moved to more affluent areas were doing better than those who had moved to other poor neighbourhoods in terms of earnings and employment (Leventhal and Brooks-Gunn, 2003). Another notable example is the Moving to Opportunity program in 1994 in which 4600 families were assigned housing vouchers to move from public housing into private housing, with some families remaining. The follow up had similar outcomes to Gautreaux, in that young people who moved to less poor neighbourhoods had better outcomes than their counterparts in areas such as mental health, improved neighbourhood conditions, and higher median income (Leventhal and Brooks-Gunn, 2003). These quasi experimental studies have been criticised, however, for not being random, due to the constraints placed on who could take part, such as families having to volunteer themselves for the program, and in some cases places were allocated on whether or not it was felt the household was 'deserving' (Manley and van Ham, 2012).

This rise in the interest in place and neighbourhood on social and economic outcomes of individuals could be seen as a reflection of the growing interest in the importance of contextual factors within society.

3.4.2 Changes in neighbourhoods

Neighbourhoods are not fixed entities, and even those in close proximity to each other can have strikingly different trajectories – both upward and downward - over time, due to factors which are both internal and external to the neighbourhood (Bashir and Flint, 2010). Lupton and Power (2004) group explanations of neighbourhood change into two main categories: 1. Within-neighbourhood explanations, which emphasise how the characteristics of neighbourhoods affect each other, including levels of human capital, local economic development, cultures of poverty, levels of social capital, and levels of investment at a local level; and 2. Wider social and economic influences, such as changes in economic structure and national tax or benefit changes. They also

outline an intermediate position, which emphasises the importance of place in determining how wider influences are played out at a local level.

Explanations for, and experience of, neighbourhood change can vary depending on the perception and status of the person asked, and can be affected by age, residential status, and education (Bashir and Flint, 2010), and by concentrating only on the macro processes behind change, this may underestimate the importance of the lived experience of those living through the changes (Forrest and Kearns, 2001). Explanations of the differences in the interpretation of change within a neighbourhood can be seen as due to differing levels of involvement and stake within the neighbourhood, and also due to differences in interests and values (Forrest and Kearns, 2001).

3.4.3 Mechanisms of neighbourhood effects

Although there is a large body of research measuring *how much* neighbourhoods affect individuals, and what outcomes they affect, there seems to be less focus on the *mechanisms* by which neighbourhood context influences outcomes (Galster, 2012). The discussion of possible mechanisms in the literature has evolved since the influential 1990 review of evidence by Jencks and Mayer, in which they identified three possible pathways: 1. *epidemic* – in which the critical feature is that 'among individuals of any great susceptibility the likelihood of anti-social or self-destructive behaviour increases with exposure to others who engage in similar behaviour' (1990: 114); 2. *collective socialisation* – which looks at the way young people are influenced developmentally by adults in the neighbourhood; and 3. *institutional* – focusing on the institutions within a neighbourhood which provide opportunities of different kinds, and 'on adults from outside the community who work in the schools, the police force and other neighbourhood institutions' (1990: 115).

Table 3-1 lists mechanisms from four reviews from 1990 up until 2012[2], and also incorporates one of the most recent iterations in which Galster has grouped the mechanisms into four categories:

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[2] These reviews were chosen to be illustrative of the types of mechanisms theorised and are in no way completely representative of all of the literature on mechanisms.

- social interactive mechanisms: endogenous social processes such as collective socialisation and social contagion;

- environmental mechanisms: attributes of the local area, both natural and man-made, for example exposure to crime and violence may lead to belief that crime is 'normal';

- geographical mechanisms: aspects of the space individuals live in that affect the life course, such as physical proximity to opportunities;

- institutional mechanisms: defined as actions taken by those not from the neighbourhood, but who control institutions within it, for example, if a local school is of poor quality, children are unlikely to receive a good education (Galster, 2012: 26).

As Table 3-1 shows, most proposed neighbourhood effects mechanisms can be aligned with Galster's four categories.

Table 3-1: The evolution of neighbourhood effect mechanisms in the literature

Jencks and Mayer, 1990	Ellen and Turner, 1997	Buck, 2001	Galster, 2012	Groupings: Galster, 2012
Epidemic	Peer influences (contagion effects)	Epidemic	Social contagion	Social interactive
Collective socialization	Socialisation by adults	Collective socialization	Collective socialization	
	Social networks	Network	Social networks	
		Competition	Competition	
		Relative deprivation	Relative deprivation	
		Expectations	Parental mediation	
			Social cohesion and control	
	Exposure to crime and violence	Insecurity	Exposure to violence	Environmental
			Physical surroundings	
			Toxic exposure	
	Physical distance and isolation	Physical isolation	Spatial mismatch	Geographical
	Quality of local services		Public services	
Institutional		Barriers to access external opportunities	Stigmatisation	Institutional
		Discrimination		
		Institutional	Local institutional resources	
			Local market actors	

Sources: (Ellen and Turner, 1997, Buck, 2001, Galster, 2012, Jencks and Mayer, 1990), compiled by author

However, the identification of which, if any, of these mechanisms are responsible for neighbourhood effects leads us to the issue of the so-called 'black box' of neighbourhood effects (Jencks and Mayer, 1990). Not only are neighbourhood effects notoriously difficult to identify (Atkinson and Kintrea, 2001), but it is difficult to attribute any identified effect to a specific mechanism (Musterd et al., 2012). The most convincing and persistent evidence to support these mechanisms seems to come from qualitative studies of neighbourhood effects. It is important to also take into account that neighbourhood effects can be both positive and negative (Musterd and

Andersson, 2006). For example, Atkinson and Kintrea identified both positive and negative neighbourhood effects in their research in deprived and non-deprived neighbourhoods in Edinburgh and Glasgow, including evidence of role models; lack of 'weak ties'; lack of support infrastructure; and stigmatisation (2004). Using a mixed methods approach, Galster and Santiago found evidence that parents in low income areas perceived the following mechanisms of neighbourhood effects on their children: social norms and efficacy; influence of children's peers; exposure to crime and violence and presence and quality of institutional resources (2006: 220).

It must also be considered that neighbourhood effects are not likely to have the same effect across all people in a neighbourhood, regardless of their shared space (Small and Feldman, 2012). For example, very young children and adolescents will experience a neighbourhood differently, as adolescents will likely have more direct contact with the surrounding area and its institutions, whereas a very young child may experience a neighbourhood only through their parent or care giver (Lupton, 2003a).

Galster uses the helpful metaphor of the 'dosage-response' pharmacological term to conceptualise the effect of neighbourhood effects on different populations, and asks 'what about this "dose of neighbourhood" might be causing the observed individual "response"?' (2012: 27). Galster outlines three overarching areas of inquiry into dosage-response neighbourhood effects: composition, administration and relationship. The *composition* concerns the 'active ingredients' of the neighbourhood – what is it about the space that acts as a causal agent, what its features are. *Administration* covers, amongst other things, the frequency, duration and intensity of the dose – how long a person has lived in the neighbourhood, how long social interactions last for, and how much of their time the individual spends in the neighbourhood. *Relationship* covers thresholds and timing, such as whether the effects of the neighbourhood are linear or non-linear, and also whether there are interactions that intensify a response to neighbourhood conditions, or whether there are antidotes that lessen a response (2012).

In other words, neighbourhood effects are dependent on whether other processes occur or exist. Some effects depend on exposure; some on social interactions or relations within neighbourhoods; some on psychological and psychosocial processes among individuals; and others on societal structures, processes and institutions. For example, a pupil who lives in a deprived area and also attends the local school will have a higher 'dose' than a pupil who lives in the area but goes to school in a more affluent area.

3.4.4 Neighbourhood effects and educational attainment

The study of the effect of neighbourhoods on children, young people and their education has a long history – indeed, some of the earliest US research on neighbourhood effects in the 1950s dealt with how the mean socioeconomic status of high schools in the US affected students' college plans (Jencks and Mayer, 1990), and the most consistent finding from neighbourhood effects research is that 'living in a socioeconomically advantaged area is associated with higher levels of education than living in a poor area, over and above important individual background characteristics' (Sykes, 2011: 609). This is especially important to this thesis as tenure mixing housing policy aims to dilute areas of deprivation by introducing owner occupied households into the area. High neighbourhood socioeconomic status has been associated with adolescent achievement, completing high school, attending college, years of schooling, educational aspiration and occupational aspirations of boys (Leventhal and Brooks-Gunn, 2000, Garner and Raudenbush, 1991, Biggart and Furlong, 1996, Furlong et al., 1996, Brooks-Gunn et al., 1993, Brooks-Gunn and Duncan, 1997, Duncan, 1994). In a UK example, Garner and Raudenbush found that in Scotland, the difference between being in the 90th and 10th percentile in terms of neighbourhood deprivation reflected a change equivalent to two O-Level passes (1991).

However, as with any neighbourhood effect, it is not clear which mechanism matters most for educational outcomes (Kauppinen, 2007, Leventhal and Brooks-Gunn, 2005). Previous research has identified mechanisms specific to children and young people through which negative neighbourhood effects may operate. Galster, Marcotte et al. (2007) found that mechanisms such as social norms that are less supportive of education and employment; forms of income generation

through illegal channels; and lack of information and geographical access to places of high quality education and employment were all thought to impact on educational outcomes. Peer group influences have been found to impact on grade point average in the US (Brooks-Gunn et al., 1997), while epidemic-like effects have been found on secondary school leaving (Crane, 1991). Other work has supported the idea of collective social norms in terms of educational outcomes, though this seems to only take hold after the neighbourhood has a substantial share of more affluent residents (Brooks-Gunn et al., 1997). In terms of institutional mechanisms, both low expectations by residents of disadvantaged places creating self-fulfilling prophecies, and the rationing of public services in ways that are insufficient to meet need have been posited (Galster, 2012).

Neighbourhoods can impact on child educational outcomes through other, less direct, pathways. Reviews of the evidence on children and young people in health terms have found that neighbourhoods with low mean socioeconomic status have been associated with: low birth weight, impaired childhood development, behavioural problems, injury and experiencing child abuse (Sellstrom and Bremberg, 2006). All of these could in turn also negatively affect educational performance.

It is important to consider the role of schools in producing or altering these mechanisms. It can be theorised that school systems could affect children's exposure to different types of neighbourhood effects. For example, a school selection process other than comprehensive could affect social interactive mechanisms. For instance, whether a child goes to the local school or to a school outside their neighbourhood will affect their exposure to their neighbourhood peers at school and the influence of adults within the neighbourhood. It must also be remembered that schools are also a context in and of themselves, and conversely, neighbourhoods can affect schools.

3.4.5 Issues in the study of neighbourhood effects

There have been several challenges in the study of neighbourhood effects identified in the literature.

3.4.5.1 Time

A major limitation of many neighbourhood studies is the time period over which the data stretches. Often, due largely to data constraints, research on neighbourhood effects has been cross sectional. This has been criticised for not taking into account the accumulation of neighbourhood effects and the change over time for individual outcomes, and has led, as Jencks and Mayer put it, to 'serious measurement errors' (1990: 121). Ellen and Turner add that 'this approach is not sensitive to the length of time an individual or family has been exposed to a particular neighbourhood environment' (1997: 844).

There has also been discussion of the temporal aspect of neighbourhood effect mechanisms: how quickly they work and what shorter or longer exposures mean. Some effects are posited to be quick working – such as stigmatisation, social disorder and accessibility, and others – such as socialisation, social networks, and the impact of institutions – are thought to be slower (Musterd et al., 2012). Musterd, Galster et al. used longitudinal Swedish data to explore the effect of neighbourhood on income. They found that not only did being exposed to a high proportion of low income neighbours have a significant negative impact on income, but that this impact was larger if the exposure had occurred more recently, and that the longer the exposure, the larger the negative effect. They also found a 'saturation level' whereby after the initial exposure a negative effect will decrease, yet remain significantly negative. Strikingly they found that there was 'no example of full recovery from initial exposure to low-income neighbours within the span of four years we investigated, even when exposure has been short and relatively long ago' (2012: 24). Temporal effects of neighbourhood have also been found for many education-related outcomes. For example an analysis of the US Panel Study of Income Dynamics 1997 Child Development Supplement, found that the effect of the neighbourhood median income on children's test scores were strongest for those who had lived in the neighbourhood for more than three years (López Turley, 2003); and a longitudinal study of over 4000 children using the Panel Study of Income Deprivation found that substantial exposure to living in a disadvantage neighbourhood had a severe impact on high school graduation (Wodtke et al., 2011). These temporal effects have also been found to operate across

generations: a separate study of Panel Study of Income Deprivation data found that a family's exposure to neighbourhod poverty across two consecutive generations reduced a child's cognitive ability by more than half a standard deviation (Sharkey and Elwert, 2011).

Recently there has been interest in the impact of what stage of life that a person is exposed has on neighbourhood effects. From a life course model perspective 'an individual's choices and behaviours can be strongly affected by the extent or states they are exposed to earlier in their life' (Van Ham et al., 2012a), therefore childhood exposure to the neighbourhood at a critical period could have effects later in life. Van Ham et al. used longitudinal data from Sweden to create neighbourhood histories, and found that the socioeconomic status of the neighbourhood that children live in is strongly related to the status of the neighbourhood they live in 5, 12 and 18 years later; and children who grow up in high poverty areas are very likely to remain in such areas (2012a).

3.4.5.2 Geographies

The difficulty of defining neighbourhood, touched on earlier in this chapter, is another issue in the researching of neighbourhood effects. Often, research in the UK is carried out with available data which are collected at electoral ward level, which may be too large an area to properly capture the effects of neighbourhood (Buck, 2001). For research on neighbourhood effects to be robust, specific geographic scales must be used (Lupton, 2003a, Lupton and Kneale, 2012) and also multiple scales must be investigated, at home; locality and urban region level (Kearns and Parkinson, 2001), in order to determine the scales at which different effects operate.

3.4.5.3 Measurement

Many of the characteristics that may potentially affect outcomes may be hidden or even unmeasurable, and not including a measure may lead to falsely identified effects because neighbourhood composition variables may pick up the effects of omitted individual level variables (Ellen and Turner, 1997, Manley and van Ham, 2012). In order to try and avoid this, studies often include proxies or composite variables to try and control for these characteristics. However proxy

measures may often still not measure important factors. Thus proxy measures used to represent neighbourhood conditions – for example poverty and income – do not take into account variation in factors such as social cohesion (Ellen and Turner, 1997) and may therefore be poor representations of the 'essence' of a neighbourhood (Friedrichs et al., 2003).

Another issue in measurement is that of selection bias, as a result of individuals being 'sorted' into neighbourhoods through sorting mechanisms - why people have moved, or been moved into a certain area. As mentioned earlier, those with more economic capital can choose their neighbourhood to a greater extent than their less affluent counterparts, to further enhance their social standing. These mechanisms can vary between countries, for example in the US race is an important sorting factor, while in Britain, social class is arguably the more important factor (Buck, 2001). These sorting mechanisms are not necessarily independent from the outcomes being measured, for example people with particular characteristics and behaviours may live in particular neighbourhoods, which might suggest a neighbourhood effect which does not operate in reality (Hedman and van Ham, 2012). It has been argued that there needs to be a better understanding of mechanisms of sorting and residential mobility (Hedman and van Ham, 2012).

3.4.5.4   Research design

There is a noticeable divide in the literature on neighbourhood effects between qualitative and quantitative studies (Lupton, 2003a), and furthermore, there is an even more noticeable split in the evidence between qualitative and quantitative research, with qualitative research identifying neighbourhood effects with more consistency and frequency compared to quantitative methods (van Ham et al., 2012b). It is possible that these discrepancies stem from the differing approach to how knowledge is gathered vs how it is constructed - 'quantitative approaches aspire to explain the connection between place and life chances based on representative and generalisable knowledge' (Atkinson and Kintrea, 2004: 452), while qualitative research 'provides the opportunity to understand the processes by which neighbourhood effects may operate' (Buck, 2001: 2258).

3.5 School factors and educational attainment

Theorists and researchers have been interested in the role schools play in the educational attainment of their pupils since at least the 1960s. Research has often concentrated on the extent to which schools can compensate for the background of their pupils. Large scale quantitative research into school intake and outcomes, beginning in the 1970s with work such as Rutter's *Fifteen Thousand Hours*, and the work of Reynolds, concluded that there were differences in the 'characteristics of the learning environments of apparently differently effective secondary schools' (Reynolds et al., 1996: 135) and that schools could make a difference to pupil outcomes over and above the background characteristics of their intake.

3.5.1 Factors affecting school outcomes

Overall school outcomes are affected by a myriad of factors. External, macro structural factors such as governmental policies have a role to play in outcomes, for example there are striking between-country differences in educational outcomes reported by PISA, as seen in section 2.3. Analysis of the results show that the school systems with the best results are those which 'allocate educational resources more equitably among advantaged and disadvantaged schools' (OECD, 2013: 4); and also those that give schools the most autonomy on implementing the curriculum and assessing students (OECD, 2013). However, this section will focus on between-school differences – rather than between-country differences - as the analysis for this thesis is based on schools in a single country.

3.5.2 School effectiveness and educational attainment

School effectiveness research elucidates the differences in outcomes between more and less successful schools in terms of the internal organisation of the school, and the identification and replication of processes associated with effectiveness (Teese et al., 2007). The 'school effect' is the variance in educational attainment between schools that is unexplained after pupils' background and prior educational attainment have been controlled for (Macbeath and Mortimore, 2001), and has been found to be, through different

studies, between 8-15% of the educational attainment difference between schools (Lupton, 2004, Sellström and Bremberg, 2006). There is evidence that schools can make some difference in outcomes. In the Scottish context, the Improving School Effectiveness Project was carried out between 1995 and 1997 with a geographically, social demographically and denominationally representative sample of 80 schools across Scotland: 44 primary and 36 secondary. Schools administered three tests (one in maths, two in English) in 1995 and these tests were repeated in 1997. These scores, along with 14 background measures, were modelled to investigate school effects. The pattern of performance varied, and only 3 (8%) of the secondary schools were found to significantly add value to overall pupil performance (Macbeath and Mortimore, 2001).

School effectiveness research seeks to identify 'best practice' in schools that are producing good outcomes, with the idea that when these practices are identified and implemented in other schools that they will also see improvements (Lupton, 2004, Rutter and Maughan, 2002). In 1997, a review by Bosker and Scheerens identified over 700 factors, however in more recent research the number has been reduced (Macbeath and Mortimore, 2001). Some of the factors that have been identified and associated with school effectiveness are listed below.

3.5.2.1 Processes – school organisation

The processes in place within a school are a possible way in which schools differ. For example, a 1999 review of two large-scale US studies on class size - the Tennessee Student Teacher Achievement Ratio (STAR) experiment and the Wisconsin Student Achievement Guarantee in Education quasi-experiment - found statistically significant positive effects of smaller class size on achievement (Grissmer, 1999). However, in a review of the evidence of class size in non-experimental studies, Hanushek found mixed results, with a similar number of positive and negative results (1999).

3.5.2.2 Staff – management / teaching

The idea of leadership as a factor that has an effect on school outcomes is one that recurs throughout the literature, and is seen as 'an indirect but powerful

influence on the effectiveness of the school and achievement' (Muijs and Harris, 2003: 437).

A 2004 study using the Tennessee STAR data found that there were differences in teacher effectiveness within schools, however these variations were not uniform across schools. Those schools with a lower SES intake had greater variations in teacher effectiveness than schools with a more affluent intake (Nye et al., 2004), lending weight to the finding that schools in more deprived areas have trouble recruiting and retaining teachers (Lupton, 2004).

3.5.2.3   School culture/ethos

The definition of ethos within schools is much debated, however it is seen to include things such as a coherence among staff, so pupils know what to expect, as well as a culture of high expectations (Muijs et al., 2004). The PISA study found that schools that had problems with students playing truant or arriving late for school tended to perform worse than other schools, even when compared with schools from similarly deprived areas (OECD, 2013: 18). This supports the idea that the school culture or ethos impacts on outcomes.

3.6 School intake/catchment area factors and educational outcomes

However, although a school may use a certain approach and produce good results, it does not necessarily follow that these processes are the reason for the good results (Hallinan, 2006). It could be that these processes are not the *cause of* the school doing well, but are in fact *caused by* the school doing well. In other words, having a high proportion of students from deprived backgrounds may make it more difficult to implement the factors associated with successful schools.

An important point for consideration for the question to be addressed in this thesis, is that there are also differences in outcomes at school level associated with the intake of the school in that 'the composition of a schools' intake can have a substantial effect on pupils' outcomes over and beyond the effects associated with pupils' individual backgrounds' (Willms and Echols, 1992: 342).

Indeed, 'many people define a good school not as one with fancy facilities or highly paid teachers, but one with the 'right' kind of students' (Jencks, 1972: 29).

School composition research 'suggests that many factors identified by school effectiveness and improvement research as contributing to student achievement will be hard to replicate because while they may be school-based, they may not be school-caused' (Teese et al., 2007: 110). In other words, the intake of the school may be affecting the schools' ability to put into practice the factors associated with 'effective' schools.

This is the school context or mix effect theory, which posits that the socioeconomic mix of the school influences the school processes, which in turn influences the achievement of the pupils (Thrupp, 1999, Rutter and Maughan, 2002). The school mix effect can be defined as 'the cumulative outcome of numerous smaller effects resulting from the differences in each of these areas among the schools, all of which [are] related to their intake characteristics' (Thrupp, 1999: 123). Importantly, this is an effect over and above the effect on the mean educational attainment of simply having a large proportion of low SES students within the school. A study using Scottish secondary school data showed that not only were there large variations between schools in the SES of their intake, but that there were 'substantial' context effects of the mean SES of a school on educational attainment in exams. These effects were found to be more strongly related to the proportion of high SES pupils in a school rather than lower SES pupils (Willms, 1986), implying that pupils tend to benefit in terms of their educational attainment from being in a school with a high SES intake (Reynolds and Teddlie, 2002).

From the school context theory comes the idea of the 'negotiated curriculum' – that 'teachers are more or less required to respond to the needs and desires of the groups of students they teach' (Thrupp, 1999: 126) and that this impacts on processes within the school, both positively and negatively. Some of the ways in which the socioeconomic mix of a school can negatively affect the processes of the school can be illustrated using the work of Thrupp (1999) and Lupton (2005). In Thrupp's analysis of schools in New Zealand he identified the following

mechanisms through which a deprived socioeconomic pupil mix can negatively affect school processes: extra time spent on the organisation of the school, dealing with organisations, welfare, negotiation with pupils and parents; more emphasis on classroom management, at the expense of subject teaching; difficulty financing and planning extracurricular activities and engaging with parents; and more time spent on the distribution and collection of equipment (1999). Lupton, in her analysis of four disadvantaged schools in England, found that issues prominent in the schools – large number of pupils with low prior educational attainment; evidence of widespread material poverty; a charged emotional environment; and low attendance - led to an unpredictable school environment. This in turn led to issues with retaining and recruiting staff; pressure on teacher performance; pressure on the performance of management; and inadequate resources to deal with complex problems (2005), and hence the lower educational performance of the schools.

Schools with disadvantaged intakes tend to be characterised by their disadvantage, and work by Lupton and Thrupp found that not only were these schools similar in that they provided a huge range of support and extra activities, but that staff in these schools saw their school in terms of 'an implicit comparison to a norm, around which typical school learning was designed' (2013: 778). This resonates with the deficit view of parenting and aspirations in poor pupils and families (Raffo et al., 2007), in that poverty is seen as a deviation from the norm, and relies on individualistic interventions, whether these are at individual or school level. Research within more advantaged schools has found that teachers rarely make comment on the need to do anything different from the standard curriculum (Lupton and Thrupp, 2013).

These important findings are crucial to this thesis, as in Scotland, most young people go to the school in the catchment area in which they live. A relatively low percentage (4.1%) of pupils in Scotland attend a private school (Scottish Council for Independent Schools, 2016), and while some pupils attend a state school outside their catchment area, overall this suggests that the composition of a catchment area has a direct impact on the composition of the school. Glasgow in particular has a high share of deprived areas, and has the highest proportion of free school meal registration out of any local authority in Scotland

– the most recent figures for 2017 show that 27.5% of secondary school pupils in Glasgow are registered for free school meals, while in Scotland overall it is 14.1% (Scottish Government, 2017d). This could mean that in a city such as Glasgow, with large areas of deprivation, the educational attainment of schools in these areas could be affected by the social mix of the pupil body, over and above the background factors of the individual pupils.

3.7 Regeneration

Urban regeneration aims to improve the social and economic prosperity of an area by improving the built, social and economic environment, and area based policies are a common way of using regeneration to tackle the problems in poor areas (Lupton, 2003b). Turok (2004) discusses area based policies in the following terms:

1. They are intended to change the nature of a place and in the process involve the community and other actors with a stake in its future.

2. They embrace multiple objectives and activities that cut across the main functional responsibilities of central government, depending on the areas' particular problems and potential.

3. They usually involve some form of partnership working amongst different stakeholders, although the form of partnership can vary (Turok, 2004: 1).

There are a range of outcomes that are posited to result from regeneration and they can be grouped into three themes: economic, people, and physical/environmental, which can be seen in Table 3-2 below. Although the people outcomes have most often been referred to in terms of adult outcomes, they can also apply to children and young people in the neighbourhood.

Table 3-2: Outcomes of neighbourhood improvement through urban regeneration

Themes	Outcomes
Economic	Increase competitiveness in terms of business performance; create more local jobs and prosperity
People	Enhance skills, capacities and aspirations; enable people to participate in and benefit from opportunities
Physical/environmental	Improve general appeal to attract people and business

Source: Tallon 2013

Over the past 70 years the dominant policy towards regeneration in the UK has shifted. At the end of the Second World War, a programme aiming to redevelop the damaged housing and commercial buildings was undertaken – this programme concentrated mainly on rebuilding (Tallon, 2013). Throughout the 1980s, regeneration focused on the economic aspect of poor areas by increasing private enterprise (Lupton, 2003b). In 1998, a year after New Labour were elected into power, a National Strategy for Neighbourhood Renewal was announced, which included the New Deal for Communities which was more focused on social conditions than previous policy (Tallon, 2013). However, the findings from area based regeneration efforts have been mixed. A 2006 review of the existing evidence found that there was little evidence showing impacts on health or socioeconomic outcomes (Thomson et al., 2006).

In terms of regeneration, there is some evidence however that improvements in housing appearance are associated with an improvement in mental wellbeing for residents. Bond et al. found that mental wellbeing for those living in deprived areas was higher when participants felt that the neighbourhood had good aesthetic qualities, and the home had a good external appearance; and in particular when the neighbourhood and home represented personal progress (Bond et al., 2012).

3.7.1 Policy responses to neighbourhood effects: mixed tenure housing

As introduced in the context section 2.4, mixed tenure housing policy has been a major policy response to the idea that people are disadvantaged by where they lived, and that large concentrations of poverty are detrimental.

There are three main approaches to the social mixing of community: dilution, using schemes such as Right to Buy to reduce the proportion of social rented homes; diversity, in which new developments include a mix of housing tenure types and which is often achieved through planning agreements such as Section 106 agreements for affordable housing (Monk et al., 2006); and dispersal, where those in deprived neighbourhoods are relocated to low-poverty neighbourhoods (Kearns and Mason, 2007). The first two have been the main focus of UK policy over the past thirty years, and the third has been used in US policy and initiatives such as Moving to Opportunity, referred to in section 3.4.1.

Mixed communities are said to bring about a wide range of benefits, which can be grouped into four categories: 1 - economic and service impacts, such as better quality public services and increased employment; 2 - social and behavioural effects, such as raised aspirations and a reduction of anti-social behaviour; 3 - community level effects, such as increased social interaction and enhanced sense of community; and 4 - the overcoming of social exclusion, such as decreased area stigmatisation and enhanced social networks (Kearns and Mason, 2007: 665).

The *kind* of social mix that is being aimed for is often left unspecified by policy initiatives. For example, in the US racial mixing is often seen as social mix, whereas in Europe, income mixing and housing tenure mixing are more often referred to. For the purposes of this thesis, social mix and mixing will be used to describe mixing of housing tenure types. It is important here to point out that the purported benefits of mixed tenure housing areas are not being compared to all types of mono housing tenure neighbourhoods, but specifically to areas that are mainly socially rented.

Housing tenure mixing has been one of the most ubiquitous responses to the issues in predominantly socially rented neighbourhoods, the idea that by creating areas that are more socially and income mixed, that neighbourhood effects will be reduced (Galster, 2007). The idea of this kind of social mixing is not new – there are examples of the idea being used in the UK going back to the model villages of Cadbury and Bourneville, the 19th century garden cities initiative, and the post-war new towns of the Clyde valley (Galster, 2009, Cole and Goodchild, 2000, Sarkissian, 1976). In 2011, the Scottish Government published a strategy and action plan for housing which declared their 'tenure neutral approach, seeking sustainable choices for all rather than encouraging one particular tenure, and promoting mixed tenure communities' (: 30).

It is important at this point to consider whether housing tenure mix is a means in itself, or whether it is seen as a way in which to deliver income mix in a residential area. There are problems with equating income mix with housing tenure mix as income and housing tenure do not have a 'perfect' correlation (Tunstall and Fenton, 2006). Kearns and Mason outline reasons why in the UK context housing tenure mixing could be a means to area improvement in itself, including the breaking up of areas that are seen to be socially excluded, and in tackling stigmatisation (2007).

Kearns and Mason identify four possible mechanisms in which mixing could bring the purported benefits to a community: resource effects, for example inhabitants with more income have better means to bring about improvements to poor services; role model effects, the introduction of role models leading to behavioural change; community effects, such as cultural change, for example an increase in the area's cultural capital will lead to improved local outcomes; and transformation effects, whereby to achieve a reduction of stigma, real transformation must occur, and the mixing of housing tenures is seen as key to this (2007).

There has been wide ranging discussion relating to who receives these supposed benefits, and whether certain groups may be disadvantaged. Galster splits the goal of social mix into two wellbeing outcomes: equity – which will be improved if a social mixing policy increases the wellbeing of the most disadvantaged

groups in a neighbourhood; and efficiency – which would be improved if the overall wellbeing of all members of society improves; the ideal result of social mix would be a combination of both outcomes (Galster, 2009). Most of the purported benefits focus on the more disadvantaged groups in mixed areas, however it has been theorised that owner occupied households in predominantly social rented areas could be negatively affected in several ways, including negative influences on young people, the exacerbation of negative behaviours, and if mix is achieved by relocating poorer households into a predominantly owner occupied area, the neighbourhood into which the households were being moved could be negatively affected if anti-social behaviours are also relocated, so-called 'negative spillover' effects (Kearns and Mason, 2007).

Within the literature on mixed tenure housing, the problematic nature of ascribing characteristics according to housing tenure is addressed – that those who own are responsible, and those who live in social rented housing are not, for example – and housing tenure has been used as a proxy for the type of social characteristics that those belonging to it are seen to share (Tunstall and Fenton, 2006). With the large reduction in availability of social housing, and therefore the inevitable concentration of those who are vulnerable increasing, social housing has been 'portrayed as an inherently flawed and problematic housing product, framed with a language of dependency and residualisation' (McIntyre and McKee, 2012: 236). The problems arising within areas of concentrated deprivation have been framed in a pathological way as a function *of* the spatial concentration of those in deprivation (Hastings, 2004). This does not just apply to social housing itself, but to those who live within it.

The government-wide acceptance that mixed tenure housing is the way forward has been brought into question by several pieces of work examining the assumption of beneficial outcomes through mixed tenure housing. Not only is it unclear whether mixed tenure housing improves outcomes for deprived groups (Livingston et al., 2013), but a recent review of systematic reviews of the evidence of the benefits of mixed communities found that the conclusions of the reviews were often more positive than the evidence presented. In terms of education, there was weak, mixed evidence on the effects of mixed tenure housing on educational attainment – this will be looked it in more detail in the

next section. Overall, it was found that a stronger theoretical base is required to guide any future work on mixed tenure housing (Bond et al., 2011).

Many of the mechanisms identified to bring about the benefits of mixed tenure housing have an underlying dependence on the residents of a new socially mixed area socialising with each other, or at the very least interacting with residents from other housing tenures or socioeconomic statuses. However, just because an area is socially mixed does not mean that its inhabitants are socially mixing (Camina and Iannone, 2013, Livingston et al., 2013). A study by Jupp showed that there is often little actual interaction between residents of differing housing tenures (1999). However, one area in which evidence of social mixing has been found is through schooling (Atkinson and Kintrea, 2000).

3.7.2 Mixed tenure housing and educational attainment

In terms of the creation of mixed areas, schools are both a medium for neighbourhood mixing and also are affected by the mixing of the neighbourhoods that make up the catchment area. One of the most important reasons that schools are seen to play a part in the creation of successful mixed areas is that the kind of transformative change brought about by improvement of schools in areas that were previously heavily disadvantaged allows the neighbourhood to overcome stigma (Smith and Lupton, 2008). Also, the provision of new schools is a possible way to attract and retain middle class families, particularly those with children, to a mixed tenure housing area (Joseph and Feldman, 2009). The mixing of pupils within a school as a result of the surrounding community becoming more mixed, therefore creating a more comprehensive ideal, is another way that schools may play a part in successful mixed communities (Lupton and Tunstall, 2008). This is an idea that is related to the theory of school mix and composition having a direct effect on the way that a school can operate and therefore on the success of its pupils (Thrupp, 1999).

Housing tenure mixing can be seen to have both direct and indirect effects on processes outside and within schools. The mechanisms outlined by Kearns and Mason (2007) through which mixed tenure housing has an effect – resource effects, role model effects, community effects and transformation effects - can

be extended to take into account the impact on young people both within as well as outside school, and are outlined below.

The idea that more affluent residents are able to influence the resources an area receives – so-called resource effects - could operate both within a school as well as outside. For example, an influx of better-off residents could bring about an improvement of school resources via direct and in-kind parental contributions, but could also bring about improved home resources and resources within the wider community. Role model effects could operate both within and outside a school, exposure occurring within the neighbourhood to adults with higher rates of employment and possibly more positive experiences of the educational system, and peer role model effects operating within the school. Community effects, such as cultural change, could be found outside the school with the idea that with mixed tenure housing comes a more orderly social environment, with owner occupiers more likely to exert formal and informal social control – this could potentially also operate within the school via pupils of owner occupier families. Some of the benefits that social mix is said to provide is that home owners, that are employed and more highly educated are seen to act as role models of positive behaviour to social renters (Higgins and Moore, 2016). Finally, transformation effects could be found both within and outside the school environment, with the possibility of school improvements in outcomes due to the mixing of housing tenures raising the profile of the school, and the stigma of both school and area being reduced by these improvements. A reduction in stigma could stimulate or support higher aspirations among young people in the area.

Importantly for this thesis, there is some evidence from the US that the share of affluent neighbours positively influences educational attainment (Duncan and Brooks-Gunn, 1999), however a review of reviews found only two studies looking directly at mixed tenure housing and education: one study that reported positive effects and the other with no evidence (Tunstall and Fenton, 2006). From the UK, a study using the Scottish School Leavers Survey found that coming from a household that was owner occupied had a strong and significant association with better attainment in secondary school (Bramley and Karley, 2005). Crucially for this thesis, the same authors also found that the level of owner occupied

households at data zone level had a significant association with individual educational attainment in Edinburgh, Fife and North Lanarkshire (Bramley and Kofi Karley, 2007).

However, there are some caveats which must be taken into account when considering the effects of residential tenure mix within neighbourhoods and schools. Firstly, the differences between renters and owners in terms of income may not be great (Atkinson and Kintrea, 2001). Secondly, the impact of more affluent residents on local services may be diluted if local services are poor and the affluent residents have greater mobility (Atkinson and Kintrea, 2004). This kind of response may also impact the effect of housing tenure mix on school mix, if parents choose to send their children elsewhere (Silverman et al., 2005). The peer effects through which mixed tenure housing is thought to be able to impact on educational attainment are based on the idea that aspirations are lower in poorer areas, which has been questioned, with the suggestion that it is accessing resources to realise those aspirations that is more difficult for those who are less affluent (St Clair and Benjamin, 2010).

It could be posited therefore that regeneration with a focus on housing tenure mixing could lead to changes both within the neighbourhood and catchment area, and within the school that could positively impact on both school and individual outcomes. Figure 3-4 below shows possible pathways, taken from the literature, from housing tenure diversification to educational outcomes. As can be seen, there are many possible pathways identified in which this diversification – at both neighbourhood and catchment area level, and through children and parents – could impact on both individual educational outcomes, and whole school educational performance.

For instance, in a neighbourhood-based example across the top of the model, housing tenure diversification could lead to an increased proportion of owner occupied households in the neighbourhood, leading to the impact of deprivation being lessened, increased care of the environment and informal social control, and an increased middle class 'voice'. This in turn could lead to school processes becoming easier to implement, the school becoming easier to manage, as well as raised aspirations, less neighbourhood stigmatisation, an improvement in the

school reputation, and improved neighbourhood resource - all leading to improved outcomes for individual pupils and the school overall.

Looking at the impact of housing tenure diversification within the neighbourhood through parents – if parents are consequently exposed to a mix within the neighbourhood, this could lead to an improvement in behaviour within the neighbourhood through informal social control. This improvement in behaviour could feed through into the school, again lessening the impact of deprivation. The influence of higher SES families could also lead to the development of more 'weak ties' within the neighbourhood, thus increasing the social capital of the lower SES families, possibly leading to improved outcomes within the school. The increased proportion of higher SES families could also lead an increased middle class 'voice', leading to improvements in the neighbourhood and less stigmatisation, which would feed into the higher level outcomes.

Within the school, the exposure of pupils to a wider mix of pupils due to housing tenure diversification could lead to the lessening of the impacts of deprivation, and an improvement of behaviour in the school, again leading to the long term outcomes described above. Not only could this happen through the overall impact of deprivation being lessened, but also through individual pupils being exposed to different attitudes to education, and raised aspirations, leading to individual pupil outcomes improving.

As can be seen, there are many possible pathways through which an increase in owner occupation could, in theory, lead to improved outcomes at both the individual pupil level and the overall school level, through both parents and pupils, and occurring in the neighbourhood, catchment area, or within the school itself.

Figure 3-4: Visual representation of pathways from tenure diversification to educational outcomes
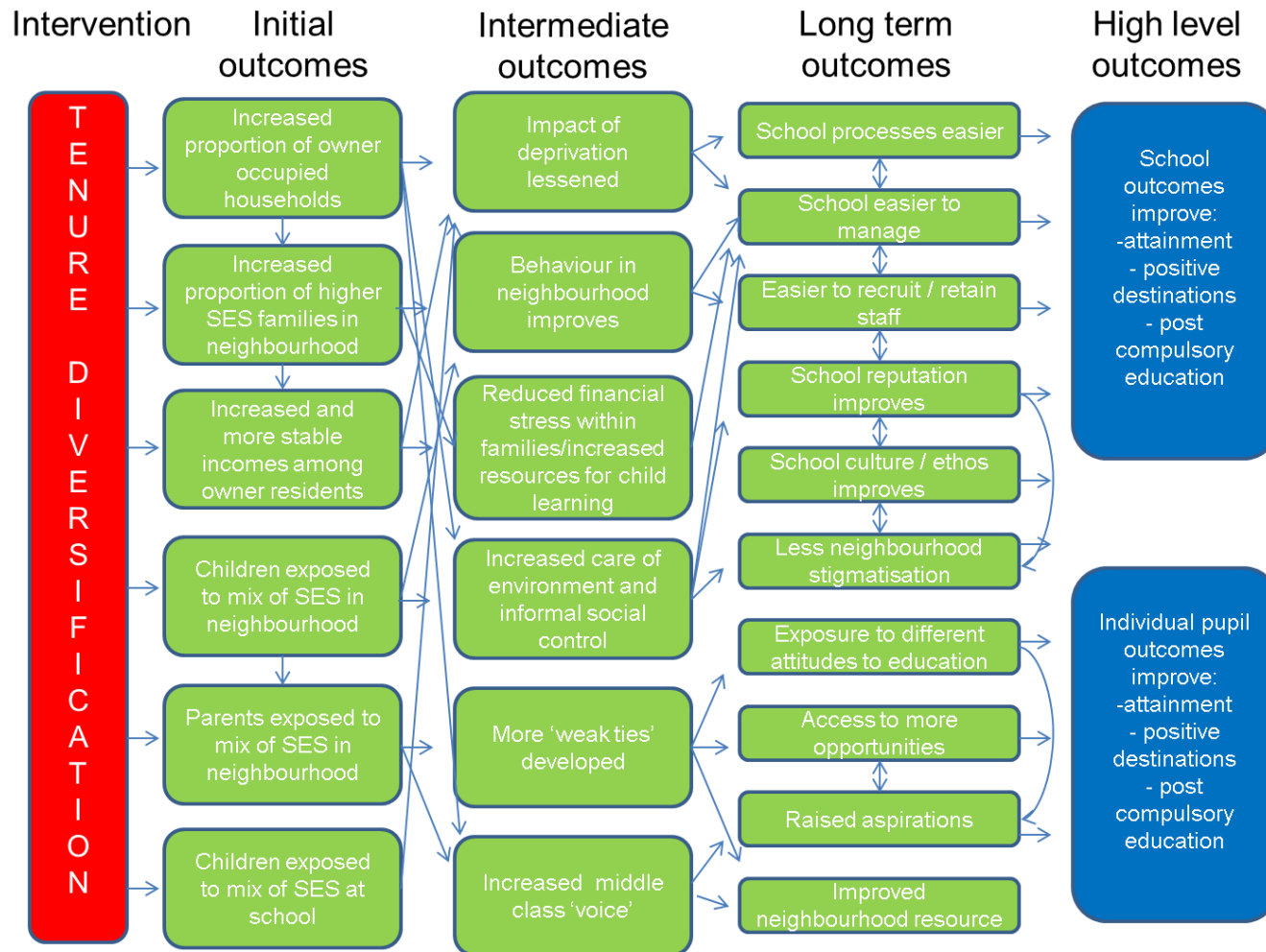
This thesis takes as a starting point the literature around the many different contextual levels - outlined in this chapter - that can impact on a pupil's educational outcomes, and the claim that mixed communities have benefits which include education, and looks to explore and build on this knowledge within a framework of regeneration policy. Specifically, it looks at how the changing of these contexts through a specific housing policy, mixed tenure, in a specific place, Glasgow, could impact on young people's educational attainment. It also aims to provide evidence around whether it is tenure itself that can make a difference to educational outcomes, and the role of other socioeconomic measures.

3.8 Summary

This chapter has reviewed the literature pertinent to the aim of the thesis, which seeks to establish if mixed tenure housing policy can make a difference to educational outcomes. The chapter started by exploring educational attainment. Positioning the review within an ecological framework, the levels of influence that affect a pupil's educational attainment were examined, concluding that the impact on educational attainment is a complicated mix of individual, family, neighbourhood, school and catchment area influences. The review then looked in turn at the theories and evidence around individual and family influences on educational attainment, focusing especially on the link with poverty; then at the influence of the neighbourhood; then looked at school based factors; before moving on to look at the impact on the intake of the school, focusing on the catchment area. Finally, this chapter looked at regeneration and specifically mixed tenure housing as a response to neighbourhood effects. The literature has shown that there is a possibility that mixed tenure housing initiatives could make a difference to individual educational outcomes in a city such as Glasgow, and that there are many possible pathways through which this could take place at individual, neighbourhood, catchment area and school level – these were set out in a conceptual logic model. The next chapter will outline the methods that will best allow the research questions to be answered.

4 Methods

4.1 Introduction

The previous chapter illustrated the complex and many-layered contexts that impact upon a person's educational outcomes. This chapter gives an overview of the methodological strategy used to address the aim of the thesis, namely whether mixed tenure housing policy can make a difference to these educational outcomes, and outlines the individual methods used for each distinct research question. Firstly, the chapter locates the research approach within a mixed-methods, critical realist framework, before moving on to link the methods with the conceptual approach introduced in chapter 3. It then looks at the quantitative methods used for research questions 1 and 2, firstly describing the data used in the quantitative analysis: where the data came from; how variables were derived; and how the data were linked. It then discusses the statistical methods used and details the quantitative analysis undertaken. The final section discusses the methods used in the qualitative part of the study for research question 3, looking at the rationale for the methods chosen and how the case study schools were selected, and how the qualitative data were analysed.

4.2 Research aim and approach

The overarching aim of the study was to explore whether mixed tenure housing policy can make a difference to educational outcomes.

As stated in the introduction, the specific research questions were:

1. How have catchment areas and schools changed, focusing especially on housing tenure and educational attainment?

2. What explains individual educational attainment and changes in educational attainment, focusing especially on housing tenure?

3. How have changes in neighbourhoods, catchment areas and schools been experienced by staff and pupils?

The methods described in the rest of the chapter were formulated in order to answer these questions robustly, and in the most appropriate way.

4.2.1 Mixed methods approach

In order to answer the research questions of this thesis in the fullest possible way, a mixed methods strategy was developed. It used quantitative methods to measure both variations and changes in social mix among neighbourhoods and schools, and their associations with educational attainment outcomes for schools and pupils, and used a qualitative component to explore how these changes impacted on schools with the staff and pupils of two case study schools.

Methodology and the design of research in general has classically been discussed in terms of the philosophical framework it is associated with, and the fundamental assumptions that shape these views (Johnson and Onwuegbuzie, 2004). For example, qualitative research arguably has a constructionist epistemology, in that meaning is constructed by participants; whereas quantitative research comes from an objectivist epistemology – that reality exists objectively, and that research gathers objective measurements of this reality (Gray, 2013). However, this binary opposition is often unhelpful and in recent years more empirical work has made use of both quantitative and qualitative methods, working with mixed methodologies (Onwuegbuzie and Leech, 2005). This approach posits that although researchers are influenced by philosophical underpinnings they need not be necessarily limited by them (Maxwell and Mittapalli, 2010). For example, an approach such as critical realism, most closely associated with the work of Bhaskar (2010), has a philosophical stance that is compatible with both qualitative and quantitative methods of inquiry (Maxwell and Mittapalli, 2010), by taking the position that although there are objective truths that can be uncovered, finding 'absolute truths' is not possible (Tashakkori and Teddlie, 2010). This means that by coming from a critical realist approach one gains '...a framework for better understanding the relationship between individual perspectives and their actual situations... critical realism treat both individuals and their situations as real phenomena that causally interact with each other. In this, realism supports the emphasis that critical theory places on the influence that social and economic conditions have on beliefs and ideologies' (Maxwell and Mittapalli, 2010).

Mixed methods research has been defined as follows, based on the definition of a range of methodologists working in the field:

> *'Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration'* (Johnson et al., 2007)

Therefore a critical realist approach and a mixed methods strategy seem to be natural bedfellows as a mixed methods approach takes a pragmatic approach to research, a key feature being its 'methodological pluralism' (Johnson and Onwuegbuzie, 2004). This approach draws from both qualitative and quantitative approaches to gathering knowledge as it is felt this will strengthen research as together they can 'enhance methodological strengths and serve to reduce or offset methodological weaknesses' (Weis et al., 2009). It can be argued that – dependent on the questions - using a mixed methods approach allows the researcher to answer the research questions more fully than using either qualitative or quantitative methods alone (Creswell and Clark, 2007).

For this thesis, the mixed methodological approach consisted of using quantitative data to examine changes in indicators of social mix, particularly housing tenure, of catchment areas, and then examining the associations of these indicators with pupil educational attainment within schools. The qualitative section of the approach used semi-structured interviews to explore how these changes in context had impacted on the schools and catchment areas.

4.3 Conceptual approach

As was seen in the previous chapter, educational attainment is influenced by many factors at a variety of levels. Although this thesis is specifically interested in housing tenure, other factors must be taken into account. Consistent with the ecological model by Bronfenbrenner, introduced in section 3.3, and the conceptual model pupils were conceptualised as being within spheres of influence, as illustrated by Figure 4-1 below (though due to the availability of data, 'family' was removed). The conceptual model is a modified version of

Figure 3-2, the model of spheres of influence introduced in the last chapter. Each pupil has individual characteristics, and lives in a neighbourhood which itself has its own characteristics. All neighbourhoods are grouped inside a catchment area, which has its own characteristics, and both feed into the school characteristics, though schools also have characteristics independent of the catchment. In terms of the data, this was operationalised within the research frame to give three levels of influence: the pupil, their neighbourhood, and the catchment area/school. The modification of the figure is a reflection of the decision to have catchment area and school at the same level for practical reasons, as due to the structure of the quantitative data, each school corresponded to one catchment area, and therefore the model would treat them as one level even if they were added separately.

Figure 4-1: Conceptual framework of pupil spheres of influence
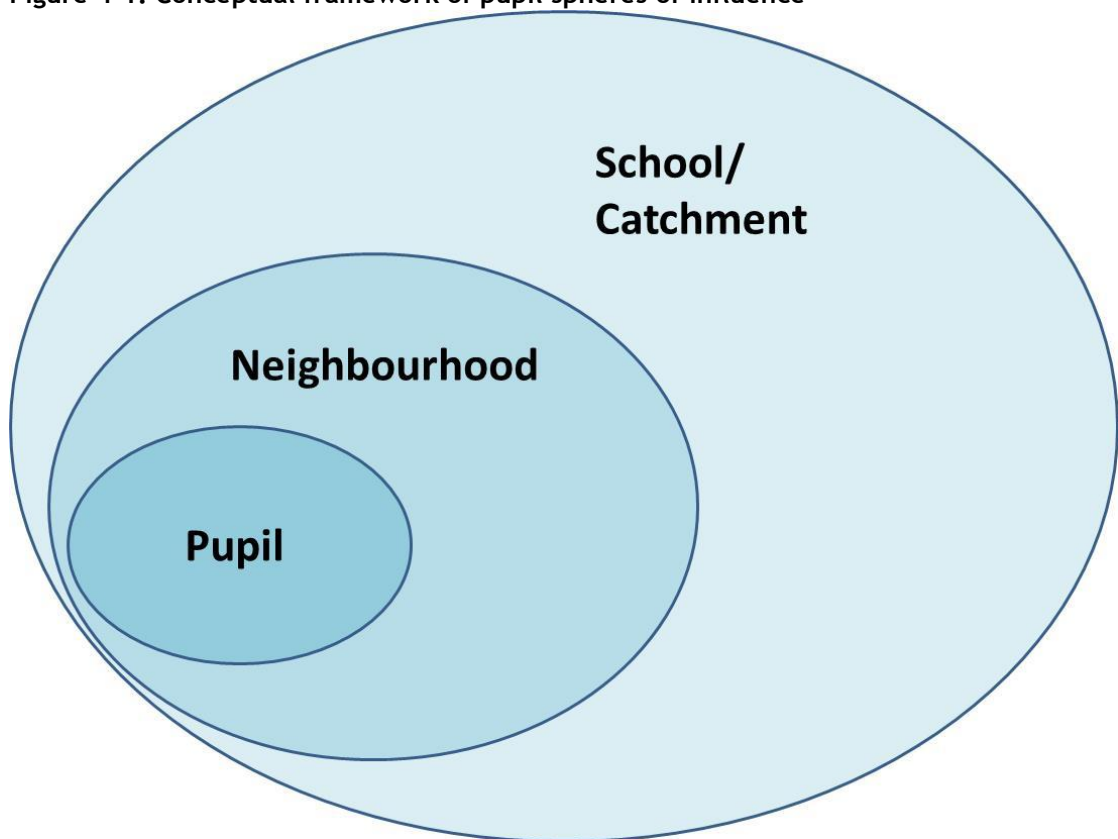
This conceptual framework is of course a simplification, as it suggests that there exists a strict classification in which each pupil is within a neighbourhood, and in a school which is itself within a catchment area, which is not true of all cases. There were some pupils for whom the conceptual model above differed – these pupils lived in a neighbourhood within one catchment area but attended school

in another. The approach for dealing with these cases this will be discussed in more detail in section 4.6.8 on cross classification. However the simplified framework is useful for illustrating the approach.

4.4 Data for quantitative analysis

The data for the quantitative analysis came from three separate sources: individual pupil level data for 2003 and 2012 from Glasgow City Council (GCC) Education Services; area level socioeconomic and demographic data from the 2001 and 2011 censuses; and area deprivation data from the 2004 and 2012 Scottish Index of Multiple Deprivation (SIMD).

1. GCC provided individual pupil level data on educational attainment and characteristics for every child in a mainstream state school in Glasgow for 2003 and 2012. These data were from multiple sources, namely the school records management system, SEEMiS[3]; the pupil census, filled in at the start of each school year by the parents of the pupil; and the Scottish Qualifications Agency (SQA).

2. Census data from 2001 and 2011 were collated at two levels: firstly to provide information on socio-demographics of pupil neighbourhoods; and secondly to provide information on the socio-demographics of the school catchment areas.

3. SIMD data provided area level deprivation information, and were used to construct data on deprivation at neighbourhood and catchment area levels.

The overall process of managing, cleaning and matching all the data was a major undertaking, and the process was recorded, along with the process of analysis, in a 271 page data diary. Figure 4-2 shows the sources of the data, and the stages of data cleaning and matching that were undertaken to create the final data sets. This process was undertaken twice – once to match the 2001 census data with the 2003 pupil data and 2004 SIMD data, and the second time to match the 2011 census data with the 2012 pupil data and 2012 SIMD data. These

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[3] SEEMiS (School Management Information System) is specialist educational management software used in all local authorities in Scotland to record and collate pupil data.

processes and the resultant data sets will be described in more detail over the course of the chapter.

Figure 4-2: Data matching process

| Original data files | Steps taken | Final data file |

Data files matched - repeated for each timepoint

- SQA pupil attainment data, SCN
- GCC pupil census data, pupil ID
- GCC other pupil data, SCN, pupil ID
- Catchment area postcodes
- Census area boundaries, COA and DZ
- Census data
- SIMD

- All pupil data cleaned
- Pupil characteristics aggregated to school level
- S4 pupils identified
- SCN and pupil ID lookups created
- All postcodes manually checked
- Imported into GIS
- Four catchment profiles created for DZ and COA, RC and ND
- Desired variables extracted
- Desired data extracted
- Individual pupil data, school data, DZ data, catchment data combined
- RC and ND recombined
- COA aggregated to catchment level

- SCN Pupil characteristics Neighbourhood characteristics Catchment characteristics School characteristics

Key:
SQA – Scottish Qualifications Agency
SCN – Scottish Candidate Number
GCC – Glasgow City Council
COA – Census Output Area
DZ – Data Zone
GIS – Geographic Imaging Software
SIMD – Scottish Index of Multiple Deprivation
RC – Roman Catholic school
ND – non denominational school

4.4.1 Geographies

In terms of geographies, neighbourhoods were represented by data zone; and catchment areas by census output area (COA) information aggregated to catchment area level – this section will outline these processes. Census output areas are the smallest level at which census data are released, and used to construct data zones, the next smallest level. Figure 4-3 below gives a graphical representation of how the geographies fit together (not to scale).

Figure 4-3: Graphical representation of census output areas, data zones and catchment areas

Catchment area

Data zone

Census output area
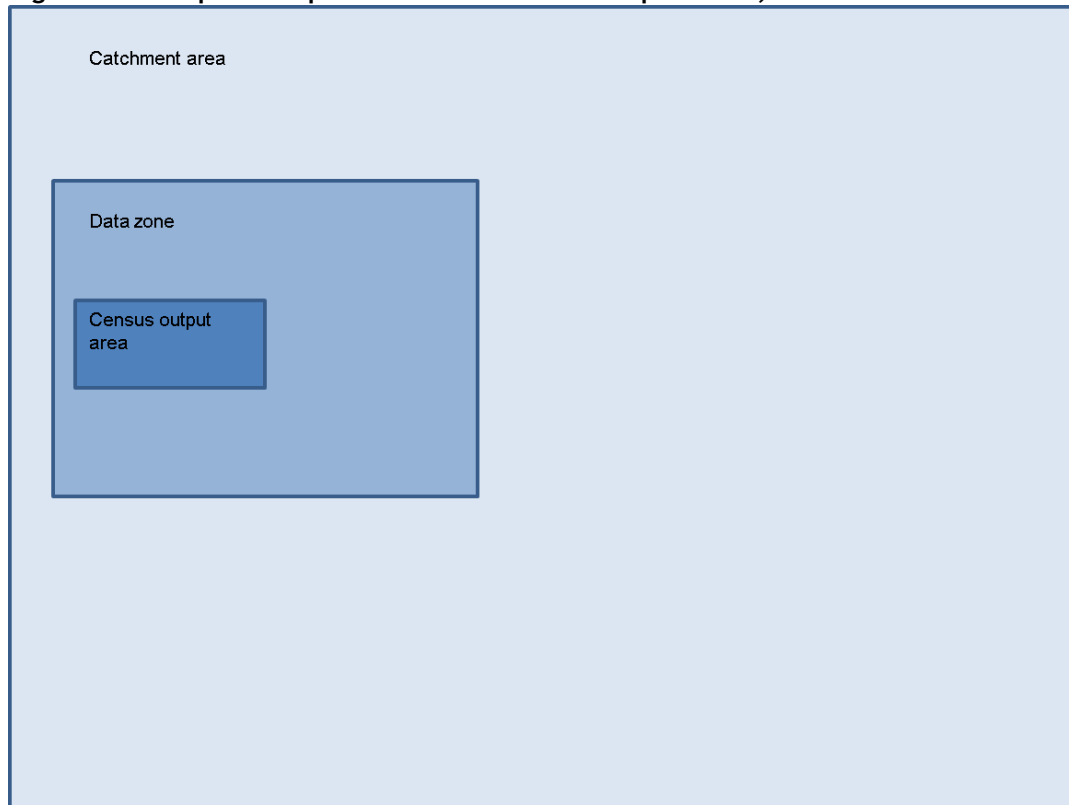
The influence of these levels on individual educational attainment helped to shape the methodological approach of using multilevel modelling, and all explanatory variables were included due to them having a putative influence on educational outcomes, whether in theory or literature. This will be discussed in further detail in section 4.4.3.

4.4.1.1   Neighbourhoods

The home postcode was provided for each pupil through GCC education data, allowing the pupils to be matched to a home data zone, and enabling the creation of variables that reflect the socioeconomic conditions of the pupils'

individual neighbourhoods. Data zone was chosen as the geographic level to represent neighbourhood, as it was small enough that it could conceivably represent a neighbourhood, but also large enough that there were enough pupils living in each data zone on average to make the analysis viable. There are 6505 data zones in Scotland, and each data zone contains several post codes. They have populations of between 500 and 1000 residents of generally similar social characteristics, and wherever possible are constructed around natural communities (Scottish Government, 2011b). A preliminary iteration of the modelling used COA as the neighbourhood level, however it was found that there were too few pupils at this level for the analysis to be viable. Data zones identified from the 2001 census were used for both timepoints so that neighbourhoods were consistent over time, as changes were made in data zone boundaries between the 2001 and 2011 censuses. At timepoint 1 there were 677 home data zones, and at timepoint 2, 664.

4.4.1.2   Catchment areas

Catchment area data, in the form of catchment-specific lists of postcodes, allowed the aggregation of census data to catchment area level. Although access to the catchment area postcodes of 2001 and 2011 would have ideally been obtained in order to take into account any changes within the boundaries, it was not possible to access this information. Therefore use was made of a list of the postcodes associated with each school from 2008 that had been collated by University of Glasgow colleagues for a separate piece of research. This meant that it was not possible to take into account any adjustments that had been made to school catchment boundaries between the two timepoints, though any changes would be expected to be minor. Postcodes and respective schools were systematically checked for accuracy against the GCC 'postcode checker' tool online, which allows users to enter a postcode and see the associated services, including secondary schools. Although a time consuming process, this allowed the production of an updated and accurate list of catchment area postcodes.

Of the 37 schools with available data, eight were excluded as they were special educational needs or specialist language (Gaelic) schools, and therefore did not have a sub-city catchment area, and the remaining school was excluded as the catchment area boundaries were unavailable. Figure 4-4 and Figure 4-5 below

show the distribution of the catchment areas for the 18 non-denominational and 10 Roman Catholic schools that were used in the analysis, respectively. The figures were created from the finalised updated list of catchment area postcodes.

Figure 4-4: Non-denominational school catchment areas in Glasgow City Council boundary
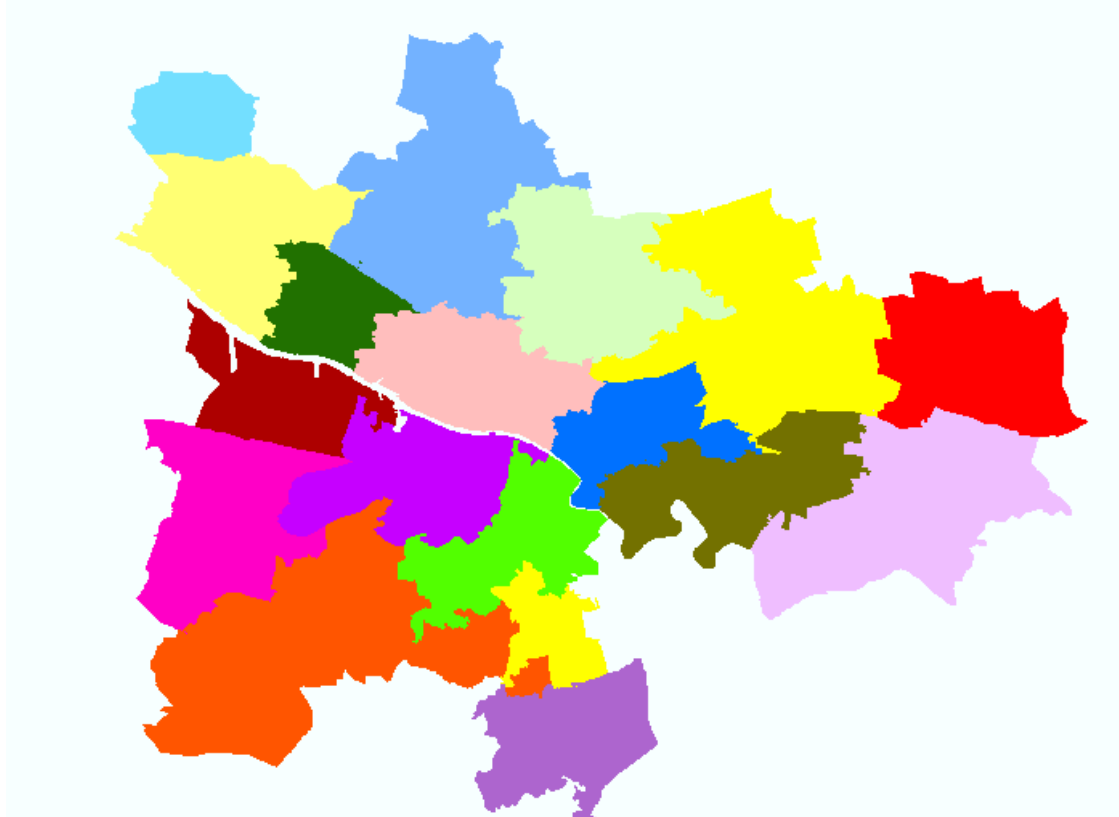
Figure 4-5: Roman Catholic school catchment areas in Glasgow City Council boundary
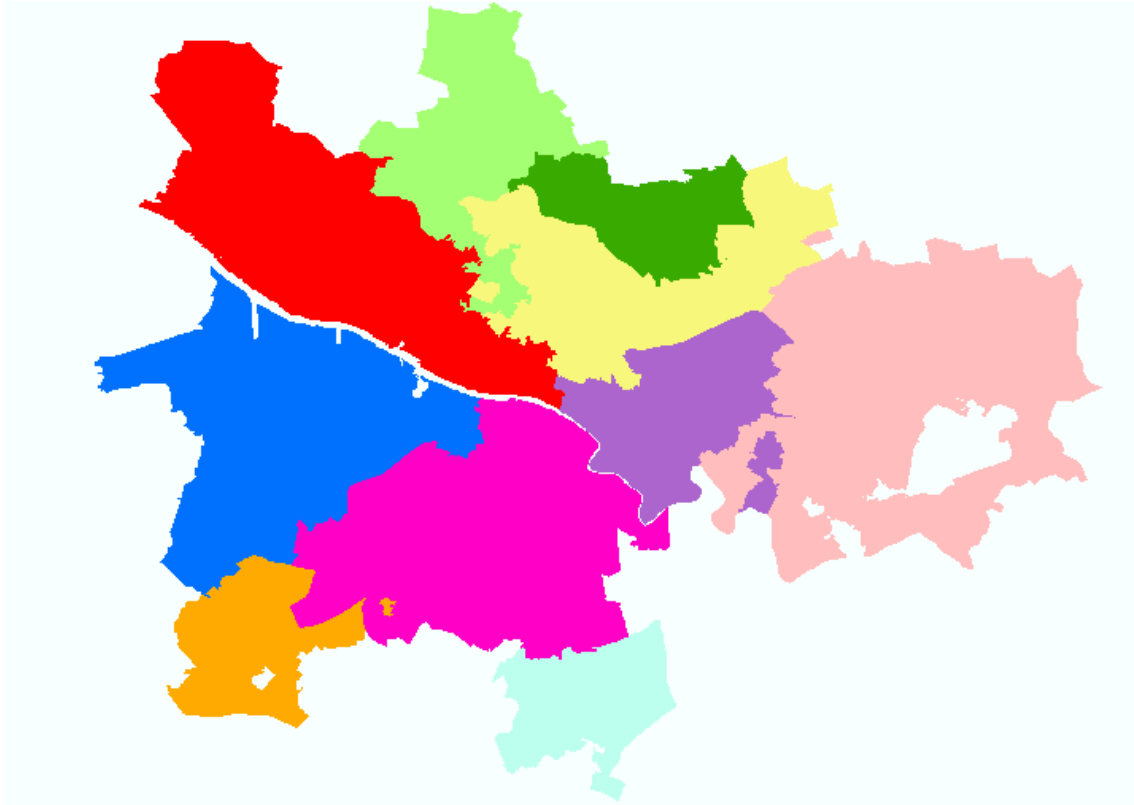
Catchment area level data were constructed by aggregating the data of the COAs that were contained within each catchment area. In order to ascertain which COAs fell into which catchment area, Geographic Imaging Software (GIS) was used in the first instance to overlay COAs, for both 2001 and 2011, and catchment areas.

However, some COAs straddled catchment areas and others were exclusively within one catchment area. Where there was an overlap of a COA between two or more catchment areas, the population weighted centroid was used to establish into which catchment area it should be placed. Figure 4-6 is an example of a section of the border between two catchment areas (one beige, the other red), overlaid with census output areas (red border) and population weighted centroids (green circles).

Figure 4-6: Border between two catchment areas with census output areas

After this process was complete, the lists of COAs associated with each catchment area were then exported from the GIS software, and matched to the corresponding census data for 2001 and 2011. Census data were then aggregated to give catchment area figures. As was seen in Figure 4-4 and Figure 4-5, the non-denominational and Roman Catholic schools have overlapping catchments, therefore this process was performed separately for both the non-denominational and Roman Catholic schools included in the analysis.

4.4.2 Outcome variable – individual pupil educational attainment

The outcome variable for individual pupils was a measure of the level of their educational attainment. In early stages of the research it had been planned to have three outcome variables for each pupil: educational attainment; behaviour; and attendance. Due to large variations between the reporting of behaviour and attendance, both between schools and over time, it was felt that there were possible discrepancies in how these data were recorded, and therefore they were deemed to not be of sufficient quality to be included in the analysis. For example, it had been planned to use both absences and exclusions in order to create a proxy for behaviour, however the difference in the type and number of absences recorded both between the two timepoints and between the schools was very large, and without knowing the reasons behind these discrepancies, it was decided that excluding these variables from consideration was the most

sensible approach. It was thus decided to focus on educational attainment as the outcome.

SQA exam educational attainment data for the two timepoints were provided in Microsoft Access files by GCC. Each file contained exam results for each pupil, as well as the school name, pupil date of birth, year, and sex. Results were identifiable by Scottish Candidate Number, the individual code allocated to all pupils who undertake an SQA course at school or college. The qualifications of interest were Standard Grades - the first set of national exams pupils sit, in their fourth year of secondary school (S4), when they are around 15 or 16 years of age. As S4 is the last compulsory year at school for pupils in Scotland, it was decided that using S4 educational attainment data for those pupils who were in S4 at each timepoint would be the most suitable approach, as this would encompass the full range of pupils, as opposed to a possibly more biased outcome based only on those who remained in the school system in S5 and S6. However, this meant that there was no previous SQA data available for the selected pupils, as S4 is the first year of national examinations. It also meant that the results for each timepoint are from a different group of pupils.

Scottish qualifications are measured using the Scottish Credit and Qualifications Framework (SCQF), and the data were provided as categories, indicating whether or not a pupil had achieved a certain level. Table 4-1 below describes the relevant SCQF levels contained in the SQA data, along with the equivalent exams and usual stage at which they are undertaken. There were three separate Standard Grade papers: foundation, general and credit, each with a corresponding SCQF level. For each subject taken, each pupil sat two papers (either foundation and general, or general and credit) and was awarded the highest grade they received from either paper. From 2015, the exam structure in Scotland changed and Standard Grades were no longer used, however the data used in this thesis are from before the change in the examination system.

Table 4-1: Scottish qualifications and levels pupil has received

SCQF level	Equivalent qualification at time of data	Usual stage of qualification
SCQF level 3	Standard Grade at Foundation level	S4
SCQF level 4	Standard Grade at General level	S4
SCQF level 5	Standard Grade at Credit Level	S4

Within the data, there were three categories for which each pupil was either classified as a 1 or a 0, indicating that they had either achieved this level (1) or that they had not (0). Table 4-2 shows the categories and descriptions.

Table 4-2: Qualification variables included in GCC data and description

Variable name	Description
A5_scqf3orbetter	Pupil has received five or more qualifications at SCQF level 3 (or better)
A5_scqf4orbetter	Pupil has received five or more qualifications at SCQF level 4 (or better)
A5_scqf5orbetter	Pupil has received five or more qualifications at SCQF level 5 (or better)

Table 4-3 below shows an example of the raw data, in which in row 1 a pupil has not achieved five or more qualifications at SCQF level 3, which is equivalent to them gaining fewer than five Standard Grades at Foundation Level; in row 2 a pupil achieved 5 or more qualifications at SCQF level 3, equivalent to them gaining five or more Standard Grades at Foundation level; in row 3 a pupil achieved 5 or more qualifications at level 4 – equivalent to five or more Standard Grades at General Level; and in row 4 a pupil achieved 5 or more qualifications at level 5, equivalent to 5 or more Standard Grades at Credit Level.

Table 4-3: Example of raw qualifications data

Pupil	A5_scqf3orbetter	A5_scqf4orbetter	A5_scqf5orbetter
1	0	0	0
2	1	0	0
3	1	1	0
4	1	1	1

Only those who were in S4 at either of the timepoints were used in the data, and an outcome measure – pupil_attain - was created using the available SQA data.

For each pupil, pupil_attain was coded as 0, 1, 2 or 3 depending on the columns that were marked as 1 in the SQA data. As can be seen in Table 4-4 below, a pupil who had 000 for A5_scqf3orbetter, A5_scqf4orbetter, and A5_scqf5orbetter – indicating they had not achieved the lowest category of 5 or more Standard Grades at Foundation level - would be assigned a 0; a pupil who had gained five or more at foundation would be assigned a 1; a pupil who had gained a maximum of five or more at general would be assigned a 2; and a pupil who had gained five or more at credit would be assigned a 3. Some pupils were missing from the SQA data, but were included in the pupil census data for the year. After discussion with GCC, those missing from SQA data but included in the school

census data fit the criteria of not attaining 5 or more Standard Grades at Foundation Level and were thus coded as a 0 for the outcome variable.

Table 4-4: Construction of derived variable pupil_attain variable from SQA data

Raw data			Derived variable
A5_scqf3orbetter	A5_scqf4orbetter	A5_scqf5orbetter	pupil_attain
0	0	0	0
1	0	0	1
1	1	0	2
1	1	1	3

At timepoint 1, there were 5068 S4 pupils. The distribution of their educational attainment can be seen in Table 4-5, with the majority of pupils (41.7%) in category 2, with 5 or more general level standard grades.

Table 4-5: Derived variable 2003 pupil educational attainment distribution

pupil_attain	2003: pupil educational attainment derived variable	Frequency	Percent
0	<5 foundation	841	16.6
1	>5 foundation	988	19.5
2	>5 general	2113	41.7
3	>5 credit	1126	22.2
	Total	5068	100

At timepoint 2, as can be seen in Table 4-6 below, the majority of the 4374 pupils were again in category 2, >5 general (47.3%), however the percentage in category 0, with fewer than 5 foundation level standard grades, had fallen to 4.6% from 16.6% at timepoint 1, thus overall educational attainment was higher at timepoint 2.

Table 4-6: Derived variable 2012 pupil educational attainment distribution

pupil_attain	2012: pupil educational attainment derived variable	Frequency	Percent
0	<5 foundation	199	4.6
1	>5 foundation	903	20.6
2	>5 general	2067	47.3
3	>5 credit	1205	27.6
	Total	4374	100

4.4.2.1 Residuals

In order to show the distribution of individual educational attainment across the 28 schools at each timepoint, 'caterpillar plots' are shown in the results in section 6.1.4. Caterpillar plots are graphs that show the estimates of group

residuals, or unexplained variance, plotted with 95% confidence intervals of the residuals for the null (i.e. no explanatory variables) model. There are 28 residuals, one for each school, and they represent the school departures from the overall mean educational attainment across all 28 schools[4]. Therefore a school whose residual 95% confidence interval does *not* overlap zero differs significantly from the average at the 5% significance level (Steele, 2011).

4.4.3 Explanatory variables – pupil, neighbourhood and catchment area/school variables

Explanatory variables – variables included in a model to try and explain differences between outcomes - comprising housing tenure, the key one of interest, along with covariates, were constructed across three different levels – individual pupil; neighbourhood; and catchment area/school. The assumed causal order from an increase in owner occupation to an improvement in pupil educational attainment is outlined in Figure 3-4, but can be roughly summarised as happening in two ways: firstly a direct effect on pupils within the neighbourhood, due to the presence of the children of owner occupiers, through one or more social interactive neighbourhood effects; and secondly within the school, through institutional effects, in which the resulting change in the mix of pupils in the school has an impact on how processes within the school operate, including teaching. All variables described here were selected because, as outlined in the previous chapter, they not only have been found to have an association with educational attainment, but could also explain an association between housing tenure and educational attainment. Of course the inclusion of variables was limited by the data available, which may have resulted in missing confounding variables at all levels. For example, although family is an important influence, as outlined in the conceptual framework in 3.2.2, it was not possible to include this as a level as there was no family data available, such as parental education, income or housing tenure. There was also no prior educational attainment data at pupil level. It is possible that not controlling for these potential confounders may bias the effect estimates somewhat.

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[4] Although it is possible to show residuals at all variable levels (e.g. by pupil and neighbourhood as well as by school), due to the number of neighbourhoods and pupils, caterpillar plots for these levels were too difficult to read to be meaningful and are therefore not presented.

This section will detail what characteristics were included at each level, how they were constructed, and then give a breakdown of each variable for each timepoint. Chapter 5 looks in detail at the changes between the two timepoints, however the basic descriptive statistics are provided here.

All of the pupil level explanatory variables (gender, ethnicity, free school meal registration and looked after status) were categorical. All the neighbourhood and catchment area/school explanatory variables were constructed as proportion variables with the exceptions of neighbourhood deprivation, which was categorical, and school denomination, which was binary. In order to have consistency of model coefficients, all variables were constructed in line with the expectation from theory and/or literature that an *increase* in the variable would be associated with a *higher* chance of pupils being in the highest educational attainment category. For binary variables this meant that the reference category was that which was less likely to be associated with high educational attainment. The exception to this was looked after status, where due to low numbers of pupils being looked after, 'not looked after' was used as the reference category.

The four pupil explanatory variables constructed from individual pupil level data are shown in Table 4-7 below, with reference categories.

Table 4-7: All constructed explanatory variables from pupil data – pupil and school

Level	Variable	Measure description	Variable type (reference category if applicable)
1 – Pupil	Gender	Male or female	Categorical (male)
1 – Pupil	Ethnicity	White British/Irish or not White British/Irish	Categorical (White British/Irish)
1 – Pupil	Free school meals	Registered for free school meals or not	Categorical (registered for free school meals)
1 – Pupil	Looked after status	Looked after or not	Categorical (not looked after)

Characteristics constructed from the census to measure neighbourhood and catchment area mix were: housing tenure; social class; area level of education; ethnic mix; working status; family structure; and area deprivation. As mentioned, all variables were constructed in line with the expectation from theory and/or literature that an *increase* in the variable would be associated

with a *higher* chance of pupils being in the highest educational attainment category, therefore proportional variables measured the proportion of characteristics that would likely have a *positive* association with educational attainment.

Therefore, for variables constructed from the census for neighbourhood (shown in Table 4-8 below): housing tenure was the proportion of owner occupied households; social class was the proportion of those of working age in NS-SEC categories 1-3; education was the proportion of those in work with a degree or higher; ethnic mix was the proportion of those who did *not* identify as being White British/Irish; working status was the proportion of those of working age who were in employment; and family structure was the proportion of households that were not classified as single parents with dependent children. SIMD was a five category categorical variable, however as is consistent with the type of analysis used for the modelling, it was treated as a continuous variable (Steele, 2009).

Owner occupation was used to measure mixed tenure housing – as opposed to a categorical variable with one category describing mixed tenure housing or a variable that measures the extent of social housing in an area - because the premise underlying the thesis, based on the literature review, was that an increase in owner occupation could, through whatever mechanism, lead to improved individual educational attainment. Although there were other changes in the housing structure (this can be seen in section 5.3.1), it was felt that this was the most important change to examine as the increase of owner occupied housing in social rented areas – dilution – has been the focus of mixed tenure policy. The proportion was used for two reasons: firstly, the variable measured the neighbourhood and catchment area levels of owner occupation; and secondly, in order to be able to interpret the coefficients of the explanatory variables on the same scale, as outlined in section 4.6.6.2.

Table 4-8: All constructed explanatory variables constructed from census data – neighbourhood

Level	Variable	Measure description	Variable type
2 – Neighbourhood	Housing tenure	Proportion of households in the data zone that were owner occupied	Proportion
2 – Neighbourhood	Social class	Proportion of those of working age in data zone in NS-SEC categories 1-3	Proportion
2 – Neighbourhood	Education	Proportion of those of working age in data zone with Level 4 qualification or above (degree or higher)	Proportion
2 – Neighbourhood	Ethnic mix	Proportion of all people in the data zone that do not identify as being White British/Irish	Proportion
2 – Neighbourhood	Working status	Proportion of those of working age in the data zone who were in employment	Proportion
2 – Neighbourhood	Family structure	Proportion of households in the data zone that were not single parents with dependent children	Proportion
2 – Neighbourhood	Area deprivation	SIMD quintile of the data zone	Continuous

Catchment level variables were for the most part the same as the neighbourhood level. However at catchment area level SIMD was measured by a 'reverse' local share – the proportion of data zones in the catchment area which were *not* in the most deprived 15% in Scotland. School level characteristics constructed from the pupil data were: S4 educational attainment - the average proportion of S4 pupils attaining 5 or more credit standard grades in the three years closest to the timepoint; free school meals - the proportion of pupils in the school not registered for free school meals; and ethnic mix - the proportion of pupils who did not identify as White British/Irish. Denomination was the only school variable that was categorical, and indicates whether the school is Roman Catholic or non-denominational.

Table 4-9: All constructed explanatory variables constructed from census data – catchment area/school level

Level	Variable	Measure description	Variable type
3 – Catchment	Housing tenure	Proportion of households in the catchment area that were owner occupied	Proportion
3 – Catchment	Social class	Proportion of those of working age in catchment area in NS-SEC categories 1-3	Proportion
3 – Catchment	Education	Proportion of those of working age in catchment area with Level 4 qualification or above (degree or higher)	Proportion
3 – Catchment	Ethnic mix	Proportion of all people in the catchment area that do not identify as being White British/Irish	Proportion
3 – Catchment	Working status	Proportion of those of working age in the catchment area who were in employment	Proportion
3 – Catchment	Family structure	Proportion of households in the catchment area that were not single parents with dependent children	Proportion
3 – Catchment	Area deprivation	Proportion of data zones in the catchment area that were not in the 15% most deprived in Scotland	Proportion
3 – School	S4 educational attainment	Proportion of students who gained >5 credit Standard Grades in the three years surrounding the timepoint	Proportion
3 – School	Denomination	Non-denominational or Roman Catholic	Categorical (Non-denominational)
3 – School	Free School Meals	Proportion of students who were not registered for free school meals	Proportion
3 – School	Ethnic mix	Proportion of students who were not White and from the UK or Ireland	Proportion

Each explanatory variable will be discussed in more detail below. All census data were downloaded from the Scotland's Census Data Warehouse (http://www.scotlandscensus.gov.uk/ods-web/data-warehouse.html#introductiontab), and full information on census variable extraction and full categories can be found in Appendix 1.

4.4.3.1   Pupil characteristics

The pupil level characteristics – gender, ethnicity, free school meal registration, and looked after status – and the proportion of pupils in each category are shown in Table 4-10 below, for both 2003, when there were 5068 pupils, and 2012 when

there were 4374 pupils. The gender split stayed roughly the same from 2003 and 2012; the proportion of White British/Irish pupils fell from 0.88 to 0.83; the proportion of children registered for free school meals fell from 0.41 to 0.30; and the proportion of looked after children rose from 0.01 to 0.03.

Table 4-10: Individual level pupil variables for 2003 and 2012

	2003 proportions		2012 proportions	
Gender	Male	Female	Male	Female
	0.49	0.50	0.51	0.49
Ethnicity	White British/Irish	Not White British/Irish	White British/Irish	Not White British/Irish
	0.88	0.09	0.83	0.15
Free school meals	Registered	Not registered	Registered	Not registered
	0.41	0.59	0.30	0.70
Looked after status	Not looked after	Looked after	Not looked after	Looked after
	0.99	0.01	0.97	0.03

Note: not known for ethnicity is not shown in the table, but was 0.03 in 2003 and 0.01 in 2012 – more detailed tables can be found in Appendix 1

There were other potential pupil level explanatory variables that it was not possible to use. This was either due to how the information had been recorded changing between the two timepoints (e.g. special educational needs), or due to extreme variation between the two timepoints (e.g. absences and exclusions). For absences and exclusions particularly, the differences between schools and over time showed such unpredictable inconsistencies it suggests that there were, or could have been, differences in the way that this information has been collected, meaning that what it measures may differ between schools or over time. Without knowing the reasons behind these inconsistencies, it was felt that it was not appropriate to include these potentially unreliable measures.

4.4.3.2 School characteristics

The rationale for inclusion of school level variables as well as neighbourhood and catchment level variables in the analysis is as follows: school communities and neighbourhoods are subsets of catchment areas but do not necessarily share precisely the same characteristics, therefore not controlling for school factors could lead to mistakenly attributing too much importance to either catchment or neighbourhood factors. As well as this, a pupil may attend a school but not live

in the corresponding catchment area. This is another means by which a school may not reflect fully the mix of the catchment area in which it sits.

In order to provide school level explanatory variables based on school social mix pupil level data were aggregated up to the school level - proportion not registered for free school meals, proportion not from a White British/Irish background, proportion who achieved 5 or more credit Standard Grades, and school denomination. These can be seen in Table 4-11 below. For all variables except for educational attainment – which was based on the educational attainment of solely S4 pupils from the three years closet to the timepoints - data from all the pupils in the school at the timepoint were used to create the aggregated variables. Overall, 28 schools were included in the analysis – 18 non-denominational and 10 Roman Catholic - out of the 37 available schools. All school variables were created as proportions, with the exception of school denomination, which was binary.

Table 4-11: School level variables for 2003 and 2012

	2003 proportions		2012 proportions	
Ethnic mix (% not White British/Irish)	Mean	Standard deviation	Mean	Standard deviation
	0.11	0.12	0.16	0.13
Free school meals (% not registered for free school meals)	Mean	Standard deviation	Mean	Standard deviation
	0.60	0.12	0.71	0.09
S4 educational attainment (% S4 achieving >5 standard grades)	Mean	Standard deviation	Mean	Standard deviation
	0.22	0.09	0.26	0.09
	Number in 2003		Number in 2012	
Denomination	Non-denominational	Roman Catholic	Non-denominational	Roman Catholic
	18	10	18	10

Note: more detailed information on the construction of the variables and more detailed tables can be found in Appendix 1

4.4.3.3 Neighbourhood and catchment area characteristics

All neighbourhood and catchment area variables were constructed as proportions with the exception of neighbourhood SIMD. Neighbourhood refers to the 661 data zones identified from the 2001 data at timepoint 1 and 2, whereas catchment area refers to the 28 aggregations of COAs contained within each catchment area. These distinctions result in the values of means across the two geographies

not always being identical. Further information on all census variables that were used in the construction of the neighbourhood and catchment area variables, as well as the sources of the data are shown in Appendix 1.

The mean housing tenure, as measured by the proportion of owner occupied households in the neighbourhood fell across the neighbourhoods from 0.46 to 0.45, as can be seen in Table 4-12. The means of other measurements used rose: social class as measured by the percentage of NS-SEC categories 1-3 from 0.25 to 0.32; education, as measured by the proportion of adults with a degree or higher from 0.13 to 0.19; ethnic mix as measured by the percentage of those in the neighbourhood who did not classify themselves as White British/Irish from 0.06 to 0.13; family structure as measured by the proportion of households with dependent children who were not single parents, from 0.86 to 0.87; working status as measured by those of working age in employment from 0.45 to 0.52; and area deprivation as measured by the SIMD quintile of the neighbourhood, where 1 was most deprived and 5 was least deprived, from 1.68 to 1.81.

Table 4-12: Neighbourhood level variables 2003 and 2012

	2003 proportions		2012 proportions	
	Mean	Standard deviation	Mean	Standard deviation
Housing tenure	0.46	0.28	0.45	0.25
Social class	0.25	0.13	0.32	0.13
Education	0.13	0.12	0.19	0.14
Ethnic mix	0.06	0.10	0.13	0.13
Family structure	0.86	0.09	0.87	0.07
Working status	0.45	0.13	0.52	0.11
Area deprivation[1]	1.68	1.14	1.81	1.20

[1]As opposed to the other variables in this table which are proportions, area deprivation is the mean of SIMD quintiles 1 to 5.
Note: More detailed information on these variables can be found in Appendix 1

As would be expected, the picture across the catchment areas was similar, as can be seen in Table 4-13. The mean proportion of owner occupied households in the catchment area fell from 0.48 to 0.46. The means of all other measurements rose or were static: social class from 0.28 to 0.35; education from 0.16 to 0.23;

ethnic mix from 0.06 to 0.13; family structure stayed at 0.88; working status from 0.46 to 0.53; and area deprivation from 0.44 to 0.56[5].

Table 4-13: Catchment area level variables 2003 and 2012

	2003 proportions		2012 proportions	
	Mean	Standard deviation	Mean	Standard deviation
Housing tenure	0.48	0.15	0.46	0.13
Social class	0.28	0.09	0.35	0.10
Education	0.16	0.10	0.23	0.12
Ethnic mix	0.06	0.05	0.13	0.08
Family structure	0.88	0.04	0.88	0.04
Working status	0.46	0.07	0.53	0.05
Area deprivation	0.44	0.27	0.56	0.25

Note: More detailed information on these variables can be found in Appendix 1

4.4.4 Data management

All variables were constructed and merged in Stata, and all descriptive analysis was performed in Stata. All binary variables were cross tabulated to check for sense, and categorical variables were examined for outliers. All checks were correct and no outliers were found.

4.4.5 Missing data

As mentioned in section 4.4.1, some pupils at each timepoint (406, or 8.0% in 2003 and 153, or 3.4% in 2012) that were included in the data for the pupil census were missing from the SQA data. After discussion with GCC it was decided that these pupils should be included in the 0 category of the outcome variable, as they had not attained 5 or more Standard Grades at Foundation Level.

Some pupils were also missing ethnicity: 145 (2.9%) in 2003 and 59 (1.4%) in 2012. This was handled by the creation of a dedicated missing category for this variable. It could have been possible in theory to use multiple imputation to account for missing data, however as the circumstances which led to the data being missing were not known, because the numbers were small, and ethnicity

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[5] Unlike at neighbourhood level, SIMD at catchment level was the proportion of data zones in the catchment that were not in the most deprived 15%, and was therefore measured as a proportion.

was not the variable of interest, a missing category was created. There were no other variables with missing data.

4.5 Research question 1 analysis

The first stage of the analysis aimed to answer the first research question: How have catchment areas and schools changed, focusing especially on housing tenure and educational attainment? This involved descriptive analysis of all of the quantitative data, examining:

- Changes in Glasgow and Scotland overall between the two timepoints in terms of the census derived variables

- Changes across the catchment areas between the two timepoints in terms of the census derived variables

- Changes in the schools between the two timepoints in terms of the school data derived variables

The aim of this descriptive analysis was to gain an overview of how Glasgow, its catchment areas and schools had changed between the two timepoints of interest, in ways which might be expected to impact upon school performance and pupil educational attainment. Data from the 2001 and 2011 censuses, SIMD, and school and SQA data from 2003 and 2012 were analysed by looking at the absolute and relative changes over time, firstly by Glasgow City overall compared to Scotland, then by catchment area, and school. Finally, the catchment areas that saw an increase in owner occupation between the two censuses are looked at in more detail, in terms of their performance in other catchment area/school based measures. The results can be seen in chapter 5.

4.6 Research question 2 analysis

Research question 2 looks at what explains individual educational attainment and changes in educational attainment, focusing especially on housing tenure.

To answer this, statistical analysis was performed to examine the associations between the individual pupil educational attainment outcome variable and the explanatory variables at all levels. This analysis was in two phases, formative and final, and will be discussed in more detail below.

4.6.1 Overview of statistical modelling

Due to the hierarchical nature of the data with pupils within neighbourhoods, and neighbourhoods within catchment areas, multilevel modelling was performed for the analysis of the pupil educational attainment outcome (Goldstein, 1995). Multilevel modelling allows contextual effects on an outcome to be explored. Because the outcome variable was ordinal – as in, the 4 educational attainment categories contained an inherent order, from 0 to 3 - an ordered logit approach was taken. These modelling techniques are detailed in the following sections.

4.6.2 Overview of multilevel modelling

Multilevel modelling is performed when there are hierarchies within data. One of the assumptions of standard regression modelling is that the units within the analysis are independent of each other. However, in a data set such as this where pupils are grouped both within neighbourhoods and within schools, this assumption does not hold. If the structure of the data is not taken into account in the chosen analysis strategy, the standard errors are likely to be underestimated which could result in misleading results of significant association between explanatory variables and the outcome (Type I error) (Steele, 2008a).

4.6.3 Formative analysis

The analytical steps for this section followed the research question sub questions and are shown below. The *formative* phase of the analysis was in four parts, and was conducted using a multilevel framework, which can be seen in Figure 4-7 below, in order to inform the models used in the final analyses.

Figure 4-7: three level model
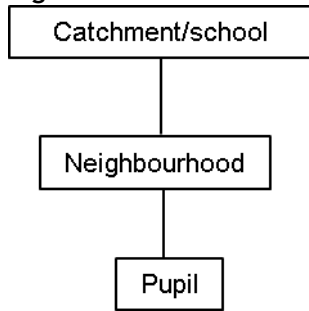
The first two parts of the formative analysis can be summarised by Figure 4-8 below:

Figure 4-8: Diagrammatic summary of formative analysis 1 and 2
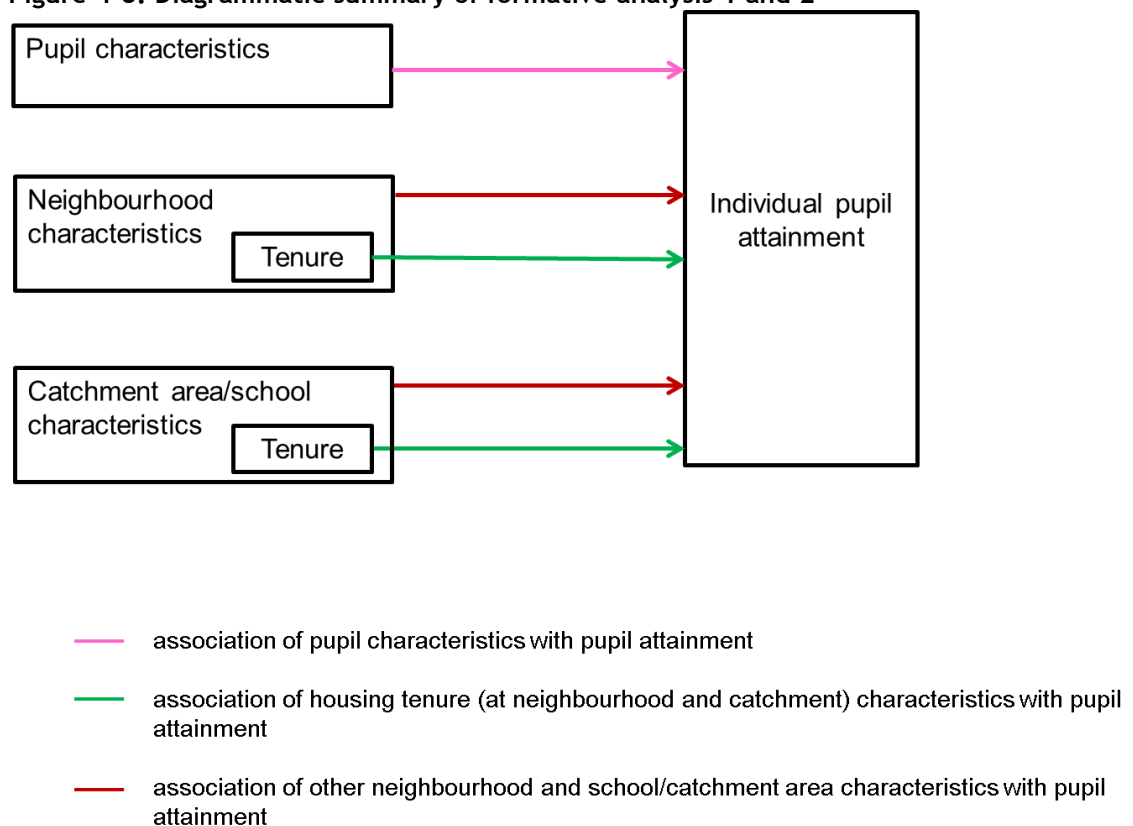
──── association of pupil characteristics with pupil attainment

──── association of housing tenure (at neighbourhood and catchment) characteristics with pupil attainment

──── association of other neighbourhood and school/catchment area characteristics with pupil attainment

Formative analysis 1: What associations do pupil characteristics have with individual pupil educational attainment? (pink in Figure 4-8)

All pupil level variables were assessed to see if they had significant associations with the outcome variable, and if so were added to a *null*, or *empty* model (the multilevel model which contains the three levels, but no explanatory variables) to create the baseline model (which includes pupil level characteristics).

Formative analysis 2: What association does housing tenure and other neighbourhood, catchment area and school characteristics have with individual pupil educational attainment?

Housing tenure at neighbourhood and catchment area level were added separately to the baseline model, and the association with individual educational attainment was assessed (green in Figure 4-8). This was then repeated for other neighbourhood and catchment area/school variables (dark red in Figure 4-8).

Figure 4-9: Diagrammatic summary of formative analysis 3 and 4
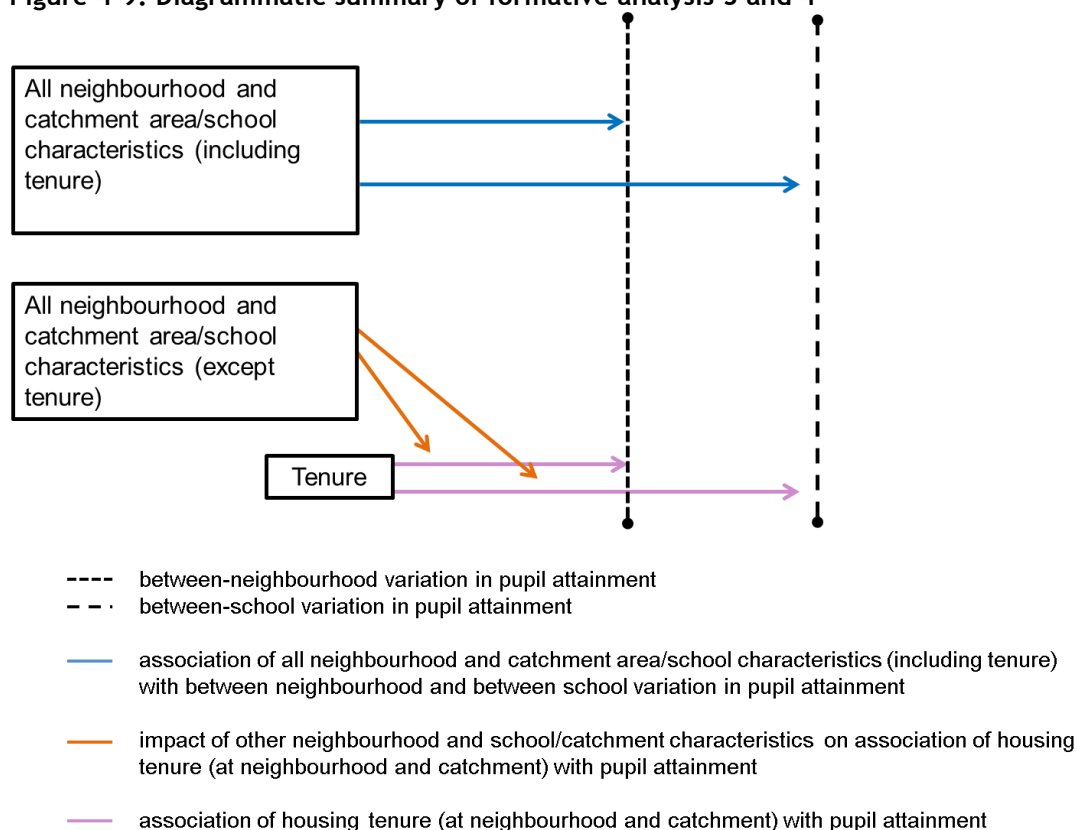
Formative analysis 3: To what extent do housing tenure and other neighbourhood, catchment area and school characteristics explain differences in educational attainment between neighbourhoods, and between schools? (blue in Figure 4-9).

Each neighbourhood and catchment area/school variable, starting with housing tenure, was added individually to the baseline model in turn, and the impact on the variance in educational attainment between neighbourhoods, and between schools was assessed.

Formative analysis 4: What impact does accounting for neighbourhood, catchment area and school characteristics have on the effect of housing tenure on individual pupil educational attainment? (orange and violet in Figure 4-9)

Each neighbourhood and catchment area/school variable was added individually to the baseline model in turn, while also including firstly housing tenure at neighbourhood level, and then housing tenure at catchment area level, in order to assess any impact these other variables had on the coefficients for either of the housing tenure variables. The impact on the variance in educational attainment at each level was assessed.

4.6.4 Final analyses

The first stage of the *final* analysis was:

Final analysis 1: To what extent can the variation in individual pupil educational attainment between neighbourhoods within schools, and between schools, be explained by neighbourhood, catchment area and school characteristics, for both timepoint 1 and timepoint 2?

Informed by the formative analysis, a three level multilevel model, with appropriate explanatory variables at pupil, neighbourhood and catchment area/school level was built, and the impact on the variance at each level and the housing tenure coefficients were assessed.

Figure 4-10: Diagrammatic representation of first stage of final analysis
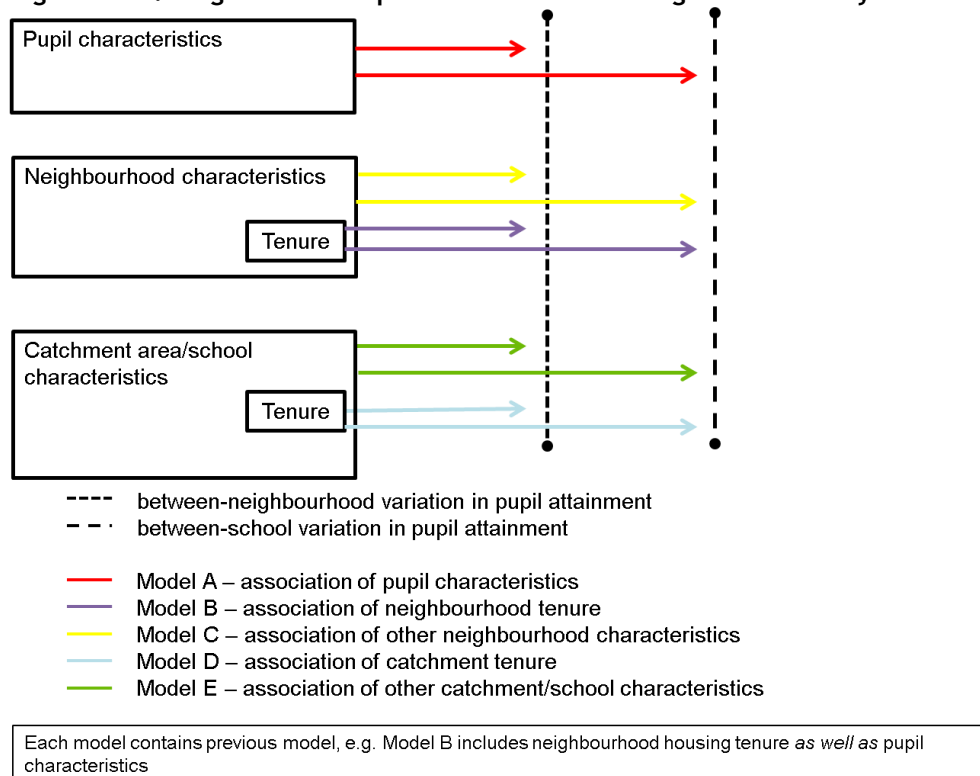
The second part of the final analysis was:

Final analysis 2: Does change in housing tenure between timepoint 1 and timepoint 2 explain differences in educational attainment between the two timepoints?

The data from each timepoint were combined, and a further level, time, was added to the three level model used in final analysis 1, to create a four level multilevel model, with all appropriate explanatory variables at pupil, neighbourhood and catchment area/school level. Time was also added as a fixed effect. The impact on the variance at each level and the housing tenure coefficients were assessed. This can be summarised by Figure 11 below:

Figure 4-11: Diagrammatic representation of second stage of final analysis
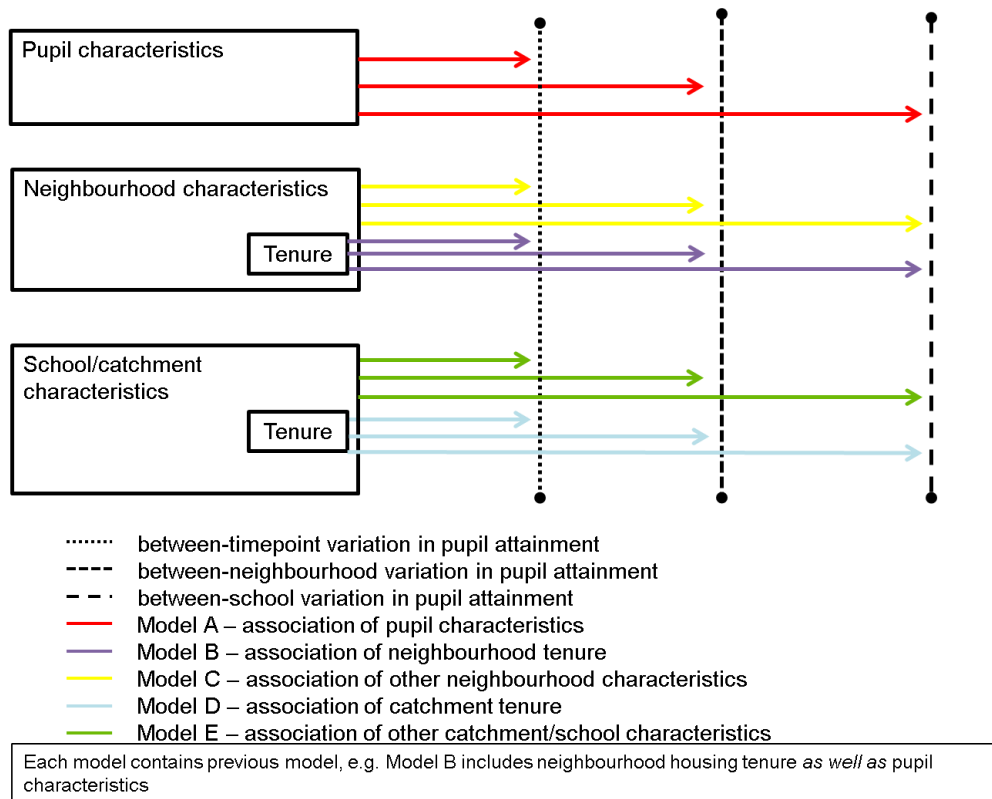
The four level structure will be explored in more detail in section 4.6.14, but can be seem in diagrammatic form in Figure 4-12 below.

Figure 4-12: four level model
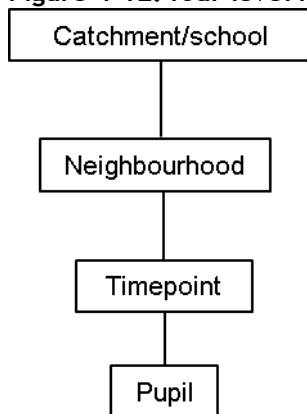
4.6.5 Ordered logit approach

As described in section 4.4.2, the pupil educational attainment outcome variable was a four category ordered variable – i.e., the four categories have an inherent order. Therefore, an ordered logit approach was appropriate. An ordered logit model (also known as a cumulative logit model or a cumulative proportional odds

model) is an extension of a binary logit model, and allows a variable of more than two categories with inherent order to be used as the outcome variable (Fielding and Yang, 2005). This is as opposed to multinomial logit models, which are used for non-ordered categorical outcomes. Ordered logit analysis is often used for Likert scales within surveys (e.g. agree strongly to disagree strongly); for reports of self-rated health (e.g. very well to very unwell) (Steele, 2011); and for educational scales, such as our constructed variable (Fielding, 1999).

The logit part of the model means that a Normal distribution is not assumed, as it would be in a probit model (Hedeker, 2007). An ordered logit model differs from the standard log odds (or logistic) model (commonly used for binary data) not only in the number of outcome categories but also in the respect that the coefficients are not comparable to a reference category. Rather, the coefficients for the outcome variable provide the basis for determining the probability of, in the example of this data, a pupil being within each educational attainment category. For the outcome variable, the model creates one less intercept (the point where the coefficients cut the *y*-axis) than the number of categories within the variable – so for the four-category outcome variable in this model, three intercepts are created. For each intercept, a coefficient is estimated (section 4.6.5.1 provides details on how these are used in the model interpretation).

To illustrate, below is a one level variance components model (i.e. single-level with no explanatory variables) also known as a null or empty model, for an ordered logit outcome with C categories, labelled from 1 to C.

$$log\left(\frac{\Pr(y_i \leq k)}{\Pr(y_i > k)}\right) = logit(y_{ki}) = \alpha_k, \qquad k = 1, \dots C - 1$$

y_{ki} is a multinomial response variable, with categorical outcome k for individual i. The left hand part of the equation shows the cumulative probability of the event, i.e. the probability of each response being in category k or lower (Ananth and Kleinbaum, 1997).

α_k are threshold intercept terms for k, and are produced for $C - 1$ of the outcome categories (Steele, 2011).

For this study, with four category outcome variable labelled from 0 to 3, the one level variance components model would be:

$$log\left(\frac{\Pr(y_i \leq k)}{\Pr(y_i > k)}\right) = logit(y_{ki}) = \alpha_k, \qquad k = 0,1,2$$

The three level variance components model will be introduced in section 4.6.7.

4.6.5.1 Fixed and random effects

Multilevel models can be thought of as being made up of two parts, fixed effects and random effects. The fixed part specifies the relationship between the mean of y and the explanatory variables, while the random part specifies the level residuals – this will be covered in more detail in section 4.6.7. A fixed classification is an explanatory variable, as each variable has a small fixed number of categories, for example pupil free school meal registration status. A random effect is the outcome for a level, or classification of units, such as pupil, neighbourhood, or catchment area/school. The random classification can be thought of as a sample from a wider population, for example our sample is a sample of a wider population of pupils, neighbourhoods and catchment area/schools. A fixed effect however is not sample from a wider population, for example there is no wider population of pupil free school meal registration status to sample from (Steele, 2008a). For explanatory variables, fixed effects are produced through modelling, while for random classifications, or levels, random effects, or group level residuals, are produced through modelling.

4.6.5.2 Random slopes model

Multilevel models allow the exploration of random effects (in this case the neighbourhood and catchment area levels), by allowing the effects of predictor variables to vary across the levels in what is called a random slopes model (Steele, 2011). A random intercept model assumes that the relationship between the outcome variable and the explanatory variable is the same for each group, however a random slopes model relaxes this constraint, allowing the explanatory variable to have a different effect for each group (Steele, 2008a). In order to explore whether the effect of housing tenure on educational attainment varied across the schools and neighbourhoods, the models for the final analysis were

run with housing tenure allowed to vary, firstly for neighbourhood, and secondly for catchment area.

4.6.6 Interpretation of model coefficients

4.6.6.1   Intercept coefficients

In order to be interpreted meaningfully, the intercept coefficients (and, indeed, all the coefficients within this type of model) must be manipulated. The three intercept coefficients of the outcome variable in this study were:

- the logit of the expected probability of a pupil being in the <5 foundation category (category 0 of the outcome variable)

- the logit of the expected probability of a pupil being in >5 foundation or lower (categories 0 and 1 of the outcome variable)

- the logit of the expected probability of a pupil being in >5 general or lower (categories 0, 1 and 2 of the outcome variable)

By taking the antilogit[6] of each coefficient, this gives the expected cumulative probability that a pupil is in the observed category or a lower category.

For all categories except the lowest (0), in order to get the expected probabilities for being in each category, the lower group values must be subtracted. We have four educational attainment categories, but only three intercepts. The probability of any pupil being in any of the four categories is 1, therefore to calculate the expected probability of the highest educational attainment category (3), the expected probability of being in the lowest three categories (the antilogit of category 2) is subtracted from 1. This can be seen below in Table 4-14.

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[6] The formula for the antilogit is $antilogit(\beta) = \frac{exp(\beta)}{[exp(\beta)]+1}$

Table 4-14: Manipulations of intercept coefficients

Educational attainment category	Expected probability
0	Antilogit of coefficient for 0 category
1	Antilogit of coefficient for 1 category, minus antilogit of coefficient for 0 category
2	Antilogit of coefficient for 2 category, minus antilogit of coefficient for 1 category
3	1 minus antilogit coefficient for 2 category

4.6.6.2 Explanatory variable coefficients

As outlined in section 4.4.3, all neighbourhood, catchment area and school level variables (with the exception of school denomination and neighbourhood SIMD) were constructed as proportional variables, and all pupil level variables were constructed as binary variables. Variables at all levels were constructed in order to have a positive association with higher educational attainment (except for looked after status – for a fuller explanation see section 4.4.3). This means that we would expect the coefficients produced for the explanatory variables to be negative. The coefficients produced for each proportional variable can be interpreted as the (extreme and hypothetical[7]) effect on a pupil's chances of being in each educational attainment category when living in an area which has 100% of the explanatory variable characteristic, compared to an area that has 0% of the explanatory variable characteristic. An advantage of this measure is that coefficients for different explanatory variables are comparable as they are on the same scale.

4.6.7 Interpretation of variance

As well as interpreting the intercept and explanatory variable (or fixed effect) coefficients, it is important to be able to explore how much of the difference between pupils in terms of educational attainment can be explained by the variables added at neighbourhood and catchment area/school level. This section will outline how this is measured, and how it can be interpreted.

Below is a three level variance components model for a 4-category outcome variable. As can be seen, the left hand part of the model is the same as the one

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[7] This is especially true for catchment/school SIMD, as due to the nature of this variable this would be impossible in practice.

level variance components model, however y now has an addition to subscripts k (outcome) and i (individual): j (neighbourhood) and l (catchment/school), representing the two additional levels. There are also two new parts of the equation - v_l and u_{jl} representing the random effects – or group-level residuals[8], the distance to the group average - for neighbourhood and catchment/school.

$$log\left(\frac{\Pr\left(y_{ijl} \le k\right)}{\Pr\left(y_{ijl} > k\right)}\right) = logit\left(y_{kijl}\right) = \alpha_k + v_l + u_{jl}, \qquad k = 0 - 2$$

$v_l \sim N(0, \sigma_v^2)$ are the level 3 random effects - the effects of catchment area/school l

$u_{jl} \sim N(0, \sigma_u^2)$ are the level 2 random effects - the effect of neighbourhood j within catchment area/school l

As for a logit model, the level 1 residuals of an ordered logit model are assumed to follow a standard logistic distribution which has a variance of $\frac{\pi^2}{3} \approx 3.29$.

The school and neighbourhood variance components, σ_v^2 and σ_u^2, measure how variation in the individual outcome is distributed across the levels. In order to look at this distribution, the variance partition coefficient (VPC) can be calculated for the between school variance σ_v^2, and the between neighbourhoods within schools variance σ_u^2. The residual variance indicates how much overall between-pupil variation in educational attainment variance (level 1+ level 2 + level 3) is unexplained by the model. The VPC is the proportion of the total residual variance in between-pupil variation in educational attainment that is due to between-group (neighbourhood or catchment area/school) variation. This is of interest as it tells us how much of the difference between pupils in terms of educational attainment can be explained by the variables added at neighbourhood and catchment area/school level.

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[8] The residual for each observation is the difference between the observed value of Y and the value of Y predicted by the model (STEELE, F. 2008b. Multiple Regression Concepts. Available: https://www.cmm.bris.ac.uk/lemma/pluginfile.php/295/mod_resource/content/2/Module3Concepts.pdf.).

The school level VPC is calculated as the ratio of the school variance to the total variance: $VPC_v = \frac{\sigma_v^2}{\sigma_v^2 + \sigma_u^2 + 3.29}$

And the neighbourhood within school VPC is calculated as the ratio of the neighbourhood within school variance to the total variance: $VPC_u = \frac{\sigma_u^2}{\sigma_v^2 + \sigma_u^2 + 3.29}$

The VPC at neighbourhood level can be thought of as a measure of 'neighbourhood effects', discussed in section 3.4. However, as prior educational attainment data was not available for the pupils included in the analysis, the VPC between schools cannot truly be called a measure of 'school effects' (Goldstein, 1997). VPCs are presented as percentages, with a corresponding p-value to indicate whether the variance is significant.

The expression for the 3 level baseline model is shown below:

$$log\left(\frac{\Pr(y_{ijl} \leq k)}{\Pr(y_{ijl} > k)}\right) = logit(\gamma_{kijl})$$

$$= \alpha_k + \beta_{1ijl}gender + \beta_{2ijl}freeschoolmeals + \beta_{3ijl}ethnicity$$
$$+ \beta_{4ijl}looked\ after + v_l + u_{jl}, \qquad k = 0 - 2$$

y is a multinomial response variable - the four category individual educational attainment outcome - with categorical outcomes k for individual i in neighbourhood j in school l. The left hand part of the equation shows the cumulative probability of the event, or for each response being in category k or lower (Ananth and Kleinbaum, 1997).

α_k are threshold intercept terms for k, and are produced for 3 of the outcomes (Steele, 2011).

The βs are the coefficients for the pupil characteristics – gender, free school meal registration, ethnicity and looked after status.

$v_l \sim N(0, \sigma_v^2)$ are the catchment area/school (level 3) random effects

$u_{jl} \sim N(0, \sigma_u^2)$ are the neighbourhood (level 2) random effects

4.6.8 Structure of data – cross classification

As mentioned at the beginning of section 4.6.1, the data for this analysis were generally hierarchical: pupils live in a neighbourhood, and the neighbourhoods make up the catchment areas of the 28 schools. However, the data did not have a strictly hierarchical structure – there were pupils that did not attend the school for which their neighbourhood is in the catchment area. These type of data are referred to as cross classified. It is important to take into account this cross classification when modelling the data as failing to do so can lead to misattributing response variation and is likely to cause biased standard errors for the predictor variables, leading to a higher probability of type I errors (Leckie, 2013). Therefore, in all multilevel models in the thesis, cross classification has been taken into account. The exception to this is the final set of models, where time was included as a level. Due to the particularly complex nature of this model, it was not possible to achieve convergence while taking account of cross classification. Therefore pupils who attended a school but did not live in the catchment area were removed for this final piece of modelling (1062 pupils, or 20.9% at timepoint 1, and 980 pupils, or 22.4% at timepoint 2).

4.6.9 Model estimation

Due to the estimation algorithms of this type of model being less stable than some other models, convergence can be an issue (Snijders, 1999). Therefore all models were run in MLwiN using Markov Chain Monte Carlo Estimation, with a burn in of 10,000 and a monitoring chain length of 100,000 to aid model stability. Trace plots and model diagnostics were checked in order to assess stability (Browne, 2014) and found to be satisfactory.

4.6.10   Collinearity

As many of the variables measure similar aspects of the neighbourhood, catchment area and school – e.g. socioeconomic measures – there was the potential for collinearity. Collinearity, also called multicollinearity, occurs in a model when one or more of the explanatory variables are correlated with each other (Field, 2007). This has the effect that the higher the correlation between

the explanatory variables, the less precise the model will be (Kennedy, 2003). Perfect collinearity is when two explanatory variables have a perfect correlation with each other, i.e. that they are measuring the same thing. Perfect collinearity that is not due to a specification error is rare, however less than perfect collinearity, a high level of correlation, is very common in social science research. Although moderate collinearity does not have a great impact on models, greater collinearity can cause an increase in the standard errors of the coefficients, and can cause model instability, characterised by coefficients changing dramatically or switching signs (from positive to negative or vice versa) among similar models[9] (Kennedy, 2003).

Collinearity can be identified by looking at the correlation matrix of the explanatory variables, and identifying those with high correlations, for example, over 0.8 (Field, 2007). To identify possible issues with collinearity among the data used for this thesis, correlation matrices were created for each timepoint (Table 4-15 is timepoint 1, Table 4-16 is timepoint 2). In each table, those correlations coloured red show a very high correlation of 0.8 or higher, whereas those coloured amber show a high correlation of between 0.5 and 0.79. There was little collinearity amongst the individual pupil variables, however amongst the neighbourhood and catchment area/school variables there were some variables that were highly correlated with each other. Social class at both neighbourhood and catchment area/school was highly correlated with housing tenure and several other neighbourhood and catchment area/school explanatory variables, such as working status, deprivation, family structure, and free school meals at both timepoints. It can be seen that the number of very high correlations reduces between timepoint 1 and timepoint 2 – with 23 that are very high at timepoint 1 and 13 that are very high at timepoint 2.

It could be argued that alongside housing tenure, there are multiple variables all measuring economic resources - for example SIMD, social class, and highest qualification - and as can be seen from the collinearity tables they are indeed highly correlated. However it is important to consider them all alongside housing tenure for several reasons: firstly, as it is posited owner occupation is not

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[9] Coefficients switching between positive and negative can be a sign of instability, however it is also important to note that this can be a natural process if coefficients are close to zero.

merely a proxy measure of resources but represents cultural and behavioural factors too; secondly, because of the lack of clarity around whether tenure mixing within policy is an end in and of itself, or whether it is a proxy to deliver a mix of income or social class, as discussed in section 3.7.1 of the literature review; and thirdly, to explore whether owner occupation has effects irrespective of level of area deprivation. As well as this, while these variables are correlated, there is potential for distinct neighbourhood level and catchment level effects.

Table 4-15: Correlations of all timepoint 1 explanatory variables (red shows a very strong correlation (0.8+) and amber a strong correlation (0.5-0.79))

Level	Timepoint 1	Gender	Free school meals	Ethnicity	Looked after	Tenure	NSSeC	Qualifications	Working	Ethnicity	Family structure	SIMD quintile 2004	Tenure	NSSeC	Qualifications	Working	Ethnicity	Family structure	SIMD	School attainment	School denomination	School free school meals	School ethnicity
Level 1	Gender	1																					
	Free school meals	-0.01	1.00																				
	Ethnicity	0.00	0.04	1.00																			
	Looked after	-0.01	0.03	0.01	1.00																		
Level 2	Tenure	0.01	-0.38	0.03	-0.03	1.00																	
	NSSeC	0.01	-0.33	0.09	-0.02	0.83	1.00																
	Qualifications	0.01	-0.24	0.16	0.00	0.59	0.87	1.00															
	Working	0.00	-0.35	0.01	-0.04	0.89	0.90	0.61	1.00														
	Ethnicity	0.01	-0.04	0.37	0.01	0.19	0.29	0.47	0.12	1.00													
	Family structure	0.01	-0.31	0.10	-0.03	0.74	0.68	0.61	0.61	0.27	1.00												
	SIMD quintile 2004	0.02	-0.34	0.04	-0.01	0.79	0.85	0.76	0.76	0.21	0.59	1.00											
Level 3	Tenure	-0.01	-0.24	0.05	-0.01	0.51	0.47	0.35	0.45	0.18	0.46	0.43	1.00										
	NSSeC	0.02	-0.21	0.14	-0.01	0.43	0.55	0.58	0.42	0.35	0.49	0.46	0.81	1.00									
	Qualifications	0.03	-0.16	0.17	-0.01	0.28	0.49	0.62	0.29	0.39	0.43	0.37	0.53	0.91	1.00								
	Working	0.00	-0.23	0.06	-0.01	0.49	0.50	0.42	0.46	0.20	0.44	0.47	0.95	0.87	0.61	1.00							
	Ethnicity	0.03	-0.06	0.22	0.01	0.16	0.30	0.43	0.15	0.53	0.30	0.21	0.30	0.60	0.72	0.30	1.00						
	Family structure	0.00	-0.19	0.13	0.00	0.41	0.46	0.47	0.36	0.31	0.53	0.37	0.80	0.86	0.76	0.75	0.58	1.00					
	SIMD	-0.01	0.23	-0.10	0.01	-0.47	-0.52	-0.49	-0.44	-0.30	-0.48	-0.47	-0.92	-0.93	-0.77	-0.92	-0.54	-0.85	1.00				
	School attainment	0.01	-0.23	0.07	-0.01	0.44	0.47	0.43	0.40	0.21	0.43	0.43	0.79	0.79	0.64	0.83	0.31	0.69	-0.83	1.00			
	School denomination	0.01	-0.05	0.09	-0.01	0.12	0.16	0.16	0.12	0.10	0.10	0.12	0.16	0.16	0.12	0.14	0.00	0.08	-0.14	-0.08	1.00		
	School free school meals	0.01	-0.27	0.05	-0.01	0.49	0.47	0.39	0.43	0.18	0.46	0.43	0.91	0.81	0.60	0.86	0.31	0.77	-0.88	0.85	0.11	1.00	
	School ethnicity	0.04	-0.03	0.27	0.00	0.16	0.32	0.45	0.16	0.55	0.26	0.22	0.20	0.52	0.62	0.27	0.81	0.42	-0.41	0.26	0.26	0.17	1.00

Table 4-16: Correlations of all timepoint 2 explanatory variables (red shows a very strong correlation (0.8+) and orange a strong correlation (0.5-0.79))

Timepoint 2	Gender	Free school meals	Ethnicity	Looked after	Tenure	NSSeC	Qualifications	Working	Ethnicity	Family structure	SIMD quintile 2012	Tenure	NSSeC	Qualifications	Working	Ethnicity	Family structure	SIMD	School attainment	School denomination	School free school meals	School ethnicity
Level 1 Gender	1.00																					
Free school meals	0.01	1.00																				
Ethnicity	-0.05	0.01	1.00																			
Looked after	0.01	0.05	-0.04	1.00																		
Level 2 Tenure	0.01	-0.27	-0.05	-0.05	1.00																	
NSSeC	-0.02	-0.25	0.07	-0.05	0.78	1.00																
Qualifications	-0.04	-0.16	0.27	-0.05	0.39	0.79	1.00															
Working	-0.01	-0.23	-0.03	-0.05	0.79	0.84	0.49	1.00														
Ethnicity	-0.03	0.03	0.45	-0.02	-0.19	0.01	0.44	-0.17	1.00													
Family structure	-0.03	-0.21	0.17	-0.05	0.61	0.72	0.67	0.48	0.19	1.00												
SIMD quintile 2012	-0.02	-0.25	0.07	-0.04	0.75	0.83	0.70	0.65	0.06	0.61	1.00											
Level 3 Tenure	-0.01	-0.16	0.04	-0.03	0.46	0.42	0.24	0.39	0.01	0.34	0.36	1.00										
NSSeC	-0.02	-0.15	0.20	-0.04	0.33	0.55	0.59	0.35	0.27	0.49	0.44	0.71	1.00									
Qualifications	-0.03	-0.10	0.26	-0.04	0.15	0.45	0.65	0.20	0.38	0.46	0.36	0.32	0.88	1.00								
Working	0.00	-0.16	0.09	-0.03	0.42	0.49	0.35	0.40	0.08	0.37	0.38	0.89	0.83	0.49	1.00							
Ethnicity	-0.02	-0.04	0.33	-0.03	0.04	0.26	0.48	0.07	0.54	0.35	0.20	0.07	0.51	0.71	0.18	1.00						
Family structure	-0.03	-0.13	0.24	-0.04	0.28	0.48	0.58	0.28	0.34	0.52	0.39	0.58	0.88	0.87	0.61	0.65	1.00					
SIMD	0.02	0.15	-0.20	0.04	-0.35	-0.51	-0.52	-0.33	-0.27	-0.47	-0.43	-0.79	-0.92	-0.78	-0.76	-0.52	-0.87	1.00				
School attainment	-0.01	-0.16	0.15	-0.05	0.34	0.49	0.49	0.33	0.16	0.42	0.41	0.65	0.81	0.66	0.76	0.33	0.69	-0.77	1.00			
School denomination	-0.02	-0.04	0.02	0.03	0.09	0.14	0.15	0.10	0.02	0.11	0.13	0.18	0.15	0.08	0.14	0.01	0.11	-0.13	-0.05	1.00		
School free school meals	-0.01	-0.19	0.13	-0.04	0.42	0.49	0.41	0.38	0.12	0.42	0.44	0.77	0.74	0.49	0.80	0.28	0.65	-0.74	0.83	0.05	1.00	
School ethnicity	-0.01	-0.07	0.34	-0.03	0.08	0.29	0.50	0.11	0.52	0.37	0.24	0.14	0.55	0.72	0.25	0.97	0.67	-0.57	0.41	-0.02	0.37	1.00

There are several approaches to dealing with collinearity. The option that was most appropriate for this analysis was dropping variables, though there are other options available such as obtaining more data and using factor analysis (Kennedy, 2003). Obtaining more data was not a viable option for this project, and factor analysis is of more use when investigating relationships between all variables, however as this thesis was looking specifically at the relationship between housing tenure and educational attainment, this was not the most appropriate solution. As housing tenure, at both neighbourhood and catchment area level, were the main explanatory variables of interest, it was imperative to keep them in the model. Housing tenure and social class were highly correlated with one another at both levels and at both timepoints. From the correlations, it was clear that many of the level 2 and 3 variables were measuring similar outcomes, and in order to decide which were impacting most on our models, the variance inflation factor (VIF) for the variables at each timepoint were examined.

The VIF is a measure of how much the variance of the parameter estimates change relative to a (hypothetical) model in which all of the predictor variables were uncorrelated. The VIF shows how much the variance of the coefficient estimate is being inflated by collinearity. A VIF of 1 suggests little collinearity. However statisticians differ as to the value of the VIF that is problematic, with some citing anything above 5 as problematic, and others using above 10 (Field, 2007).

For each timepoint, the VIF was calculated for all neighbourhood and catchment area/school variables. The next step taken was to exclude the variable with the highest VIF, and rerun the model. This process was repeated until all remaining variables had a VIF of under 10 – the full process is shown in Appendix 2. Table 4-17 below summarises the collinear variables that were removed from the statistical modelling at each timepoint, based on the VIF process. As can be seen, variables with high correlations in the correlation matrices were most likely to have high VIF and be removed.

Table 4-17: The collinear variables removed at each timepoint

Timepoint 1	Timepoint 2
Neighbourhood NS-SEC	Neighbourhood NS-SEC
Catchment NS-SEC	Catchment NS-SEC
Catchment working	Catchment education
Catchment SIMD	Catchment SIMD
	Catchment ethnic mix

Although these variables were not included in the final analyses in chapter 6, for completeness they are still included in all descriptive and formative analysis up to that point.

4.6.11   Scaling

One issue with ordered logit models, is that as the level 1 residual variance has a fixed value at 3.29 - as discussed in section 4.6.7 - when explanatory variables are added to the model this can often lead to an increase in the level 2 (or higher) residual variance, which in turn can lead to an increase in the coefficient of any explanatory variables that are already in the model (Steele, 2011, Steele, 2009). Because of this, throughout the analysis unless indicated, all models will be compared to the baseline model (which includes pupil level characteristics) and not the null, or empty model.

4.6.12   Proportional odds assumption

An ordered logit model makes the assumption that the effect of an explanatory variable on the odds of being in category k or lower is the same for all values of k (Steele, 2011, Kleinbaum et al., 2002). If the proportional odds assumption does not hold, a possible alternative approach is the separate addition of explanatory variables for each category, as opposed to once as a common coefficient. As part of the model specification for this analysis, the proportional odds assumption was tested for each of the explanatory variables, at both timepoints using a Wald test to test the null hypothesis that the effects of each variable are proportional. If the p-value is greater than 0.05, the null hypothesis is not rejected and we conclude that the proportional odds assumption holds. However, with large samples such as in the data used in this thesis, the p-value is often less than 0.05, even if the model is actually providing a good fit (Harrell, 2001), and it is felt to be a better test to compare the coefficients of each variable between separate models with identical predictors (Baguley, 2012).

The majority of variables had a Wald statistic that gave a p-value of less than 0.05, indicating that they may violate the proportional odds assumption (the tables can be found in Appendix 3). Several of the variables violating the proportional odds assumption were in fact variables that were removed from the final modelling due to collinearity (at timepoint 1: neighbourhood NS-SEC; catchment area NS-SEC; catchment area working and catchment area SIMD; at timepoint 2: catchment area NS-SEC; catchment area education; catchment area ethnic mix and catchment area SIMD). As noted earlier, with a large sample such as this, failing the assumption is not uncommon. As well as this, including some of the variables as separate coefficients and some as common coefficients in the final models would have a detrimental impact on both model stability and interpretation. For the rest of the affected variables, a visual inspection was made of the coefficients, and it was decided after discussion that pragmatically they were similar enough to be included as a common coefficient in the final models (the coefficients can be seen in Appendix 3).

Although there are alternatives to the ordinal logit model in the situation that the proportional odds assumption is not met, such as the generalised ordered logit model (Steele, 2011), because of the reasons outlined above and the fact that using the generalised ordered logit model would have greatly increased the complexity of both the model and the interpretation, it was felt that it was appropriate to continue with the planned methodology.

4.6.13   Removal of insignificant variables

The development of the final statistical models was informed by the formative analyses. It was decided to exclude variables that were both insignificant when included themselves in a single context-variable model[10] (results given in section 6.2.2), *and* had negligible impact on either of the housing tenure coefficients or the VPCs when included in a single context-variable model plus housing tenure at either neighbourhood or catchment area level (results given in section 6.2.4).

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[10] A single context-variable model consists of the baseline model (i.e. including pupil background factors) plus one of the neighbourhood, school or catchment variables.

4.6.14   Modelling time as a level

In order to determine whether changes in housing tenure, the key explanatory variable of interest, could explain differences in individual pupil educational attainment over time, the data for both timepoints were combined. Timepoint was also included in the four level models as a pupil level characteristic, or fixed effect, with timepoint 1 as the reference category, as overall educational attainment was lower at timepoint 1 than timepoint 2. This tells us about the overall differences in educational attainment between the two timepoints. By assessing changes in the magnitude and significance of the time fixed effect before and after the inclusion of housing tenure, as well as the other neighbourhood and catchment area/school covariates, the extent to which any educational attainment changes can be explained can be established. The timepoint to which each pupil belongs was also included as a level, or random effect, to obtain a four level model. Assessing the magnitude and significance of the time random effect in relation to the timepoint VPC, detects any differential change in educational attainment performance among neighbourhoods over time. The extent to which tenure or other explanatory factors explain any *differences* among the neighbourhoods in the changes over time in educational outcomes, is assessed by examining changes to time VPC before and after the inclusion of tenure.

In this model, timepoint was included as level 2, with each pupil belonging to a timepoint, a neighbourhood, and then a catchment area/school. Below is a four level variance components model for our 4-category outcome variable. As can be seen, the overall structure is similar to the three level variance components model, however y now has m (timepoint) in addition to subscripts k (outcome), i (individual), j (neighbourhood) and l (school), representing the additional level, and there is one new part of the equation - f_{jlm} representing the random effects for timepoint as level 2.

$$log\left(\frac{\Pr\left(y_{ijlm} \le k\right)}{\Pr\left(y_{ijlm} > k\right)}\right) = logit\left(y_{kijlm}\right) = \alpha_k + v_l + u_{jl} + f_{jlm}, \qquad k = 0 - 2$$

$v_l \sim N(0, \sigma_v^2)$ are the level 4 (catchment area/school) random effects

$u_{jl} \sim N(0, \sigma_u^2)$ are the level 3 (neighbourhood) random effects

$f_{jlm} \sim N(0, \sigma_f^2)$ are the level 2 (timepoint) random effects

As discussed in section 4.6.8, due to the complexity of this model, it was not possible to use cross classification to account for pupils who lived in a neighbourhood not within their school catchment area. Therefore, all cross classified pupils were removed before the model was run.

The results of the analysis described in section 4.6 can be seen in chapter 6.

4.7 Qualitative methods

The quantitative data analysis described in the first part of this chapter will show how the demographic structure of the catchment areas of schools have changed since 2001, and how the school results have changed. However, neither of these can give insight into how these changes have manifested within schools.

The qualitative research aimed to answer the third research question: How have changes in neighbourhoods, catchment areas and schools been experienced by staff and pupils?

Primarily, the qualitative research was a chance to explore in two case study schools in Glasgow first hand whether any changes identified in the quantitative analyses had been seen within the school and catchment area by staff and pupils. As has been discussed in the review of the existing literature, descriptions of the possible mechanisms of change, although hugely expanded theoretically since the 1990s, have relatively rarely been supported by evidence. Specifically, I was interested in: firstly, exploring if staff and pupils within these schools had noticed changes within the catchment area and within the school; and secondly, whether they felt that school mix had a direct impact on school outcomes and the running of the school.

4.7.1 Semi-structured interviews

For this part of the research, a qualitative approach was chosen, as this section aimed to explore the participants' views and experiences (Mason, 2002). Semi-structured in-depth interviews were considered the most appropriate means as they allow the researcher to explore the subject through the eyes of the participant, and can uncover what the participant feels is important to the subject area, rather than the preconceived ideas of the researcher (Burman et al., 2001). Qualitative interviews are able to produce what Geertz referred to as 'thick description' (Geertz, 1973) a depth and richness of detail that can be missing from other forms of data generation.

Semi-structured interviews differ from unstructured interviews as the researcher develops a topic guide which outlines the key topics to be explored (Ritchie et

al., 2013b). However the difference compared to a structured interview is that although the topic guide provides a structure, the researcher is free to pursue issues which may arise in individual interviews (Ritchie et al., 2013b). Further discussion of the development of the topic guide will be given in section 4.7.5.

As the research aimed to explore the views and experiences of both staff and pupils within the schools, it was important that the method was suitable for both adults and young people. In recent years social science research has begun to utilise methods that take into account the views and experiences of children and young people, in line with the United Nations Convention on the Rights of the Child and the UK Children's Act, both of which recognise the rights of children and young people to have their voices heard by adults (Barker and Weller, 2003). In early iterations of the research strategy of this thesis, paired interviews were considered for the pupils in order to make the interview experience less daunting for them, however upon reflection it was felt that this may not allow the participants to voice their opinions as fully as it would in an individual interview. For this reason, interviews were conducted on a one-to-one basis for both pupils and staff.

4.7.2 Sampling and recruitment

It was decided that two schools would be included in the project. It was felt that a qualitative component that was any larger than this would be unmanageable, as I would be unable to conduct and analyse enough interviews within each school. I knew from experience that a large qualitative undertaking, alongside the quantitative analysis would have been unmanageable, but I felt that it was hugely important within this project to use a mixed methods approach.

It was felt that it would be most useful if the qualitative research component focused on two schools in which the assumption underpinning the thesis had occurred - there had been both a rise in owner occupation, and an increase in educational attainment. As this was a thesis, and was therefore bounded by time and capacity, it was felt that this approach would add the most useful data, and would most closely answer the research questions of how staff and pupils have experienced the changes, and whether they felt school mix made a difference.

The target schools were chosen during the analysis of the joint SQA and census data for research question 1.

By concentrating the qualitative component on two schools with these characteristics, the interviews would allow me to explore the changes in both the catchment area and school in depth, looking for whether staff or students attributed changes to housing tenure mixing. This would also allow for the exploration of the possible pathways and mechanisms identified in the literature review.

Schools with a balance of substantial enough increase in both catchment owner occupation and educational attainment were targeted. Figure 4-13 below shows the changes in owner occupation by each school catchment area, plotted against the change in educational attainment. As can be seen, ten schools had an increase in owner occupation, and all had an increase in educational attainment. The six schools within the red rectangle were approached to take part in the first instance, with the hope that two would take part. The two schools indicated by the red diamonds are the case study schools.

Figure 4-13: Change in S4 educational attainment by school (2003-2013), by change in owner occupation in catchment areas (2001-2011)
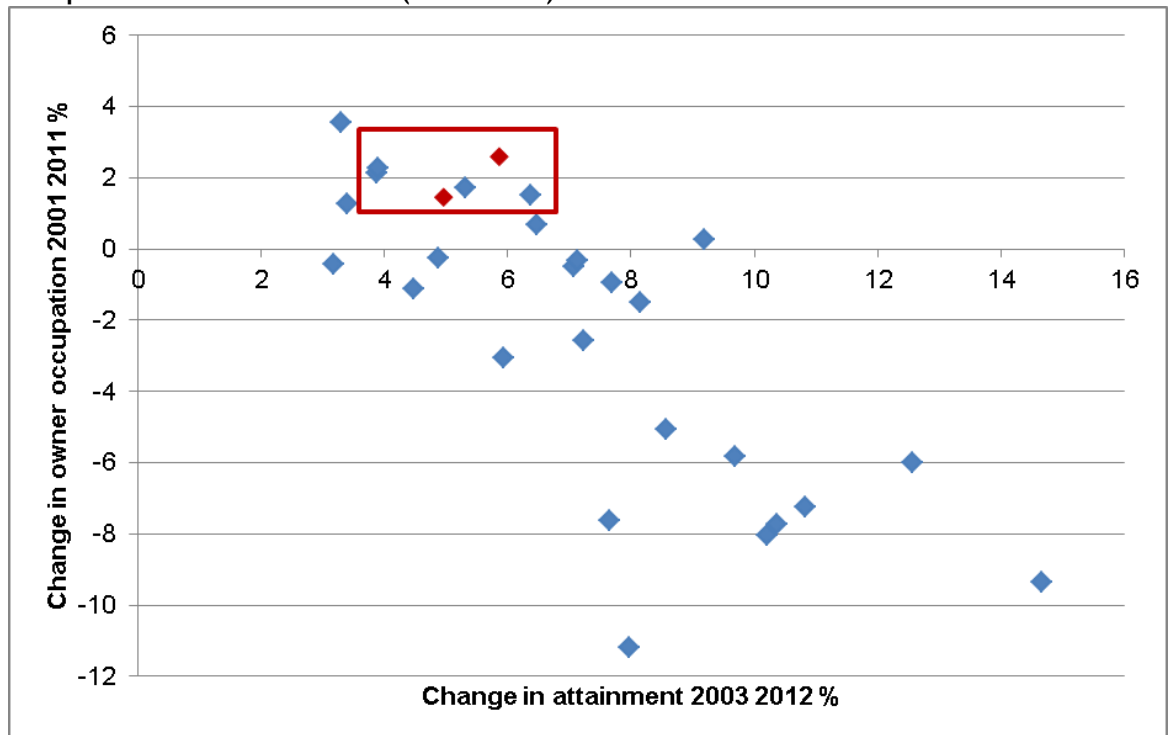
Within the schools, it was decided that I should try and recruit between two and three members of staff, and between four and six pupils. I felt that 6th year pupils would be the most appropriate to interview for this project. As the most senior pupils in the school, they have had the longest experience of attending and would be most likely to have noticed any changes within the catchment or school, and be prepared to discuss them. They would also be aged over 16, making consent simpler than had they been younger. In order to be able to get a view on both the neighbourhood they lived in and the school, I specified that I was looking for pupils who had lived in the same area since beginning secondary school. In each interview, I verified that the pupil was in 6th year and that they had lived in the catchment area since at least the start of secondary school, as well as attending the school since first year. For the staff, I specified that I was looking to speak to those who had been in the school for a relatively long time in order to give a view on any changes that had taken place.

4.7.3 Recruiting schools

Initially, as mentioned above, six schools were approached to take part in the study, with the hope of two agreeing. Head teachers of the school were identified by using the Glasgow City Council website, and I obtained their names and email addresses. An introductory email was drafted (Appendix 4) and sent out to each of the six schools on the 2nd April 2015, along with the information sheet for both staff and students. The introductory email was concise and to the point, introducing myself and the research. I outlined whom I would like to interview – two or three members of staff, and between four and six 6th year pupils - and gave my contact details in case they should wish to get in touch. This was followed up with a phone call to the school, and if I was unable to get through to the head teacher I followed this up with another email. In the end, three schools showed interest in taking part. As I could only involve two schools in the main study, I set up a one-off interview with the Depute Head of the third school to get in touch, and recruited the first two schools, Parkside and Meadow Flats (these are pseudonyms) as my case study schools.

Table 4-18 below gives demographic information about the two schools, as well as the Glasgow average, from the 2011 census and 2013 school data. Although the schools differed in that one was Catholic and the other non-denominational,

in many ways they were similar: they both served deprived catchment areas and had high levels of pupils registered for free school meals, and both had high level of lone parents. Parkside, as a Catholic school did have a larger catchment area than Meadow Flats. Although the relative change in owner occupation from 2001 to 2011 was similar, as shown in Figure 4-13, Parkside had a higher level in 2011, 41.2% to Meadow Flats' 32.5%.

Table 4-18: Demographic information on case study schools, 2011 census

School	Parkside	Meadow Flats	Glasgow
Denomination	Roman Catholic	Non-denominational	-
Size	c740 pupils	c950 pupils	-
Proportion owner occupied households	41.1%	32.5%	45.6%
NS-SEC category 1 to 3	25.9%	23.5%	36.4%
Level 4 qualifications	12.3%	12.4%	25.9%
Working	49.7%	44.5%	52.7%
White British/Irish	86.3%	85.3%	84.6%
Lone parent with dependent children	15.9%	16.1%	9.3%
2012 SIMD local share	60.9%	68.8%	41.6%
School educational attainment	21.3%	19.5%	24.0%
Free school meals	36.3%	39.2%	31.8%

The housing tenure profile of each school catchment area is explored in more detail in Table 4-19 below. As well as the rise in owner occupation, both catchment areas had a reduction in social rented households, and an increase in private rented households.

Table 4-19: Case study schools housing tenure profiles 2001-2011

	Owner occupation		Social rented		Private rented	
	2001	2011	2001	2011	2001	2011
Meadow Flats	31.0%	32.5%	59.7%	57.7%	2.4%	8.3%
Parkside	38.6%	41.1%	53.1%	50.9%	2.5%	7.4%

4.7.3.1 Recruitment within schools

The head teacher of each school was the first point of contact. At the first school, Meadow Flats, I arranged to meet with the head teacher to go over the requirements of the study. After this meeting, the head teacher emailed other members of staff (while also CCing me in) outlining the study, and asking for

volunteers to take part, and also to inform the 6th year pupils about the study. In the second school, after emailing the head teacher, I received a reply from the depute head, who gave me the names of two long standing pastoral care staff who they believed would be best placed to take part, and also said they would inform the pupils. In terms of the recruitment of the pupils, in both cases I left pupil and parent information sheets, as well as parental consent forms for pupils with the contact teacher, for distribution to 6th year pupils. Pupils then volunteered themselves to the contact teacher, who sent me a list of names. In both cases I had little control over who was recruited from within the school, in terms of either staff or pupils. This recruitment approach can be less than ideal as it is difficult to gauge whether a representative selection of staff or pupils will be recruited, especially in the case of pupils, where teachers may select pupils they think will represent the school well – in this project there is no way of knowing whether this was the case.

4.7.4 Participants

Table 4-20 shows the ten pupil participants. Seven of the ten participants were male, and three were female.

Table 4-20: Pupil participants (n=10)

Participant	Gender	School
Sean	Male	Meadow Flats
Gary	Male	Meadow Flats
Grant	Male	Meadow Flats
Jamie	Male	Meadow Flats
Ben	Male	Meadow Flats
Chloe	Female	Meadow Flats
Grace	Female	Parkside
Matt	Male	Parkside
Sarah	Female	Parkside
Gregor	Male	Parkside

As mentioned in section 4.7.2, I also attempted to recruit teachers who had taught in the school for a relatively long time. When approaching the schools originally this was difficult to judge as it would have been perfectly possible for there to be no teachers that had been there more than a few years, however only one of the five members of staff interviewed had been at the school less than ten years, and the average length of time was 23 years. Table 4-21 below shows the five staff participants, their positions and the length of time they had taught at the school.

Table 4-21: Staff participant characteristics (n=5)

Participant	School	Position	Length of time at school
Maria	Parkside	Pastoral care	Over 5 years
Helen	Parkside	Pastoral care / subject	Over 10 years
Brian	Meadow Flats	Subject teacher	Over 30 years
Peter	Meadow Flats	Management	Over 10 years
Anita	Meadow Flats	Management	Over 30 years

4.7.5 Development of topic guides

Two topic guides were produced, one for the pupils and one for the staff, reflecting the different approaches needed for each group of participants. They both included broad topic areas for discussion, some open ended questions and some potential probes. I felt that my approach needed to be tailored for the two groups, not just because of the age difference in the groups, but because they were being asked to discuss different perspectives on the subject matter. The staff, although very involved with the school and communities, were in essence being interviewed about aspects of their job. Although some of the issues could be seen as quite emotional, I felt that a more direct approach was possible with the staff in relation to the questions, on the basis that they were used to discussing these types of issues. For the pupils however, not only were they aged just 16 or 17, and this might be their first experience of taking part in a research project through a qualitative interview, but I was asking them what could be seen as sensitive questions about what they thought of where they lived, their school, and the people in both of these places.

Although both topic guides had a broadly similar structure (introduction, participant thoughts on the area, thoughts on the school) questions in the pupil topic guide were shorter and simpler than those in the staff guide. For example, the pupil topic guide relied more on quite broad questions to introduce the subject, such as 'how would you describe your neighbourhood to someone who had never been there before?', whereas the staff topic guide was more specific, with questions on changes in the catchment area and on school processes. The pupil guide can be seen in Appendix 5 and the staff topic guide in Appendix 6.

4.7.6 Pilot

Due to the timings of the interviews, and the fact that I did not have access to the schools prior to the main fieldwork, it was not possible to conduct a full

formal pilot. However, a pilot staff interview was conducted with the depute head teacher of the third school that had got in touch asking to be part of the study after I had already confirmed the two participating schools. Although I was unable to include the school as a full case study, I agreed to interview the depute head teacher and used this as an opportunity to pilot the staff topic guide. The participant was aware that this was the first interview, and this allowed me to review the topic guide afterwards thinking about what had worked well, what had worked less well, and whether it had generated the data I was looking for. I felt this was the best solution to not being able to include the third school fully in the research as I was very grateful to the school for showing an interest in taking part, and I did not want to possibly prejudice them against taking part in any further research by asking for their participation and then refusing them on the basis that I had already reached capacity.

With the pupil topic guide, I was unable to conduct any formal pilot interviews with school pupils, however I conducted an unofficial test of the topic guide with my then 18 year old brother, who had been a 6th year pupil during the previous academic year. This allowed me to make sure that the language was appropriate and understandable; that it made sense; and that it generated the relevant data.

As well as the informal pilots, the topic guides were an ever evolving resource. Throughout the fieldwork I made notes on my copies of the topic guides to reflect what had happened in the interviews. For example, if I found that a reworded version of a question written in the topic guide was better understood by a participant I would make a note of this on my own copy in order to use in the next interview.

4.7.7 Conducting the fieldwork

All of the fieldwork was conducted over two consecutive days, on the 16th and 17th of June 2015. In introductory meetings with the schools, both had suggested that the best way for the research to be conducted from their point of view, was for me to be given a room within the school for the day and for participants to be able to choose time slots to drop by and take part.

June was decided upon in discussion with the schools as the most appropriate time for the interviews to take place, as it was post exams, pupils had returned from exam leave, and it was prior to the summer holidays. Most schools move to the new timetable in June, after senior pupils return from exam leave. Not only did this give me access to those newly in 6th year as their new timetable would include free periods meaning they could take part in the study without interrupting their classes, but it meant that I would also be more likely to be able to engage with at least some of those who leave in the summer between starting and continuing 6th year, even after indicating they will stay on. June also suited me personally, as between July to October 2015 I was undertaking an internship within the Scottish Government. Due to planned school trips and staff absences, the two days that were best suited to the schools happened to fall directly one after the other. The possible implications of this set up will be discussed further in chapter 8 in the reflections session (section 8.7). The set up worked well in the main, as staff and pupils had been given advance warning that I was coming and told where I would be stationed, and this resulted in one previously unplanned interview with a member of staff.

Prior to each interview I introduced myself and the project, and went through the consent form and information sheet with the participant. I made it clear that they could stop the interview process at any time, and made sure that they were aware of and happy with the interview being recorded. Before starting the interview, and at the end of each interview, I gave each participant the chance to ask any emergent questions. The interviews were varied in length, though all were bounded by the length of a school period (50 minutes). The staff interviews all lasted between 35 and 42 minutes, whereas the pupil interviews tended to be shorter, lasting between just under 10 to 25 minutes.

After each interview I made notes on how I felt the interview had gone, any body language or gestures from the participants that would not have been picked up by the recording device, my feelings about it, and any areas that were particularly interesting or unexpected. All interviews were digitally recorded, and at the end of each day all sound files were transferred into a secure drive within my PhD office and then removed from the hand-held device.

4.7.8 Ethics and permissions

Ensuring that research is ethical in both design and practice is crucial when carrying out primary research, especially when working with young people (Skelton, 2008). Therefore, although institutional ethics procedures and guidelines were rigorously followed, ethics were interwoven through the entire process of 'doing' the research since it is important for any researcher to have ethical issues at the forefront of their mind throughout the research process (Mason, 2002). When working with young people especially, there are several specific ethical considerations that must be addressed – informed consent, anonymity, confidentiality and power (Heath et al., 2009, Tisdall et al., 2008). Therefore, from planning how to recruit, and what questions to ask, to trying to ensure that the participants were represented as well as possible in the analysis and discussion of the results, ethical considerations were central to the project.

At the start of this project, an application to join the Scottish Protecting Vulnerable Groups (PVG) scheme was made, and granted. PVG replaced Enhanced Disclosure as a membership scheme to vet individuals who work directly with children or vulnerable adults, and is important both as an ethical consideration for the researcher, and also as reassurance for participants.

Ethical approval was given by the University of Glasgow's College of Social Science Ethics Committee. The ethics procedure involved providing information about the proposed project, as well as outlining how issues such as consent, confidentiality, anonymity and data storage would be handled. The ethics application was submitted to the University in November 2014 and approval was received on the 5th March 2015: a copy of the completed application can be seen in Appendix 7. Due to the nature of the research, and the fact that it involved approaching schools to take part and then interviewing both staff and pupils within the school, permission was also sought from GCC Education Services, by completing the standard research request questionnaire, which can be seen in Appendix 8. Submission of the research questionnaire to GCC was only possible once institution approval had been granted and was therefore submitted on the 5th March 2015. Permission was granted by the Council on the 2nd April 2015.

Initially, a joint opt-out/opt-in consent strategy was felt to be the most appropriate and ethically sound approach for the pupil interviews – this is where opt-out consent is used for the parents, and opt-in consent used for the pupils themselves. This was felt to be appropriate as all target pupils were in 6th year at secondary school, and would be over 16 years old, and all interviews were to take place during the school day within the school building. In this approach, all pupils are given an 'opt-out' consent form for their parent or carer to sign, instead of having to get a parent or carer to sign an 'opt-in' consent form. This is felt to be a more equitable way of conducting research (Junghans et al., 2005), as opt-in consent is strongly biased against those who would struggle to get a parent to sign a consent form. However, this approach was rejected by the University Ethics Committee – leading to the delay in approval mentioned above - and opt-in consent forms were created for both parents and the participants.

Information sheets were developed for staff, pupils and parents in order to give an outline of the project and what participants could expect from the interview. As well as this, consent forms were produced for staff and pupils that reiterated the points made in the information sheets – that the interview was being recorded, that it was anonymous, and they could leave at any time. For the pupil participants, parental consent forms were also produced. All information and consent forms can be found in Appendix 9.

Ensuring the confidentiality and anonymity of participants is of great importance in qualitative research. Specific issues such as small sample sizes make it theoretically easier to identify participants than in other forms of research (Ritchie et al., 2013b). Ensuring confidentiality and anonymity was considered at great length, and several structures were put in place. Both schools and individual participants were given pseudonyms, which were used throughout the entire research process and in all documentation, in order to ensure preservation of confidentiality. Although, within each school, both staff and pupils knew who had taken part in the research, details were amended and generic job titles were used for staff to make identification more difficult, and when reporting direct quotes from participants, information which may have identified the participant was removed. Descriptions of the school were

intentionally kept to a minimum[11]. In order to try and reduce the likelihood of accidental disclosure from myself, the schools were referred to only by their pseudonyms in all conversations with colleagues.

Within qualitative research, power can manifest in many ways including gender, age, ethnicity and level of education (Van der Riet, 2008). It is important to acknowledge the power dynamic in the doing of any piece of research, however when researching young people this becomes especially important (Matthews, 2001). The additional complication of accessing young people through an educational institution, and the inherent power imbalances between myself and the participants within such establishments, adds another layer of complexity (Heath et al., 2009). Much thought was given to ways to address the power imbalance and several practical approaches were taken in order to try and reduce this. Although the research took place within the school context, I deliberately dressed down for the interviews, and made sure to introduce myself by my first name to pupils in order to distinguish myself from the teachers. I also tried to use much less formal language during the pupil interviews, often referring to the interviews as 'a chat'. Although I did not have control over where in the school the interviews took place, I tried to rearrange furniture where possible in order to create a less formal environment. Reflections on the success of these strategies are discussed in chapter 8, section 8.8.

4.8 Qualitative analysis

4.8.1 Transcription

All fifteen interviews were transcribed by a professional transcription service. Upon receiving the transcripts I listened back to each interview while reading the transcript, correcting minor errors, and annotating with comments and recollections from my field notes. This allowed me to begin to familiarise myself with the data.

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[11] The exception to this is in the demographic information on the schools in sections 4.7.3 and 7.3 – this was calculated using the data sets created by merging the census data with the catchment area postcode data, and was felt to be difficult enough to replicate to not identify the schools.

4.8.2 Thematic analysis

Analysis of qualitative data has a great many approaches, however for this set of interviews I used a type of substantive thematic analysis that focused on what the data is saying, and try and capture the meaning (Ritchie et al., 2013a). Thematic analysis is one of the foundational approaches to analysing qualitative data (Braun and Clarke, 2006). As with many versions of thematic analysis, my analytical approach was based on grounded theory, an inductive method of qualitative data analysis, and aimed to generate categories and themes from the data to ensure that the participants own views and opinions were represented and that I was not imposing my own ideas onto the data, and then try to identify patterns and relationships between the themes that had arisen (Charmaz, 2014, Braun and Clarke, 2006).

I started the thematic analysis by thoroughly familiarising myself with all of the transcripts by reading and rereading them, and then began the process of unstructured coding by making a note of themes that arose within each interview separately. I then coded cross sectionally across the staff and pupil transcripts separately using themes that had arisen during my reading of the data, before looking across both the staff and pupil interviews for common themes and differences (Mason, 2002). Although many of the themes and subthemes overlapped between the two groups, there were areas in which they diverged, and therefore two coding frames were developed, one for staff participants and one for pupil participants.

For ease of data management, transcripts were loaded into NVivo, and were coded as either a staff or pupil interview. I then read through each transcript again and coded each one within NVivo with the themes and sub themes that had arisen during my initial reading of them. From each transcript, a list of themes and subthemes was produced, and these were combined in order to create the final coding frames. Extracts from the staff and pupil coding frames can be found in Appendix 10.

4.9 Summary

This chapter described the data and methods used in the thesis, for both quantitative and qualitative components, in order to address the aim of the thesis – whether mixed tenure housing policy can make a difference to educational outcomes. Firstly, it detailed the sources of the pupil, neighbourhood, school and catchment area data, and explored the outcome and explanatory variables to be used. Then an account of the quantitative methods was given, including the formative and final analyses, and the statistical methods used. It looked at the structure of the data and how this informed the analysis approach, and multilevel modelling was introduced. Secondly, the chapter looked at the qualitative methods used in the two case study schools. It began by explaining how schools were selected and approached, and gave some demographic information on the chosen schools, Parkside and Meadow Flats. It then moved on to introduce the ten pupil and five staff participants, and looked at how the topic guides had been developed, before providing a discussion of the practical aspects of conducting the fieldwork. Finally, an account of the process of the qualitative analysis of the interviews was given. The next three chapters will outline the findings from each of the three research questions.

5 Catchment area and school changes over time

5.1 Introduction

This chapter sets out the findings of research question 1, which asks:

How have catchment areas and schools changed, focusing especially on housing tenure and educational attainment?

The thesis overall aims to explore whether mixed tenure housing policy can make a difference to educational outcomes. In order to do this, firstly the changes that have occurred in the city between the 2001 and 2011 censuses must be examined.

This chapter is in two sections as follows:

The first section looks at how Scotland and Glasgow City changed between 2001 and 2011, using data from the 2001 and 2011 censuses. This section focuses first on housing tenure, then social class; level of education; employment status; ethnic mix; family structure and deprivation. Each measure will then be looked at according to how the overall changes have been distributed throughout the catchment areas of the 28 Glasgow secondary schools included in the analysis[12]. This section again uses 2001 and 2011 census data, aggregated to catchment area level.

The second section looks at how the schools themselves have changed in terms of the characteristics of their students, using data from Glasgow City Council (GCC) between 2003 and 2012, and looks at free school meal registration; ethnic mix; and overall educational attainment.

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[12] As discussed in the methods chapter, section 4.4.1.2, although there are 29 non-specialist schools, catchment data was not available for one of these, therefore it was excluded from analysis.

5.2 Glasgow demographic context

After decades of population decline, in more recent years Glasgow's population began to grow. In 2001 the population was 577,869, and by 2011 this had risen to 593,244, an increase of 15,375 people, or 2.7%.

The demographic structure of Glasgow changed between the censuses, with fewer children as a proportion of the population and a greater share of working age people over time. Between 2001 and 2011 there was a slight drop in the percentage of those under 16 years, from 18.5% to 16.0% (Figure 5-1). Though the classifications of those of pensionable age changed between 2001 and 2011 (2001 refers to those of 'pensionable age' whereas the 2011 census classifies this as those '65 years old and over') and therefore cannot be directly compared, looking at the figures for each gives us an idea of demographic change. In 2001 the proportion of those of pensionable age was 18.2%, while in 2011, those aged 65 years and over was 13.9%. In 2001, those aged 16 years up to pensionable age was 63.4%, while by 2011 those aged 16-64 years accounted for 70.0% of residents. These changes in Glasgow mirrored similar changes for the country as a whole. In Scotland, those under 16 years fell from 19.2% in 2001 to 17.3% in 2011. Those aged 16 years to pensionable age accounted for 62.2% of the population in 2001, and those aged 16-65 years made up 65.9% of the population in 2011. In 2001, 18.6% of the population were of pensionable age, and by 2011, 16.8% were over 65 years.

Figure 5-1: Age demographics in Glasgow and Scotland, 2001 and 2011

Note: the 2001 census refers to those of 'pensionable age' whereas the 2011 census classifies this as those '65 years and older'.

5.3 Scotland, Glasgow and catchment area change, 2001-2011

This section will explore how Scotland and Glasgow City changed overall between the 2001 and 2011 censuses, and will then examine how these changes manifested across the catchment areas of the 28 Glasgow state schools included in the analysis.

Figures for catchment areas in this section are aggregated from the census output areas (COA) figures for each school catchment area. Because of the overlapping of catchment areas due to Glasgow having both denominational and non-denominational state schools (as illustrated by Figure 4-4 and Figure 4-5), summary statistics do not always match the city-wide figures. In all catchment area graphs, the 2001 and 2011 figures are shown as a percentage on the left hand axis, and are displayed alongside the percentage change between the two censuses, referred to as the difference. Shown on the right hand axis are the relative change percentage figures, measured as the change in percentage in 2011, relative to the 2001 figure. All charts are ordered from left to right, from largest relative change to smallest relative change.

5.3.1 Housing tenure

5.3.1.1   Scotland and Glasgow

The housing tenure landscape changed in Glasgow in the ten years between the 2001 and 2011 censuses. The proportion of owner occupied households fell, from 48.5% to 45.6%, as did the proportion living in social rented housing, from 39.2% to 36.7% (Figure 5-2). These decreases were due to a large rise in private renting in Glasgow over the same time period, with a market share of 7.5% in 2001 almost doubling to 16.8% by 2011. In Scotland overall, the social housing sector also shrank, but changes in housing tenure within the private sector were slightly different than in Glasgow city: social renting decreased across Scotland from 27.2% in 2001 to 24.3% in 2011; whereas owner occupation fell only slightly from 62.2% in 2001 to 62.0% in 2011; and private renting rose from 10.3% in 2001 to 13.7% in 2011. As can be seen in Figure 5-2, at both timepoints Glasgow had more social rented households, and fewer owner occupied households than across Scotland.

Figure 5-2: Household housing tenure in Glasgow and Scotland, 2001 and 2011
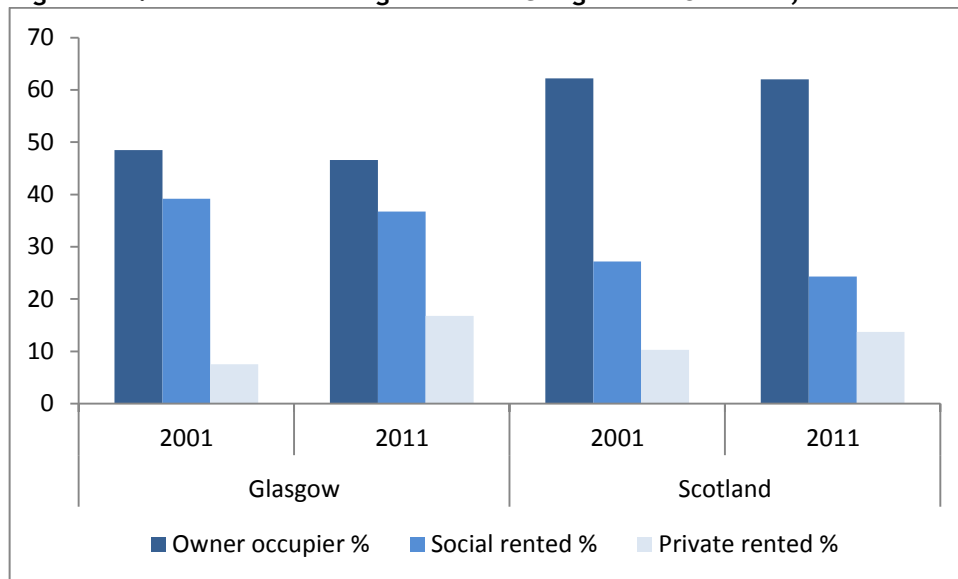
5.3.1.2   Catchment areas

As was seen when looking at Glasgow City overall, the pattern of housing tenure changed among the school catchment areas, with an increase in private renting and decreases in both owner occupation and social renting.

The overall decrease in owner occupation across the city was not spread equally across all catchment areas, as can be seen in Figure 5-3. Indeed, in ten of the catchment areas there were slight rises in owner occupation. The catchment areas in which the largest increases relative to 2001 were seen tended to be the catchment areas that had the lowest owner occupation in 2001. The relative change in owner occupation's share of the housing market ranges from a relative increase of 20 percent in one school catchment area to a relative decrease of 20 percent in another.

Figure 5-3: Owner occupied households by catchment areas 2001 and 2011
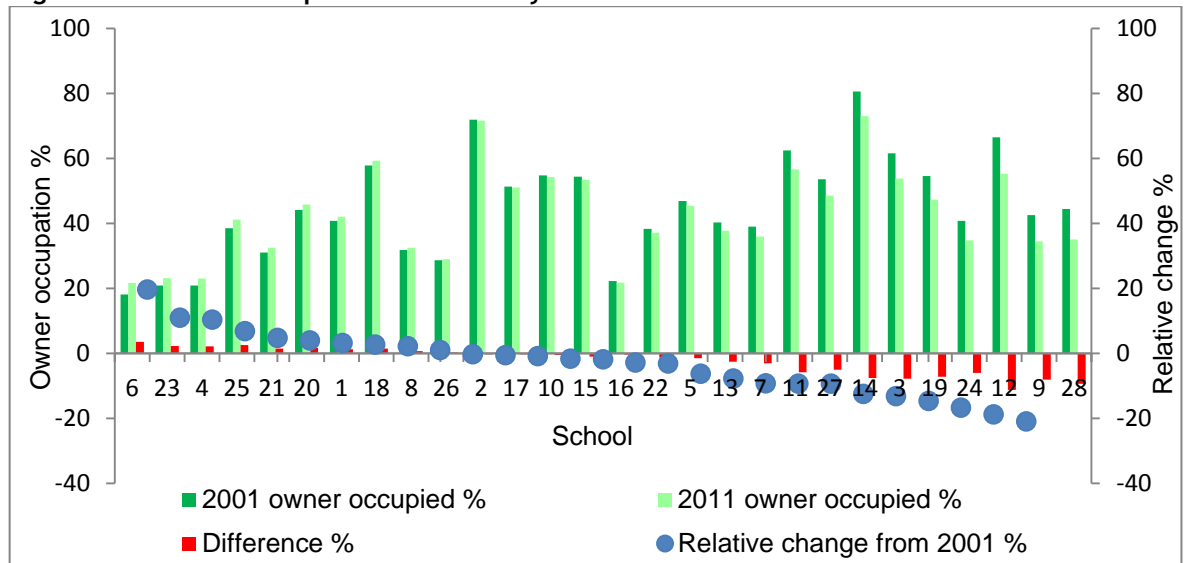
As can be seen from the summary statistics in Table 5-1, the standard deviation decreased as well as the mean percentage, suggesting that there was less variation between the catchment areas in terms of the level of owner occupation in 2011 than there was in 2001. In other words, the catchment areas became more similar to each other in terms of the percentage of owner occupied households over the time period.

Table 5-1: Summary statistics of owner occupied households by catchment area 2001 and 2011

		Mean percentage	Standard deviation
Owner occupied households	2001	45.0	15.9
	2011	42.8	13.9

Although, as with owner occupation, on average the proportion of social rented properties fell across the city, there were five catchment areas in which it rose

between 2001 and 2011, four of which had very high levels of social renting, as can be seen in Figure 5-4. The majority of the larger decreases were in catchment areas where the level of social renting was already comparatively low.

Figure 5-4: Social rented households by catchment areas 2001 and 2011
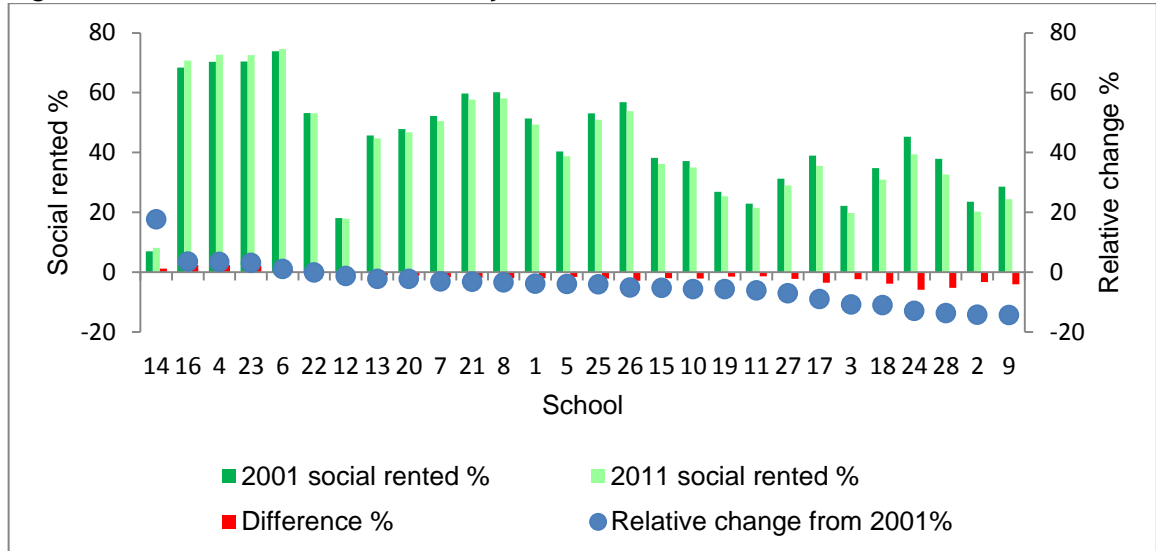
The summary statistics for social renting in Table 5-2 show that although the mean fell between 2001 and 2011, the standard deviation rose, suggesting that the variation between the catchment areas in terms of social renting actually increased.

Table 5-2: Summary statistics of social rented households by catchment area 2001 and 2011

		Mean percentage	Standard deviation
Social rented households	2001	43.4	17.4
	2011	41.8	18.3

Although all catchment areas saw an increase in private renting, reflecting the city-level change observed earlier, the percentage point increases varied greatly across school catchment areas, from just under 2.5%, to nearly 16%, as can be seen in Figure 5-5. There were only seven catchment areas in which the relative change was under 100%. The areas with the largest relative increases tended to be the catchment areas that had the lowest levels of private renting in 2001.

Figure 5-5: Private rented households by catchment areas 2001 and 2011
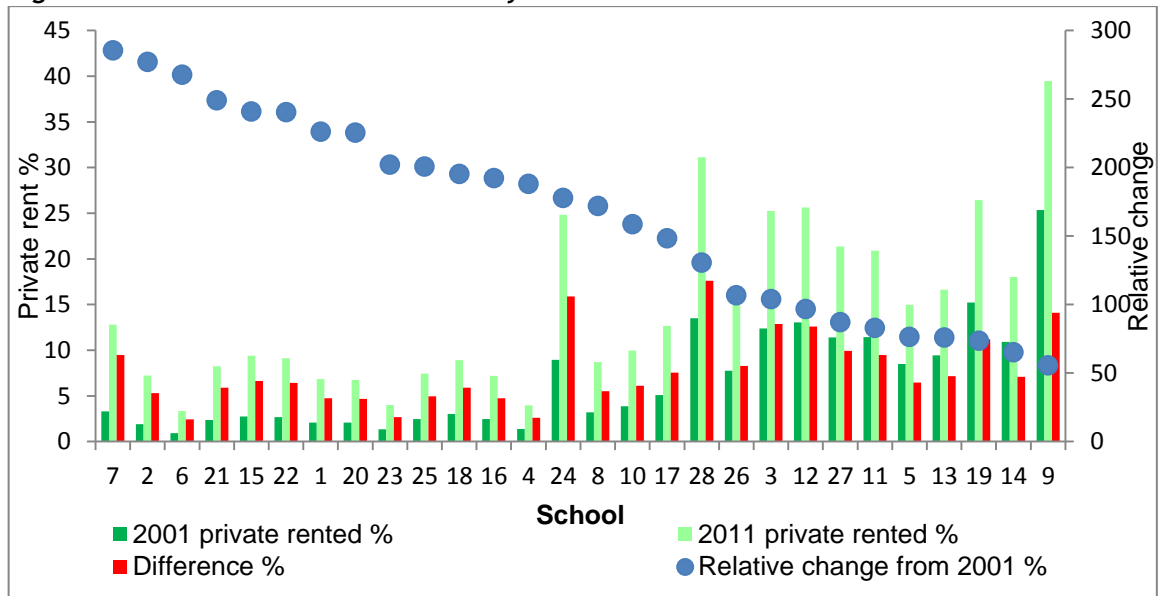
As can be seen from the summary statistics in Table 5-3, the mean percentage of private rents across the catchment areas more than doubled, however the standard deviation also increased by over half, meaning the variation between the catchment areas in terms of private renting increased markedly between the two censuses.

Table 5-3: Summary statistics of private rented households by catchment area 2001 and 2011

		Mean percentage	Standard deviation
Private rented households	2001	6.8	5.8
	2011	14.6	9.2

5.3.2 Social class

5.3.2.1 Scotland and Glasgow

Within post-industrial cities like Glasgow, one might expect to see a shift in the labour market structure over time towards a greater representation of middle-class, white-collar occupations within the economy. Social class was measured using categories 1-3 of NS-SEC, a measure of socioeconomic position based on employment relations, with 1-3 representing the professional and managerial classes. In 2001 in Glasgow, as can be seen in Figure 5-6 below, the percentage of working age residents who were in categories 1-3 of the NS-SEC was under a third, at 29.4%. By the 2011 census, the percentage of those in NS-SEC category

1-3 had risen to over a third of the working age population, at 36.4%. However, at both timepoints Scotland had a higher proportion of working age citizens in NS-SEC class 1-3 than Glasgow, with 33.6% in 2001 and 41.8% in 2011.

Figure 5-6: Those of working age in NS-SEC categories 1-3 Glasgow and Scotland, 2001 and 2011
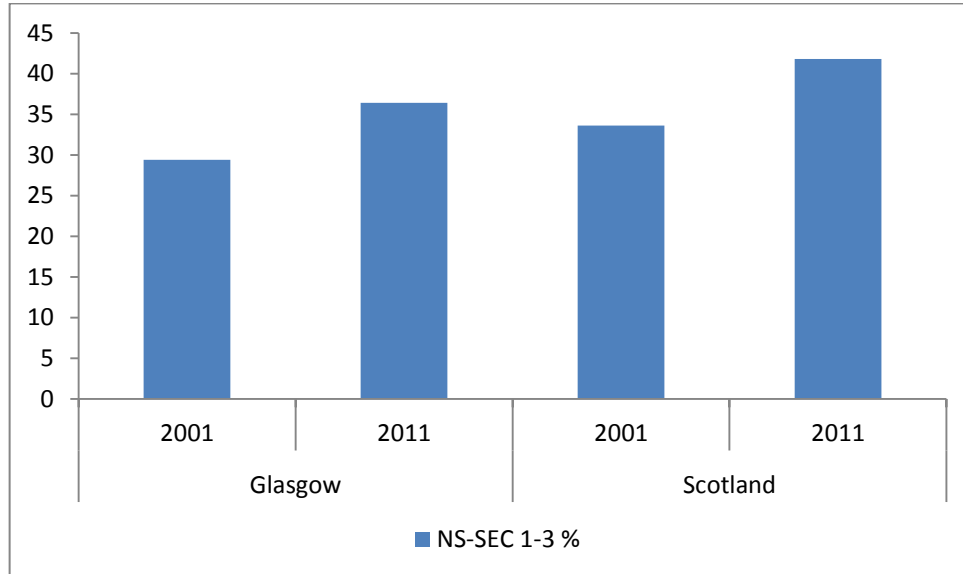
5.3.2.2 Catchment areas

All catchment areas saw an increase in the percentage of those of working age who were in NS-SEC categories 1-3 from 2001 to 2011, as can be seen in Figure 5-7. The largest relative increases were generally in those catchment areas with the lowest levels of NS-SEC categories 1-3 in 2001. In three catchment areas the relative increase in NS-SEC categories 1-3 was over 40%, and in six catchment areas it was under 20%.

Figure 5-7: NS-SEC by catchment areas 2001 and 2011
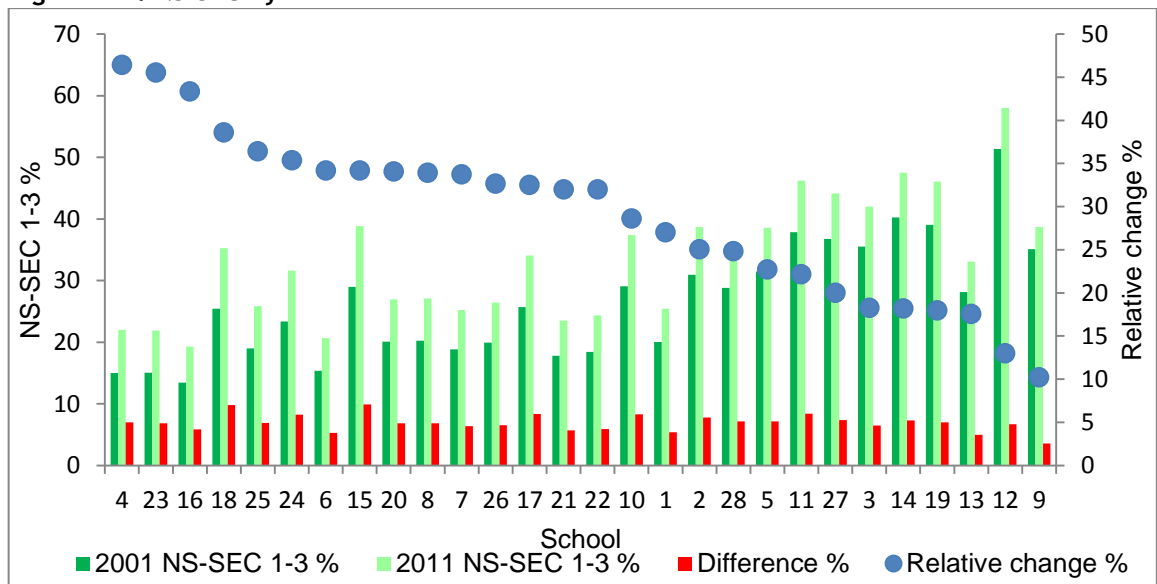
As can be seen from the summary statistics in Table 5-4, the mean of the percentage of those of working age who were in NS-SEC categories 1-3 increased from 26.5% in 2001 to 33.4% in 2011. However the standard deviation also increased slightly, showing a slight increase in the variation between the catchment areas in terms of the presence of professional and managerial classes over time.

Table 5-4: Summary statistics of NS-SEC level 1-3 by catchment area 2001 and 2011

		Mean percentage	Standard deviation
NS-SEC level 1-3	2001	26.5	9.4
	2011	33.4	9.8

5.3.3 Level of education

5.3.3.1 Scotland and Glasgow

In an increasingly information-based economy, less dependent on manual (including skilled manual) labour, there is a growing emphasis on educational credentials. To consider this, the proportion of those of working age with level 4 qualifications - defined as a degree or higher - were examined. The proportion of the city's working age population who had a degree or higher increased quite substantially between the census years of 2001 and 2011 as can be seen in Figure 5-8. In Glasgow in 2001, 17.9% of the population had a degree or higher, but this had risen to 25.9% in 2011. The Scotland wide figure also increased, from 19.5%

in 2001 to 26.1% in 2011, although this was a lower relative increase than seen in Glasgow.

Figure 5-8: Those of working age with degree or higher, Glasgow and Scotland, 2001 and 2011
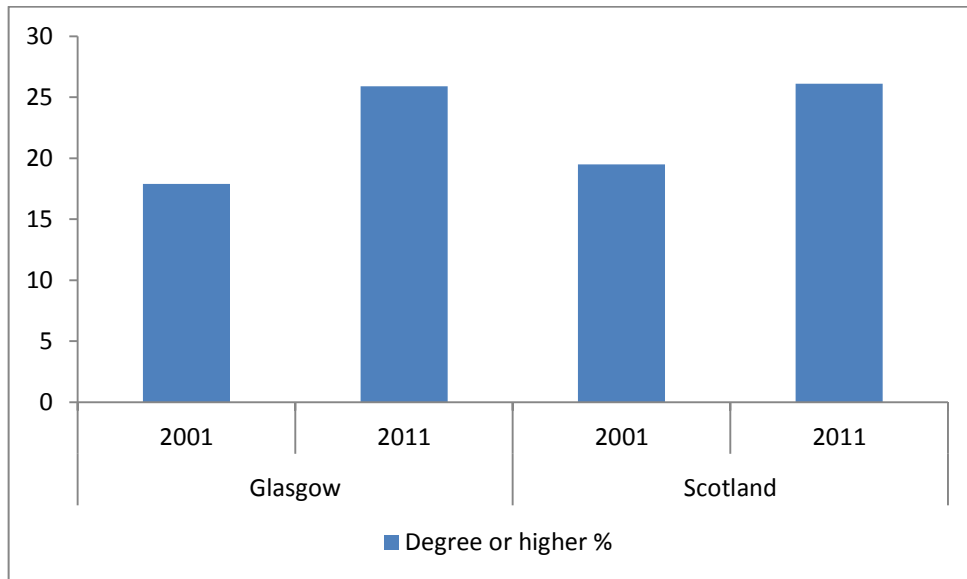
5.3.3.2 Catchment areas

As seen when looking at Glasgow City overall, there were general rises in the proportion of residents who have a degree or higher within catchment areas. As can be seen from Figure 5-9, the increases varied but occurred in all catchment areas. In six catchment areas, the relative increase was over 80%, and in five catchment areas it was under 40%. Generally, those with the lowest percentage of higher educated adults in 2001 had the largest relative change.

Figure 5-9: Those of working age with degree or higher by catchment areas 2001 and 2011
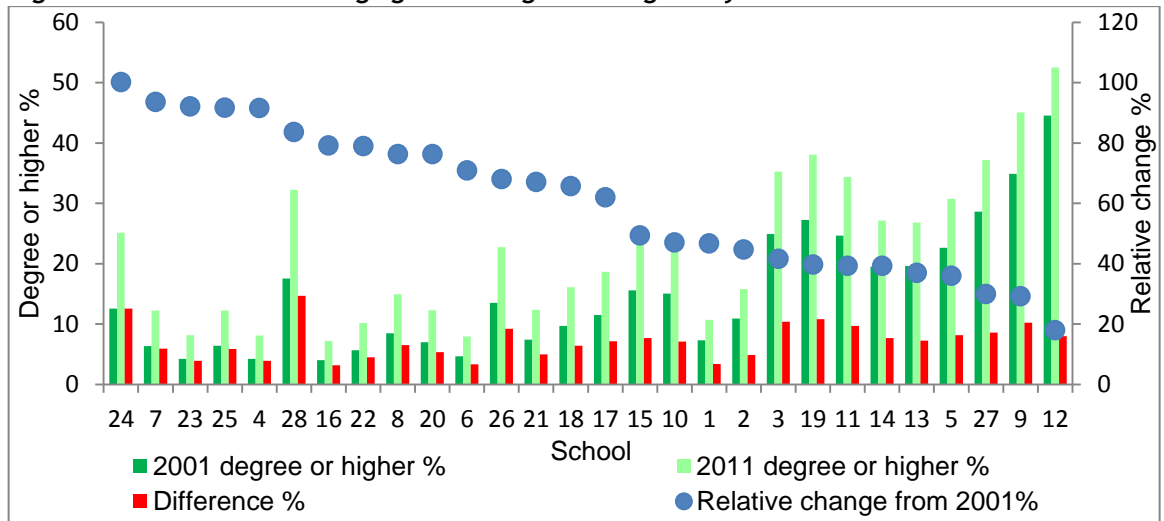
The standard deviation increased as well as the mean, as seen in Table 5-5, suggesting the variation between the catchment areas of the proportion of those with a degree or higher increased between 2001 and 2011.

Table 5-5: Summary statistics of degree or higher qualifications by catchment area 2001 and 2011

		Mean percentage	Standard deviation
Degree or higher	2001	14.9	10.3
	2011	22.1	12.3

5.3.4 Working status

5.3.4.1 Scotland and Glasgow

Employment contexts impact on educational outcomes both through parental employment (Ermisch and Francesconi, 2001a) and through the level of employment in the neighbourhood (Galster et al., 2010). Economic activity in the city and catchment areas was looked at in terms of those of working age who were economically active: classed as working either full time, part time, or self-employed.

Looking at those who were employed, in 2001 this was 46.9% of the working age population in Glasgow, rising to 52.7% in 2011, as can be seen in Figure 5-10. The increase in those working in Glasgow was far outstripped by changes at the

national level, where 46.9% of those in Scotland of working age were classed as working in 2001, rising to 60.4% in 2011.

Figure 5-10: Those of working age who are in employment Glasgow and Scotland, 2001 and 2011
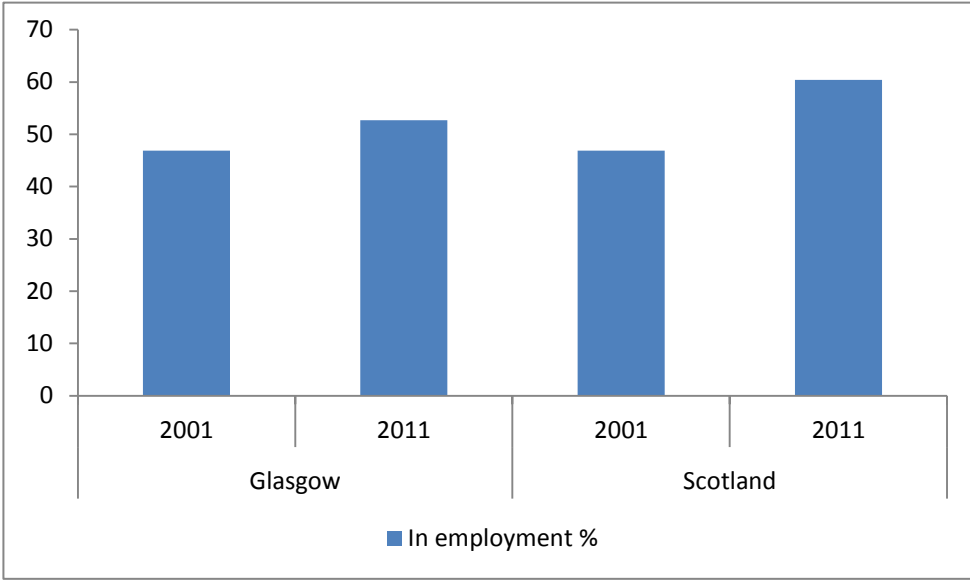
5.3.4.2 Catchment areas

Figure 5-11 shows that the percentage of those of working age who were in employment rose in all catchment areas between 2001 and 2011, and in only six catchment areas was the relative increase less than 10 percent. In general, those catchment areas which had the lowest percentages in work in 2001 saw the largest relative increases.

Figure 5-11: Those of working age in employment by catchment areas 2001 and 2011
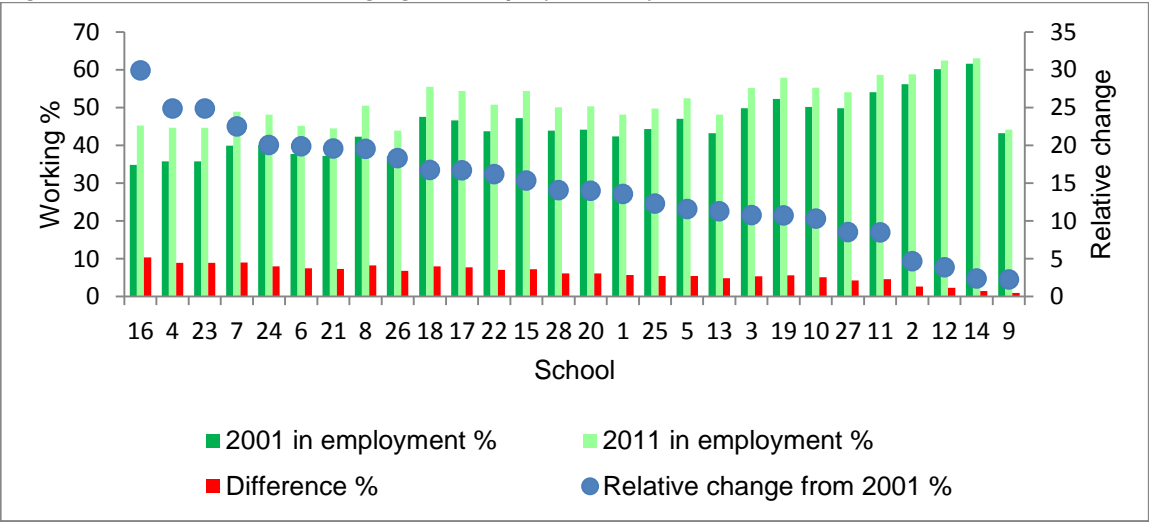
As can be seen from Table 5-6, the mean percentage of those in employment rose and the standard deviation fell between 2001 and 2011, suggesting that there was less variation between the catchment areas in terms of those proportions who were in employment between the two censuses.

Table 5-6: Summary statistics of those of working age who are in employment by catchment area 2001 and 2011

		Mean percentage	Standard deviation
Working age in employment	2001	45.3	7.1
	2011	51.4	5.6

5.3.5 Ethnic composition

5.3.5.1 Scotland and Glasgow

Glasgow has for some time been seen as a predominately white, working-class city with only a small ethnic minority population, albeit more ethnically diverse than Scotland as a whole. However, the ethnic makeup of the city changed markedly between the 2001 and 2011 censuses. Although, as discussed in section 4.4.3.3, the variable used in the modelling in the next chapter is the percentage of those who do *not* classify themselves as White Irish or British, for completeness this section will focus on the three largest ethnicity classifications that saw the biggest changes between 2001 and 2011: White British/Irish; White Other (as referred to in the census i.e. not from either the UK or Ireland); and Asian, Asian Scottish or Asian British.

As can be seen in Figure 5-12, in 2001 92.8% of those living in Glasgow identified as being White British/Irish, whereas by 2011 this had dropped to 84.6%. The difference came partially from an increase in those who identified as White Other, from 1.8% in 2001 to 3.9% in 2011, coinciding with the increase in European migrants following the European Union enlargement in 2004 (Drinkwater et al., 2009). There was also an increase in those who identified as Asian, Asian Scottish or Asian British from 4.4% to 8.0%.

Glasgow became more ethnically diverse than the country as a whole, although at both timepoints the vast majority of the population were White British/Irish. In Scotland overall, there was less change in the ethnic makeup of the population. In 2001, 96.4% of the population identified as being White

British/Irish, and by 2011 this was 92.9%. White and not from the UK or Ireland more than doubled between the censuses - from 1.5% in 2001, to 3.2% in 2011. Those identifying as being Asian, Asian Scottish or Asian British went from 1.1% in 2001 to 2.7% in 2011 across Scotland as a whole.

Figure 5-12: Ethnic mix in Glasgow and Scotland, 2001 and 2011
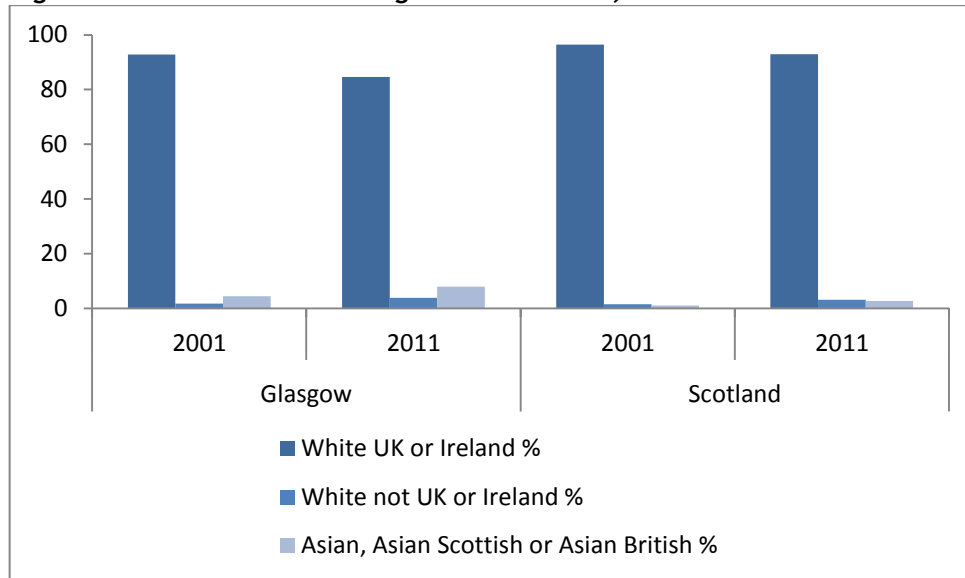
Although the census question on where residents were born changed between the 2001 and 2011 questionnaires, and therefore cannot be compared directly, the numbers still give a sense of the proportions of foreign-born residents in Glasgow. In 2001, 1.1% of residents were born in the 'rest of Europe (as opposed to the UK)', and 3.6% were born 'elsewhere'. By 2011, 3% of residents were born in 'other (other than the UK) EU countries', and 8.5% were born in 'other countries', illustrating how the city experienced migration over the past decade or more.

5.3.5.2   Catchment areas

As discussed above, the ethnic composition of Glasgow as a whole changed quite markedly between 2001 and 2011. In order to examine these changes in more detail, this section will look at the changes by catchment area for three categories: White British/Irish; White Other; and Asian, Asian Scottish or Asian British.

From Figure 5-13, it can be seen that the city-wide decrease in the proportion of residents who were White British/Irish was not distributed equally across all

catchment areas in Glasgow. In general, catchment areas that in 2001 had the lowest proportion of White British/Irish residents still had the lowest proportion in 2011, and with a greater decrease than catchment areas that had the highest levels of White British/Irish citizens in 2001. Therefore, it can be stated that catchment areas that were already the most ethnically mixed in 2001 became more mixed than those which were in 2001 relatively mono ethnic.

Figure 5-13: Residents who are White from UK or Ireland by catchment areas 2001 and 2011
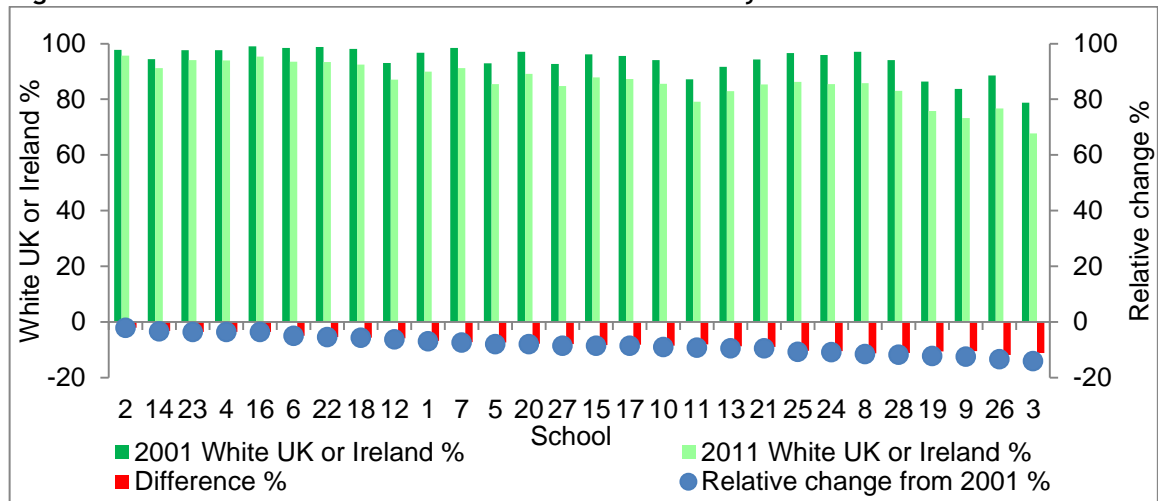
Looking at Table 5-7, it can be seen that although the mean percentage of White British/Irish residents reduced, the standard deviation increased, supporting the assertion above that there was more variation between catchment areas in terms of ethnic mix in 2011 than in 2001.

Table 5-7: Summary statistics of percentage of White British/Irish residents by catchment area 2001 and 2011

		Mean percentage	Standard deviation
White British/Irish	2001	94.0	5.0
	2011	86.4	6.9

As seen in the examination of Glasgow City overall, the proportion of those identifying as White and *not* from the UK or Ireland (White Other) in the census increased between 2001 and 2011.

Figure 5-14 shows the proportion of White Other by catchment area for 2001 and 2011. The figure increased in all catchment areas, however in eight of the catchment areas the White and not from the UK or Ireland population more than trebled in size relative to 2001, and from the remaining 20, seven more than

doubled, and ten increased by more than half. Additionally, some of the largest relative increases were in the catchment areas with some of the lowest percentages in 2001, although there were some catchment areas with relatively high proportions of White Other in 2001.

Figure 5-14: Residents who are White Other by catchment areas 2001 and 2011
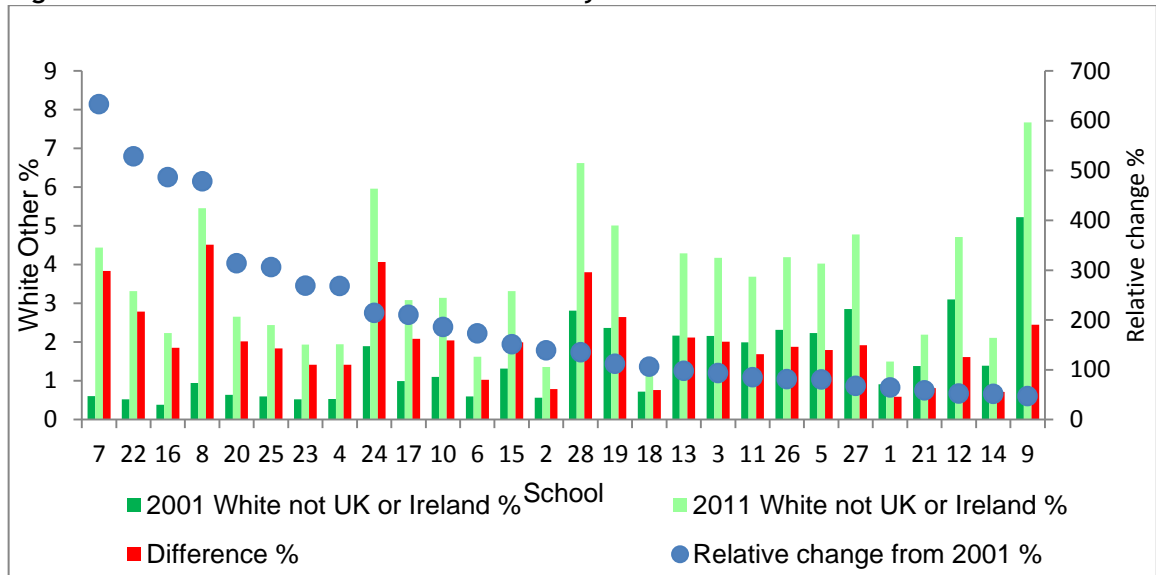
By looking at the summary statistics for those identifying as White Other in 2001 and 2011 by catchment area (Table 5-8), it can be seen that though the mean percentage rose, variation between catchment areas also increased with the standard deviation increasing, meaning that the variation between catchment areas in terms of the percentage of White Other residents grew.

Table 5-8: Summary statistics for those White Other by catchment area, 2001 and 2011

		Mean percentage	Standard deviation
White Other	2001	1.5	1.1
	2011	3.6	1.7

Again from the overall Glasgow City statistics, it could be seen that the proportion of people identifying as Asian, Asian Scottish or Asian British nearly doubled between 2001 and 2011. When looked at by catchment area, as in Figure 5-15, it is apparent that this increase occurred in all catchment areas but not equally. In seven of the catchment areas the Asian population more than tripled its size in relative terms, and of the remaining 21, nine more than doubled and ten increased by over half. The largest relative increases occurred in catchment areas with very low percentages in 2001.

Figure 5-15: Residents who are Asian, Asian British or Asian Scottish by catchment areas 2001 and 2011
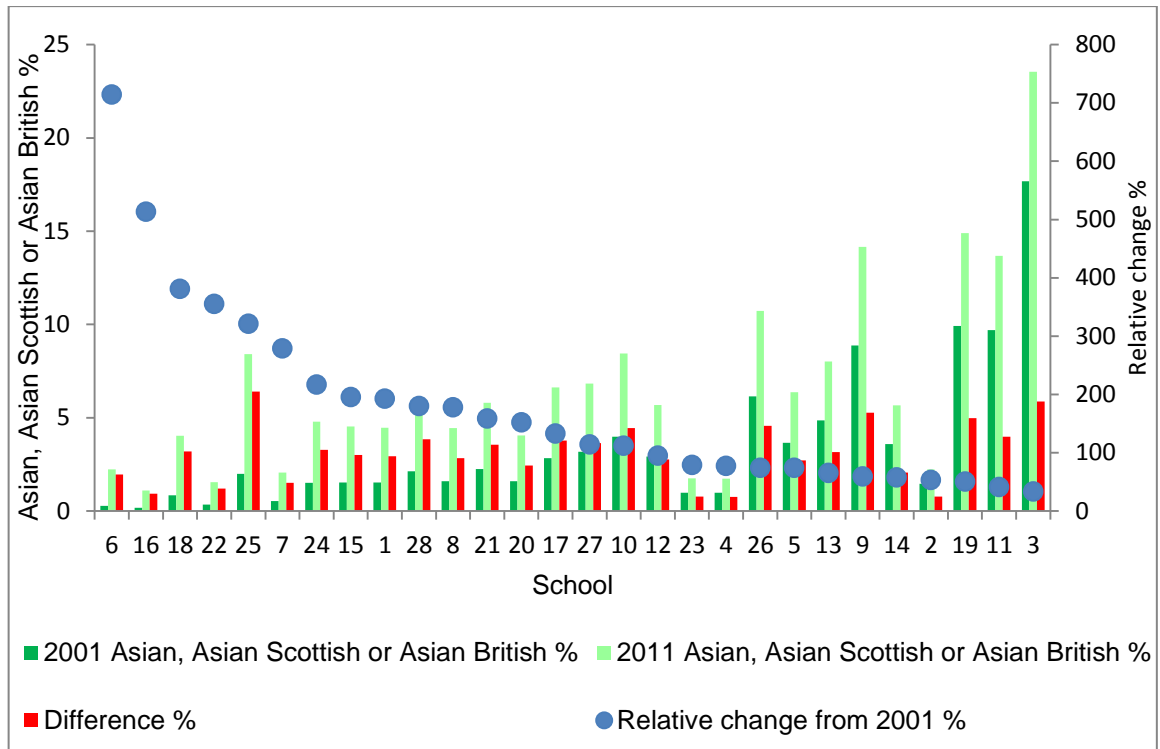
Looking at the summary statistics for Asian, Asian Scottish or Asian British residents, Table 5-9, it can be seen that, as with White Other residents, the mean rose but so did the standard deviation. This suggests that although there was an increase in all catchment areas, the variation between the catchment areas increased between 2001 and 2011.

Table 5-9: Summary statistics for Asian, Asian British or Asian Scottish residents by catchment area, 2001 and 2011

		Mean percentage	Standard deviation
Asian, Asian Scottish or Asian British	2001	3.5	3.9
	2011	6.6	5.0

5.3.6 Family structure

5.3.6.1 Scotland and Glasgow

Given the general view that family structure and social background can affect a child's educational attainment (Ermisch and Francesconi, 2001b), it is important to consider whether or not family structures have been changing. Family structure was compared over time by looking at the percentage of households made up of a lone parent with dependent children, one category of the

household composition measure in the census. The proportion of households comprising lone parents with dependent children in Glasgow fell slightly between 2001 and 2011 from 10.3% to 9.3%, however these were still higher than the Scotland average of 7.2% in 2001, and 7.6% in 2011, as can be seen below in Figure 5-16.

Figure 5-16: Households of lone parents with dependent children Glasgow and Scotland, 2001 and 2011
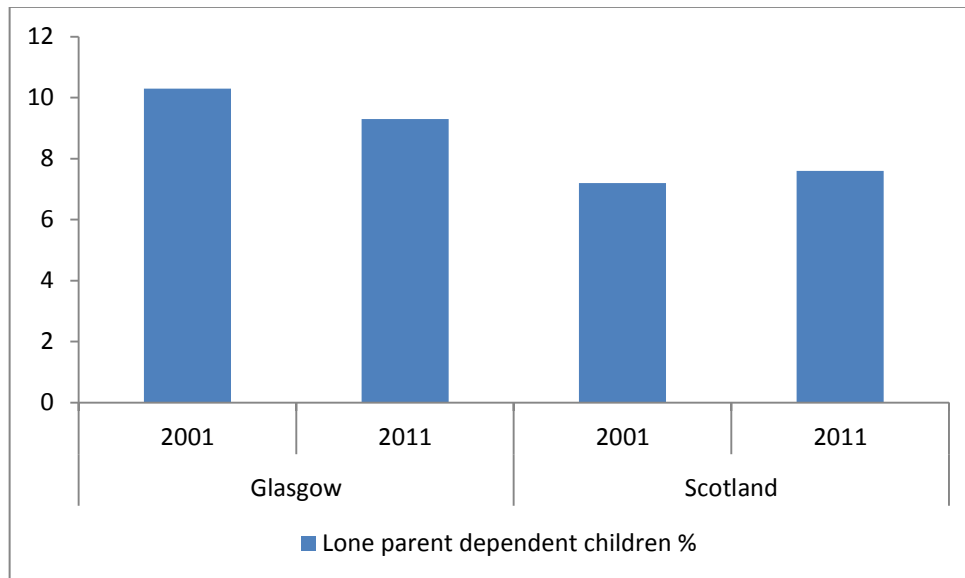
5.3.6.2 Catchment areas

Although the percentage of lone parents with dependent children fell slightly overall across Glasgow as a whole, this was not so across all the catchment areas, as can be seen in Figure 5-17. In two catchment areas, the percentage of households made up of lone parents of dependent children increased by a fifth or more in relative terms. There was a relative increase in a third of catchment areas and a relative decrease in the remaining two thirds, indicating very different experiences across catchment areas on this measure. There was not any obvious association between change in the percentage of lone parents with dependent children and absolute proportions in 2001.

Figure 5-17: Households of lone parents with dependent children by catchment area, 2001 and 2011
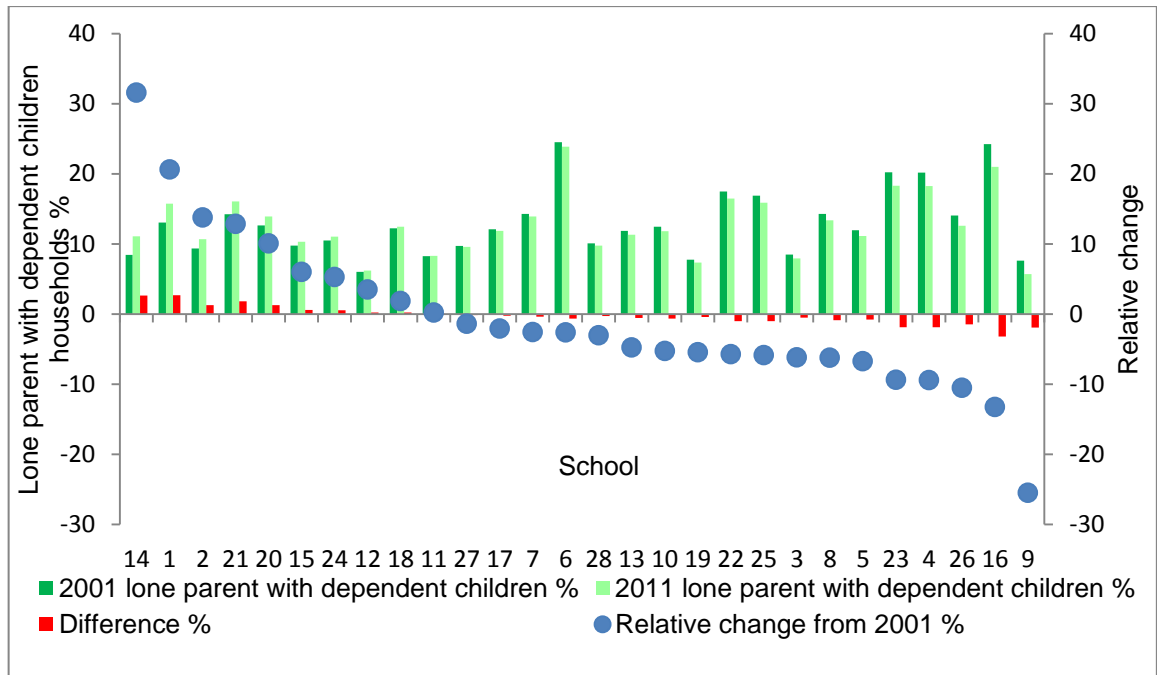
As can be seen in Table 5-10, the mean fell slightly, as did the standard deviation, suggesting that the catchment areas became slightly more similar in terms of the percentage of lone parents with dependent children in 2011 than they were in 2001.

Table 5-10: Summary statistics for lone parent with dependent children households by catchment area, 2001 and 2011

		Mean percentage	Standard deviation
Lone parent with dependent children	2001	13.0	4.8
	2011	12.7	4.3

5.3.7 Area deprivation

5.3.7.1 Glasgow

Deprivation was measured using the Scottish Index of Multiple Deprivation (SIMD) for 2004 and 2012, the two closest timepoints to the 2001 and 2011 censuses. The local share measure is the percentage of an area's data zones that are among the 15% most deprived in Scotland. It has been observed that area deprivation in Glasgow has been falling: in 2004, 53.9% of its data zones were in the 15% most deprived data zones in the whole of Scotland, but by 2012 the local share had dropped to 41.6% (Scottish Government, 2013). As this is a

relative measure of all of the data zones in Scotland, Scotland wide figures for local share are, by definition, 15% for both timepoints.

5.3.7.2 Catchment areas

Area deprivation, as measured by local share – the percentage of data zones that are in the most deprived 15% in Scotland – fell across Glasgow, and this is mirrored across the catchment areas. Two of the catchment areas had a local share of 100% in 2004, whereas by 2012, one catchment area had no data zones in the 15% most deprived, as can be seen in Figure 5-18. Some of the areas with the highest percentage of deprived data zones saw the smallest relative change in deprivation: seven out of eight catchment areas with over 80% of their data zones in the most deprived group in 2004 had a relative decrease of less than 20%, suggesting that the drop in deprivation was less marked in the most deprived areas.

Figure 5-18: Local share (area of percentage of data zones which are in the 15% most deprived in Scotland) by catchment area, 2004 and 2012
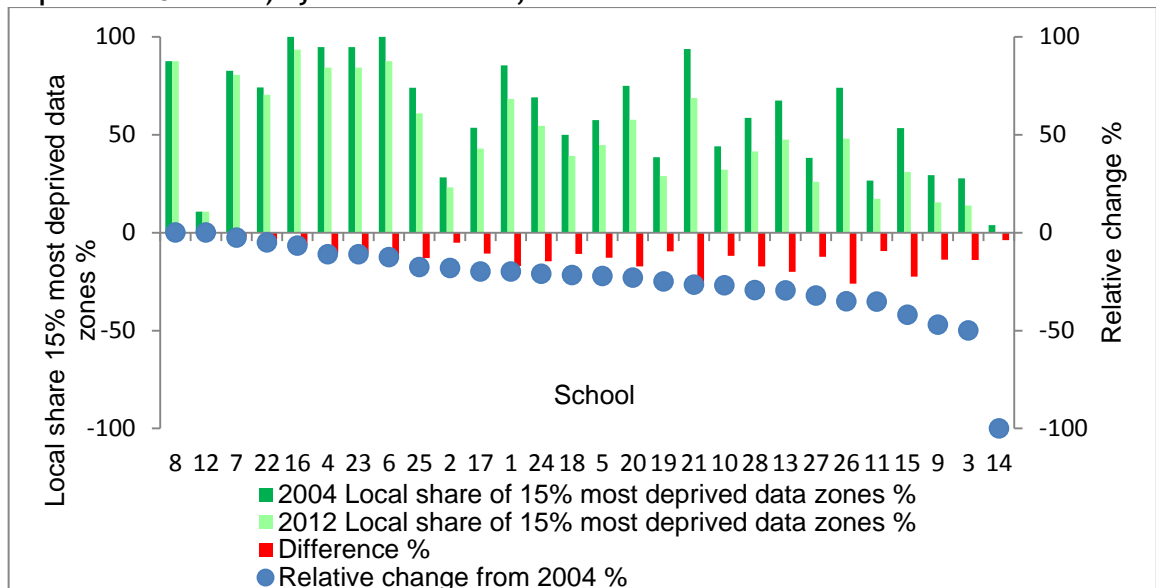
As can be seen in the summary statistics in Table 5-11, the mean local share fell to less than 50%, and the standard deviation fell very slightly, suggesting that the variation between the catchment areas decreased only slightly.

Table 5-11: Summary statistics for local share SIMD by catchment area, 2004 and 2012

		Mean percentage	Standard deviation
Local share SIMD	2004	60.4	27.7
	2012	48.6	26.9

5.4 Summary of city and catchment area changes

It is clear that the characteristics of the population of Glasgow City changed between the 2001 and 2011 censuses, an overview of which can be seen in the summary Table 5-12 below. In terms of housing tenure, the city saw an unforeseen drop in the levels of owner occupation, and an unprecedented rise in private renting (Meen, 2013). The catchment areas became less variable between 2001 and 2011 for owner occupation, however they became more variable in terms of social renting and private renting.

Between the two censuses, more of those of working age were in employment, had a degree or higher, and were in the highest three social class groupings. Fewer households were made up of a lone parent with dependent children. The ethnic makeup of the city also changed, with a larger share of those living in the city of White and not from the UK or Ireland, and Asian backgrounds. Ethnic mix changed much more dramatically in Glasgow than in the whole of Scotland between the censuses. Glasgow City also became relatively less deprived over the time period, when measured using the SIMD.

However, as can also be seen in Table 5-12, the changes over the period between the two censuses did not affect all of the catchment areas equally. The catchment areas became less variable between 2001 and 2011 for those in employment, lone parents with dependent children, and area deprivation, however they became more variable in terms of qualifications, ethnic mix and social class. The increases in variation between catchment areas were greater than the reductions, hence as a result of changes in the labour market, housing market and migration, school catchment areas in the city have become more varied over time. The two variables where catchment areas vary the most in their experience relative to the city-wide trend are owner occupation and lone parents. In both cases, school catchment areas split two-thirds: one-third in terms of whether they follow or counter the city-wide trend.

Table 5-12: Changes in Glasgow City measures from 2001 and 2011

Measure	Category	2001 (%)	2011 (%)	Absolute change (%)[13]	Relative change (%)	Glasgow trend	Catchment areas following trend (of 28)	Catchment areas countering trend (of 28)	Change in variance among catchment areas
Housing tenure	Owner occupied	48.5	45.6	-2.9	-6.0	decrease	18	10	Decrease
	Social rented	39.2	36.7	-2.5	-6.4	decrease	23	5	Increase
	Private rented	7.5	16.8	+9.3	+124.0	increase	28	0	Increase
Social class	NS-SEC categories 1 to 3	29.4	36.4	+7	+23.8	increase	28	0	Increase
Level of education	Level 4	17.9	25.9	+8	+44.7	increase	28	0	Increase
Working status	Working	46.9	52.7	+5.8	+12.4	increase	28	0	Decrease
Ethnic composition	White British/Irish	92.8	84.6	-8.2	-8.8	decrease	28	0	Increase
	White Other	1.8	3.9	+2.1	+116.7	increase	28	0	Increase
	Asian, Asian Scottish, or Asian British	4.4	8.0	+3.6	+81.8	increase	28	0	Increase
Family structure	Lone parents with dependent children	10.3	9.3	-1	-9.7	decrease	18	10	Decrease
Area deprivation	SIMD local share	53.9 (2004)	41.6 (2012)	-12.3	-22.8	decrease	26	2	Decrease

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[13] Absolute change (%) refers to the absolute change in percentage points between the two timepoints, while relative change (%) is the change as a percentage relative to the first timepoint.

5.5 Changes in school composition 2003-2012

As we have seen, the 28 school catchment areas varied in their characteristics, and, in terms of the majority of the census variables examined, became more variable between 2001 and 2011. This section explores to what extent any of these changes in the catchment area composition fed into the pupil composition of the schools.

Pupil level data, based on all pupils from 2003 and 2012 aggregated to school level, were examined for the two variables which were constructed in order to give an indication of the demographic composition of the schools – free school meal registration and ethnic mix – along with S4 educational attainment.

5.5.1 Free school meals

Given the reductions in area deprivation observed across the catchment areas, we would expect to see this mirrored in a reduction in pupils registered for free school meals within schools. Figure 5-19 shows the proportion of pupils in each school registered for free school meals, a measure very often used in school research as a proxy for deprivation. Free school meal registration decreased in the majority of schools, however it rose marginally in two. In all nine schools in which at least half of pupils were registered for free school meals in 2003, the percentage had fallen by over 20% in relative terms by 2012.

Figure 5-19: Pupils registered for free school meals by school, 2003 and 2012
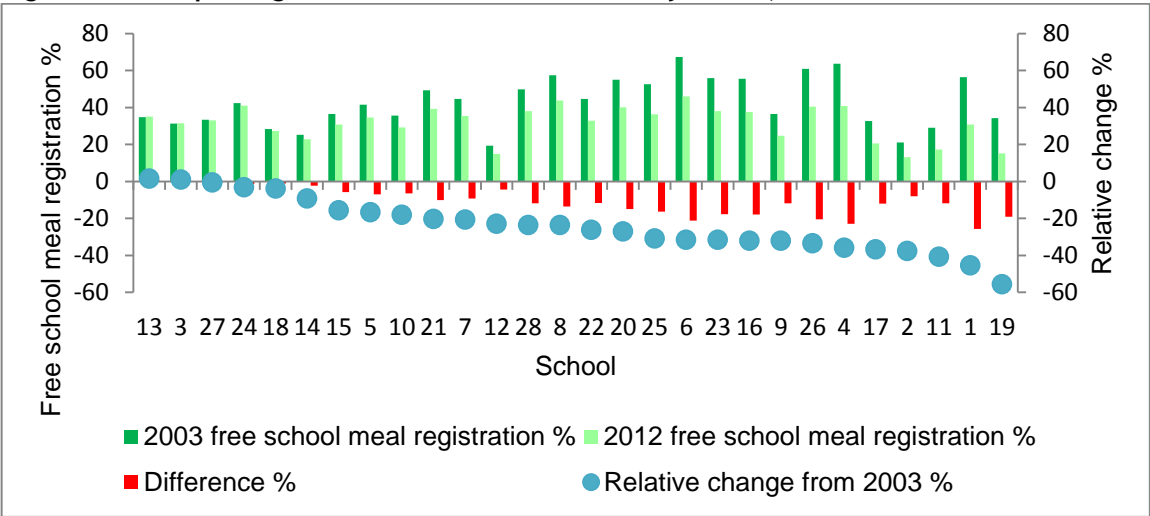
The mean and the standard deviation of the percentage of those registered for free school meals both decreased, as illustrated in Table 5-13, suggesting that the schools had a decrease overall but also that the schools became less varied in the percentage of pupils registered, reflecting the reduction in variation in percentage of deprived data zones per school catchment area.

Table 5-13: Summary statistics for those who are registered for free school meals, 2003 to 2012

		Mean percentage	Standard deviation
Free school meal registration	2003	42.7	13.3
	2012	31.8	9.2

5.5.2 Ethnic composition

Figure 5-20 shows the percentage of pupils identified through the pupil census as White British or Irish in 2003 and 2012, in each school. The percentage of White British/Irish pupils fell over time in all but seven of the schools, and in four schools it fell in relative terms by around 20%.

Figure 5-20: White British/Irish pupils by school 2003 and 2012
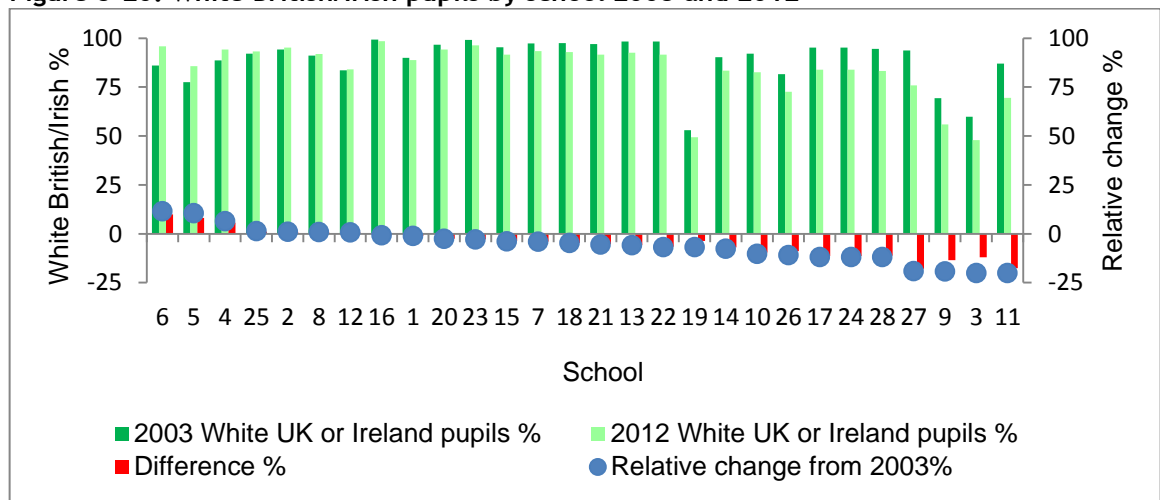
As can be seen from Table 5-14, the mean proportion of pupils identifying as White British/Irish went down but the standard deviation rose, suggesting that as well as the schools being more ethnically mixed overall, there was more variation between them in 2012 than there was in 2003, reflecting the changes in ethnic mix between the catchment areas as seen in section 5.3.5.

Table 5-14: Summary statistics for those who identify as White British/Irish, 2003 to 2012

		Mean percentage	Standard deviation
White British/Irish	2003	89.0	11.6
	2012	84.3	13.8

5.5.3 S4 educational attainment

Section 5.3.3 has already shown that the educational attainment of the adult population increased across all school catchment areas, and we might expect this to be reflected in pupil educational attainment, given the strong association between parental and child educational attainment (Brooks-Gunn et al., 1997). As outlined in the methods in section 4.4.3, S4 educational attainment was the mean percentage of those in S4 who gained 5 or more credit level Standard Grades in the three years closest to the timepoints. Indeed, as can be seen in Figure 5-21, all but four of the schools saw an increase between the timepoints in their S4 educational attainment score, with some of the lowest scoring schools in the first timepoint having the largest relative change. Six of the nine schools that had the lowest overall educational attainment at timepoint 1 (with under 20% of pupils with 5 or more credit qualifications) experienced relative increases of 50% or more in their share of higher attaining pupils and they were the only schools to experience such high relative increases.

Figure 5-21: S4 educational attainment score by catchment area, timepoint 1 and timepoint 2
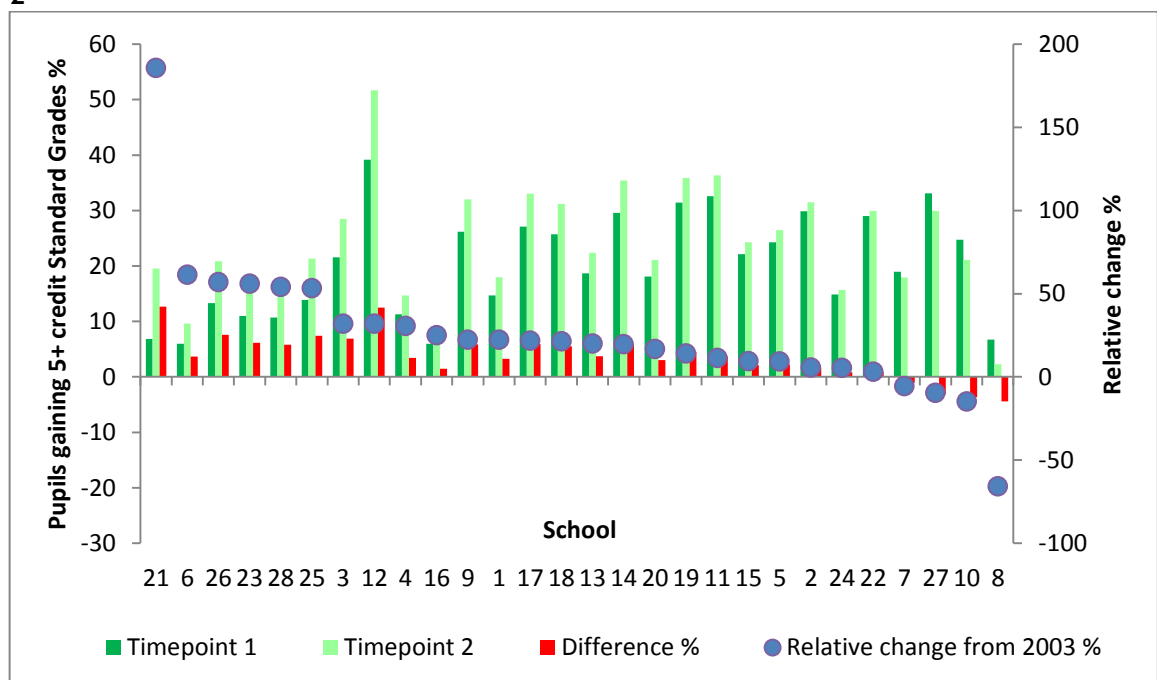
Although the mean was higher, the standard deviation was also slightly higher at timepoint 2, as can be seen in Table 5-15, suggesting that although the overall educational attainment score had risen, there was more variation between the schools in terms of educational attainment at timepoint 2 than there was at timepoint 1.

Table 5-15: Summary statistics for S4 educational attainment timepoint 1 and timepoint 2

		Mean percentage	Standard deviation
S4 educational attainment	Timepoint 1	20.3	9.4
	Timepoint 2	24.0	10.3

5.5.4 Summary of school change

Across the 28 schools between 2003 and 2012, there was a drop in the proportion of pupils registered for free school meals; a decrease in those identifying as White British/Irish; and an improvement in the overall S4 educational attainment scores of the schools, as can be seen in summary Table 5-16 below. However, as with the catchment area variables, these changes did not occur evenly across the schools. Although the registration for free school meals fell across most of the schools, in two it rose. Despite this, there was less variation between the schools in terms of free school meal registration in 2012 than there was in 2003. The schools became more ethnically mixed, however there was more variation between the schools in terms of their ethnic composition in 2012 than there was in 2003 – those schools that were already more ethnically mixed to start with became more so. The improvement in overall educational attainment was higher in schools that performed the most poorly in 2003. All but four of the schools improved in terms of educational attainment between 2003 and 2012, and there was slightly more variation in terms of educational attainment at timepoint 2 than at timepoint 1.

Table 5-16: Summary of school changes and trends

Measure	Overall trend	Schools following trend (of 28)	Schools countering trend (of 28)	Change in variance among schools
Free school meals	decrease	26	2	Decrease
Ethnic composition (White British/Irish)	decrease	21	7	Increase
S4 educational attainment	increase	24	4	Increase

5.6 Changes in catchment areas with a rise in owner occupation

As the aim of this thesis is to look at whether mixed tenure housing policy could make a difference to educational attainment, it is appropriate at this stage to look in more detail at the 10 catchment areas for which there was a rise in owner occupation between 2001 and 2011.

Table 5-17 shows the ten catchment areas that had an increase in owner occupation between 2001 and 2011, alongside the relative differences in some of the other measures. Those cases marked with a + or – indicate where a catchment area/school was in the top ten for largest relative increase or decrease in any of the other measures.

For example, the fact that for NS-SEC 1-3 seven of the schools were in the top ten for relative increase suggests that the places that saw increases in owner occupation tended to be the places that also saw increases in NS-SEC. Overall, the results in the table suggest those places which had an increase in owner occupation were also seeing corresponding increases in qualifications, social class, school educational attainment, and a reduction of free school meals. Six of the schools with an increase in owner occupation were in the top ten relative increases in school educational attainment. However, it is important to note that this could be a reflection of the mix of the area – for example an increase in the children of owner occupied households raising the average attainment - rather than through an impact on individual pupils.

Table 5-17: Outcomes for the ten catchment areas with increases in owner occupation

Catchment area/schools with increase in owner occupation	School attainment	Degree or higher	NS-SEC 1-3	Area deprivation	Working	Free school meals
	Relative difference	Relative difference	Relative difference	Relative difference	Relative difference	Relative difference
6	+		+		+	
23	+	+	+		+	-
4	+	+	+			-
25	+	+	+			
21	+				+	
20		+	+			
1						-
18			+		+	
8		+	+		+	
26	+			-		-

However, these findings are suggestive that mixed tenure housing policy in Glasgow could be having an impact on educational outcomes.

5.7 Overall summary

In order to look at whether mixed tenure housing could have an impact on educational attainment in Glasgow, firstly we needed to look at how the city changed overall, and by catchment area, as well as how the schools themselves changed.

In terms of the variables of interest, educational attainment and housing tenure, educational attainment rose overall in the schools, while owner occupation decreased across the city, but rose in ten of the catchment areas, so there was a differential experience between school catchments in housing tenure change. In the catchment areas there were also rises in private renting, those of working age in employment, those with a degree or higher, those in the highest three social class groupings, and those who were not White and from the UK or Ireland, and falls in social renting, and lone parents with dependent children. Within the schools, there were falls in those registered for free school meals and White British or Irish pupils.

However, the changes in the catchment areas between the 2001 and 2011 censuses, and between the schools from the 2003 and 2012 school data, were

not distributed evenly throughout the 28 catchment areas and schools, illustrating that catchment areas and schools within the city have differing trajectories. In some ways the catchment areas seemed less mixed in 2011 than they were in 2001 – they became more similar in terms of owner occupation, working and deprivation. However, they became less similar in terms of social and private renting, qualifications, ethnic mix and social class. The schools themselves became less variable in terms of free school meal registration, but more variable in terms of educational attainment and ethnic mix.

The ten catchment areas in which owner occupation rose also had increases in qualifications and higher social class categories, and in the schools a rise in educational attainment, and a reduction of free school meals. This has shown that in theory, mixed tenure housing policy to increase owner occupation in mainly social rented areas in Glasgow could be having an impact on educational outcomes, though this could be a reflection of the mix of the area rather than an impact on educational attainment, i.e. the average attainment of a school being raised through an influx of the children of owner occupiers, rather than an impact on individual pupil attainment. The next chapter will look at what association individual, neighbourhood and catchment area and school factors have on educational attainment at an individual level, with an emphasis on housing tenure.

6 Modelling individual pupil educational attainment

6.1 Introduction

The previous chapter looked at how catchment areas and schools had changed between the two timepoints[14], using census, Scottish Index of Multiple Deprivation (SIMD) and aggregated Glasgow City Council (GCC) school variables. It found that although the population of the city generally had become more professional and middle class, catchment areas had differing trajectories and had not all changed in the same way – generally, those that were already relatively middle class had becomes more so. It also found that owner occupation had fallen in most of the catchment areas, but had risen in ten and that educational attainment had risen overall. The data on the ten catchment areas with increased owner occupation showed some initial suggestion that mixed tenure housing could be impacting on educational attainment.

This chapter takes the analysis a step further, and looks at the association of housing tenure and other variables - at each timepoint and over time - with the outcome of interest, individual educational attainment. It answers the second research question: What explains individual educational attainment and changes in educational attainment, focusing especially on housing tenure?

In order to address this question, and due to the complexity of the data, several key pieces of analysis - detailed in methods section 4.6 - will be presented, using individual, neighbourhood, and catchment area/school data, collated from individual GCC, census and SIMD data. In order to simplify the presentation, and as outlined in section 4.6, the analysis will be presented in two phases. The first phase can be referred to as formative analysis – the process of formulating how the final models should be constructed - whereas the second phase can be referred to as the 'final' analysis. These are outlined as follows:

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[14] For simplicity, the model using census data from 2001, school data from 2003, and SIMD data from 2004 will be referred to as timepoint 1, and the model using census data from 2011, and school and SIMD data from 2012 will be referred to as timepoint 2 in this chapter.

- Formative analysis 1: What associations do pupil characteristics have with individual pupil educational attainment?

- Formative analysis 2: What association does housing tenure and other neighbourhood, catchment area and school characteristics have with individual pupil educational attainment?

- Formative analysis 3: To what extent do housing tenure and other neighbourhood, catchment area and school characteristics explain differences in educational attainment between neighbourhoods, and between schools?

- Formative analysis 4: What impact does accounting for neighbourhood, catchment area and school characteristics have on the effect of housing tenure on individual pupil educational attainment?

- Final analysis 1: To what extent can the variation in individual pupil educational attainment between neighbourhoods within schools, and between schools, be explained by neighbourhood, catchment area and school characteristics, for both timepoint 1 and timepoint 2?

- Final analysis 2: Does change in housing tenure between timepoint 1 and timepoint 2 explain differences in individual pupil educational attainment between the two timepoints?

This chapter will present the results of the formative and final analysis, however firstly a recap will be given of the type of modelling used, along with an overview of the individual educational attainment outcome variable, and an overview of the pupil, neighbourhood, and catchment area/school variables.

6.1.1 Analysis context and construction of the variables

In order to give context to the analysis strategy, a brief recap of the modelling approach will be given, followed by an outline of the construction of the individual educational attainment variable and the pupil, neighbourhood catchment area and school explanatory variables. A fuller account can be found in the methods section 4.4.3.

6.1.2 Multilevel modelling

The analysis approach used was multilevel modelling, a form of analysis that takes into account the inherent clustering in hierarchical data. This approach takes into account that the data were at different levels – individual pupil, neighbourhood, and catchment area/school – and accounts for the fact that pupils within a neighbourhood or school are more likely to be similar to each other than to pupils in other neighbourhoods or schools, and thus allows for pupils being nested within neighbourhoods, and neighbourhoods within school catchment areas. Therefore the modelling for the formative analysis and the first part of the final analysis uses a three level structure – pupils at level 1, neighbourhoods at level 2, and catchment areas/schools at level 3 – as can be seen in Figure 6-1; and the modelling for the second part of the final analysis uses a four level structure - pupils at level 1, timepoint at level 2, neighbourhoods at level 3, and catchment area/schools at level 4 – as can be seen in Figure 6-2.

Figure 6-1: three level model

```
┌──────────────────────┐
│   Catchment/school   │
└──────────┬───────────┘
           │
     ┌─────┴────────┐
     │ Neighbourhood│
     └──────┬───────┘
            │
         ┌──┴────┐
         │ Pupil │
         └───────┘
```
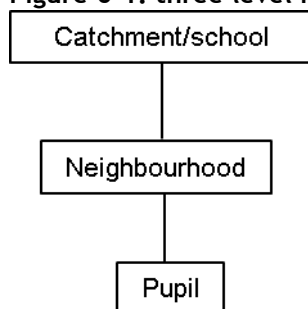
Figure 6-2: four level model

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┌──────────────────────┐
│   Catchment/school   │
└──────────┬───────────┘
           │
     ┌─────┴────────┐
     │ Neighbourhood│
     └──────┬───────┘
            │
       ┌────┴──────┐
       │ Timepoint │
       └─────┬─────┘
             │
          ┌──┴────┐
          │ Pupil │
          └───────┘
```
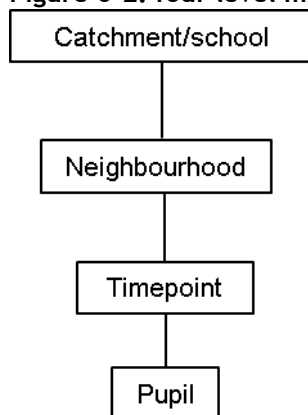
6.1.3 Individual pupil educational attainment

The outcome of interest for this analysis is the educational attainment of individual pupils, based on national examination results at the end of S4, in the 28 Glasgow schools at two timepoints – 2003 and 2012 (this is distinct from the aggregate whole-school educational attainment looked at in the previous chapter). The categories of the educational attainment variable are shown in Table 6-1.

Table 6-1: Structure of the individual educational attainment outcome variable

Educational attainment category	Label
0	Did not gain 5 or more foundation standard grades
1	Gained 5 or more foundation standard grades
2	Gained 5 or more general standard grades
3	Gained 5 or more credit standard grades

As detailed in section 4.6.5 of the methods, an ordered logit approach to modelling was taken. This approach and what this means in terms of interpreting the output of the analysis are discussed in more detail in the section on model interpretation in 4.6.5.1.

6.1.4 Individual pupil educational attainment distribution, by school

In order to look at how the outcome variable, individual pupil educational attainment, was distributed across the 28 schools, 'caterpillar plots' of group residuals were created. These are discussed in more detail in section 4.4.2.1 of the methods chapter. Figure 6-3 shows the school level residuals for timepoint 1 individual pupil educational attainment for the null (i.e. empty of any explanatory variables) model, ranked from lowest to highest. As can be seen, there was variation around the mean educational attainment, with 12 of the schools' confidence intervals crossing zero. This shows that the overall educational attainment in these schools did not differ significantly from the city-wide school mean. However the remaining 16 schools had confidence intervals that did not cross zero, which shows that the mean educational attainment in those schools differed significantly from the overall mean, with nine of these lower than the mean and seven above it.

Figure 6-3: Timepoint 1 unadjusted individual pupil educational attainment residuals by school
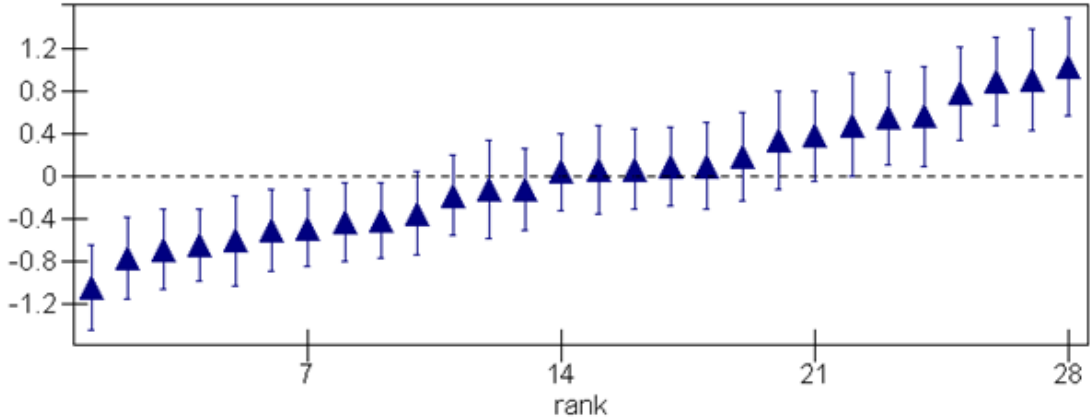
At timepoint 2, the number of schools that differed significantly from the mean drops to eight, indicating that there was less variation in individual educational attainment between schools than there was at timepoint 1. As can be seen in Figure 6-4 below, at timepoint 2 the variation was skewed towards above average educational attainment.

Figure 6-4: Timepoint 2 unadjusted individual pupil educational attainment residuals by school
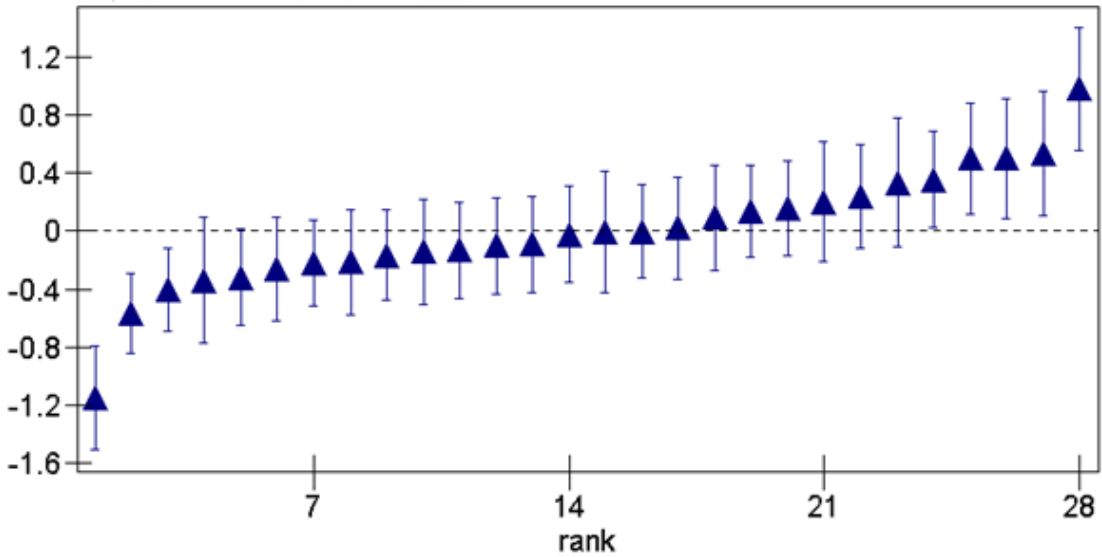
The residual plots of the final models will be shown after each set of models is presented in section 6.3.

6.2 Formative analyses results

6.2.1 Formative analysis 1: Association of pupil characteristics with individual pupil educational attainment

This section considers the individual pupil characteristics included in the analysis, and quantifies the association these characteristics have with individual pupil educational attainment.

6.2.1.1 Pupil characteristics

All individual pupil variables - gender, ethnicity, free school meal registration and looked after status – were included to take into account variations between pupils that could impact on their educational outcomes. They were all categorical, with one category used as the reference category for each, and they were all sourced from data provided by GCC. Individual pupil variables are shown in Table 6-2, along with the name that they are referred to in the analysis and tables from this point on. For more detailed information on the construction of these variables see methods section 4.4.3.

Table 6-2: Pupil characteristic variables, with reference category

Level	Variable name	Reference category
1 – Pupil	Gender	Male
1 – Pupil	Free school meals	Registered for free school meals
1 – Pupil	Ethnicity[15]	White and from the UK or Ireland
1 – Pupil	Looked after	Not looked after

Due to the issues of scaling with ordered multinomial models (discussed in more detail in the methods, section 4.6.11), in that residual variance at level 1 is fixed, models with level 1 explanatory variables *cannot* be directly compared with a null model – a model with no explanatory variables. Therefore, all subsequent models throughout this chapter are compared with what is referred to as the baseline model, unless otherwise specified. The baseline model is a three level model, with pupils nested in neighbourhoods, and neighbourhoods nested in catchment area/schools, that includes pupil characteristics.

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[15] The ethnicity variable also had a 'missing' category, however coefficients for this category are not shown – see section 4.4.5 for more details.

6.2.1.2 How are pupil characteristics associated with educational attainment?

As outlined in the methods section 4.6.5.1, output from an ordered logit model enables the determination of a set of expected probabilities – the probabilities that an individual pupil will be in each of the four educational attainment categories. This chapter is primarily interested in exploring whether housing tenure can explain differences in individual pupil educational attainment between neighbourhoods and between schools, and less on the specific expected probabilities for educational attainment. However, to get a sense of the effects and strength of each variable and in order to inform decisions about their inclusion in the final models, how each covariate is associated with the expected probabilities of individual educational attainment is looked at. The explanatory variable coefficients relate to the probability of the *non-reference* category pupils scoring *lower* on the outcome variable, since the non-reference categories were set up to have a positive association with higher educational attainment (except for looked after status) - this is explained in detail in section 4.6.5.1. This means that we would expect the coefficients - with the exception of looked after status - to be negative. As such, the association of the pupil characteristics with educational attainment are presented below.

Each pupil covariate was included in a null model by itself in turn, giving one overall coefficient for that covariate (shown on the same row as the covariate name in Table 6-3) and three coefficients for the educational attainment categories 0, 1 and 2 (shown in same row as each educational attainment category). Table 6-3 also shows the antilogit and expected probabilities for the reference category and the non-reference category (see section 4.6.5.1 in chapter 4 for further explanation of how these expected probabilities are calculated). In terms of magnitude, the further a coefficient is from zero, the more pronounced the differences are between the expected probabilities. Reassuringly, the coefficients for the pupil covariates are in the direction one would expect - negative, except for looked after status.

For gender, the coefficient is -0.459, it can be seen that males are more likely than females to be in the lowest educational attainment category (17% for males, 12% for females), and that females are more likely to be in the highest

educational attainment category (22% for females, 15% for males). For those not registered for free school meals the coefficient is stronger, at -1.002, and those who are not registered are far more likely to be in the higher educational attainment categories than those registered for free school meals (25% versus 11%, respectively). Ethnicity is quite close to zero, at -0.167, and pupils who are *not* White British/Irish are slightly more likely to be in the higher categories than pupils who *are* White British/Irish (21% versus 19% respectively). The looked after coefficient is strong at 2.205, and those who are not looked after are also far more likely to be in the higher educational attainment categories as opposed to those who are looked after (19% versus 2%, respectively). These results are in line with what would be expected from theory and literature.

Table 6-3: Timepoint 1 pupil covariates effect on individual educational outcomes, with antilogit and expected probability

Educational attainment category	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
Gender	-0.459	**Male**		Female	
0. <5 foundation	-1.575	0.17	17%	0.12	12%
1. >5 foundation	-0.401	0.40	23%	0.30	18%
2. >5 general	1.721	0.85	45%	0.78	48%
3. >5 credit	-	-	15%	-	22%
Free School Meals	-1.002	**Free school meals**		No free school meals	
0. <5 foundation	-1.230	0.23	23%	0.10	10%
1. >5 foundation	-0.042	0.49	26%	0.26	16%
2. >5 general	2.094	0.89	40%	0.75	49%
3. >5 credit	-	-	11%	-	25%
Ethnicity	-0.167	**White British/Irish**		Not White British/Irish	
0. <5 foundation	-1.793	0.14	14%	0.12	12%
1. >5 foundation	-0.628	0.35	21%	0.31	19%
2. >5 general	1.474	0.81	47%	0.79	48%
3. >5 credit	-	-	19%	-	21%
Looked after status	2.205	Looked after		**Not looked after**	
0. <5 foundation	-1.816	0.60	60%	0.14	14%
1. >5 foundation	-0.643	0.83	23%	0.34	20%
2. >5 general	1.460	0.98	15%	0.81	47%
3. >5 credit	-	-	2%	-	19%

Note: Reference category in bold

Table 6-4 shows the same analysis as Table 6-3 above, however this time for the pupil covariates for timepoint 2. It can be seen that overall, the coefficients at timepoint 2 are less strong than at timepoint 1, and that pupils at timepoint 2 are less likely to be in the lowest educational attainment categories – especially <5 foundation - than at timepoint 1. Those that are female, not White British/Irish, are not registered for free school meals, and those that are not looked after, tend once more to be in the higher educational attainment

categories more often than with their counterparts in the reference categories. Again, results are in line with what would be expected.

Table 6-4: Timepoint 2 pupil covariates effect on individual educational outcomes, with antilogit and expected probability

Category	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
Gender	-0.401	**Male**		Female	
0. <5 foundation	-2.969	0.05	5%	0.03	3%
1. >5 foundation	-0.924	0.28	24%	0.21	18%
2. >5 general	1.321	0.79	51%	0.72	51%
3. >5 credit	-	-	21%	-	28%
Free School Meals	-0.853	**Free school meals**		No free school meals	
0. <5 foundation	-2.607	0.07	7%	0.03	3%
1. >5 foundation	-0.546	0.37	30%	0.20	17%
2. >5 general	1.719	0.85	48%	0.70	51%
3. >5 credit	-	-	15%	-	30%
Ethnicity	-0.162	**White British/Irish**		Not White British/Irish	
0. <5 foundation	-3.145	0.04	4%	0.04	4%
1. >5 foundation	-1.106	0.25	21%	0.22	18%
2. >5 general	1.129	0.76	51%	0.72	50%
3. >5 credit	-	-	24%	-	28%
Looked after status	1.533	Looked after		**Not looked after**	
0. <5 foundation	-3.237	0.15	15%	0.04	4%
1. >5 foundation	-1.169	0.59	44%	0.24	20%
2. >5 general	1.081	0.93	34%	0.75	51%
3. >5 credit	-	-	7%	-	25%

Note: Reference category in bold

6.2.1.3   Summary of formative analysis 1

These results provide reassurance that the individual pupil characteristics have been constructed in a theoretically sound way, and also show that all four of the individual pupil characteristics - gender, free school meals status, ethnicity and looked after status - have an association with educational attainment at both timepoints, and should be included in the final models.

6.2.2 Formative analysis 2: Associations of housing tenure and other neighbourhood and catchment area/school characteristics with pupil educational attainment

This section looks at the neighbourhood, catchment area and school characteristics – or context characteristics - and gives a brief recap of the variables that have been constructed. It examines the association of each context characteristic, starting with housing tenure, with individual pupil educational attainment.

6.2.2.1   Neighbourhood, catchment area and school characteristics

Almost all the neighbourhood, catchment area and school context characteristics, or explanatory variables, were constructed as proportions (with two exceptions – denomination and neighbourhood area deprivation) and all are constructed from one of either census, GCC or SIMD data. All variables can be found in Table 6-5, with the variable name; the shortened name used in the modelling; and a description of the measure. All context characteristic variables were constructed in line with the expectation from theory and literature that an *increase* in the value of the variable would be associated with a *higher* chance of a pupil being in the *highest* educational attainment category, therefore, as with the pupil variables, we would expect the coefficients produced to be negative.

Table 6-5: Description of neighbourhood and catchment area/school context variables

Level	Variable name	Name in models	Measure description
2 – Neighbourhood	Housing tenure	Tenure	Proportion of households in the neighbourhood that are owner occupied
2 – Neighbourhood	Social class	NS-SEC	Proportion of those of working age in neighbourhood in NS-SEC categories 1-3
2 – Neighbourhood	Level of education	Education	Proportion of those of working age in neighbourhood with Level 4 qualification (degree) or above
2 – Neighbourhood	Working status	Working	Proportion of those of working age in the neighbourhood who are in employment
2 – Neighbourhood	Ethnic mix	Ethnic mix	Proportion of all people in the neighbourhood that do not identify as being White British/Irish
2 – Neighbourhood	Family structure	Family structure	Proportion of households in the neighbourhood that are not single parents with dependent children
2 – Neighbourhood	Area deprivation	SIMD	SIMD quintile of the neighbourhood
3 – Catchment	Housing tenure	Tenure	Proportion of households in the catchment area that are owner occupied
3 – Catchment	Social class	NS-SEC	Proportion of those of working age in catchment area in NS-SEC categories 1-3
3 – Catchment	Level of education	Education	Proportion of those of working age in catchment area with Level 4 qualification or above
3 – Catchment	Working status	Working	Proportion of those of working age in the catchment area who are in employment
3 – Catchment	Ethnic mix	Ethnic mix	Proportion of all people in the catchment area that do not identify as being White British/Irish
3 – Catchment	Family structure	Family structure	Proportion of households in the catchment area that are not single parents with dependent children
3 – Catchment	Area deprivation	SIMD	Proportion of neighbourhoods in the catchment area that are not in the 15% most deprived in Scotland
3 – School	S4 educational attainment	S4 attainment	Proportion of S4 pupils who gained >5 credit Standard Grades in the three years surrounding the timepoint
3 – School	Denomination	Denomination	Non-denominational (ref) or Roman Catholic
3 – School	Free school meals	Free school meals	Proportion of pupils who are not registered for free school meals
3 – School	School ethnic mix	Ethnic mix	Proportion of pupils who are not White British/Irish

Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation

6.2.2.2 How is housing tenure associated with individual pupil educational attainment?

In order to look at the effects of housing tenure, our key explanatory variable of interest, on the educational attainment outcome variable, two models for each timepoint were run. Both models were constructed from the baseline model (which includes the pupil characteristics), with the first adding *neighbourhood* housing tenure to the baseline, and the second adding *catchment area* housing tenure to the baseline. Models which consist of the baseline model plus one other explanatory variable, such as these, are referred to as single context-variable models throughout. The housing tenure coefficients and their corresponding p-values tell us about the "independent" (of other factors included in the model) effects of housing tenure on educational attainment.

As the housing tenure variables constructed are proportions, the coefficients are interpreted as the (potentially hypothetical) effect on a pupil's educational attainment of living in an area where *none* of the households are owner occupied, vs the effect of living in an area where *all* of the households are owner occupied[16]. The magnitude of the effects is determined from how far the coefficient is from zero, and contrasting the expected probabilities that a pupil will fall into the four educational attainment categories: these are shown for timepoint 1 and timepoint 2 in Table 6-6 and Table 6-7 respectively. Further explanation of the interpretation of the coefficients can be found in section 4.6.5.1 of the methods.

Comparing the housing tenure coefficients at neighbourhood and catchment, we can see that the associations of housing tenure with educational attainment are slightly greater for catchment area tenure (-2.350) than for neighbourhood tenure (-1.916). One would expect that a higher proportion of owner occupied households in an area would be associated with a higher chance of pupils being in the higher educational attainment categories, and this is supported by the data for both timepoints. For timepoint 1 this is seen in the findings shown in Table 6-6: accounting for individual pupil characteristics, nearly a quarter (23%) of pupils in a neighbourhood where *all* households were owner occupied would

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[16] This interpretation is discussed in more detail in section 4.6.5.1 of the methods. Please note that this analysis is not carried out for each iteration of the model, but will be discussed for the fully adjusted model only.

be in the highest educational attainment category; 50% would be in the second highest category; 17% in the third highest; and 10% in the lowest category. Whereas only one in 25 (4%) of pupils in a neighbourhood where *none* of the households were owner occupied would be in the highest category; 24% in the second highest category; 29% in the third highest; and 43% in the lowest category. For housing tenure at the catchment area, there is a similar picture, with 26% of pupils in the highest educational attainment category if they lived in a catchment area in which all houses were owner occupied, compared with 3% in a catchment area in which no houses were owner occupied. As with looking at the association of pupil characteristics with educational attainment, the further the coefficient is from zero, the more pronounced are the differences between the two sets of expected probabilities.

Table 6-6: The associations of neighbourhood and catchment area housing tenure with pupil educational attainment at timepoint 1

Variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
Neighbourhood tenure	-1.916	none owner occupied		all owner occupied	
0. <5 foundation	-0.285	0.43	43%	0.10	10%
1. >5 foundation	0.926	0.72	29%	0.27	17%
2. >5 general	3.119	0.96	24%	0.77	50%
3. >5 credit			4%		23%
Catchment tenure	-2.350	none owner occupied		all owner occupied	
0. <5 foundation	0.138	0.51	53%	0.09	9%
1. >5 foundation	1.371	0.78	26%	0.25	16%
2. >5 general	3.580	0.97	18%	0.74	50%
3. >5 credit			3%		26%

Note: controlling for pupil characteristics.

Table 6-7, which shows the results for timepoint 2, also supports the theory that a greater percentage of pupils would be in the higher educational attainment categories in neighbourhoods and catchment areas where all houses were owner occupied as opposed to those where no houses were.

Unlike timepoint 1, neighbourhood housing tenure (-1.599) is slightly stronger than catchment area housing tenure (-1.414). Adjusting for individual pupil characteristics, a pupil would have a 28% chance of being in the highest educational attainment category if all houses in the neighbourhood were owned, compared with a 7% chance of being in the same category if none of the houses are owned. A pupil would have a 25% probability of being in the highest category

where all houses in the catchment area were owned, and a 7% chance if no houses were owned. However, the probability of any pupils being in the lowest category is lower at timepoint 2 than at timepoint 1. At the later timepoint, there is very little difference in the effects of neighbourhood and catchment area housing tenure upon educational attainment.

Table 6-7: The effects of neighbourhood and catchment area housing tenure on pupil educational attainment at timepoint 2

Variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
Neighbourhood tenure	-1.599	none owner occupied		all owner occupied	
0. <5 foundation	-1.872	0.13	13%	0.03	3%
1. >5 foundation	0.234	0.56	42%	0.20	17%
2. >5 general	2.556	0.93	37%	0.72	52%
3. >5 credit			7%		28%
Catchment tenure	-1.414	none owner occupied		all owner occupied	
0. <5 foundation	-1.867	0.14	13%	0.04	4%
1. >5 foundation	0.240	0.57	43%	0.23	20%
2. >5 general	2.548	0.93	37%	0.75	52%
3. >5 credit			7%		25%

Note: controlling for pupil characteristics.

Overall, the coefficients are smaller for both neighbourhood and catchment area housing tenure at timepoint 2 than at timepoint 1, suggesting that associations between housing tenure and educational attainment are weaker at timepoint 2 than at timepoint 1. However, for both years and both neighbourhood and catchment area, there *is* an association between housing tenure with educational attainment, over and above pupil background characteristics. This is an important finding, and suggests that there may be evidence for mixed tenure housing policy having an association with individual educational attainment. Whether this is borne out accounting for other contextual variables is explored later in the chapter.

6.2.2.3 Random slopes model

Multilevel models allow the exploration of random effects (in this case the neighbourhood and catchment area/school levels), by allowing the effects of predictor variables to vary across the levels in what is called a random slopes model (Steele, 2011). The baseline models plus housing tenure for timepoint 1 and timepoint 2 were run with housing tenure allowed to vary, firstly for

neighbourhood, and secondly for catchment area, but were found to be insignificant at both timepoints – in other words the effect of housing tenure on educational attainment did not vary across the schools and neighbourhoods.

6.2.2.4 How are other neighbourhood, catchment area and school characteristics associated with individual pupil educational attainment?

In order to be able to assess their respective effects, we now consider how the other neighbourhood, catchment area and school variables, or "covariates", were associated with educational attainment when added to the baseline model

Table 6-8 shows the neighbourhood, catchment area and school covariates for timepoint 1, along with their educational attainment-specific expected probabilities. As with the calculations for housing tenure in section 6.2.2.2 above, the 'none' column shows the expected probabilities of a pupil being in each educational attainment category if (potentially hypothetically) *none* of the households/residents[17] were in the covariate category that the proportion represents, and the 'all' column shows the expected probabilities if *all* of the households/residents were in the covariate category – outlined in section 4.6.6.2. Depending on the geographical level of the covariate, the probabilities are for a pupil where all or none of the households/residents in their neighbourhood, catchment area, or school exhibit the characteristic in question. The exceptions to this are denomination, which is a categorical as opposed to a proportional outcome: the first denomination category shows expected educational attainment probabilities for non-denominational schools, and the second shows them for Catholic schools; and neighbourhood SIMD, which is a five category variable, which as is common in this type of analysis, will be treated as continuous. Neighbourhood SIMD is centred around the mean (1.68) and the expected probabilities can be interpreted as those for a pupil with the average neighbourhood SIMD. The magnitude of the associations is assessed by how far the coefficient is from zero, and neighbourhood covariates will be discussed firstly, followed by catchment area/school covariates.

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[17] Whether this is households or residents depends on the variable, and is outlined in section 4.4.3 on the construction of the variables.

As can be seen in Table 6-8, neighbourhood family structure and social class show the largest magnitude of associations with pupil educational attainment of the neighbourhood characteristics, with coefficients of -4.545 and -4.093 respectively. In each case the chances of a pupil achieving the highest level of educational attainment is greater when all residents share the most educationally beneficial characteristic compared with a situation where none do so - not being a single parent 16% vs 0%; being in NS-SEC category 1-3 69% vs 4%. Slightly smaller associations are seen for level of adult education in the neighbourhood, at -3.862. The chances of a pupil being in the highest educational attainment category where all residents in the neighbourhood have a degree or higher is 74%, compared to 6% in a neighbourhood in which none of the residents have a degree. Weaker associations, though still in the direction expected, are observed for neighbourhood working status, ethnic mix and area deprivation.

Among catchment area covariates, the two strongest associations are seen for family structure (-8.575) and working status (-5.172), and these are greater than at neighbourhood level. Whilst there would be close to zero chance of pupils achieving the highest level of educational attainment if all households in the catchment area were single parent families, 22% would achieve the highest level of educational attainment if none of the households in the catchment area were of this type. If all working-age adults in the catchment area were in employment, the chances of a pupil achieving the highest level of educational attainment are more than sixty times greater than if none of the adults in the catchment area were working (62% vs 1%). There are somewhat smaller but still very positive associations of educational attainment with catchment area social class (-3.587, 57% vs 4%), level of education (-2.486, 44% vs 6%), ethnic mix (-2.084, 40% vs 8%), and catchment area SIMD (-1.307, 18% vs 2%).

The school covariates are S4 educational attainment, free school meals, denomination and ethnic mix. For S4 educational attainment, the strongest at -4.768, we see a self-reinforcing association with educational attainment levels: the chances of an individual pupil achieving the highest level of educational attainment are much higher where all pupils in the school achieved this level in recent years (81%), compared with a situation where none of the pupils at the school did so (3%). Free school meals has the next strongest association (-2.650),

and the chances of a pupil achieving the highest level of educational attainment are more than ten times greater where none of the pupils in the school are registered for free school meals (23%), compared with a situation where all pupils are registered (2%). Small positive associations are seen between individual pupil educational attainment and both the denomination of the school (10% Roman Catholic, 8% non-denominational) and its ethnic composition (14% all ethnic minorities; 8% none).

Table 6-8: The effects of neighbourhood and catchment area covariates on pupil educational attainment expected probabilities at timepoint 1

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
Neighbourhood					
		None of working age in NS-SEC 1-3		All of working age in NS-SEC 1-3	
NS-SEC	-4.093				
0. <5 foundation	-0.098	0.476	48%	0.015	1%
1. >5 foundation	1.105	0.751	28%	0.048	3%
2. >5 general	3.291	0.964	21%	0.310	26%
3. >5 credit			4%		69%
		None of working age with level 4 qualifications		All of working age with level 4 qualifications	
Education	-3.862				
0. <5 foundation	-0.586	0.358	36%	0.012	1%
1. >5 foundation	0.620	0.650	29%	0.038	3%
2. >5 general	2.804	0.943	29%	0.258	22%
3. >5 credit			6%		74%
		None of working age in employment		All of working age in employment	
Working	-3.372				
0. <5 foundation	0.380	0.594	59%	0.048	5%
1. >5 foundation	1.590	0.831	24%	0.144	10%
2. >5 general	3.775	0.978	15%	0.599	46%
3. >5 credit			2%		40%
		All White British/Irish		None White British/Irish	
Ethnic mix	-0.354				
0. <5 foundation	-1.017	0.266	27%	0.202	20%
1. >5 foundation	0.197	0.549	28%	0.461	26%
2. >5 general	2.372	0.915	37%	0.883	42%
3. >5 credit			9%		12%
		All households headed by lone parent		No households headed by lone parent	
Family structure	-4.545				
0. <5 foundation	2.792	0.942	94%	0.148	15%
1. >5 foundation	4.006	0.982	4%	0.368	22%
2. >5 general	6.190	0.998	2%	0.838	47%
3. >5 credit			0%	0%	16%
		Expected probability for pupils with average N SIMD			
SIMD	-0.465				
0. <5 foundation	-1.140	0.167	17%		
1. >5 foundation	0.060	0.400	23%		
2. >5 general	2.254	0.857	46%		
3. >5 credit			14%		
Catchment area					
		None of working age in NS-SEC 1-3		All of working age in NS-SEC 1-3	
NS-SEC	-3.587				
0. <5 foundation	-0.079	0.480	48%	0.025	2%

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
1. >5 foundation	1.135	0.757	28%	0.079	5%
2. >5 general	3.310	0.965	21%	0.431	35%
3. >5 credit			4%		57%
		None of working age with level 4 qualifications		All of working age with level 4 qualifications	
Education	-2.486				
0. <5 foundation	-0.652	0.343	34%	0.042	4%
1. >5 foundation	0.563	0.637	29%	0.128	9%
2. >5 general	2.737	0.939	30%	0.562	43%
3. >5 credit			6%		44%
		None of working age in employment		All of working age in employment	
Working	-5.172				
0. <5 foundation	1.310	0.788	79%	0.021	2%
1. >5 foundation	2.523	0.926	14%	0.066	5%
2. >5 general	4.697	0.991	7%	0.383	32%
3. >5 credit			1%		62%
		All White British/Irish		None White British/Irish	
Ethnic mix	-2.084				
0. <5 foundation	-0.895	0.290	29%	0.048	5%
1. >5 foundation	0.320	0.579	29%	0.146	10%
2. >5 general	2.495	0.924	34%	0.601	46%
3. >5 credit			8%		40%
		All households headed by lone parent		No households headed by lone parent	
Family structure	-8.575				
0. <5 foundation	6.443	0.998	100%	0.106	11%
1. >5 foundation	7.659	1.000	0%	0.286	18%
2. >5 general	9.837	1.000	0%	0.779	49%
3. >5 credit			0%		22%
		All households in 15% most deprived		No households in 15% most deprived	
SIMD	-1.307				
0. <5 foundation	-0.513	0.139	14%	0.689	69%
1. >5 foundation	0.700	0.353	21%	0.882	19%
2. >5 general	2.873	0.827	47%	0.985	10%
3. >5 credit			2%		18%
School					
		No pupils gained 5 or more Credit qualifications		All pupils gained 5 or more Credit qualifications	
S4 attainment	-4.768				
0. <5 foundation	-0.053	0.487	49%	0.008	1%
1. >5 foundation	1.158	0.761	27%	0.026	2%
2. >5 general	3.331	0.965	20%	0.192	17%
3. >5 credit			3%		81%
		All pupils registered for free school meals		No pupils registered for free school meals	
Free school meals	-2.650				
0. <5 foundation	0.492	0.621	62%	0.104	10%

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
1. >5 foundation	1.706	0.846	23%	0.280	18%
2. >5 general	3.880	0.980	13%	0.774	49%
3. >5 credit			2%		23%
		All pupils White British/Irish		No pupils White British/Irish	
School ethnic mix	-0.594				
0. <5 foundation	-0.960	0.175	17%	0.277	28%
1. >5 foundation	0.254	0.416	24%	0.563	29%
2. >5 general	2.429	0.862	45%	0.919	36%
3. >5 credit			14%		8%
		Non-denominational		Roman Catholic	
Denomination	-0.187				
0. <5 foundation	-0.971	0.275	27%	0.239	24%
1. >5 foundation	0.244	0.561	29%	0.514	28%
2. >5 general	2.419	0.918	36%	0.903	39%
3. >5 credit			8%		10%

Note: controlling for pupil characteristics, Reference category in bold
Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation

Though these tables show the impact on the expected probabilities, they do not show the significance or confidence intervals of each covariate coefficient. Figure 6-5 shows the coefficient point estimates and 95% confidence intervals for the timepoint 1 neighbourhood, catchment area and school covariates included in single context-variable models, in the same order as Table 6-8. As can be seen, the confidence intervals for the majority of variables do not cross zero and are therefore significant at a 5% significance level. However, the confidence intervals for ethnic mix in neighbourhood, catchment area and school, along with denomination, cross zero indicating that these are not significant. Catchment area family structure has quite wide confidence intervals compared with the other covariates, indicating that these effects are not as precise, and that we can be less sure that this is a true effect, and not due to random variation.

Figure 6-5: Confidence intervals for neighbourhood, catchment area and school variables timepoint 1
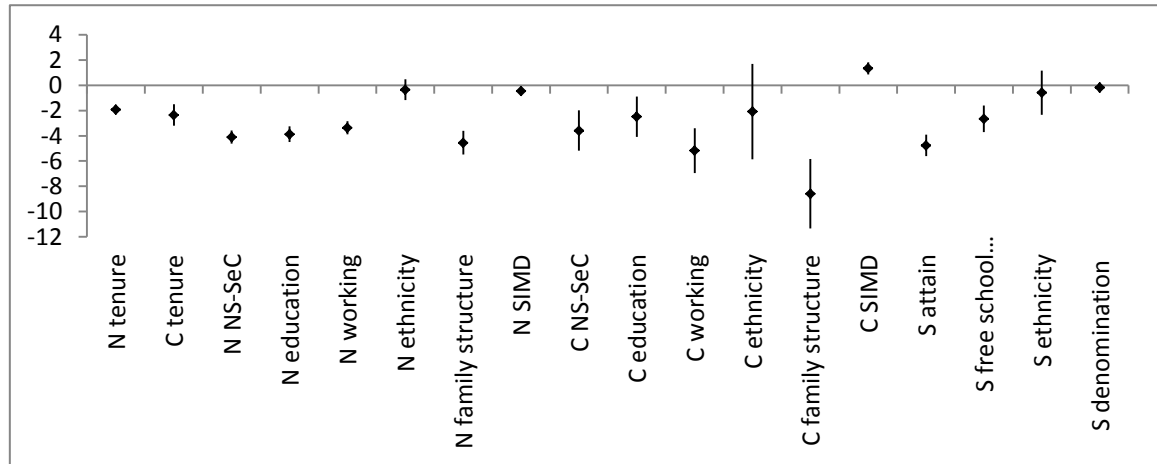
Note: controlling for pupil characteristics. N = neighbourhood, C = catchment area, S = school

Table 6-9 shows the single context-variable model results for the timepoint 2 neighbourhood, catchment area and school covariates.

For the neighbourhood, the covariates which have the strongest association with educational attainment are family structure (-4.274) and social class (-3.380). In a neighbourhood where none of the families were headed by lone parents 21% of pupils would achieve the highest educational attainment category, compared with 0% of pupils achieving this if all families were. In a neighbourhood where all of adults of working age were in the higher social class classifications 61% of pupils would be in the highest educational attainment category, vs 5% where none were. The next strongest were neighbourhood level of education (-2.734, 58% if all adults had a degree vs 8% if none did) and working status (-2.699, 36% if all adults were employed vs 4% if none were). In terms of area deprivation, those with the mean neighbourhood SIMD had a 19% probability of being in the highest category. Neighbourhood ethnic mix had a small association, in the opposite direction than expected.

Among catchment area covariates, family structure (-5.672) and working status (-3.276) have the largest coefficients. A catchment area in which no families were headed by lone parents would have 23% of pupils in the highest educational attainment category, with 0% in a catchment area where all were; and a catchment area where all adults were working would have 41% of pupils in the highest category, and a catchment area where none were working would have 3%. The next biggest impacts are social class (-2.513) and level of education (-

1.624), with 43% in the highest attainment category for a catchment area with all adults in the higher NS-SEC categories, 6% with none, and 34% in the highest category where all adults were educated to degree or higher, and 9% where none were. Area deprivation (-0.833) and ethnic mix (-0.840) also have an impact, with 34% of pupils in the highest category where no residents were in the 15% most deprived, and 9% where all were; and 23% in the highest where none of the residents were White British/Irish and 11% where all of the residents were White British/Irish.

Finally, for the school, the cumulative educational attainment of other pupils has the largest association (-3.525), with 68% in the highest category where all previous pupils had gained 5 or more credit qualifications; 6% where none had. Free school meal registration had the next strongest association, at -2.767, with 26% in the highest category where no pupils were registered, and 2% where all were. Ethnic mix and school denomination both had small effects (-0.567, 19% all ethnic minorities vs 12% none; -0.174, 14% Roman Catholic, 12% non-denominational).

Table 6-9: The effects of neighbourhood and catchment area covariates on pupil educational attainment expected probabilities at timepoint 2

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
Neighbourhood					
		None of working age in NS-SEC categories 1-3		All of working age in NS-SEC categories 1-3	
NS-SEC	-3.380				
0. <5 foundation	-1.493	0.183	18%	0.008	1%
1. >5 foundation	0.611	0.648	46%	0.059	5%
2. >5 general	2.935	0.950	30%	0.391	33%
3. >5 credit			5%		61%
		None of working age with level 4 qualifications		All of working age with level 4 qualifications	
Education	-2.734				
0. <5 foundation	-1.998	0.119	12%	0.009	1%
1. >5 foundation	0.095	0.524	40%	0.067	6%
2. >5 general	2.397	0.917	39%	0.417	35%
3. >5 credit			8%		58%
		None of working age in employment		All of working age in employment	
Working	-2.699				
0. <5 foundation	-1.135	0.243	24%	0.021	2%
1. >5 foundation	0.971	0.725	48%	0.151	13%
2. >5 general	3.280	0.964	24%	0.641	49%
3. >5 credit			4%		36%
		All White British/Irish		None White British/Irish	
Ethnic mix	0.672				
0. <5 foundation	-2.561	0.072	7%	0.131	13%
1. >5 foundation	-0.453	0.389	32%	0.555	42%
2. >5 general	1.858	0.865	48%	0.926	37%
3. >5 credit			13%		7%
		All households headed by lone parents		No households headed by lone parents	
Family structure	-4.274				
0. <5 foundation	1.190	0.767	77%	0.044	4%
1. >5 foundation	3.294	0.964	20%	0.273	23%
2. >5 general	5.603	0.996	3%	0.791	52%
3. >5 credit			0%		21%
		Expected probability for pupils with average N SIMD			
SIMD	-0.375				
0. <5 foundation	-2.578	0.049	5%		
1. >5 foundation	-0.482	0.298	25%		
2. >5 general	1.845	0.813	52%		
3. >5 credit			19%		
Catchment area					
		None of working age in NS-SEC categories 1-3		All of working age in NS-SEC categories 1-3	
NS-SEC	-2.513				
0. <5 foundation	-1.637	0.163	16%	0.016	2%
1. >5 foundation	0.469	0.615	45%	0.115	10%

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
2. >5 general	2.778	0.941	33%	0.566	45%
3. >5 credit			6%		43%
		None of working age with level 4 qualifications		All of working age with level 4 qualifications	
Education	-1.624				
0. <5 foundation	-2.119	0.107	11%	0.023	2%
1. >5 foundation	-0.013	0.497	39%	0.163	14%
2. >5 general	2.298	0.909	41%	0.662	50%
3. >5 credit			9%		34%
		None of working age in employment		All of working age in employment	
Working	-3.276				
0. <5 foundation	-0.785	0.313	31%	0.017	2%
1. >5 foundation	1.319	0.789	48%	0.124	11%
2. >5 general	3.624	0.974	19%	0.586	46%
3. >5 credit			3%		41%
		All White British/Irish		None White British/Irish	
Ethnic mix	-0.840				
0. <5 foundation	-2.365	0.086	9%	0.039	4%
1. >5 foundation	-0.258	0.436	35%	0.250	21%
2. >5 general	2.051	0.886	45%	0.770	52%
3. >5 credit			11%		23%
		All households headed by lone parents		No households headed by lone parents	
Family structure	-5.672				
0. <5 foundation	2.473	0.922	92%	0.039	4%
1. >5 foundation	4.581	0.990	7%	0.251	21%
2. >5 general	6.891	0.999	1%	0.772	52%
3. >5 credit			0%		23%
		All households in most deprived 15%		No households in most deprived 15%	
SIMD	-0.833				
0. <5 foundation	-2.901	0.052	11%	0.115	2%
1. >5 foundation	-0.794	0.311	40%	0.516	14%
2. >5 general	1.514	0.820	40%	0.914	50%
3. >5 credit			9%		34%
School					
		No pupils gained 5 or more Credit qualifications		All pupils gained 5 or more Credit qualifications	
S4 attainment	-3.525				
0. <5 foundation	-1.630	0.164	16%	0.006	1%
1. >5 foundation	0.473	0.616	45%	0.045	4%
2. >5 general	2.782	0.942	33%	0.322	28%
3. >5 credit			6%		68%
		All pupils registered for free school meal		No pupils registered for free school meals	
Free school meals	-2.767				
0. <5 foundation	-0.587	0.357	36%	0.034	3%
1. >5 foundation	1.518	0.820	46%	0.223	19%
2. >5 general	3.827	0.979	16%	0.743	52%

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
3. >5 credit			2%		26%
		All pupils White British/Irish		**No pupils White British/Irish**	
School ethnic mix	-0.567				
0. <5 foundation	-2.392	0.084	8%	0.049	5%
1. >5 foundation	-0.285	0.429	35%	0.299	25%
2. >5 general	2.026	0.883	45%	0.811	51%
3. >5 credit			12%		19%
		Non-denominational		**Roman Catholic**	
Denomination	-0.174				
0. <5 foundation	-2.415	0.082	8%	0.070	7%
1. >5 foundation	-0.306	0.424	34%	0.382	31%
2. >5 general	2.005	0.881	46%	0.862	48%
3. >5 credit			12%		14%

Note: controlling for pupil characteristics, reference category in bold.
Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation

Figure 6-6 shows the confidence intervals for timepoint 2. The majority of the variables are significant, however the confidence intervals for school and catchment area ethnic mix cross zero, with neighbourhood ethnic mix touching zero, along with school denomination. Catchment area ethnic mix, family structure and working status all have large confidence intervals.

Figure 6-6: Confidence intervals for neighbourhood, catchment area and school variables timepoint 2
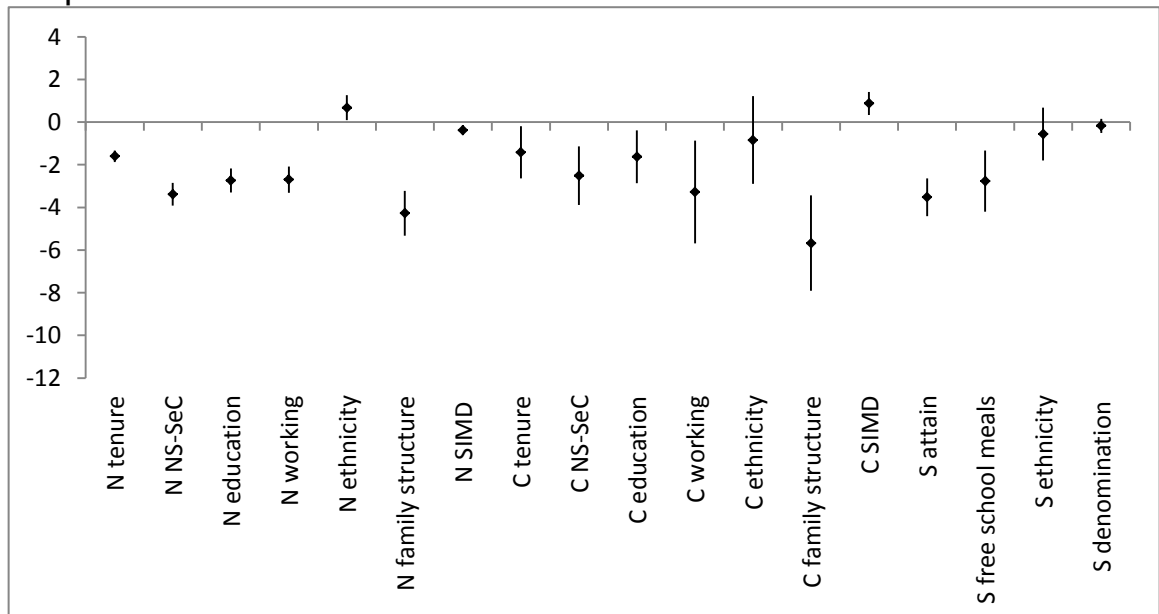
Note: controlling for pupil characteristics. N = neighbourhood, C = catchment area, S = school

6.2.2.5   Summary of formative analysis 2

This section has shown that the majority of context variables for neighbourhood, catchment area and school do have an association with individual educational attainment over and above background characteristics, at both timepoints. Therefore, these variables should therefore be considered for inclusion in the final modelling, depending on their impact on unexplained variance, to be explored below in formative analysis 3 and 4. It has also identified variables that do not have a significant association – neighbourhood, catchment and school ethnic mix at timepoint 1, and catchment and school ethnic mix at timepoint 2 - and should therefore possibly not be included in the final modelling.

6.2.3 Formative analysis 3: Impact of adjusting for neighbourhood, catchment area and school characteristics on unexplained variance in individual pupil educational attainment

Having looked at the association of individual, and, in turn, neighbourhood, catchment area and school variables on the expected probabilities of educational outcomes, it is important to focus in more detail on the extent to which they can account for the unexplained variation in educational attainment between neighbourhoods and between schools.

The variance partition coefficient (VPC) - as discussed in section 4.6.7 - is the proportion of residual variance (level 1 + level 2 + level 3) that is due to within-level variation in educational attainment, and is presented as a percentage. Statistical significance is shown as a p-value for the VPC. Each table is ordered by, and will be discussed by, firstly neighbourhood, then catchment area/school.

In order to examine the effect of the addition of neighbourhood, catchment area and school context variables on variance, we look again at the single context-variable models for each variable at neighbourhood and catchment area/school. The impacts on expected probabilities were previously examined in Table 6-8 and Table 6-9 – however this time the focus will be on variance. Although, as discussed in the methods chapter, some variables had to be excluded from the final model due to issues of collinearity, all possible variables are examined here for completeness.

For each model, the VPC is calculated for both the between-school variance, and the between-neighbourhoods within-schools variance. In this analysis, the amount of between-neighbourhood within-school variance unexplained by the model will be presented as "neighbourhood VPC", and the amount of between school variance unexplained by the model will be presented as "school VPC". If the VPC is *reduced* when variables are added into the baseline model, this tells us that the included variables help to explain the variations in pupil educational attainment that remain after pupil characteristics are controlled for.

The main purpose of these tables is that they allow us to look at the effect of each context variable on the neighbourhood and school VPC. If covariates have no real impact on the neighbourhood or school VPC, their inclusion in the final model will be assessed along with other factors (discussed further in section 6.3.1).

Within each table, columns 2 and 3 show the between school VPC and between-neighbourhood within-school VPC for each model. P-values are shown for each in brackets.

6.2.3.1 Impact of adjusting for context variables on neighbourhood and school variance, timepoint 1

Table 6-10 shows the VPCs for the baseline model (exclusively pupil characteristics as explanatory variables) and all the single context-variable models for timepoint 1, first neighbourhood, then catchment area/school. The baseline model has a significant between-neighbourhoods within-school VPC of 6.44% (p<0.001) and a significant between-school VPC of 5.99% (p=0.003). This tells us that with pupil characteristics alone accounted for, 6.44% of the remaining unexplained variance in individual pupil educational attainment is due to between neighbourhood within-school differences and 5.99% is due to between school differences.

Looking first at the single context-variable models including the neighbourhood variables, the inclusion of neighbourhood housing tenure in a single context-variable model reduces the school VPC to 3.55% (p=0.005) and neighbourhood VPC to 2.37% (p=0.007). This means that additionally adjusting for the proportion of owner occupied households in the neighbourhood accounts for

almost half of the unexplained school variation and over half of the between neighbourhood within-school variation in educational attainment. Neighbourhood social class in a single context-variable model has a similar effect to housing tenure on school VPC (3.96%), but reduces neighbourhood VPC more (to 1.61%) and renders it insignificant (p=0.062) - this is the only neighbourhood covariate to do so. Importantly, this means that between-neighbourhood differences in individual pupil educational attainment are explained away by accounting for neighbourhood social class in addition to the individual pupil characteristics. All of the other neighbourhood covariates reduce both the school VPC and neighbourhood VPC, mainly to lesser degrees. The exception is ethnic mix, where its inclusion leaves the two VPC percentages almost unchanged.

Turning next to the single context-variable models including the catchment area variables, the addition of catchment area housing tenure to the baseline model has a relatively large impact on the school VPC, reducing it to 2.38% (p=0.009). This demonstrates that with pupil characteristics already adjusted for, further adjusting for the proportion of owner occupied households in the catchment area accounts for over half of the remaining between-school variation in pupil educational attainment. However catchment area housing tenure has little impact on the neighbourhood VPC, and in fact increases it slightly. Working status and SIMD local share both reduced school VPC to under 3%. However, none of the single context-variable models with catchment area variables had any impact on the neighbourhood VPC.

Looking at the school covariates included in the single context-variable models, inclusion of school educational attainment has a significant impact on school VPC reducing it to under 0.5% and making it insignificant - this is perhaps unsurprising given its close similarity to the individual pupil educational attainment outcome variable. Free school meals also has a considerable impact on school VPC, reducing it to 2.65% (p=0.009). Neither denomination nor school ethnic mix had a significant impact. Similar to the catchment area variables, school variables had little impact on the neighbourhood VPC.

Table 6-10: Single context-variable models, with neighbourhood and school VPC, timepoint 1

	neighbourhood VPC (p-value)	school VPC (p-value)
BASELINE	6.44% (<0.001)	5.99% (0.003)
Neighbourhood		
Tenure	2.37% (0.007)	3.55% (0.005)
NS-SEC	1.61% (0.062)	3.96% (0.004)
Education	3.02% (0.001)	4.95% (0.003)
Working	3.05% (0.001)	4.04% (0.004)
Ethnic mix	6.52% (<0.001)	5.88% (0.003)
Family structure	4.42% (<0.001)	4.17% (0.004)
SIMD quintile	2.17% (0.009)	3.72% (0.005)
Catchment area/School		
Tenure	6.61% (<0.001)	2.38% (0.009)
NS-SEC	6.61% (<0.001)	3.15% (0.007)
Education	6.50% (<0.001)	4.44% (0.005)
Working	6.65% (<0.001)	2.13% (0.013)
Ethnic mix	6.51% (<0.001)	6.01% (0.003)
Family structure	6.64% (<0.001)	3.89% (0.006)
SIMD local share	6.55% (<0.001)	2.60% (0.009)
S4 attainment	6.48% (<0.001)	0.48% (0.191)
Denomination (**ND**/RC)	6.54% (<0.001)	5.96% (0.004)
Free school meals	6.64% (<0.001)	2.65% (0.009)
School ethnic mix	6.45% (<0.001)	6.16% (0.004)

Note: controlling for pupil characteristics.
Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient, Reference category in bold

6.2.3.2 Impact of adjusting for context variables on neighbourhood and school variance, timepoint 2

For timepoint 2, the baseline model containing the pupil characteristics has a between neighbourhood VPC of 3.33% (p=0.008) and a between school VPC of 4.70% (p=0.004), as can be seen in Table 6-11 below. Both VPCs are lower than at timepoint 1, suggesting – as has been stated previously – that there is less variation in educational attainment both between neighbourhoods within schools, and between schools at timepoint 2 than timepoint 1. Neighbourhood housing tenure in a single context-variable model, although having a small impact on school VPC, reduces the neighbourhood VPC to under 1% and renders it insignificant (p=0.273). This is also true for neighbourhood social class, level of

education and SIMD. Neighbourhood working status and family structure reduce the neighbourhood VPC to under 2% and render it insignificant. Neighbourhood ethnic mix has little or no impact upon either school or neighbourhood VPC.

When catchment area housing tenure is included it has a small impact on between school VPC, reducing it by about 1%, though it has no sizeable impact on neighbourhood VPC. All of the catchment area covariates, except for ethnic mix, have similar effects to housing tenure.

The school educational attainment covariate reduces the school VPC to under 1%, and makes it insignificant (p=0.141). Free school meals also reduces school VPC, to 2.85% (p=0.012). As with the neighbourhood and catchment area variables, none of the school covariates have much impact on neighbourhood VPC.

Table 6-11: Single context-variable models, with neighbourhood and school VPC, timepoint 2

	neighbourhood VPC (p-value)	school VPC (p-value)
BASELINE	3.33% (0.008)	4.70% (0.004)
Neighbourhood		
Tenure	0.67% (0.273)	3.83% (0.006)
NS-SEC	0.50% (0.371)	3.36% (0.007)
Education	0.81% (0.317)	3.71% (0.005)
Working	1.55% (0.166)	3.99% (0.005)
Ethnic mix	3.27% (0.005)	4.86% (0.005)
Family structure	1.75% (0.108)	3.60% (0.007)
SIMD quintile	0.41% (0.351)	3.42% (0.007)
Catchment area/school		
Tenure	3.19% (0.019)	3.79% (0.009)
NS-SEC	3.30% (0.010)	3.16% (0.010)
Education	3.36% (0.005)	3.70% (0.008)
Working	3.04% (0.026)	3.52% (0.008)
Ethnic mix	3.24% (0.008)	4.78% (0.005)
Family structure	3.37% (0.006)	3.43% (0.009)
SIMD local share	2.82% (0.077)	3.47% (0.008)
S4 attainment	3.38% (0.006)	0.82% (0.141)
Denomination (**ND**/RC)	3.38% (0.007)	4.69% (0.007)
Free school meals	3.25% (0.010)	2.85% (0.012)
School ethnic mix	3.35% (0.004)	4.72% (0.006)

Note: controlling for pupil characteristics.
Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient
Reference category in bold

6.2.3.3   Summary of formative analysis 3

Housing tenure, particularly neighbourhood housing tenure, is shown to account for much of the variation in individual educational attainment over and above pupil characteristics at both timepoints, though this is stronger at timepoint 1. However, so too do other neighbourhood and catchment area/school factors. This indicates the complexity of the association of different neighbourhood and catchment area/school aspects with individual educational attainment, and also indicates that it is correct to include variables for these in the final models.

6.2.4 Formative analysis 4: Impact of adjusting for neighbourhood, catchment area and school characteristics on the association between housing tenure and educational attainment

Having examined the effect that each neighbourhood and catchment area/school variable has on individual educational attainment, and the variation in educational attainment, we now turn to examine the effect of each of the covariates on the *association between* educational attainment and our main explanatory variable of interest, housing tenure. Taking into account the impact of covariates on the association between housing tenure and educational attainment enables us to determine the importance of the inclusion of the individual covariates in the final models. To do this, the neighbourhood housing tenure single context-variable model was run, while each other covariate was added in turn - these are referred to as single context-variable plus housing tenure models. The same was then performed for catchment area housing tenure.

Within each table (Table 6-12 and Table 6-13), the first column shows the names of the other covariate included in the model; the second column shows the coefficient of the housing tenure variable in the presence of the other covariate (outlined in the first column) in turn, with the first row showing the coefficient for only housing tenure being included. The third column shows the coefficient of the covariate in the model. Columns four and five show the between-neighbourhood within-school VPC and between school VPC for each model. P-values are shown for each in brackets.

6.2.4.1 How does adjusting for neighbourhood, catchment area and school characteristics impact on the effects of housing tenure at timepoint 1?

6.2.4.1.1 Neighbourhood housing tenure

Table 6-12 shows firstly the single context-variable model of neighbourhood housing tenure, and below that, the models of neighbourhood housing tenure combined with each of the other neighbourhood, catchment area and school variables in turn.

As can be seen in the top line of Table 6-12, and as was previously reported in 6.2.3.1, neighbourhood housing tenure in the single context-variable model has a coefficient of -1.916 (p<0.001), indicating a significant, positive effect upon pupil educational attainment, while the neighbourhood VPC is 2.49% (p=0.005) and the school VPC is 3.54% (p=0.005). This shows that adjusting for the proportion of owner occupied households in the neighbourhood accounts for all but 2.49% of the between neighbourhood within-school variation, and all but 3.54% of the between school variation in educational attainment. When neighbourhood housing tenure is combined in a single context-variable plus housing tenure model with neighbourhood social class, the coefficient for housing tenure is halved, and the between neighbourhood VPC reduces to just over 1%. This is similar for SIMD, with the coefficient being reduced to -1.059, and the between neighbourhood VPC reducing to 1.65%. When neighbourhood housing tenure is combined with neighbourhood education it has a slightly smaller effect on the neighbourhood VPC, reducing it to 1.67%, and the coefficient to -1.438. None of the neighbourhood covariates have much impact on school VPC.

Although the catchment area covariates have little impact on the neighbourhood housing tenure coefficient or neighbourhood VPC, neighbourhood housing tenure combined with catchment area housing tenure reduces the between school VPC to 2.85%. Several of the other catchment area variables have a similar effect when included in a model with neighbourhood tenure: social class reduces the between school VPC to 2.90%; working status reduces it to 2.76%; and SIMD reduces it to 2.76%. Ethnic mix is not significant and does not impact on the catchment area housing tenure effect.

The inclusion of the school covariates has little impact on the neighbourhood housing tenure coefficient, nor on the neighbourhood VPC. When combined with neighbourhood housing tenure, school educational attainment has a large impact on the school VPC, reducing it to 1.31% (p=0.032). Both denomination and free school meals have a small impact on the school VPC, reducing it to under 3%, whereas ethnic mix is insignificant.

Table 6-12: Single context-variable plus housing tenure models, with neighbourhood housing tenure, timepoint 1

	Neighbourhood tenure coefficient	Context variable coefficient	neighbourhood VPC	school VPC
Neighbourhood				
tenure	-1.916 (<0.001)	-	2.49% (0.005)	3.54% (0.005)
Neighbourhood				
NS-SEC	-0.987 (<0.001)	-2.408 (<0.001)	1.19% (0.143)	3.53% (0.005)
Education	-1.438 (<0.001)	-1.969 (<0.001)	1.67% (0.061)	3.49% (0.005)
Working	-1.632 (<0.001)	-0.644 (0.156)	2.09% (0.043)	3.56% (0.005)
Ethnic mix	-1.933 (<0.001)	0.344 (0.354)	2.43% (0.012)	3.54% (0.005)
Family structure	-1.783 (<0.001)	-0.579 (0.253)	2.29% (0.012)	3.49% (0.006)
SIMD quintile	-1.059 (<0.001)	-0.276 (<0.001)	1.65% (0.042)	3.32% (0.005)
Catchment area/school				
Tenure	-1.847 (<0.001)	-1.074 (0.009)	2.42% (0.013)	2.85% (0.007)
NS-SEC	-1.873 (<0.001)	-1.760 (0.011)	2.53% (0.008)	2.90% (0.008)
Education	-1.890 (<0.001)	-1.368 (0.041)	2.44% (0.008)	3.13% (0.006)
Working	-1.849 (<0.001)	-2.542 (0.037)	2.53% (0.006)	2.76% (0.009)
Ethnic mix	-1.911 (<0.001)	-0.386 (0.803)	2.45% (0.006)	3.74% (0.006)
Family structure	-1.875 (<0.001)	-3.409 (0.008)	2.55% (0.009)	3.15% (0.006)
SIMD local share	-1.857 (<0.001)	0.664 (0.006)	2.59% (0.003)	2.76% (0.008)
S4 attainment	-1.793 (<0.001)	-3.089 (<0.001)	2.60% (0.005)	1.31% (0.032)
Denomination				
(**ND**/RC)	-1.936 (<0.001)	-0.304 (0.028)	2.44% (0.010)	2.99% (0.009)
Free school meals	-1.862 (<0.001)	-1.353 (0.016)	2.47% (0.009)	2.88% (0.008)
School ethnic mix	-1.911 (<0.001)	0.015 (0.981)	2.29% (0.015)	3.71% (0.006)

Note: controlling for pupil characteristics.
Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient
Reference category in bold

6.2.4.1.2   Catchment area housing tenure

This section examines the impact of adjusting for neighbourhood, catchment area and school variables on the effect of *catchment* housing tenure, as opposed to the neighbourhood housing tenure examined in the previous section. At timepoint 1, housing tenure in a single context-variable model has a coefficient of -2.350 (p<0.001), with a school VPC of 2.38% (p=0.009) and neighbourhood VPC of 6.61% (p<0.001), as can be seen in Table 6-13 below.

Neighbourhood social class and housing tenure have the largest impact on the catchment area housing tenure coefficient when included in the single context-variable plus housing tenure model, with both reducing it by around half. All the other neighbourhood covariates also reduce the catchment area housing tenure coefficient, though by a lesser amount, apart from neighbourhood ethnic mix which has no impact. Most neighbourhood covariates when included with catchment area housing tenure impact on the neighbourhood VPC - with social class, the neighbourhood VPC is reduced to under 2%; with SIMD to just over 2%, and neighbourhood housing tenure to just under 3%; and with level of education and working status the neighbourhood VPC is reduced to just over 3%. Most of the neighbourhood covariates when included along with catchment area housing tenure have little effect on the school VPC.

Looking at the catchment area variables, working status has the largest effect on the housing tenure coefficient, and making it statistically insignificant. None of the catchment area covariates have much impact on neighbourhood VPC, and none reduce the school VPC to below 2% or make it insignificant.

For the school variables, educational attainment has a large impact on the catchment area housing tenure coefficient and makes it insignificant. Free school meals has a slightly smaller impact on the coefficient, but also makes it insignificant. School denomination and school ethnic mix have no effects upon the catchment area housing tenure coefficient. None of the school covariates have much impact on the neighbourhood VPC, however educational attainment reduces the school VPC to under 1% and makes it insignificant, suggesting that catchment area housing tenure and school educational attainment together explain all of the unexplained variance between schools in terms of individual pupil educational attainment. Denomination also has an impact on school VPC, reducing it to less than 2%.

Table 6-13: Single context-variable plus housing tenure models, with catchment housing tenure, timepoint 1

	Catchment tenure coefficient	Context variable coefficient	neighbourhood VPC	school VPC
Catchment area tenure	-2.350 (<0.001)		6.61% (<0.001)	2.38% (0.009)
Neighbourhood				
Tenure	-1.144 (0.010)	-1.852 (<0.001)	2.45% (0.008)	2.88% (0.007)
NS-SEC	-1.121 (0.012)	-3.944 (<0.001)	1.71% (0.049)	3.21% (0.006)
Education	-1.497 (0.001)	-3.678 (<0.001)	3.04% (0.002)	3.41% (0.006)
Working	-1.470 (0.001)	-3.291 (<0.001)	3.09% (0.001)	2.78% (0.007)
Ethnic mix	-2.351 (<0.001)	-0.221 (0.593)	6.66% (<0.001)	2.40% (0.008)
Family structure	-1.551 (<0.001)	-4.327 (<0.001)	4.59% (<0.001)	2.73% (0.007)
SIMD quintile	-1.238 (0.005)	-0.451 (<0.001)	2.17% (0.019)	2.66% (0.009)
Catchment area/school				
NS-SEC	-1.922 (0.013)	-0.835 (0.510)	6.63% (<0.001)	2.43% (0.012)
Education	-2.084 (<0.001)	-0.640 (0.399)	6.66% (<0.001)	2.40% (0.011)
Working	-0.559 (0.530)	-4.131 (0.031)	6.63% (<0.001)	2.16% (0.012)
Ethnic mix	-2.402 (<0.001)	0.522 (0.713)	6.58% (<0.001)	2.49% (0.012)
Family structure	-2.250 (<0.001)	-0.477 (0.762)	6.61% (<0.001)	2.43% (0.010)
SIMD local share	-1.787 (0.113)	-0.355 (0.594)	6.58% (<0.001)	2.46% (0.011)
S4 attainment	-0.263 (0.515)	-4.397 (<0.001)	6.50% (<0.001)	0.54% (0.144)
Denomination (**ND**/RC)	-2.534 (<0.001)	-0.327 (0.006)	6.74% (<0.001)	1.70% (0.024)
Free school meals	-1.330 (0.132)	-1.300 (0.238)	6.53% (<0.001)	2.41% (0.011)
School ethnic mix	-2.379 (<0.001)	0.129 (0.820)	6.55% (<0.001)	2.49% (0.012)

Note: controlling for pupil characteristics.
Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient
Reference category in bold

6.2.4.2 How does adjusting for neighbourhood, catchment area and school characteristics impact on the effects of housing tenure at timepoint 2?

6.2.4.2.1 Neighbourhood housing tenure

At timepoint 2, neighbourhood housing tenure run in a single context-variable model has a coefficient of -1.599 (p<0.001), with a school VPC of 3.83% (p=0.006) and a neighbourhood VPC of 0.67% (p=0.273), as can be seen in Table 6-14. When any other variable was included in a single context-variable plus housing tenure model, the neighbourhood VPC stayed insignificant. The inclusion of neighbourhood social class and SIMD (and to a slightly lesser extent, level of

education) has an impact on reducing the housing tenure coefficient, but little impact on either school or neighbourhood VPC. Neighbourhood working status, ethnic mix and family structure are all insignificant and have little or no impact upon the neighbourhood housing tenure coefficient.

The inclusion of the catchment area covariates along with neighbourhood housing tenure in a single context-variable plus housing tenure model again makes little difference to the coefficients, or VPCs, and all other variable coefficients are insignificant.

With the inclusion of the school covariates with neighbourhood housing tenure, only educational attainment is significant, and its inclusion reduces the school VPC to 2.24% (p=0.018), but it has no real impact on the neighbourhood housing tenure coefficient.

Table 6-14: Single context-variable plus housing tenure models, with neighbourhood housing tenure, timepoint 2

	Neighbourhood tenure coefficient	Context variable coefficient	neighbourhood VPC	school VPC
Neighbourhood tenure	-1.599 (<0.001)		0.67% (0.273)	3.83% (0.006)
Neighbourhood				
NS-SEC	-0.721 (<0.001)	-2.265 (<0.001)	0.53% (0.290)	3.36% (0.007)
Education	-1.289 (<0.001)	-1.644 (<0.001)	0.70% (0.207)	3.24% (0.008)
Working	-1.656 (<0.001)	0.121 (0.809)	0.93% (0.182)	3.82% (0.006)
Ethnic mix	-1.625 (<0.001)	-0.117 (0.681)	0.75% (0.279)	3.80% (0.005)
Family structure	-1.451 (<0.001)	-1.014 (0.131)	0.87% (0.249)	3.66% (0.006)
SIMD quintile	-0.513 (0.001)	-0.277 (<0.001)	0.35% (0.424)	3.37% (0.007)
Catchment area/school				
Tenure	-1.598 (<0.001)	-0.288 (0.596)	0.87% (0.173)	3.96% (0.006)
NS-SEC	-1.572 (<0.001)	-1.224 (0.099)	0.76% (0.298)	3.58% (0.007)
Education	-1.589 (<0.001)	-1.137 (0.061)	0.81% (0.300)	3.46% (0.008)
Working	-1.590 (<0.001)	-0.561 (0.694)	0.70% (0.297)	3.94% (0.007)
Ethnic mix	-1.602 (<0.001)	-0.391 (0.693)	0.84% (0.246)	3.96% (0.006)
Family structure	-1.573 (<0.001)	-2.359 (0.098)	0.67% (0.296)	3.58% (0.006)
SIMD local share	-1.579 (<0.001)	-0.317 (0.168)	0.67% (0.296)	3.75% (0.006)
S4 attainment	-1.508 (<0.001)	-2.344 (<0.001)	0.80% (0.261)	2.24% (0.018)
Denomination (**ND**/RC)	-1.619 (<0.001)	-0.236 (0.116)	0.81% (0.243)	3.57% (0.007)
Free school meals	-1.573 (<0.001)	-1.129 (0.168)	0.81% (0.243)	3.63% (0.007)
School ethnic mix	-1.604 (<0.001)	-0.285 (0.627)	0.67% (0.296)	4.00% (0.007)

Note: controlling for pupil characteristics.
Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient
Reference category in bold

6.2.4.2.2   Catchment area housing tenure

Catchment area housing tenure when run in a single context-variable model at timepoint 2 has a coefficient of -1.414 (p=0.023), school VPC of 3.79% (p=0.009) and neighbourhood VPC of 3.19% (p=0.019), as seen in Table 6-15. When any of the neighbourhood covariates are included, they have a fairly big impact in reducing the catchment area housing tenure coefficient, and make the neighbourhood VPC insignificant. The one exception is ethnic mix, which has almost no effect on the catchment area housing tenure coefficient, nor on either of the VPCs.

When catchment area housing tenure is included in a single context-variable plus housing tenure model with any of the other catchment area covariates, almost all reduce the magnitude of the housing tenure coefficient and make it insignificant, but only the social class coefficient is itself significant and this variable also reduces the catchment area housing tenure coefficient to close to zero. None of the catchment area covariates have much impact on the school or neighbourhood VPCs.

With the inclusion of the school covariates, only educational attainment and free school meals have an impact on the catchment area housing tenure coefficient and are significant ($p<0.001$, $p=0.013$ respectively). There is little impact on either of the VPCs, with the exception of educational attainment, which reduces school VPC to 0.73% and makes it insignificant ($p=0.188$), and free school meals which reduces school VPC to just over 3%, though it remains significant ($p=0.012$). School denomination and school ethnic mix are insignificant themselves, and have little or no impact upon the catchment area housing tenure coefficient, nor on either of the VPCs.

Table 6-15: Single context-variable plus housing tenure models, with catchment housing tenure, timepoint 2

	Catchment tenure coefficient	Context variable coefficient	neighbourhood VPC	school VPC
Catchment area tenure	-1.414 (0.023)		3.19% (0.019)	3.79% (0.009)
Neighbourhood				
NS-SEC	-0.231(0.665)	-3.357 (<0.001)	0.41% (0.351)	3.53% (0.007)
Education	-0.876 (0.091)	-2.685 (<0.001)	0.99% (0.257)	3.40% (0.009)
Working	-0.775 (0.166)	-2.627 (<0.001)	1.41% (0.197)	3.89% (0.007)
Ethnic mix	-1.423 (0.010)	0.668 (0.024)	3.05% (0.012)	3.90% (0.008)
Family structure	-0.838 (0.121)	-4.578 (<0.001)	1.99% (0.069)	3.34% (0.008)
SIMD quintile	-0.513 (0.334)	-0.371 (<0.001)	0.32% (0.432)	3.45% (0.009)
Catchment area/school				
NS-SEC	-0.202 (0.787)	-2.295 (0.029)	3.32% (0.008)	3.29% (0.010)
Education	-1.041 (0.064)	-1.184 (0.069)	3.27% (0.007)	3.29% (0.010)
Working	-0.740 (0.481)	-1.877 (0.435)	3.20% (0.012)	3.65% (0.008)
Ethnic mix	-1.343 (0.030)	-0.582 (0.575)	3.30% (0.005)	3.92% (0.009)
Family structure	-0.948 (0.225)	-2.526 (0.266)	3.26% (0.005)	3.54% (0.011)
SIMD local share	-0.439 (0.595)	-0.658 (0.135)	3.26% (0.006)	3.54% (0.008)
S4 attainment	0.655 (0.125)	-4.144 (<0.001)	3.32% (0.008)	0.73% (0.188)
Denomination (**ND**/RC)	-1.610 (0.003)	-0.250 (0.105)	3.31% (0.008)	3.48% (0.010)
Free school meals	-0.089 (0.909)	-2.745 (0.013)	3.17% (0.016)	3.02% (0.012)
School ethnic mix	-1.216 (0.041)	-0.298 (0.617)	3.14% (0.016)	3.93% (0.009)

Note: controlling for pupil characteristics.
Note of abbreviations: NS-SEC - National Statistics Socioeconomic Classification; SIMD – Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient
Reference category in bold

6.2.4.3   Formative analysis 4 summary

At timepoint 1, neighbourhood social class and SIMD have the biggest impact on the neighbourhood housing tenure coefficient. Along with the pupil characteristics, neighbourhood housing tenure explains a lot of the between neighbourhood variation in educational attainment, but when combined with neighbourhood social class or neighbourhood level of education, the between-neighbourhood differences in educational attainment are fully explained. Separately, catchment area working status and school S4 attainment have the largest impacts on the catchment housing tenure coefficient. Catchment housing tenure explains a lot of the between school variation in educational attainment, though there is little additional impact when it is combined with other catchment area variables. However, when it is combined with school educational

attainment, the between-school differences in educational attainment are explained.

At timepoint 2, neighbourhood social class and SIMD have the biggest impact on the neighbourhood housing tenure coefficient. However housing tenure on its own makes the neighbourhood VPC insignificant, and it stays insignificant with the inclusion of all other covariates. Of the catchment area/school variables, SIMD, educational attainment and free school meals all have large impacts on the catchment area housing tenure coefficient. The inclusion of school educational attainment along with catchment area housing tenure makes the between school VPC insignificant. Catchment area ethnic mix had almost no impact on catchment area housing tenure or the VPCs.

6.3 Final analyses results

6.3.1 Final model specification and presentation

This section outlines the specification of the models for the two parts of the final analysis, outlined in the introduction to this chapter, and explains how they will be presented. The final models aim to examine firstly whether variation in individual pupil educational attainment can be explained by neighbourhood, catchment area or school characteristics, and specifically by housing tenure measured at neighbourhood and catchment area, and secondly if changes over time in educational attainment can be explained by changes in these factors.

Housing tenure as measured by the proportion of owner occupied households in the area, at both neighbourhood and catchment area, are the explanatory variables of key interest, and therefore the model specifications take this into account: models are presented that include both neighbourhood and catchment area housing tenure alone, and along with the other neighbourhood and catchment area/school covariates in order to look at the effect of housing tenure on the variances in educational attainment, and the effect of other covariates on housing tenure significance and on the variances in educational attainment. For clarity, in this section only the coefficients for the explanatory covariates are shown, but later, for the fully adjusted models, expected

probabilities are also shown. After each set of presented models, the respective residual plots will be shown.

Table 6-16 shows the models that were run for both timepoints.

Table 6-16: Model naming key, with code and description

Model code	Model name	Description
AA	Null model of pupil educational attainment	No explanatory variables
A	Baseline - with pupil characteristics	With all pupil explanatory variables
B	With pupil characteristics, plus neighbourhood housing tenure	Baseline model + neighbourhood tenure
C	With pupil and neighbourhood characteristics	Baseline model + all neighbourhood explanatory variables (including neighbourhood tenure)
D	With pupil and neighbourhood characteristics, plus catchment area housing tenure	Baseline model + neighbourhood explanatory covariates (including neighbourhood tenure) + catchment tenure
E	With pupil, neighbourhood and catchment area/school characteristics	Baseline model +neighbourhood explanatory variables (including neighbourhood tenure) + all catchment/school explanatory variables (including catchment tenure)

6.3.1.1   Removal of insignificant covariates

It was decided to remove covariates that were both insignificant when included themselves in a single context-variable model (formative analysis 2, section 6.2.2), and had negligible impact on either of the housing tenure coefficients or the VPCs when included in a single context-variable plus housing tenure model with either neighbourhood or catchment area housing tenure (formative analysis 4, section 6.2.4). These covariates were, at timepoint 1: neighbourhood, catchment area and school ethnic mix; and at timepoint 2, catchment area ethnic mix.

6.3.1.2   Removal of collinear covariates

As discussed in the methods chapter, issues with collinearity were detected throughout the first iteration of the modelling process. In order to rectify this, a process of elimination of the most highly collinear covariates was conducted, using the variance inflation factor (VIF) scores for each timepoint (see Methods

section 4.6.10, and Appendix 2 for full tables). At timepoint 1, the collinear covariates which were removed were: neighbourhood social class, catchment area social class, catchment area working status, and catchment area SIMD; and for timepoint 2 were: neighbourhood social class, catchment area social class, catchment area SIMD, catchment area ethnic mix, and catchment area education[18]. Table 6-17 shows the final covariates used in the modelling at each timepoint, with both the insignificant and collinear covariates removed. For the model that included both timepoints, only variables that were included in both the timepoint 1 and timepoint 2 models were included.

Table 6-17: Neighbourhood, catchment area and school covariates included in modelling, for timepoint 1, timepoint 2 and both timepoints

timepoint 1	timepoint 2	Both timepoints
Neighbourhood		
Tenure	Tenure	Tenure
Education	Education	Education
Working	Working	Working
	Ethnic mix	
Family structure	Family structure	Family structure
SIMD	SIMD	SIMD
Catchment area/school		
Tenure	Tenure	Tenure
Education		
	Working	
Family structure	Family structure	Family structure
S4 attainment	S4 attainment	S4 attainment
Denomination	Denomination	Denomination
Free school meals	Free school meals	Free school meals
	School ethnic mix	

6.3.2 Final model results

The results from the final models will be in two parts: the first will look at the two timepoints separately, and compare them; and the second will look at both timepoints together.

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[18] In order to ensure that any findings about the effect of tenure could not be attributed to the fact that NS-SEC was removed from the final modelling, the final models for each timepoint were rerun including NS-SEC at both neighbourhood and catchment level. The results showed that tenure had an effect over and above that of NS-SEC and the tables can be found in Appendix 11: Sensitivity analyses.

6.3.3 Final analysis 1: timepoint 1 and timepoint 2 separate models

The first part of the final analysis aims to find out to what extent can the variation in individual pupil educational attainment between neighbourhoods within schools, and between schools, be explained by neighbourhood, catchment area and school characteristics, focusing specifically on housing tenure, for both timepoint 1 and timepoint 2. This section will detail the results of the separate timepoint 1 and timepoint 2 models of pupil educational attainment, and compare the results.

6.3.3.1 Modelling pupil educational attainment at timepoint 1

As was seen in section 6.2.3, and shown below in Table 6-18, when looking at the baseline model (referred to from this point on as Model A, for details see model naming key in Table 6-16), the between-neighbourhood within-schools VPC is 6.44%, and is highly significant (p<0.001). This means that over 6% of the variation in pupil educational attainment is due to between-neighbourhoods within-schools differences, even after pupil characteristics have been accounted for. The VPC for school variance is 5.99% and highly significant (p=0.003), showing that almost 6% of the variation in pupil educational attainment is due to between school differences, even when pupil characteristics have been accounted for.

As also seen in Table 6-18, when neighbourhood housing tenure is introduced (Model B), it has a coefficient of -1.916 and is significant (p<0.001), even though pupil characteristics have been accounted for. This indicates that the proportion of owner occupiers in the neighbourhood makes a difference to individual pupil educational attainment, over and above individual pupil characteristics. The neighbourhood VPC reduces by over half to 2.49% and stays significant (p=0.005) with the inclusion of neighbourhood housing tenure. The school VPC also decreases considerably to 3.54% (p=0.005).

With the addition of all other neighbourhood characteristics (Model C), the neighbourhood housing tenure coefficient is less strong at -0.825, however it is still significant (p=0.006). This suggests that even with the other neighbourhood and pupil characteristics accounted for, neighbourhood housing tenure still has

an influence on individual pupil educational attainment. The attenuation in the housing tenure coefficient suggests that the effect of housing tenure is partly due to its association with area deprivation and level of education in the area, the other two neighbourhood variables found to have significant effects on pupil educational attainment in Model C. Neighbourhood VPC drops to 1.22% in Model C, and it becomes insignificant (p=0.148), indicating that accounting for pupil and neighbourhood characteristics explains variance in educational attainment between neighbourhoods within schools. School VPC drops slightly, but is still significant (p=0.006), indicating that there is still unexplained variation in pupil educational attainment between schools after all pupil and neighbourhood characteristics are accounted for.

From Model C, the inclusion of all pupil and neighbourhood characteristics has accounted for between neighbourhood differences in pupil educational attainment, however there is still unexplained variation between schools. When catchment area housing tenure is included (Model D), its coefficient is -0.931 and it is significant (p=0.038). Although this inclusion does little to the neighbourhood VPC, which stays insignificant, the between school VPC is reduced only slightly to under 3%, and it stays significant (p=0.008).

When all of the other catchment area and school covariates are included (Model E), the catchment area housing tenure coefficient becomes insignificant (p=0.193) suggesting that the level of owner occupied households within the catchment area does not have a significant association with educational attainment over and above the other catchment area and school covariates. However, the coefficient for neighbourhood housing tenure remains significant and largely unchanged, suggesting that the level of owner occupied households within the neighbourhood *does* have a significant association with educational attainment over and above the other catchment area and school covariates. Neighbourhood VPC is largely unaffected by this inclusion and remains insignificant - but between school VPC is reduced to 1% and becomes insignificant (p=0.074). This indicates that the inclusion of catchment area/school covariates into the model along with pupil and neighbourhood covariates explains differences in variation between the schools in individual pupil educational attainment for timepoint 1.

Table 6-18: Full model comparison of pupil, neighbourhood and catchment area/school covariates on educational attainment, timepoint 1

Timepoint 1 – proportions	Model A		Model B		Model C		Model D		Model E	
Level 1 – Pupil	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value
Gender (**male**/female)	-0.478	<0.001	-0.478	<0.001	-0.476	<0.001	-0.478	<0.001	-0.477	<0.001
Free school meals (**fsm**/no fsm)	-1.018	<0.001	-0.831	<0.001	-0.812	<0.001	-0.807	<0.001	-0.813	<0.001
Ethnicity (**white**/non white)	-0.261	0.014	-0.204	0.048	-0.143	0.165	-0.138	0.180	-0.125	0.225
Looked after status (LA/**not LA**)	2.163	<0.001	2.132	<0.001	2.179	<0.001	2.178	<0.001	2.188	<0.001
Level 2 – Neighbourhood										
Tenure			-1.916	<0.001	-0.825	0.006	-0.782	0.015	-0.879	0.009
Education					-0.903	0.047	-0.829	0.072	-0.958	0.046
Working					-0.170	0.723	-0.197	0.698	-0.002	0.997
Family structure					-0.696	0.202	-0.665	0.252	-0.551	0.359
SIMD quintile					-0.214	<0.001	-0.211	<0.001	-0.203	<0.001
Level 3 – Catchment area / School										
Tenure							-0.931	0.038	-1.140	0.193
Education									0.781	0.299
Family structure									2.443	0.061
S4 attainment									-4.281	<0.001
Denomination (**ND**/RC)									-0.257	0.016
Free school meals									1.728	0.078
	VPC		VPC		VPC		VPC		VPC	
Neighbourhood VPC	6.44%	<0.001	2.49%	0.005	1.22%	0.148	1.40%	0.098	1.36%	0.113
School VPC	5.99%	0.003	3.54%	0.005	3.36%	0.006	2.94%	0.008	1.01%	0.074

Note of abbreviations: fsm – free school meals; LA – looked after; SIMD– Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient
Reference category in bold
Model naming key at Table 6-16, page 208

Figure 6-7 shows the school level residuals of models AA (null) to E (fully adjusted) for timepoint 1. The school level residuals for Model E show that all of the schools' confidence intervals cross zero, meaning that the educational attainment between the schools does not differ significantly from each other once pupil, neighbourhood and catchment area/school characteristics are adjusted for. By accounting for variables at pupil, neighbourhood and catchment area/school, all unexplained variance in educational attainment between schools has been accounted for.

Figure 6-7: School level residuals for Models AA-E, timepoint 1
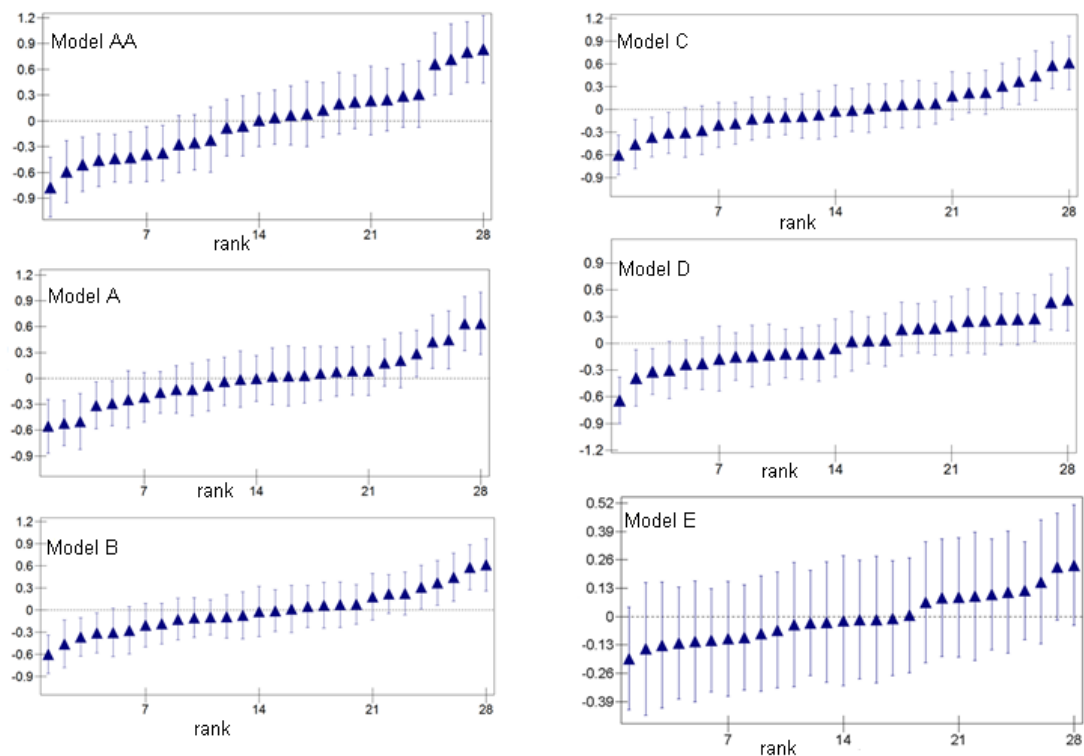
Note: Model naming key at Table 6-16, page 208

Table 6-19 shows the expected probabilities for the significant variables in the timepoint 1 fully adjusted model (Model E). As can be seen, even with all other pupil, neighbourhood, catchment area and school variables adjusted for, 28% of pupils living in a neighbourhood where all households were owner occupied would be in the highest educational attainment category, compared with 6% in a neighbourhood where no households were owner occupied. Living in a neighbourhood where all adults had a degree or higher would give a pupil a 30% probability of being in the highest educational attainment category, compared to 6% if none of the adults had a degree or higher. Living in a neighbourhood

with an average SIMD would give pupils a 17% chance of being in the highest category.

Within the school, 92% of pupils would be in the highest educational attainment category if all pupils had achieved 5 or more credit qualifications, whereas 0% would if none had achieved this. Denomination still has a small effect, with 18% of pupils in the highest educational attainment category in Roman Catholic schools, and 11% in non-denominational schools.

Table 6-19: Expected probabilities for significant variables at timepoint 1 fully adjusted model (Model E)

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
		No households owner occupied		All households owner occupied	
Neighbourhood tenure	-0.879				
0. <5 foundation	-1.601	0.327	33%	0.077	8%
1. >5 foundation	-0.398	0.618	29%	0.218	14%
2. >5 general	1.802	0.936	32%	0.716	50%
3. >5 credit			6%		28%
		No residents with level 4 qualifications		All residents with level 4 qualifications	
Neighbourhood education	-0.958				
0. <5 foundation	-1.601	0.345	34%	0.072	7%
1. >5 foundation	-0.398	0.636	29%	0.205	13%
2. >5 general	1.802	0.940	30%	0.699	49%
3. >5 credit			6%		30%
		For those pupils with average N SIMD			
Neighbourhood SIMD	-0.203				
0. <5 foundation	-1.601	0.142	14%		
1. >5 foundation	-0.398	0.355	21%		
2. >5 general	1.802	0.833	48%		
3. >5 credit			17%		
		None with >5 credit Standard Grades		All with >5 credit Standard Grades	
S4 attainment	-4.281				
0. <5 foundation	-1.601	0.936	94%	0.003	0%
1. >5 foundation	-0.398	0.980	4%	0.009	1%
2. >5 general	1.802	0.998	2%	0.077	7%
3. >5 credit			0%		92%
		Non-denominational		Roman Catholic	
School denomination	-0.257				
0. <5 foundation	-1.601	0.207	21%	0.135	13%
1. >5 foundation	-0.398	0.465	26%	0.342	21%
2. >5 general	1.802	0.887	42%	0.824	48%
3. >5 credit			11%		18%

Reference category in bold

6.3.3.2 Modelling pupil educational attainment at timepoint 2

As introduced in section 6.2.3, looking at the timepoint 2 baseline model (Model A in Table 6-20), in which all pupil characteristics are included, it can be seen that all of the pupil coefficients are significant and in the direction one would expect. However, all pupil characteristics have a slightly weaker effect on

individual educational attainment at timepoint 2 than they did at timepoint 1. Between neighbourhood VPC is 3.33% and significant (p=0.008), though it is less than half than the same figure in the baseline model for timepoint 1. Between school VPC is 4.7% and significant (p=0.004), though this is also lower than the same figure at timepoint 1, though by only a fifth.

When neighbourhood housing tenure is included (Model B), as can be seen in Table 6-20, the coefficient is -1.599 and it is significant (p<0.001). This is a slightly weaker effect than the same figure at timepoint 1. With the inclusion of neighbourhood housing tenure, the between neighbourhood VPC drops to under 1% (0.67%) and becomes insignificant, suggesting that accounting for the proportion of owner occupiers in a pupil's neighbourhood explains differences between pupil educational attainment between neighbourhoods within schools not accounted for by pupil characteristics. This was not the case at timepoint 1, where although the inclusion of neighbourhood housing tenure reduced the VPC by half, it remained significant, though the VPC was larger in the first place. School VPC is reduced slightly to 3.83% (p=0.006) with the inclusion of neighbourhood housing tenure at timepoint 2 – this is similar to the timepoint 1 school VPC at the same stage.

The inclusion of all of the other neighbourhood covariates (Model C) reduces the effect of neighbourhood housing tenure to -0.980, though it stays significant (p=0.001), suggesting that neighbourhood housing tenure is still associated with pupil educational attainment even after accounting for the other neighbourhood covariates. This also suggests, that like at timepoint 1, the effect of neighbourhood housing tenure is partly due to its association with neighbourhood education and SIMD, as was seen in the formative analysis in section 6.2.4.2. The neighbourhood VPC stays insignificant, and there is some impact on the school VPC which drops to 3.10% but stays significant.

When catchment area housing tenure is included (Model D), the coefficient is -0.291, and is insignificant (p=0.598). This coefficient is much smaller than when the same variable was included at timepoint 1 (-0.931), and unlike at timepoint 1 the coefficient was also insignificant. The neighbourhood VPC remains insignificant, however the school VPC stays significant.

The inclusion of the other school and catchment area covariates (Model E) causes catchment area housing tenure to become positive though it remains insignificant, as in the timepoint 1 models at this stage. Neighbourhood VPC remains insignificant, and school VPC drops to 1.26% and becomes insignificant.

Therefore, the inclusion of all pupil, neighbourhood and catchment area/school covariates in the model explains away the variation in educational attainment between neighbourhoods, and between neighbourhoods within schools, at both timepoint 1 and timepoint 2, however neighbourhood housing tenure remains significant, meaning the proportion of owner occupiers in the neighbourhood still has a significant association with individual pupil educational attainment even after all other characteristics have been accounted for.

Table 6-20: Full model comparison of pupil, neighbourhood and catchment area/school covariates on educational attainment, timepoint 2

timepoint 2 - proportions	Model A		Model B		Model C		Model D		Model E	
Level 1 – Pupil	Coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value
Gender (**male**/female)	-0.425	<0.001	-0.422	<0.001	-0.434	<0.001	-0.435	<0.001	-0.437	<0.001
Free school meals (**fsm**/no fsm)	-0.869	<0.001	-0.733	<0.001	-0.720	<0.001	-0.717	<0.001	-0.719	<0.001
Ethnicity (**white**/non white)	-0.197	0.029	-0.249	0.005	-0.216	0.022	-0.213	0.023	-0.213	0.027
Looked after status (LA/**not LA**)	1.484	<0.001	1.414	<0.001	1.429	<0.001	1.425	<0.001	1.427	<0.001
Level 2 – Neighbourhood										
Tenure			-1.599	<0.001	-0.980	0.001	-0.876	0.002	-1.061	<0.001
Education					-1.433	0.008	-1.302	0.015	-1.413	0.010
Working					1.218	0.024	1.091	0.033	1.305	0.020
Ethnic mix					0.800	0.012	0.780	0.015	0.707	0.035
Family structure					0.224	0.782	0.011	0.988	0.569	0.483
SIMD quintile					-0.202	<0.001	-0.204	<0.001	-0.208	<0.001
Level 3 – Catchment area / School										
Tenure							-0.291	0.598	0.541	0.477
Working									0.248	0.891
Family structure									0.479	0.744
S4 attainment									-4.206	<0.001
Denomination (**ND**/RC)									-0.206	0.052
Free school meals									1.795	0.130
School ethnic mix									0.806	0.098
	VPC		VPC		VPC		VPC		VPC	
Neighbourhood VPC	3.33%	0.008	0.67%	0.273	0.53%	0.230	0.29%	0.475	0.42%	0.382
School VPC	4.70%	0.004	3.83%	0.006	3.10%	0.008	3.28%	0.009	1.26%	0.106

Note of abbreviations: fsm – free school meals; LA – looked after; SIMD– Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient

Reference category in bold

Model naming key at Table 6-16, page 208

Figure 6-8 shows the timepoint 2 school level residuals for Models AA (null) to E (fully adjusted) and shows that when the timepoint 2 model is fully adjusted for pupil, neighbourhood, and catchment area/school variables, the schools do not differ significantly from each other in terms of individual pupil educational attainment.

Figure 6-8: School level residuals for Models AA-E, timepoint 2
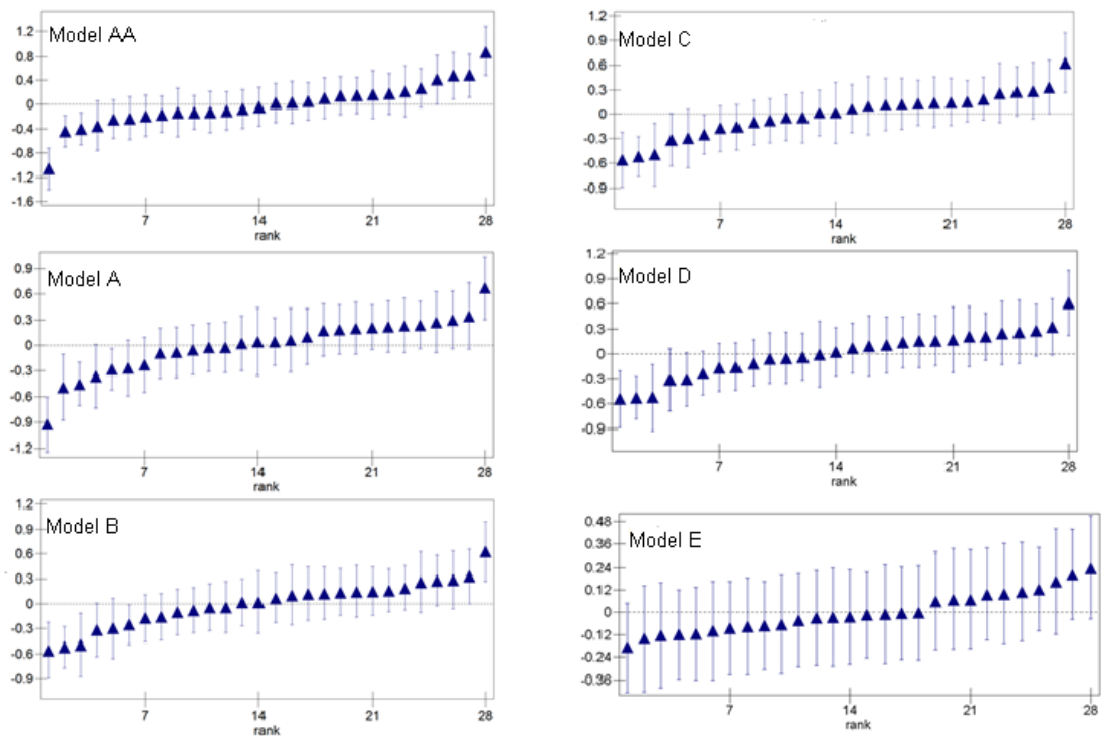
Note: Model naming key at Table 6-16, page 208

Table 6-21 shows the expected probabilities for individual pupil educational attainment for the fully adjusted model (Model E) at timepoint 2, for those variables that were significant. All but one of the significant variables were at the neighbourhood. Neighbourhood housing tenure still had an effect on individual pupil educational attainment over and above all other covariates – a pupil in a neighbourhood where all households were owner occupied would have a 60% probability of being in the highest educational attainment category, whereas a pupil in a neighbourhood where no households were owner occupied would have a 15% probability, a similar size of effect found at timepoint 1. A pupil in a neighbourhood where all adults had a degree or higher would have a 68% probability of being in the highest educational attainment category, while a

pupil in a neighbourhood where none did would have an 11% probability. As discussed when looking at the full model, both working status and ethnic mix are not in the direction we would expect. This is likely due to collinearity in the final models, even though steps were taken to reduce the effects (more information can be found in section 4.6.10), as both working status and ethnic mix were in the direction we would expect during the formative analysis (see section 6.2.2.4).

S4 educational attainment is the only catchment area or school variable to be significant, and a pupil in a school where all of the pupils in the most recent years gained 5 or more credit qualifications would have a 97% probability of also being in the highest educational attainment category, whereas a pupil in a school where none had achieved this would have a 1% probability.

Table 6-21: Expected probabilities for significant variables at timepoint 2 fully adjusted model (Model E)

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
		No households owner occupied		All households owner occupied	
Neighbourhood tenure	-1.061				
0. <5 foundation	-3.799	0.061	6%	0.008	1%
1. >5 foundation	-1.700	0.345	28%	0.059	5%
2. >5 general	0.640	0.846	50%	0.396	34%
3. >5 credit			15%		60%
		No residents with level 4 qualifications		All residents with level 4 qualifications	
Neighbourhood education	-1.413				
0. <5 foundation	-3.799	0.084	8%	0.005	1%
1. >5 foundation	-1.700	0.429	34%	0.043	4%
2. >5 general	0.640	0.886	46%	0.316	27%
3. >5 credit			11%		68%
		No residents of working age in employment		All residents of working age in employment	
Neighbourhood working	1.305				
0. <5 foundation	-3.799	0.006	1%	0.076	8%
1. >5 foundation	-1.700	0.047	4%	0.403	33%
2. >5 general	0.640	0.340	29%	0.875	47%
3. >5 credit			66%		13%
		All White British/Irish residents		No White British/Irish residents	
Neighbourhood ethnic mix	0.707				
0. <5 foundation	-3.799	0.011	1%	0.043	4%
1. >5 foundation	-1.700	0.083	7%	0.270	23%
2. >5 general	0.640	0.483	40%	0.794	52%
3. >5 credit			52%		21%
		For those pupils with average N SIMD			
Neighbourhood SIMD	-0.199				
0. <5 foundation	-3.799	0.018	2%		
1. >5 foundation	-1.700	0.130	11%		
2. >5 general	0.640	0.608	48%		
3. >5 credit			39%		
		None with >5 credit Standard Grades		All with >5 credit Standard Grades	
S4 attainment	-4.206				
0. <5 foundation	-3.799	0.600	60%	<0.001	0%
1. >5 foundation	-1.700	0.925	32%	0.003	0%
2. >5 general	0.640	0.992	7%	0.027	2%
3. >5 credit			1%		97%

6.3.3.3 Summary of final analysis 1

The results of the first part of the final analysis have shown that neighbourhood housing tenure is significantly associated with individual pupil educational attainment over and above other pupil, neighbourhood, catchment area and school variables at both timepoint 1 and timepoint 2. This suggests that the proportion of owner occupied households in a neighbourhood has an association with the educational attainment of the pupils living within that neighbourhood. Catchment area housing tenure was not significantly associated with individual pupil educational attainment in the fully adjusted model at either timepoint.

6.3.4 Final analysis 2: timepoint 1 and timepoint 2 combined model

As was seen in section 6.2.1, individual pupil educational attainment changed between timepoint 1 and timepoint 2, with more pupils in the higher categories at timepoint 2. The second part of the final phase of analysis looks at whether changes in housing tenure between timepoint 1 and timepoint 2 explain these differences in individual pupil educational attainment between the two timepoints.

The data for both timepoints were combined, and the timepoint was included as a fixed effect (see section 4.6.5.1 for further explanation), or pupil covariate. Timepoint 1 was taken the reference category, as overall attainment was lower at timepoint 1, and as this is chronologically intuitive. Therefore by taking timepoint 1 as the reference category we would expect the coefficient to be negative, as with the other pupil coefficients. The timepoint fixed effect tells us about the overall differences in educational attainment between the two timepoints. The extent to which tenure (or other explanatory factors) can explain these changes over time is assessed by examining changes to the timepoint coefficient with and without the inclusion of tenure.

Timepoint was also included as a random effect (see section 4.6.5.1 for further explanation), or level. The timepoint random effect – represented here as the timepoint VPC - tells us about the *differences in changes over time in educational outcomes among the neighbourhoods*. The extent to which tenure (or other explanatory factors) explains the differences among the

neighbourhoods in the changes over time in educational outcomes is assessed by examining changes to the timepoint VPC with and without the inclusion of tenure.

Figure 6-9 shows the unadjusted residuals (Model AA, or the null model) and the 95% confidence intervals for both timepoints combined, with 15 schools not significantly different from the mean educational attainment, and 13 significantly different.

Figure 6-9: School level residuals – both timepoints combined, null model (model AA)
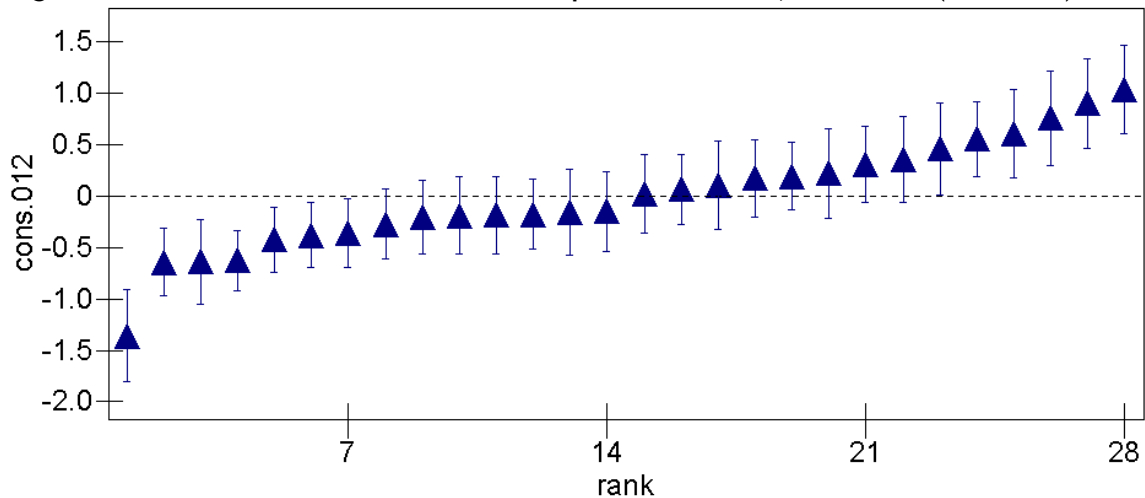
6.3.4.1   Both timepoints, model comparison

The model results for the both timepoints model comparisons will be presented firstly focusing on the fixed effects, and then looking at the random effects.

The baseline model[19] for data from both timepoints combined (Model A in Table 6-22), which includes all pupil characteristics, including timepoint, shows that all pupil fixed effects are significant and in the direction one would expect, with timepoint having a similar magnitude of effect to gender (timepoint -0.432, $p<0.001$; gender -0.421, $p<0.001$). This shows therefore that there are significant changes over time in educational attainment, with all other pupil characteristics accounted for.

When neighbourhood housing tenure is introduced into the baseline model (forming Model B) the coefficient is -1.942, and it is significant ($p<0.001$),

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[19] As with each individual year, the null model is not presented due to issues of scaling.

indicating that it has a significant association with educational attainment, with pupils characteristics – including timepoint – controlled for. The introduction of neighbourhood housing tenure however has little effect on the timepoint fixed effect, which stays significant, suggesting that neighbourhood housing tenure does not explain overall changes in educational attainment over time.

The introduction of the rest of the neighbourhood covariates (Model C) reduces the magnitude of the neighbourhood housing tenure coefficient to -0.771, but it remains significant (p=0.003). The neighbourhood housing tenure coefficient is attenuated here not only by the inclusion of neighbourhood education and SIMD – as in the separate models – but also by family structure, and of the three, family structure has the strongest effect. The timepoint fixed effect is slightly reduced in magnitude, but stays significant, suggesting that the inclusion of the neighbourhood covariates also does not explain overall changes in educational attainment over time.

When catchment area housing tenure is included (Model D), the coefficient is -0.570 and insignificant (p=0.179). There is also very little impact on the timepoint coefficient. This shows that accounting for both neighbourhood and catchment area housing tenure has not explained the differences in pupil educational attainment over time.

When all pupil, neighbourhood and catchment area/school covariates are included in the final model (Model E), catchment area housing tenure stays insignificant, however neighbourhood housing tenure stays significant (p=0.003), suggesting it has an association with educational attainment once all other characteristics are controlled for. Interestingly, the pupil timepoint coefficient becomes insignificant (p=0.161) in the fully adjusted model, suggesting that overall changes in educational attainment over time seem to be explained by adjusting for all of the neighbourhood, catchment area and school characteristics.

Turning to the random effects, at Model A, between timepoint VPC is very low at 0.53% and is insignificant (p=0.341). The timepoint random effect tells us about the *differences in changes over time in educational outcomes among the neighbourhoods,* and its insignificance in Model A suggests that changes in

educational attainment over time are *not* occurring significantly differently among the neighbourhoods, once pupil characteristics are controlled for. The timepoint random effect stays insignificant through each set of results in Table 6-22. However, both other random effects are significant in Model A, with between neighbourhood VPC 6.76%, and school VPC 5.89%.

The introduction of neighbourhood housing tenure at Model B reduces neighbourhood VPC by over half to 3.07%, though it remains significant (p=0.005). School VPC is also significantly reduced to 3.04%, though it also remains significant (p=0.006).

At Model C, where the rest of the neighbourhood covariates are introduced, neighbourhood VPC drops to just over 1% and becomes insignificant (p=0.290). Although school VPC drops slightly to 2.73%, it stays significant (p=0.005).

When catchment area housing tenure is introduced at Model D there is little impact on any on the VPCs - timepoint and neighbourhood both stay insignificant, and school VPC stays significant (p=0.006).

In Model E, the fully adjusted model, when the remaining catchment area/school variables are introduced, both timepoint and neighbourhood VPC are insignificant. However although school VPC has dropped to 1.58%, it is still significant (p=0.031).

Table 6-22: Combined Years, Model comparison 1: with pupil characteristics; with pupil characteristics plus neighbourhood housing tenure; with pupil and neighbourhood characteristics, both timepoints

| Both timepoints	Model A		Model B		Model C		Model D		Model E	
Level 1 – Pupil	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value
Gender (**male**/female)	-0.421	<0.001	-0.427	<0.001	-0.436	<0.001	-0.435	<0.001	-0.439	<0.001
Free school meals (**fsm**/no fsm)	-0.933	<0.001	-0.792	<0.001	-0.765	<0.001	-0.763	<0.001	-0.757	<0.001
Ethnicity (**white**/non white)	-0.162	0.048	-0.185	0.021	-0.092	0.256	-0.091	0.267	-0.087	0.289
Looked after status (LA/**not LA**)	1.654	<0.001	1.580	<0.001	1.567	<0.001	1.565	<0.001	1.557	<0.001
Timepoint (**1**/2)	-0.432	<0.001	-0.475	<0.001	-0.353	<0.001	-0.363	<0.001	-0.174	0.161
Level 2 – Neighbourhood										
Tenure			-1.942	<0.001	-0.771	0.003	-0.731	0.003	-0.806	0.001
Education					-0.950	0.020	-0.942	0.022	-0.812	0.039
Working					-0.149	0.725	-0.140	0.730	-0.096	0.806
Family structure					-1.116	0.041	-1.098	0.027	-1.041	0.040
SIMD quintile					-0.213	<0.001	-0.216	<0.001	-0.209	<0.001
Level 3 – Catchment area / School										
Tenure							-0.570	0.179	0.689	0.362
Family structure									2.340	0.016
S4 attainment									-2.282	0.004
Denomination (**ND**/RC)									-0.291	0.009
Free school meals									-0.515	0.389
	VPC		VPC		VPC		VPC		VPC	
School VPC	5.89%	0.003	3.04%	0.006	2.73%	0.005	2.84%	0.006	1.58%	0.031
Neighbourhood VPC	6.76%	<0.001	3.07%	0.005	1.06%	0.290	1.24%	0.138	1.46%	0.064
Timepoint VPC	0.53%	0.341	1.18%	0.329	1.75%	0.194	1.38%	0.253	0.99%	0.241

Note of abbreviations: fsm – free school meals; LA – looked after; SIMD– Scottish Index of Multiple Deprivation; ND – non-denominational; RC – Roman Catholic; VPC – variance partition coefficient
Reference category in bold, Model naming key at Table 6-16, page 208

Table 6-23 shows the expected probabilities for individual pupil educational attainment for the fully adjusted model (Model E) for both timepoints, for those variables that were significant.

Four of the neighbourhood variables were significant: housing tenure, level of education, family structure and area deprivation. Neighbourhood housing tenure still had an effect on individual pupil educational attainment over and above all other covariates: a pupil in a neighbourhood where all households were owner occupied had a 9% chance of being in the highest educational attainment category, while a pupil in a neighbourhood where no households were owner occupied had a 2% chance of being in the same category. A pupil in an area where all adults had a degree or higher would have a 9% chance of being in the highest category, while a pupil in a neighbourhood where no adults had a degree would have a 2% chance. A pupil in an area where none of the households were headed by lone parents would have an 11% chance of the highest category, and where no households were headed by lone parents would have 2% chance. A pupil in a neighbourhood with average neighbourhood SIMD would have a 3% chance of being in the highest category.

One catchment area variable was significant – family structure – though not in the expected direction, and two school variables were - educational attainment and denomination. A pupil in a catchment where none of the households were headed by lone parents would have a 31% chance of the highest category, and where no households were headed by lone parents would have 0% chance. A pupil in a school where all pupils gained >5 credit qualifications had a 30% chance of being in the highest educational category, while a pupil in a school where none had these qualifications had a 0% chance of being in the highest category. In terms of denomination, a pupil in a Roman Catholic school had a 6% chance of being in the highest category, while a pupil in a non-denominational school had a 3% chance.

Table 6-23: Expected probabilities for individual pupil educational attainment for variables significant in both timepoint model

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
		No households owner occupied		All households owner occupied	
Neighbourhood tenure	-0.806				
0. <5 foundation	-0.654	0.538	54%	0.188	19%
1. >5 foundation	0.814	0.835	30%	0.502	31%
2. >5 general	3.132	0.981	15%	0.911	41%
3. >5 credit			2%		9%
		No adults with degree or higher		All adults with degree or higher	
Neighbourhood education	-0.812				
0. <5 foundation	-0.654	0.539	54%	0.188	19%
1. >5 foundation	0.814	0.836	30%	0.500	31%
2. >5 general	3.132	0.981	15%	0.911	41%
3. >5 credit			2%		9%
		All households headed by lone parent		No households headed by lone parent	
Neighbourhood family structure	-1.014				
0. <5 foundation	-0.654	0.596	60%	0.155	16%
1. >5 foundation	0.814	0.865	27%	0.443	29%
2. >5 general	3.132	0.985	12%	0.890	45%
3. >5 credit			2%		11%
		For those pupils with average N SIMD			
Neighbourhood SIMD	-0.209				
0. <5 foundation	-0.654	0.391	39%		
1. >5 foundation	0.814	0.736	35%		
2. >5 general	3.132	0.966	23%		
3. >5 credit			3%		
		All households headed by lone parent		No households headed by lone parent	
Catchment family structure	2.340				
0. <5 foundation	-0.654	0.048	5%	0.844	84%
1. >5 foundation	0.814	0.179	13%	0.959	12%
2. >5 general	3.132	0.688	51%	0.996	4%
3. >5 credit			31%		0%
		None with >5 credit Standard Grades		All with >5 credit Standard Grades	
School attainment	-2.282				
0. <5 foundation	-0.654	0.836	84%	0.050	5%
1. >5 foundation	0.814	0.957	12%	0.187	14%
2. >5 general	3.132	0.996	4%	0.701	51%

Explanatory variable	Coefficient	Antilogit	Expected probability	Antilogit	Expected probability
3. >5 credit			0%		30%
		Non-denominational		Roman Catholic	
School denomination	-0.291				
0. <5 foundation	-0.654	0.410	41%	0.280	28%
1. >5 foundation	0.814	0.751	34%	0.628	35%
2. >5 general	3.132	0.968	22%	0.945	32%
3. >5 credit			3%		6%

Bringing together the time aspects of the timepoint 1 and timepoint 2 combined modelling: as the timepoint random effect was not significant in any of the models, this suggests that once the characteristics of the pupils have been accounted for, differences between neighbourhoods in educational attainment are not significantly different at the two.

However, as a fixed effect, timepoint is significant in all models prior to inclusion of all catchment area/school variables. Timepoint remains significant with the inclusion of both neighbourhood housing tenure and catchment area housing tenure, indicating that housing tenure does not explain the differences in pupil educational attainment over time. However, differences in pupil educational attainment over time can be explained by the variables included in the fully adjusted models – all pupil, neighbourhood and catchment area/school characteristics. Residuals can be seen in Figure 6-10 below.

Figure 6-10: School level residuals, both timepoints combined: fully adjusted (Model E)
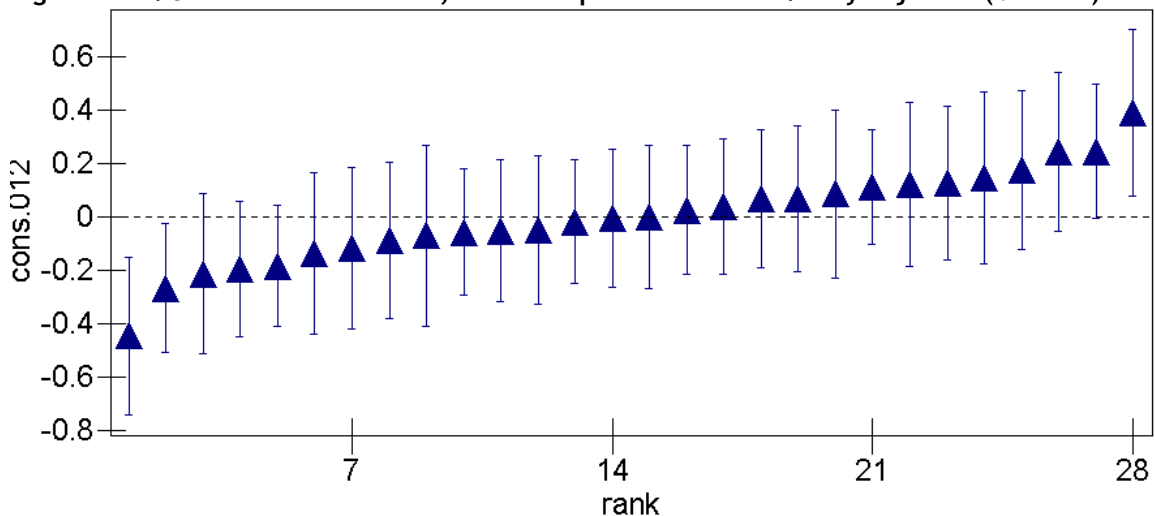
Note: Model naming key at Table 6-16, page 208

The second part of the final analysis has shown that the overall changes over time in educational attainment are not explained by changes over time in neighbourhood or catchment tenure, however they are explained by the inclusion of all pupil, neighbourhood and catchment area/school characteristics. It has also shown that *differences* in changes in educational attainment over time are not occurring significantly among neighbourhoods over time.

6.4 Summary of key findings

This chapter has aimed to address the research question:

What explains individual educational attainment and changes in educational attainment, focusing especially on housing tenure?

In order to answer this question, the analysis was split into two phases, formative and final, and the results presented.

6.4.1 Formative analysis

The formative analysis showed that at both timepoint 1 and timepoint 2, individual pupil educational attainment was associated with individual, neighbourhood, catchment area and school factors.

All of the considered pupil characteristics – gender, free school meal registration, ethnicity and looked after status – were associated with individual pupil educational attainment, and all in the way one would expect from theory and evidence. Being 'looked after' had by far the biggest impact upon educational attainment, although this status did not affect many pupils. Apart from this, registration for free school meals (an indicator of family poverty) had a bigger effect upon educational attainment than gender, with individual pupil ethnicity having the smallest effect. However, all pupil characteristics (apart from ethnicity) had slightly weaker effects at timepoint 2 than at timepoint 1, suggesting that the impact of pupil characteristics on individual educational attainment had lessened over time.

Both neighbourhood and catchment area housing tenure had an association with individual pupil educational attainment at both timepoint 1 and timepoint 2, though the effect was stronger for neighbourhood and catchment area at timepoint 1. The effect was what would be expected – that the higher the proportion of households in the neighbourhood or catchment area that are owner occupied, the higher the expected probability of a pupil receiving a higher educational attainment outcome.

The other context characteristics with the strongest effects on pupil educational attainment were neighbourhood social class and family structure, catchment area working status and family structure, and school educational attainment – though catchment working status and family structure had very wide confidence intervals. Ethnic mix had no effect upon pupil educational attainment, apart from a small, significant effect of neighbourhood ethnic mix at timepoint 2. The results for context variables were similar for both timepoints, though effects were weaker at timepoint 2.

At the earlier timepoint housing tenure of pupils' neighbourhoods accounted for half of the unexplained variation in individual pupil educational attainment between neighbourhoods. Housing tenure of school catchment area accounted for half of the unexplained variance in individual pupil educational attainment between schools. At the later timepoint, accounting for neighbourhood housing tenure rendered between-neighbourhood variation in educational attainment insignificant – however so did every other variable. Catchment area housing tenure had a smaller impact on the between-school variation. At both timepoints, only the addition of school educational attainment explained away all between-school variation.

By providing a wealth of information on the associations between the context variables and individual educational attainment, the formative analysis influenced the final models, by showing which context variables should be included.

6.4.2 Final analysis

The final analysis aimed to answer two questions, which were key to addressing the aim of the thesis:

1: To what extent can the variation in individual pupil educational attainment between neighbourhoods within schools, and between schools, be explained by neighbourhood, catchment area and school characteristics, for both timepoint 1 and timepoint 2?

At both timepoints neighbourhood housing tenure had an association with individual educational attainment over and above all other pupil, neighbourhood and catchment area/school variables included. This suggests that at both timepoints, the proportion of owner occupied households in a pupil's neighbourhood is associated with their individual educational attainment, over and above factors such as their socioeconomic status, neighbourhood deprivation, and the socioeconomic mix of the school.

Also at both timepoints, the inclusion of all pupil, neighbourhood and catchment area/school variables rendered the between neighbourhood and between school variation insignificant, suggesting that differences between neighbourhoods within schools, and differences between schools in educational attainment, can be explained by adjusting for pupil and contextual factors.

2: Does change in housing tenure between timepoint 1 and timepoint 2 explain differences in individual pupil educational attainment between the two timepoints?

The overall changes in educational attainment between timepoint 1 and timepoint 2 were *not* explained by changes over time in neighbourhood housing tenure or catchment area housing tenure. However they were explained by the inclusion of all pupil, neighbourhood and catchment area/school characteristics. There were not significant differences in changes in educational attainment among neighbourhoods over time.

6.5 Overall summary

This chapter has looked at associations of individual pupil, neighbourhood, catchment area and school variables with individual educational attainment, focusing especially on housing tenure. This chapter was in two phases: the results of the formative analysis, and the results of the final analysis. The formative analyses set up a three level multilevel model framework, and looked at the associations of individual and context characteristics with individual educational attainment, as well as at variations in educational attainment between neighbourhoods and between schools. The formative analyses then explored how these characteristics impacted on the associations of housing tenure with educational attainment. Finally, the formative analyses identified the characteristics that were associated with educational attainment and were then used to inform the construction of the final models.

The section on the final analyses was in two parts. Firstly, it used three level multilevel models to look at the extent to which variation between neighbourhoods and schools in educational attainment could be explained by pupil, neighbourhood and catchment area/school characteristics, focusing particularly on housing tenure. It found that although differences between neighbourhoods and schools in individual educational attainment could be explained by adjusting for individual, neighbourhood and catchment area/school variables, neighbourhood housing tenure had a significant impact over and above these factors at both timepoints. Lastly, it used a four level multilevel model, and found overall changes in educational attainment between timepoint 1 and timepoint 2 were *not* explained by changes over time in neighbourhood or catchment tenure, and that differences in changes in educational attainment over time did not occur significantly among neighbourhoods. The next chapter will explore how these changes were felt in two schools whose catchment areas did experience an increase in owner occupation.

7 Staff and pupil experiences of area and school change

7.1 Introduction

The previous two chapters have demonstrated several things: the social mix of Glasgow changed between 2001 and 2011, but not all changes were felt equally across the catchment areas and schools. The proportion of owner occupied households fell in the majority of catchment areas, but rose in ten. At both timepoints, the proportion of owner occupied households in the neighbourhood was positively associated with individual pupil educational attainment, over and above other factors controlled for.

This chapter aims to explore the experiences of these changes with staff and pupils at two case study schools, Meadow Flats and Parkside. It firstly gives a brief recap of the rationale for the mixed methods approach; and will then move on to outline the background and demographics of the two schools chosen. Next it explores the data generated through interviews with staff at the two case study schools, before moving on to the data gathered from the pupil interviews. Finally, this chapter will end with a brief discussion of the findings.

7.2 Aim of qualitative component

The overall aim of the thesis is to examine whether mixed tenure housing policy can make a difference to educational attainment, therefore for the qualitative component it was considered most appropriate to choose schools that both had an increase in owner occupation over the decade, as well as an improvement in educational attainment.

As discussed in section 4.2.1 of the methods, a mixed methods approach to research can give a wider picture than either quantitative or qualitative research alone (Creswell and Clark, 2007). In the specific case of this research, the qualitative section allows an exploration of how the changes identified in chapter 5, and the associations of individual, neighbourhood and catchment

area/school factors identified in chapter 6, were experienced in two of the catchment areas.

The overarching research question was:

How have changes in neighbourhoods, catchment areas and schools been experienced by staff and pupils?

By conducting interviews with the staff and pupils within the two case study schools, the contexts of both the school and catchment area can be explored. More specifically, a number of areas were looked at:

- How had area change been experienced?
- What impacts did changes in the area have on the area and school?
- What role does the social mix of the school play in educational and school outcomes?

7.3   Background to the case study schools

As described in the methods in chapter 4, the two case study schools - Meadow Flats and Parkside - were chosen on the basis of two characteristics related to the central focus of the thesis: they were both among the ten schools whose catchment area had seen an increase in owner occupation, and had both seen an improvement in educational attainment. However the overall housing tenure structure of the catchment areas differed slightly, with Meadow Flats having a lower level of owner occupation, and a higher level of social rented housing, though the increases in private rented households were similar. The changes in all housing tenures can be seen in Table 7-1.

Table 7-1: Case study schools housing tenure profiles 2001-2011

	Meadow Flats				Parkside			
	2001	2011	absolute change	relative change	2001	2011	absolute change	relative change
Owner occupation	31.0%	32.5%	+1.5%	+4.8%	38.6%	41.1%	+2.5%	+6.4%
Social rented	59.7%	57.7%	-2.0%	-3.4%	53.1%	50.9%	-2.2%	-4.1%
Private rented	2.4%	8.3%	+5.9%	+245.8%	2.5%	7.4%	+4.9%	+196.0%

Both schools were in areas of high deprivation, and had high numbers of pupils registered for free school meals. More detailed demographic information can be found in section 4.7.2.

In terms of educational attainment, both schools had an improvement between the timepoints. As can be seen in Figure 7-1, by timepoint 2 both had a percentage of pupils gaining 5 or more credit qualifications just below the average educational attainment of 23%.

Figure 7-1: Educational attainment scores for Meadow Flats and Parkside, timepoint 1 and timepoint 2, with Glasgow average
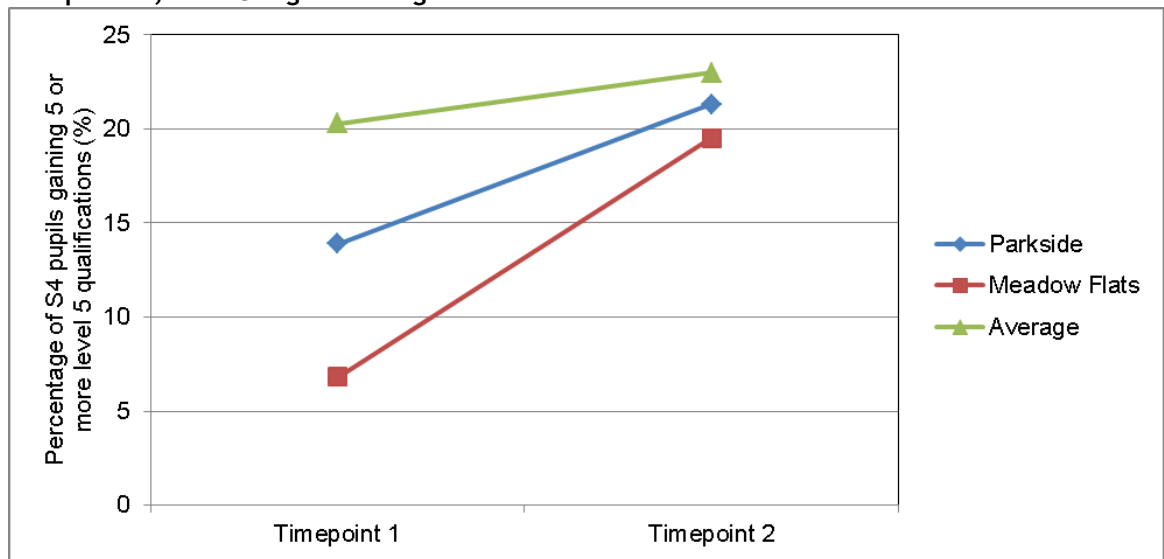
Meadow Flats had been in existence under its current name from the late 1980s, when its predecessor was merged with another local school, though it remained on the same site. Its current name was shared with the name of the wider area. The school moved into newly built premises in the early 2000s. Parkside had been in existence in its current form since around the millennium, through the merging of two previous schools in the area. The school was given a new name and building, as well as a new uniform.

7.4 Findings: school staff

At Meadow Flats, three members of staff were interviewed: two in management, Anita and Peter; and one subject teacher, Brian. Two staff members were interviewed at Parkside, Helen and Maria. Both were pastoral care teachers, though Helen combined pastoral responsibilities and subject teaching.

7.4.1 Historical context of local areas

The historical impact of poverty and deprivation was a strong and recurrent theme for the staff in both schools. At Meadow Flats staff perceived that the poverty and deprivation in the area had structural factors at its roots: macroeconomic changes such as deindustrialisation and the loss of skilled manual jobs in the area were seen to have influenced the local economic and social trajectories. The Meadow Flats area was talked about by staff in positive terms pre the 1980s, with the residents described as 'aspirational working class', and the area was felt to have continued to have a very strong identity. The language used by the staff at Meadow Flats regarding the history was often emotive, such as Anita's description of the heart of the area being 'torn out'.

> *'At the time the main occupations were, like, heavy engineering and many thousands worked in the railway industries. So come the advent of the Conservative government and Margaret Thatcher, Meadow Flats was, if you like, de-industrialised and the jobs which had once upon a day been in Meadow Flats were re-routed down to the South-East of England. And, in a way, the whole heart of Meadow Flats was torn out'*
> *Anita, Management, Meadow Flats*

It was recognised that the area did not have a strong tradition of post school education, but that those who grew up in Meadow Flats in the past were able to take advantage of local employment, which was perceived to have been plentiful. However the loss of jobs from the area and from Glasgow overall was seen to be an important contributing factor to the deprivation that the area now faced.

> *'What also has gone are the employment opportunities. That's a total fact ... you had all sorts of things, that the boys from when I was at school who weren't academically inclined would go and work in ... so there were lots of local employment opportunities which I'm not ... I'm sure is much more challenging now'*
> *Peter, Management, Meadow Flats*

At Parkside, staff recounted how historically the area around the school had been associated with poverty and was known for having a raft of issues associated with deprivation, such as anti-social behaviour. Like at Meadow Flats, this was seen to have structural causes at its root, and was felt by staff to have been caused by the redevelopment of the city centre and the forced removal of

people from the slums in the centre of Glasgow, and moving them into the area. As Maria discusses, this was not seen to solve the problems that had been rife in the city centre, but only to move them.

> *'When I first taught here [in the area] in the 1980s it was a hell hole. It was, you can look at photos of it on the internet ... in the 1970s and 80s, where there was like you know the brown tenements, with -maybe built in the 50s and 60s, to take, they took people from the, from Glasgow, from the centre of Glasgow and a lot of the stuff was knocked down in Glasgow. It's what you would have called the Glasgow overspill came into that area. But it was horrible, with graffiti over the walls and litter in the streets and all that type of thing. Kids running amok'*
> *Maria, Pastoral Care, Parkside*

7.4.1.1   What impact has this had on residents?

The staff at Meadow Flats discussed how the population of the area had decreased after employment opportunities had disappeared, with those who were able to move away doing so, leaving behind those who were seen to be less aspirational. Housing was seen to be linked to the reasons why people had left the area.

> *'If we go back, you know...the changes were that the area was decimated, the housing was of a very poor standard, people who were aspirational aspired away from Meadow Flats'*
> *Anita, Management, Meadow Flats*

Staff at Meadow Flats linked the deprivation in the area to issues that impacted on those living in the catchment area in many different ways, such as health and circumstances at home. Peter's use of the word 'obviously' in the quote below illustrates how inextricably the two were linked in the minds of the staff.

> *'So a lot of very deprived areas and therefore obviously we, well not obviously but as a result we do tend to have a lot of social problems... there's a lot of kids coming in with some fairly serious, you know, it could be health problems, it could be domestic problems, combination of all these things'*
> *Peter, Management, Meadow Flats*

The staff at Parkside also talked extensively about the impact that poverty had on people living in the catchment area. There was recognition that poverty and the issues associated with it had an impact on people in a variety of ways, from

low parental involvement with school work, lack of role models, to alcohol and drug issues.

> *'We have a lot of young people coming from homes, or single-parent families, or maybe there could be drugs and alcohol problems for carers and parents. We have a number of pupils in kinship care[20]. We have a number of pupils who are looked after and accommodated. So there is a real mix here and a lot of need, due to deprivation, unemployment and not many role models within the homes for young people'*
> *Maria, Pastoral Care, Parkside*

7.4.2 What recent changes have they seen in the catchment area?

At both schools, staff were aware of recent physical changes within the catchment areas, and generally talked about these changes in a positive light. Physical changes were seen to be mainly down to government and housing association investment. Staff described both changes at the wider catchment area level, such as demolitions, improvements in infrastructure, and new housing, and also changes in individual housing circumstances, such as housing association tenants being moved to new housing. In both schools, the areas were felt to be improving physically.

> *'And I think it has been the case that the local authorities and the government in improving the infrastructure of an area has certainly rebuilt the area...And definitely, you know, the government have, I think, you know, provided huge improvements in social housing in the area'*
> *Maria, Pastoral Care, Parkside*

At Parkside, staff also talked about new housing being an improvement upon the older housing that existed in the area, with newness felt to be a positive characteristic. Parkside staff also spontaneously discussed the creation of a mixed tenure housing area, and felt that recent work had been done to raise standards of social housing.

> *'Lovely modern houses with gardens, private housing, a mix of private housing and housing association. So a lot of the work that's been done in the housing association houses around here's really raised the profile of the area'*
> *Maria, Pastoral Care, Parkside*

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[20] Kinship care is when a child is 'looked after' by a family member or close friend when they cannot remain with their parents.

As mentioned earlier, it was felt by staff that the historic deterioration of infrastructure and housing in the area had previously added to the catchment area deprivation, and therefore recent efforts to improve the area were seen to be beneficial. Staff at Meadow Flats discussed changes in the overall area, such as demolitions of poor housing including high rise flats and tenements, waste ground being redeveloped, and general improvements in infrastructure. These changes were seen to improve the atmosphere of the area, leading to a more aesthetically pleasing catchment area.

> *'Well probably first thing, I'm sure you're aware of it, you know, your research into the area, but there's been massive changes to the whole structure of Meadow Flats'*
> *Brian, Subject Teacher, Meadow Flats*

7.4.2.1   What impact have these changes had on residents?

For existing residents, the impact of the recent changes in the catchment areas was seen by staff to manifest in two ways. The first was through the perceived improved confidence and aspiration of residents who had directly benefitted from new housing. At Meadow Flats, staff discussed residents of housing that had been demolished being moved into newly built, or improved housing. Staff saw a direct link between improving housing conditions and improved confidence and pride, which they felt had fed through into the school, and highlighted the importance they attributed to feeling valued.

> *'I think it gives people confidence. I think people feel valued and the school values them, and then they're proud o' their school and they're proud of their house and they're proud of their area. I think that's really important'*
> *Peter, Management, Meadow Flats*
>
> *'We used to have a huge number of youngsters who came from [now demolished social housing] flats and so over the years they were being decanted, they were being offered new houses in the area…I think that the better, the housing being better, more modern, has definitely encouraged youngsters to be more responsible for their area, as opposed to living in an area which has become run down'*
> *Anita, Management, Meadow Flats*

The second manifestation of recent changes was that the community overall had benefitted from upgraded infrastructure and general improvement in the area,

which in turn had also given residents more confidence and pride, as well as increased responsibilities and reduced anti-social behaviour.

> *'I think it has been the case that the local authorities and the government in improving the infrastructure of an area has certainly rebuilt the area, have given the area more confidence in themselves'*
> *Anita, Management, Meadow Flats*

Staff at Parkside also felt that the redevelopment of housing for existing residents had had a positive impact on those already living within the catchment area. It was felt that relocating residents into improved housing had a positive impact on confidence and aspirations. However, there was recognition that it was only the housing that was changing for these residents, and that all of their other circumstances would most likely remain unchanged.

> *'I think the bulk of people that move into the new houses, it's great and makes you feel better about things and better about yourself … and I know you're putting the same people into the same housing but it's better housing and I don't know if that raises peoples aspirations or… some of the housing in this area was atrocious. I'm not saying its millions and millions times better but it is better.'*
> *Helen, Pastoral Care and Subject Teacher, Parkside*

At Parkside, staff made a clear link between owner occupation and a pupil doing well at school. Changes in the housing tenure of the area seemed to some extent to be associated with the overcoming of the social exclusion and stigma of the area, attracting aspirational families to the area who it was perceived by staff were more interested in education, i.e. owner occupiers. Here, change was seen to be happening through a shift in the balance of the population, rather than the perceived changes in the existing population described by staff at Meadow Flats.

> *'We're getting people, young people from a lot of those homes and that would tend to be – and you don't like to make these statements, but tend to be from homes where parents are working, they own their own home, they're interested in education and motivating their children to do well at school'*
> *Maria, Pastoral Care, Parkside*

Although some of the social housing in the areas was recognised as being of a very good standard, this was by no means the case for all. It was felt that through investment from housing associations and the government, along with

the building of new improved housing, that the area had seen improvements in the last few years and that this improvement was attracting those who had previously left the area to move back, and also attracting new families into the area, thus impacting the mix of the school – clearly linking changes in the catchment area to changes in the school mix. However it was recognised that this influx, although welcome, did not, in the opinion of the staff interviewed, change the fact that the area was still considered to be deprived.

> *'But the kids, the kids are a real wide mix and compared to maybe fifteen, sixteen years ago it's a different mix of children and I don't know if that's because children have changed in sixteen years or maybe the catchment area has changed quite a bit'*
> *Helen, Pastoral Care and Subject Teacher, Parkside*

The term 'aspirational' was used frequently throughout the interviews by staff at both schools. Although defined slightly differently by all, the quote below from Maria was generally representative: staff felt that those who were aspirational were more interested in doing well. This is interesting as it has within the definition an implicit comparison, to those who are not interested in doing well, and for whom education is not important.

> *'Just more interested in doing well, education being important to them'*
> *Maria, Pastoral Care, Parkside*

'Aspirational' was used both to describe pupils, families of pupils, and other residents of the area. At Meadow Flats, aspirational families were seen to have left the area, leading to a more deprived catchment area and compounded disadvantage. In both schools, aspirational was a trait that was seen to either be a result of a change to the existing population - for example, one of the benefits perceived by staff of moving residents into new or improved social housing was that it raised the aspirations of those living there – or a trait that was associated with those choosing to move into the area.

7.4.2.2   What impact has the context had on the school?

The context of the catchment area at Meadow Flats was felt by staff to impact on the pupils, both at an individual level, and in terms of the wider cumulative

impact of having a large proportion of pupils with issues linked to the deprivation in the catchment area.

7.4.2.2.1   Educational attainment

The link between poverty and poor educational attainment at an individual level was almost taken for granted by the staff. Staff felt that the educational attainment of many pupils was affected by issues which the pupils faced personally, or in their home life, which impacted on how they engaged with learning on a day to day basis. These impacts were through a variety of pathways, and led to a cumulative impact of poverty on educational attainment.

> *'We do tend to have a lot of social problems which can, problems which often affect what goes on in the classroom. Speaking as an ordinary class teacher, that obviously… there's a lot of kids coming in with some fairly serious, you know, it could be health problems, it could be domestic problems, combination of all these things. And they come in and I'm trying to teach them…and it's probably not top of their list of priorities'*
> *Brian, Subject Teacher, Meadow Flats*

Staff also felt that the educational attainment and achievement of the pupils in the school was affected by the catchment area context, not only through the well-recognised association between poverty and low educational attainment, but more specifically in terms of having gaps in their knowledge from primary school and also in terms of their confidence, suggesting that educational attainment was affected by poverty at all stages of a pupil's school career.

> *'It's their lack of confidence, so they may have gaps in their education from primary which leaves them struggling in secondary'*
> *Maria, Pastoral Care, Parkside*

In a specific example, even when pupils had performed well in exams and had consequently been offered unconditional places at prestigious universities, staff at Parkside found that they were not taking these opportunities up, due to a lack of confidence and a lack of experiences of areas and contexts outside their own.

> *'Helen: So – and we'd have a couple for, like, St. Andrews unconditionals so there we are and none of them took them so.*
>
> **Oonagh: Why do you think that is?**

Helen: St. Andrews is another planet. Aye, that's the reason why. Whereas if I'd got St. Andrews I'd have been right there, do you know what I mean? So it's just different people. But a lot of them don't like – they're more comfortable to stay within Glasgow although got a few who are going to Edinburgh and a few who are going to move up to Aberdeen, which is quite unusual, but most of them prefer to stay within the Glasgow area.

Oonagh: Okay. Why – is that just...?

Helen: Cause they may appear confident in here but it's funny, see when you take children out and you put them into a bigger environment you see what the lack of confidence is. They may appear confident because they're within their area but the minute you take them out of this area...'

As well as the individual impact, staff also linked deprivation with social issues that could lead to disruptive behaviour, and having a more cumulative impact on educational attainment. Within the classroom, although staff explained that they understood why some of the pupils were disruptive, they felt that it had a negative impact on the other pupils' learning.

'And when I come out the classroom I've got a lotta sympathy for the kids, you know, but the problem is when you're in the classroom you're under pressure to get the kids through stuff ... and you've also got a lot of other pupils who you're trying tae teach as well'
Brian, Subject Teacher, Meadow Flats

7.4.2.2.2   Home and family circumstance

At an individual pupil level, staff talked about the social issues they felt impacted on the pupils: housing situations – for example a lack of space to do homework; and issues to do with family, such as a perceived lack of discipline from parents, and few positive role models, as well as issues with drugs and alcohol. The social issues faced by the pupils were reflected in the concern by teachers that chaotic lifestyles and difficult home circumstances had a negative impact on pupils in terms of their engagement with education.

'But yeah, I mean if you don't have a quiet house tae go and do homework, it's quite difficult'
Peter, Management, Meadow Flats

'I think you've definitely got some children are living ... some of the children are living in very challenging circumstances and it's bound tae be that that can spill over in tae the school'
Brian, Subject Teacher, Meadow Flats

It was felt by staff that due to the nature of the catchment area and the issues of deprivation that it faced, many of the families of pupils had little positive experience of education. This meant that some pupils were perceived as having a lack of role models with a positive experience of the education system, and that due to this, families lacked the skills to engage with their child's education – for example helping with homework - as fully as they or the school may wish. This was felt by staff to manifest as disinterest or a 'lack of aspiration', and seen to be problematic.

> *'There are a number of our youngsters who have not really known any member of their family to hold down a job and for whom benefits has become a way of life…So I think it's, in many cases, it's a lack of aspiration from the parents on the pupils and also a lack of support from parents and, you know, in fact, they don't see the value of setting boundaries or sitting down and going over homework, or reading with their youngsters. And that, I think, presents a problem'*
> *Anita, Management, Meadow Flats*

The pervasive nature of poverty was recognised by staff, as well as the narrative that schools use poverty as an excuse for poor performance. There was also recognition of the wider impacts of poverty, defined by Maria as 'chances, opportunities'.

> *'I don't believe that statement made recently that teachers couldn't use poverty as an excuse. I think poverty is always going to affect young people and their learning and their aspirations. And it's not – we don't ever use it as an excuse in here, but we take cognisance of it. Poverty, and not just poverty materially but poverty of chances, opportunities'*
> *Maria, Pastoral Care, Parkside*

In terms of the wider cumulative impact, at both schools, the deprivation and associated issues that abounded in the catchment area were seen to manifest within the school. This led to: a poor reputation, which for Meadow Flats had led to a leakage of pupils to other nearby schools; staff time being taken up by increased contact with pastoral staff and disruptive behaviour in class; and at a school level due to less time being devoted to learning. These will be explored in more detail below.

7.4.2.2.3 Reputation and leakage

In Meadow Flats, one of the consequences of the deprivation in the area identified by staff was the leakage of potential pupils living within the catchment area to other schools, due to parental choice of schools through placement requests. It was felt that due to the poor past results and reputation of the school, parents in the area who were thought to have higher educational ambition for their children were likely to choose to send them to surrounding schools that were perceived to be 'better'. This had the effect of further depleting the school roll, and it was felt this had led to the school being disproportionately weighted towards those young people whose parents had not or could not consider another school. In other words, those who were more affected by social and economic issues, and who it was perceived had less engagement with education. It was felt that this exacerbated the issues already experienced by staff and pupils within the school, leading to poorer outcomes and to a worsening of the school reputation.

> *'Lots of families [in the catchment area] who, let's say, had ambition for their children, didn't see Meadow Flats as going tae meet these ambitions. Not all, but quite a few'*
> *Peter, Management, Meadow Flats*

> *'At one point ... the school had a population of about two hundred and fifty and what had happened was that the school was perceived as not being as good as [other nearby schools]'*[21]
> *Anita, Management, Meadow Flats*

The staff at Parkside also felt that the school had a negative reputation, and this manifested in the expectation from outside agencies - for example supply teachers - that the school would be problematic, but this had not in fact been the experience for supply staff.

> *'It's a good school, right, and I'm always quite interested when people come in here to do, you know, like when you've got supply teachers coming in and I'm always – because an awful lot of children, a lot of teachers comment that it's actually really good in comparison to other schools'*
> *Helen, Pastoral Care and Subject Teacher, Parkside*

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[21]The school roll had since increased substantially.

The staff at Parkside discussed leakage to other nearby schools which were perceived as having good reputations. However, due to primary school amalgamations and one of the 'better' schools running out of space, they thought that there had been less leakage in recent years.

7.4.2.2.4 Staff time

At Meadow Flats the social issues associated with deprivation had led to a large amount of staff time being taken up dealing with situations arising from these, and it was felt that those they thought of as 'needy' pupils – those with social and behavioural issues - took up a disproportionate amount of staff time both in and outside the classroom, even though they were seen to be a minority.

> *'And although it's not a majority of pupils at all, it's a minority of pupils, they're such a needy bunch that I think they do present a real challenge for teachers'*
> *Anita, Management, Meadow Flats*

Both of the staff members interviewed at Parkside had a responsibility for pastoral care, and both found that their working days were taken up with dealing with pupil issues. The staff described their working day as being constantly sought out by pupils, including outside working hours. Administration also took up a lot of time, as did liaising and meeting with other services such as social work and psychological services due to the needs of the pupils.

> *'I mean the phone's going all the time - social work, health, parents all the time. Kids coming to the door, kids needing you to deal with something that's happening there and then, things happening in classrooms. I mean we're kind of firefighting all day'*
> *Maria, Pastoral Care, Parkside*

Due to time at school being taken up by these issues, Helen did all of her teaching preparation at home out of school time, which was seen to take its toll.

> *'And like I also teach… all the preparation stuff's done at home, and then also working with primary so I've got quite a lot of preparation for the primary and so you're doing teaching there as well so it's quite a lot of work and you're kind of run ragged a lot'*
> *Helen, Pastoral Care and Subject Teacher, Parkside*

7.4.3 Policies in mitigating negative catchment area effects

At both schools, staff talked about the policies in place to mitigate the individual and cumulative impacts of the deprived nature of the catchment areas.

Staff at Meadow Flats talked often about the school and pupils being able to overcome their background – it was felt that factors such as having high expectations of pupils, providing a wide range of support, and reducing stigma, were all factors that could help pupils to do well in spite of the difficulties they faced.

> *'They get every support in this school to be whatever they can be and so it could be that there are kids in this school who need lots and lots of support with their learning, they're really challenged academically'*
> *Peter, Management, Meadow Flats*

> *'I think school often is the one place where there's any structure for their lives and I think the school … was playing a pretty big role there and was providing a structure for a lotta kids'*
> *Brian, Subject Teacher, Meadow Flats*

The role of the school was seen to be not only about educational attainment, in terms of exam results, but also about a more general achievement. This was seen to be a positive attitude, as it was recognised that not all pupils were academically minded and that it was important to concentrate on other skills. This support fed into more specific school policies introduced to lead to particular outcomes, such as: nurture classes; improving the reputation of the school; and changing the social mix of the school. These will be discussed below.

7.4.3.1   Policies: Nurture

At Meadow Flats a specialist nurture class had been in existence for several years in order to concentrate on those pupils who it was felt needed specialist attention and support. Pupils were based in one classroom throughout the school day as opposed to moving between mainstream classes, with one main teacher supplemented by subject specific lessons from other teachers. Breakfast was also provided. It was felt that this had been a successful strategy for some, and that there were pupils for whom it had been the difference between managing

to take part in secondary education, and not managing. However, due to funding, the nurture class was no longer in operation.

> *'Third year, end of second year into third year they were kinda fed back into mainstream and it worked for some of them, didn't work for others but the fact it worked for some showed that it had been a partial success anyway, you know'*
> *Brian, Subject Teacher, Meadow Flats*

A specialist nurture club was still in operation at Parkside. The club was felt to have had a positive impact on those who had been involved.

> *'We have set up nurture now, so young people coming ... in first year, maybe five or six young people who are, they go through a scoring system and a lot of it is to do with attachment and not having attachment in early years, which leaves our, a lot of young people with challenging behaviour and difficult behaviour ... but here it's working really well'*
> *Maria, Pastoral Care, Parkside*

7.4.3.2 Policies: Improving educational attainment

Meadow Flats offered a large range of academic supports, from after school homework clubs, to partnerships with other educational institutions. This was felt to be a way of tackling the low educational attainment associated with the large proportion of deprived pupils in the catchment area.

> *'We have, in the school, we have Easter revision classes, we have weekend study weekends away at out-of-doors centres ... We have classes that run after school every day. Often the library, we pay staff to come into the library later at night. We do various awards, we have the Duke of Edinburgh Award, we do personal development awards, we do dynamic youth awards ... So, yeah, I think we've got a variety of supports in the school and all of them, you know, serve a very, very, you know, useful purpose'*
> *Anita, Management, Meadow Flats*

A strategy introduced in the mid-2000s aimed to identify pupils who had the potential for high achievement in exams at an early stage, and to provide extra support and resources in order to help them achieve this goal. Not only did this policy seek to maximise the potential for these particular pupils, but it also sought a wider impact, that of proving to the whole pupil body and parents that academic achievement was a possibility at Meadow Flats.

'Basically one of the roads our school went down there was to raise attainment, and [previous head teacher] did a number of things but for me I think one of the biggest things I noticed was… pulled in all the pupils that had a chance of getting five Highers and said to them, "Right, how could we help you to get those five Highers?" And they did one or two things but what it created was an ethos of "Yeah we could go to university", whereas [before] very few people went on to university'
Peter, Management, Meadow Flats

Improving educational attainment, and helping pupils to do as well as they could was a central strategy at Parkside. Concerted efforts had been made by a previous head teacher in the early 2000s to introduce a flexible setting and streaming system which was seen by the staff to have improved educational attainment

'What we do is we take that in first year and it's not fixed or set in stone, there's flexibility, so pupils who're really motivated and have come up with good results from primary we try to give them that experience but other pupils can come in and if that doesn't suit them we can move them… we try to keep them working at a faster pace, as you would in any setting or streaming system ... That's, I think that's helped, that's my personal opinion, but it must have something'
Maria, Pastoral Care, Parkside

As well as this, lunchtime and after school study clubs had been set up.

Staff felt that alongside the school's responsibilities for the academic wellbeing of the pupils, there was also a focus from the leadership team within the school on achievement in other areas, and supporting the pupils to become productive members of society.

'They're [senior management] very caring people and okay, they want the best and they want the best out of children but they appreciate that academic is dead, dead important but … being there for children is actually just as important and that's what we do'
Helen, Pastoral Care and Subject Teacher, Parkside

However this was seen to be an intensive process, and it was felt by staff that it could not be successful in every case.

'And that's what we have to do here, is to make them realise ... that they have to, in some way, be part of society, they're not separate from society. And that's the job of teachers, and you can do it and do it and do it, but sometimes it won't work'

Maria, Pastoral Care, Parkside

7.4.3.3   Policies: Reputation management and improvement

Both schools actively looked to improve and manage the poor reputation the schools were felt to have. A stricter uniform policy, including blazers, had quite recently been gradually introduced to Meadow Flats. This seemed to have three main purposes: firstly, in order to make the pupils feel that they were no different from other schools; secondly, to alleviate some of the more visual differences in terms of affluence between the pupils; and thirdly, to improve the image of the school within the community and therefore the local reputation of the school.

> *'The school, all pupils are in a uniform. And I think, you know, it's part also of a public perception, they see pupils from other areas who wear a blazer, the pupils themselves feel they want to look the same as schools in other areas'*
> *Peter, Management, Meadow Flats*

The reputation of Meadow Flats had been negatively affected by rumours of closure that stemmed from a drop in the school roll. Improving the reputation of the school with parents in the catchment area through primary school liaison was seen as a key strategy by staff to improve the roll, as there was a recognition that the negative reputation had fed into a stigmatisation of the school that was in part seen to have impacted on this drop. It was felt by the teachers that parents who chose for their children to go to a school outside the catchment area were generally more aspirational in terms of their child's education, therefore the reputation of the school was driving away those pupils who could otherwise improve the school's educational attainment, thus reinforcing this cycle.

> *'I was brought in the bottom of the school but to do the primary, secondary liaison. And at that point … lots of families who, let's say, had ambition for their children, didn't see [the school] as going tae meet these ambitions'*
> *Peter, Management, Meadow Flats*

> *'The school got a reputation and I think there was also sortae words out in the community that the school was gonnae close and therefore parents were thinking, "Well I'm not gonna send my kids there"'*
> *Brian, Subject Teacher, Meadow Flats*

Uniform had been introduced at Parkside when the school was created, and it was felt that it went some way to alleviating issues caused by poverty such as differences between the clothes that pupils wore.

> *'There's also kids, just poor wee souls in school who've got nothing and I think they're becoming less in the school compared to maybe fifteen years ago, definitely, because – and I don't know if it's maybe you don't see it so much because everybody's in a uniform and it's maybe not as noticeable but even still the uniform you can tell because you can see a washed uniform and a clean uniform and a uniform – you can tell the difference, you know the difference. But I don't think it's so, so obvious'*
> *Helen, Pastoral Care and Subject Teacher, Parkside*

7.4.4 Area change and school social mix

At both schools, staff talked about the social mix of the school, and felt that it had recently changed in terms of being less weighted towards poorer pupils.

As discussed above in section 7.4.2, staff at Meadow Flats saw the changes in the catchment area as affecting the school both through the impact on existing residents, through for example raising the confidence of residents, but also directly through the school, making it easier to implement the policies and strategies discussed to improve the school reputation and educational attainment. These improvements then made the school more attractive to those parents in the catchment area who would otherwise send their children to a different school - perceived by staff to be more aspirational - and therefore positively changing the school's social mix. The aim of changing the social mix of the pupil body by attracting more aspirational families already living in the catchment area to send their children to Meadow Flats was felt to be central to having a more balanced representation of pupils.

> *'More pupils were attracted to the school and I would say that over the past ten – fifteen years the school has really taken on the challenges of attracting people into the school where we were in a situation of having a thousand plus pupils in the school and, in fact, a waiting list of pupils hoping to come in…Exam results have steadily improved. There are more pupils going onto higher education, to further education, to employment'*
> *Anita, Management, Meadow Flats*

The staff at Meadow Flats explained the benefits they associated with changing the school mix. As the pupil body becomes less deprived overall, pressure on the

staff from dealing with the consequences of poverty and deprivation is lessened as the proportion of pupils with these needs is lessened. This reduction of the most vulnerable pupils was seen to impact in four ways: firstly, teacher time is freed up to concentrate on learning in the classroom as there are fewer disruptions; secondly, teacher time is freed up *outside* the classroom as those with a responsibility for pastoral care have less to deal with, and are more able to concentrate their efforts on pupils that need most support; thirdly, with a higher achieving pupil body, a wider range of subjects and levels can be introduced, increasing choice for pupils and therefore increasing the attractiveness of the school; and fourthly, a kind of 'normalising effect' takes place, whereby non-deprived pupils become the perceived 'norm' within the school.

> *'So the potential's there, because they're coming in, the kids who want tae do well and that has an effect, 'cause the more good kids, the more ambitious kids, the more ambitious families you've got in the school, the better chance you've got at succeeding. They become the norm or the majority rather than kids…rather than maybe those who don't, you know… You know, you can offer Advanced Highers and you're offering Highers. You've got kids going out with five Highers, which you didn't have before, or very, very few…So yeah, of course that's an impact on what you're offering, the range of subjects you're able to offer'*
> *Peter, Management, Meadow Flats*

> *'And the mix of pupils has been part of that [improvement], it's not the whole story, but it's part of it'*
> *Brian, Subject Teacher, Meadow Flats*

However, one of the staff members interviewed felt that despite the improvement in the school's educational attainment over recent years, things were beginning to revert back to how they had been previously.

> *'And you noticed it in the classroom, there was much more kind of drive I suppose and ambition kinda came in then amongst the kids. Sadly I feel we're beginning to lose that again. It might just be the kinda senior years we've got at the moment, maybe it's just two or three not so good years, year groups, but my feeling is we're beginning to head back to where we were maybe in the 1980s again'*
> *Brian, Subject Teacher, Meadow Flats*

At Parkside, staff did not mention the changing of the school social mix as an explicit school policy, but it was felt that the changes in the catchment area in

terms of housing and infrastructure had had an impact on the social mix of the school. Changing social mix was seen to have a positive impact in several ways, both in the wider catchment area and within the school. Several mechanisms for this impact were discussed, including role models within the pupil body; a change in the balance of the SES of pupils within the school; and a reduction in stigmatisation of both the area and school. Therefore, although not an explicit policy, the changing social mix of the school was seen to be causing the school to become more attractive, and thus reinforcing the idea that more aspirational families would move to the area.

> *'There's more children, I would say, maybe come from, maybe more affluent houses. I'm not talking like super rich but I'm talking about where mum and dad are out working and – or mum's out working or dad's out working, whatever it is, but we definitely have – I think that's changed for definite. I don't think they're, they're not like the poor relatives any more'*
> *Helen, Pastoral Care and Subject Teacher, Parkside*

Although there was some discussion of the fact that there were children coming to the school who would have previously attended another nearby school, it was felt that the main source of change within the school was coming from the children coming up through the feeder primary schools. It was felt that due to the improvements in the area, the social mix of the primary schools had been impacted which was in turn feeding into the mix of Parkside. However, staff also discussed the amalgamation of feeder primaries and the re-zoning of primary catchments to take in areas which had previously sent children to other schools, and felt this could also go some way to explaining these changes. This is important to highlight, as it illustrates that multiple changes had occurred in both the catchment area and the school, therefore it can be difficult to separate the effects on the composition of the school.

> *'Oonagh: Yeah. You were saying a minute ago that you've – some of the kids that would have gone to [nearby school] are now coming here, so that's slightly affecting the mix then?*
>
> *Maria: I think that's slightly affected the mix. But I'm beginning to notice that the kids coming from our own feeder primaries, there's more aspirational feeling there from the parents and from the kids… I mean I don't know why that is, but again it may be to do with the fact that people have chosen to live in the area, that there is nice housing in the area'*

7.4.5 Summary of staff views

In both of the schools, the staff clearly felt that the present circumstances of the area and thus the school should be seen in the context of the longer term trajectories of the areas. In both, the history of the areas was seen as previously setting the catchment area on a general downwards trajectory – structural and macroeconomic factors were felt to have led to widespread poverty and deprivation. A lack of investment until relatively recently was felt to have exacerbated these issues: for Meadow Flats due to structural forces taking jobs out of the area, and for Parkside seeing people being moved from the deprived city centre into the area. The impact in both areas had been negative, with family breakdown, lack of employment, substance issues, health issues, and in the case of Meadow Flats especially, the moving away of those who were able to choose to do so.

The deprived nature of the catchment areas was felt by all teachers to have a real and tangible effect on the day to day running of the schools, as well as the wider reputation. On an individual level, a great many pupils were seen to have problems stemming from, or linked to, the deprivation in the catchment area, both in terms of parental issues such as with alcohol or drugs, lack of employment, lack of engagement with education themselves or not seeing the 'value' of education, to individual issues, such as health problems, lack of confidence, poor attachment, poor behaviour, and poor prior educational attainment. On a day to day basis, the number of pupils with social, behavioural, and educational difficulties had a negative cumulative impact on staff time within and outside the classroom, and on the learning of the pupil body as a whole. This led to poor educational attainment and poor reputation, leakage to other schools, and to staff doing work outside of work hours.

More recently, there was felt to have been a more positive trajectory in both catchment areas, from demolition of poor housing, improved infrastructure, new build housing, and improvements to existing housing. These changes were seen to be down to investment by local authorities, government and housing associations. In both schools, staff talked of new and improved housing for existing residents, but at Parkside, there was also discussion of new, more 'aspirational' families buying houses in the area. Housing tenure was touched

upon briefly, with explicit reference to a mixed tenure housing development in Parkside, but otherwise staff talked about the 'aspirational' children of families in work who owned houses, with positive attitudes towards education, and aspirations, all making the difference in terms of social mix. People wanting to own property in the area was seen to be linked to the desirability of the area.

The social mix in both schools was felt to be changing in more recent times with more of an emphasis on 'aspirational' pupils, but the reasons for this were complex, and differed between the schools. At Meadow Flats, the work that the school had put in around raising educational attainment and improving the attractiveness of the school, as well as working with the feeder primary schools to encourage those already living in the area to attend the school instead of other nearby schools outside the catchment area, were seen to be the driver behind the changing social mix of the school. At Parkside, it was felt that the change in social mix was coming through new pupils from the primary schools, as the children of the more affluent families that had bought homes in the area came through the school system. At both schools, a huge range of extracurricular support, initiatives and new policies had been introduced recently.

7.5 Findings: pupils

Overall, ten 6[th] year pupils were interviewed. Six were at Meadow Flats: Sean, Gary, Grant, Jamie, Ben and Chloe. Four pupils from Parkside were interviewed: Grace, Matt, Sarah and Gregor. All had been at their schools since first year, and all lived within the catchment area.

7.5.1 Home neighbourhood vs the wider area

Perhaps unsurprisingly, the concept of the catchment area was not readily recognised by pupils in either school. Instead they tended to distinguish between the immediate neighbourhood – the area surrounding their home - and the wider surrounding area.

There was recognition that the overall area of Meadow Flats was seen to be a deprived community with a great many social problems, including poverty and crime, and that this view was widely held by those not living in the area, stigmatising those who lived there. Pupils seemed very used to this stigmatisation.

> *'Well, right away, Meadow Flats – people think of Meadow Flats as a bad place, like, anywhere you go. If you go on, like, holiday and you meet another Scottish person and they say "where you from?" and you say "Meadow Flats" they'll go like that [makes face] they'll, that's the first thing they'll dae. I've heard it a' before, and it's just, to be honest, a bad place. Like... a lot a' people think that, a bad place, because they say it's like full a', like, knives, knife crime, poverty and a' that'*
> *Sean, Meadow Flats*

In general the pupils had very positive views of their neighbourhood. These were generally in opposition to their feeling about the wider surrounding area of Meadow Flats. Often the positives of the immediate neighbourhood were defined relative to the negatives of the wider area. These negatives were often related to gangs, which seemed to be a relatively normalised experience for the pupils.

> *'I just like it [the neighbourhood] 'cause it's just quite quiet an' there's no' a lotta fights an' stuff like that up there. It's quite relaxed an' we can have a nice quiet like, y'know, street an' there's no really any, fights a' stuff like that an' no gangs or anything that stay up there, so I think it's quite...I just like staying up there'*
> *Ben, Meadow Flats*

> *'Just it's quiet…And you don't really get like a' the daft wee gangs an'*
> *that walking aboot it, so that's quite good'*
> *Chloe, Meadow Flats*

Like the staff, pupils were more likely to equate newness of housing and areas with how 'nice' they were, with the suggestion that the older parts of the area were less nice.

> *'It's like a new neighbourhood, and it's a nice place'*
> *Sean, Meadow Flats*

The negative opinions that the pupils held of the wider area were generally influenced by experiences with violence, gangs, alcohol and drug use, and other youths in the area, as well as with physical attributes such as rubbish and proximity to waste ground.

> *'First impressions [of the wider area] that it would probably feel was a bit*
> *shady 'cause there's hunners o' like rubbish flung aboot wi' the young*
> *stupit people. But it's a'right, you know, it's no' the worst place, so…'*
> *Jamie, Meadow Flats*

Certain areas in Meadow Flats were identified as problematic, and pupils had developed risk avoidance strategies for these areas. These strategies manifested as the pupils consciously avoiding certain streets, or avoiding specific areas on certain days or times. These avoidance strategies were in the main to avoid trouble, however they were also used to keep what were seen as trouble-causing youths out of the sight of younger relatives or friends. It was felt that by witnessing anti-social and destructive behaviour in the area, this would normalise it for younger residents, and this was a result they were keen to avoid.

> *'It's like you come oot my neighbourhood, you turn the corner and that's*
> *you, like, towards so-called Meadow Flats and it's like no' a nice place to*
> *be when it's a Friday or Saturday night, if you know what I mean. Like, say*
> *I wanted to go to the shops or something, on a Friday or Saturday, you*
> *could just go up and you'd see a guy staggering up to you and you don't*
> *know what he has on you because you can tell by he's got scars and that on*
> *his face – so you dunno what to expect. But you stay in such a nice bit and*
> *then, literally, roond the corner, you know what's happening'*
> *Sean, Meadow Flats*

'So I keep me and my siblings and that away fae the street a' the time. I take them other parts and that to play fitba'. Just want them oot a' that wan specific area'
Grant, Meadow Flats

Pupils at Parkside also tended to distinguish their neighbourhood area, the area directly around where they lived, as opposed to the wider area in which the school was situated. Pupils were generally positive about the neighbourhood they lived in. Qualities that were seen as good were that their areas were quiet; had a lot of old people; felt like a community; and were safe. Often the neighbourhood was described in terms of what it did not have and how that made it good – for example, a lack of drug addicts.

'Like, it's safe. Like, its kind o' just old people where I stay. But there's a lot o' kids but there's not really like anybody that's pure dramatic, like that ... Like, it's not dead busy and stuff like that and it's not like…like junkies or anything about, people like that'
Sarah, Parkside

'Like, it's dead quiet an' there's no trouble an' all that'
Grace, Parkside

Although pupils generally liked their immediate neighbourhood, they described the wider area as differing from their own neighbourhoods. There was discussion of issues that affected the area such as drinking, and violence.

'The only thing I ... like, obviously, like, drinking habits, smoking, all that. Like, violence. You see a lot o' violence but it's obviously not my thing but, like, I seen something I'd report it but ... yeah, probably violence is what I don't like about it … It is quite a rough area. Like, obviously like drinking an' all that stuff, all the bad stuff'
Matt, Parkside

'Can be a lot o' people going up ... an' causing trouble round there which involves drinking an' stuff like that. But apart fae that, it's fine'
Gregor, Parkside

There was however a feeling that the deprived status of the area did not detract from it having positive attributes, such as a strong sense of community.

'It's a rough, rough area but obviously it's a good community'
Matt, Parkside

7.5.2 Change in wider area

Recent changes in the wider area were not something that the pupils at Meadow Flats seemed to have much awareness of, with little spontaneous mention of it in the interviews. When probed, however, the pupils tentatively thought that there had been some changes in the area, mentioning things such as demolition, recladding, and new houses being built.

> *'Like I think just aboot three year ago they flats o'er there got like a facelift'*
> *Chloe, Meadow Flats*

However, views were mixed on whether this had improved the area or not. Although it was felt that new houses and improved housing made the area look and feel better, it was also felt that area development had not progressed as planned: demolitions had taken place and that nothing had been built to replace them, leaving large areas of waste ground, and many areas had no shops or infrastructure. This was recognised by pupils as being disadvantageous for residents. The changes mentioned by pupils were also often perceived to have happened a number of years ago. It is possible that the pupils' seemingly lower awareness of regeneration in the area than the staff was due to them having a different concept of 'their area' than the staff at Meadow Flats. While staff were able to think of the catchment area as a whole, it seems likely that the pupils had a more fragmented view of their local area, knowing only those areas in which they had reason to go to, such as their immediate home and school neighbourhoods. It is also possible that awareness was low due to a combination of the long timescales of regeneration and the relatively young ages of the pupils. However, it is also possible that pupil views were more accurate, especially if staff do not live locally.

> *'They were gonna build new houses and build new parks and that and nothing's happened for the last, God knows, seven years or something ... Nothing at all has happened ... Nothing, like, the council have done nothing – and it's no' really, the council might no' take too much care aboot it, but it's no' good for if you live in that area, when there's nothing there'*
> *Sean, Meadow Flats*

Some of the negative behaviours being played out in the wider area seemed to take place in areas associated with regeneration or improvement – the pupils discussed young people 'playing on scaffolding'. It is possible that regeneration in Meadow Flats has inadvertently led to an increase in these perceived negative behaviours due to demolition and the introduction of temporary structures and building sites.

> *'It's really no' the best o' places, honestly, because, like… you see all these weans playing aboot scaffolding and a' that, and they're just like…what do the parents think aboot that? But the parents don't care. And then you get older weans, like all the weans that are like fifteen, sixteen years old, right, picking up bricks and smashing windaes and a' that - and it's murder'*
> *Grant, Meadow Flats*

At Parkside, there was some awareness of changes in the wider area in which the pupils lived, however this was generally not front of mind. In general the pupils tended to recall the process of improvements rather than the results of regeneration efforts, and even then they were unsure of what was being done.

> *'I'm no' sure. I mean, I've seen things like scaffolding up an' around a lot o' houses. I'm no' sure what's exactly being done, like new roofs and stuff like that, that sort o' stuff'*
> *Gregor, Parkside*

There was however some awareness of newly built houses and the impact these had. This kind of new building was seen in a positive light by the pupils, in terms of making the area more attractive and attracting people to live in the area.

> *'An' it makes like the image more appealing as well instead o' like just old building, it's all newer modern stuff now'*
> *Matt, Parkside*

7.5.3 Impact of catchment area on school

Pupils at Meadow Flats felt that the area in which they lived had a negative reputation, due to having a great many residents affected by problems with poverty, violence, and drug and alcohol issues, and that this in turn had an impact on the perception of the school. They recognised that the surrounding area had issues, however they felt that all areas had their problems and that in the main their school did not deserve the negative reputation it had. It is

possible that the fact that the school and the area share the name of Meadow Flats increases the school's negative reputation.

> *'A lot a' people think 'oh, if he goes to Meadow Flats, he must be involved in knife crime. He must be, he must no' have the best clothes and a' that, and he must have a bad mum and dad where he lives'*
> *Sean, Meadow Flats*

All the pupils at Meadow Flats used the word 'good' when talking about their school, often in a way that seemed to be a pre-emptive defence that it would be assumed that their school was not 'good'. They were quick to point out that the school was no different to other schools that they had visited, perhaps indicating that they felt there was an unfair stigma attached to their school.

> *'A lot of people think, 'cause of the name and the area, it's already gonna be a, like, hard school to work in but when you actual go into the school and, like, the school grounds, it's actual as normal as any other school – 'cause I've been to other schools on trips, and it's no' any different'*
> *Sean, Meadow Flats*

> *'Well, the school is genuinely a good school'*
> *Grant, Meadow Flats*

The pupils talked openly about the issues with behaviour they had witnessed within the school: bullying, fighting and disruptive behaviour were all mentioned. This was felt to be due to a minority of pupils.

> *'Dislikes…some fights, I disagree with the fights, I don't like that. The way people speak to teachers sometimes, I don't agree wi' that either. Some people like throw things aboot an' I don't particularly agree wi' that either'*
> *Ben, Meadow Flats*

It was felt by most pupils that strict discipline was the best way to combat behavioural issues, and that generally this was dealt with effectively by staff. Disruptive behaviour was seen by most pupils to be much more of a problem in the lower school, amongst younger pupils, than amongst the upper school pupils. Indeed, one pupil interviewed who had been part of a special class when he was a younger pupil that dealt with pupils with behavioural problems described an especially strict teacher as 'brilliant'.

Pupils talked about their strategies for dealing with the challenging behaviour of other pupils in the school, which were generally avoidance based, an echo of how problematic residents and areas were dealt with. There seemed to be recognition by pupils that the mix of pupils had an impact on how other pupils fared, with differing attitudes and engagement with school work.

> *'But in every class, you dae get the class clown that tries to disrupt everything, but I mean, if you keep your heid doon, then naebody will bother you and that, know what I mean?'*
> *Grant, Meadow Flats*

At Parkside, it was also felt that the reputation of the school was negatively affected by its location and the reputation of the wider area, due to the stigma that the pupils felt was linked to it.

> *'A lot of people just judge it, like because it's in the middle o' [area]. Like 'Aww, blah-blah-blah, that school's got a bad reputation' an' all that'*
> *Grace, Parkside*

Pupils were keen to distance themselves and the school from this perceived negative reputation, citing good academic results. However, the pupils were able to pinpoint where this perceived reputation came from, citing the behaviour of a small contingent of pupils.

> *'A lot o' people that come here are just dead neddy[22], like that. Like, it's not a posh school an' I think most people know that, but it's like, I think some o' the pupils in here just give it a pure bad reputation'*
> *Sarah, Parkside*

However, discussions of the challenges and issues that the school faced did not in any way seem to detract from the feeling that the school was a 'good' school. The relationships with, and encouragement from staff especially were seen to contribute to these feelings. In the views of the pupils, not being a 'posh school' was not the same as it not being a 'good' school. Their view of the school was more to do with the behaviour of pupils rather than the results. However, throughout the descriptions of stigma, there was acknowledgement of challenging behaviour witnessed within the school, such as bullying and fighting,

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[22] A 'ned' in Scottish vernacular is a derogatory term applied to hooligans or louts (OXFORD ENGLISH DICTIONARY 2017.), and is also thought to stand for 'non-educated delinquents'.

and a feeling that discipline from staff was a way to combat this. It was felt that staff tried to enforce discipline, though it was felt by some pupils that sometimes staff lacked cooperation from parents, which could make enforcement difficult.

> *'Like, you can have a meeting wi' like their parents but it's not gonnae really do much'*
> *Sarah, Parkside*

There was recognition that pupils within the school had a range of issues to do with their background, reflecting some of the social issues that were prevalent in the catchment area.

> *'Like my friends have all got like different backgrounds, like family issues an' all that, but they're kind o' still...similar'*
> *Matt, Parkside*

This led to the observation that the staff involved in pastoral care within the school had a lot to deal with in terms of the needs of the pupils that they supported, and a recognition that this impacted on how challenging their jobs were.

> *'But they [pastoral care staff] must've like ... they've probably heard like loads and loads and it's amazing how they've dealt wi' it an' all that. So it's a tough job for them'*
> *Matt, Parkside*

There was some feeling amongst pupils that parents in the catchment area chose not to send their children to the school because of its reputation.

> *'Like you can speak tae people an' they're like "Oh, my mum didn't send me there because it was in [surrounding area], blah-blah-blah"'*
> *Grace, Parkside*

The school itself was felt to be supportive, both academically and in terms of pastoral care. There was an awareness from the pupils that strategies had been put in place in order to support academic achievement and focus on educational attainment.

*'There's a lot o' support, o' supported study an' stuff like that so it's good
for if you're ever struggling, anything you don't understand an' stuff like
that. It's good'*
Gregor, Parkside

*'Well, it's quite a good supporting school an' it's like dead compassionate
about all its pupils as well so, like, no matter what, like, their background
is they'll support them no matter what an' help them as much as they can
an' give them a good education'*
Matt, Parkside

7.5.4 Summary of pupil views

The pupils at Meadow Flats were very aware of the issues in their catchment
area, however they were more likely to refer to the neighbourhood directly
around their home when asked about the local area. They generally felt their
neighbourhood was a good place to live, though they tended to refer to the lack
of negatives that they perceived in the wider area – alcohol issues, violence,
gangs – when defining the positives of their immediate home neighbourhood.
Pupils had developed strategies to avoid exposure to the perceived negative
influences in the wider area, namely avoiding certain areas at certain times. The
pupils at Parkside also described the wider area in which they lived in as having
issues, such as drugs, alcohol, and violence.

Pupils at Meadow Flats felt that the school reputation suffered unfairly due to
the reputation of the area, and that the school was supportive and put in a lot of
effort to help its pupils. Challenging behaviour was in the main seen to be dealt
with, and they were aware of policies such as compulsory wearing of uniform
that had been brought in to their schools. Parkside pupils were also very aware
of the reputation that the school had and felt in the main that it was
unjustified, however they had witnessed behavioural issues and talked about a
small contingent of pupils who they felt were not interested in learning and
caused the poor reputation. They had some knowledge of parents who had
chosen to send their children to surrounding schools due to the poor reputation
of the school. The pupils themselves were generally very positive about the
schools, especially in terms of the support they were given by staff, and they
seemed aware that staff had a lot to deal with because of the circumstances of
other pupils in the school.

There was little spontaneous mention of area change by Meadow Flats pupils, possibly due to the long timescales of change and the tendency of young people to stay in the same areas. When probed they discussed housing demolitions, however they were generally unaware of anything happening after the demolitions, and felt that the area had been neglected. They also felt that the slow progress with renewal had provided opportunities for anti-social behaviour in the area. Parkside pupils had some awareness of area change, such as new cladding on buildings, but otherwise were not aware of area change.

7.6 Initial discussion

This chapter set out to give an account of the experiences of staff and pupils in two of the schools that had experienced both an increase in owner occupation in the catchment area and an improvement in educational attainment between the two time periods of the data, in order to answer the third and final research question of this thesis:

How have changes in neighbourhoods, catchment areas and schools been experienced by staff and pupils?

This initial discussion will look at some of the findings in more detail, exploring the impacts and role of social mix. The next chapter will bring together the findings from all three findings chapters for further discussion.

7.6.1 Experiences of change

Although both staff and pupils discussed area change, they seemed to have experienced it in different ways. Despite the negative perceptions of change that had occurred in both catchment areas in the past, more recent attempts at regeneration and improvements in housing were generally considered by staff as a positive thing. In both schools this was seen to improve the lives of existing residents through new and improved housing, and in Parkside it was said to be attracting new people to the area. New and improved housing was seen to be a 'fresh start' for those residents of the catchment area who benefitted from it. This type of 'fresh start' outcome for existing residents who have had improved or new housing has also been found in other studies, for example the GoWell study, where those who had had an improvement in housing reported higher intentions to improve health behaviours such as smoking (Egan et al., 2013). Though there is mixed evidence on improvements in mental health and wellbeing, some improvements, such as kitchens, bathrooms and new front doors have an association with improved mental health (Curl et al., 2015).

The views of the staff and pupils of how the areas had changed were different in both schools – pupils were far more likely to think that the wider area was still not very good, and that changes were minimal. This contrast in awareness may

reflect the fact that people experience neighbourhood change in different ways, depending on their levels of involvement and stake in the changes (Lupton and Power, 2004), as well as being a product of the differences between living in and working in an area. Also, the age of the participants is relevant here – staff were more likely to be positive about changes in light of their historical perspective on the area trajectories, whereas pupils were more likely to be negative, or to question the pace of change. Pupils were able to talk about some of the mechanisms of neighbourhood effects that they saw in their day to day life, while staff were much more likely to talk about effects within the school.

Pupils were much more able to talk about their immediate neighbourhood than the wider catchment area. All of the ways in which they described their neighbourhoods – as quiet, safe, with a good community – were positive, and are the type of outcomes that housing tenure mix hopes to achieve.

7.6.2 Impact of changes

It was extremely difficult to attribute changes in the social mix of schools to mixed tenure housing policies, specifically due to the vast range of other changes taking place across the catchment area and policies being implemented within the school, over time. Staff at Parkside attributed the recent positive changes in the social mix of the pupil body to new 'aspirational' families buying houses in the area (which may reflect housing development and tenure change), while at the same time acknowledging that changes in primary school boundaries and the prevention of another local school from taking non-catchment area pupils had also had an impact. At Meadow Flats, the recent positive change in social mix was attributed to the work the school had put in to attract local families, through improving educational attainment, reputation, and links with primary schools. What was felt in both schools was that improvements in the area were hugely important for residents who already lived there, whether by moving them into new housing, improving poor housing, or improving infrastructure.

A recurrent theme through both schools was that a school with a heavily deprived intake was different from other schools, and frequent comparisons with a norm were made by staff, both implicitly, and at times explicitly. It was felt

by staff and seen through the many policies and initiatives, that having a deprived intake was something that the school felt it had to compensate for, something that has been found in many schools in deprived areas (Lupton and Thrupp, 2013).

Staff referred to the importance of financial, cultural and social capital – in a deficit way when describing the difficulties that pupils and their families faced, and in a positive way when describing the ways that it was present for incomers and in more 'successful' pupils. Level of parental education, the value of reading, family role models and affluence were all felt to have a direct influence on educational attainment, and were all felt to be generally lacking in more deprived families. Staff at Parkside felt that home-owners are more likely to be in a higher income bracket, employed, and interested in education, and they linked ownership with the likelihood of the children doing better in school.

7.6.3 Role of social mix

A conceptual model was created in order to map out the views of the staff on the ways that area change had impacted on the catchment area, existing residents and school[23]. It is shown in Figure 7-2 below. Not only were there many pathways described by staff leading from area change to outcomes, but there was a striking similarity between what was perceived to be happening in the case study schools and the theorised pathways introduced in chapter 3. The recent positive changes to the catchment area were seen to impact on the wider area, through improving the reputation of the area and reducing stigma, and also in making the area more attractive to existing and new residents. For Parkside specifically, this was seen to attract new 'aspirational' families into the area, resulting in more 'aspirational' young people attending the school. These changes were also seen to impact on the existing residents, whether through improving housing or moving existing residents into new housing, by giving them more confidence and pride in themselves and in the area, making them feel more responsible for the area, and in turn raising their aspirations.

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[23] As this section was focused on the pathways between area change and school social mix, and these themes did not arise from the pupil interviews, only staff views were mapped.

These changes in the catchment area were seen to impact on the school in several ways. Overall, it had a 'normalising' effect on the pupil body, in that deprived pupils were no longer seen as the norm, and 'aspirational' pupils were seen to act as role models to those who were seen as less so. It was seen by staff to be easier to implement some of the policies that had been introduced to both improve outcomes and increase attractiveness of the schools, such as uniforms and introducing a wider range of subjects. Alongside this, due to the reduced concentration of pupils with more severe needs, staff time was freed up, both outside the classroom in terms of dealing with pupil issues, and inside the classroom with reduced disruption, leading to a greater concentration on learning and teaching, which in turn was seen to impact on outcomes. Overall, the resulting effect was that the school outcomes and reputation improved, became more attractive to more 'aspirational' parents, who were then more likely to enrol their children, illustrating the two way nature of the relationship between the school and catchment area.

Figure 7-2: pathways from area change to improved school outcomes, created from staff interview data

Changes in catchment

Area/infrastructure improvement

Aesthetic improvement

Demolition of poor quality housing

Housing improvement

New build developments

Impact on catchment

Reduction in stigma

More attractive

More aspirational families

More aspirational young people

Impact on existing residents

More confidence/pride

More responsible

Raised aspirations

Impact on school

'Normalising' effect on pupil body

Easier to implement policies

Staff time freed up in and outside classroom

More concentration on learning/teaching

Wider range of subjects introduced

More attractive to parents

Pupil role models

Reduction of stigma

'Aspirational' pupils through primary schools

Outcomes

Improved attainment

Improved reputation

Attract pupils in area

Identified only in Parkside

7.7 Chapter summary

This chapter has presented the qualitative findings of the interviews carried out in the case study schools. It explored how staff and students felt that the demographics of the catchment areas impacted on both the running and the outcomes of the schools, and how changes that had taken place in the catchment area had impacted on the schools, and also how changes in the schools had impacted on the catchment area. The two way nature of this relationship was explored, with changes in the social mix of the school leading to better outcomes, thus making the school more attractive to parents, leading to more aspirational pupils attending the school. As well as this, the difficulty of looking at housing tenure mix by itself was explored – schools and catchment areas are complex systems, with a great many different policies and changes happening at any one time. The importance of financial, social and cultural capital to education was also recognised. The different ways in which area change could lead to improvements in schools were discussed by staff, and the two schools had different interpretations of what had happened in their areas.

The next chapter will look at the findings of all three results chapters together, and how they relate to each other to answer the overall aim of this thesis, can mixed tenure housing policy make a difference to educational outcomes?

8 Discussion

First, this chapter will give a recap of the aim of the thesis, before going on to discuss how the aim was addressed. Then, an outline of the findings will be given along with a discussion of how the findings relate to previous research conducted in the area. The chapter will then address some of the limitations and strengths of the research, before a discussion of possible implications for policy. Some ideas for future research directions will then be proposed, before a summary of the main results and a final reflection on the thesis overall.

8.1 Aim of the thesis, and how aim was addressed

This thesis set out to explore whether mixed tenure housing policies could make a difference to educational outcomes. As discussed in section 3.7.2 of the literature review, mixed tenure housing policies aim to change the social mix of primarily social rented areas by introducing more owner occupied dwellings into the area. There are many possible pathways by which an increase in owner occupation in a school catchment area could lead to improved individual and whole school improvement in educational attainment. These pathways were outlined in Figure 3-4 and broadly comprise impacts within and for the school as a learning environment on the one hand, and impacts within and for the neighbourhood as a socioeconomic environment on the other.

The aim of the thesis was achieved through addressing three specific research questions, using a mixed methods design.

1. How have catchment areas and schools changed, focusing especially on housing tenure and educational attainment?

Firstly, the thesis looked at how catchment areas and schools in Glasgow had changed in terms of socioeconomic and demographic factors between 2001 and 2011, focusing specifically on housing tenure, as well as comparing the changes in Glasgow to changes in Scotland overall. It also looked at how the schools had changed in terms of educational attainment, social mix and ethnic mix. To achieve this, census data from 2001 and 2011 at census output area level were

attached to individual pupil data from Glasgow City Council for 2003 and 2012, and aggregated to catchment area to give catchment area and school characteristics. Then, changes over time for Glasgow overall, the catchment areas, and the schools were explored.

2. What explains individual educational attainment and changes in educational attainment, focusing especially on housing tenure?

Secondly, the thesis looked at the associations of individual, neighbourhood, catchment area and school characteristics with individual educational attainment, focusing on housing tenure at both neighbourhood and catchment area. A three level multilevel model of pupil educational attainment, with pupil, neighbourhood and catchment area/school levels was built in order to identify where the variation in individual pupil educational attainment lay. Next, individual pupil and context variables were added in to ascertain explanations for this variation. Individual educational attainment at both timepoints was then modelled jointly in a four level model to see whether *changes* in overall individual educational attainment over time could be explained by changes in housing tenure, independently of other neighbourhood and catchment area/school characteristics.

3. How have changes in neighbourhoods, catchment areas and schools been experienced by staff and pupils?

The final part of the findings was the account of interviews with pupils and teachers conducted within two case study schools – Meadow Flats and Parkside. This qualitative part of the research used semi-structured interviews to explore how staff and pupils within these schools had experienced the changes within the catchment area and school; and if and how they felt the social mix of the catchment area and school impacted on educational attainment. The schools were selected on the basis that they had experienced increases in owner occupation in the catchment area, and also an improvement in educational attainment. Topic guides were developed for staff and pupils, all interviews were transcribed, and a thematic analysis of the transcripts was undertaken. This section aimed to explore what impact the catchment areas had on the

schools, and whether changes within the catchment area had made a difference to school outcomes, and a theoretical model was developed from the data.

8.2 Findings and resonance with previous work

8.2.1 Housing policy and educational attainment

This research found that the proportion of owner occupied households in a pupil's neighbourhood could have a significant impact on their educational attainment, over and above other individual, neighbourhood, and catchment area and school factors in Glasgow, suggesting that mixed tenure housing policy could have an impact on individual educational attainment. This was true for both timepoints examined. This is consistent with previous research carried out in Scotland, for example with work done by Bramley and Karley (2007). The finding that the proportion of owner occupiers in a neighbourhood does make a difference to a pupil's educational attainment is evidence of a person's neighbourhood impacting on their educational outcomes, and also resonates with previous works from other countries (Jencks and Mayer, 1990, Blasius et al., 2007, Sellstrom and Bremberg, 2006, Brooks-Gunn et al., 1993, Ellen and Turner, 1997, Buck, 2001, Galster, 2012).

Unsurprisingly, housing tenure was highly correlated with the social class measures at both neighbourhood and catchment, so much so that due to collinearity social class had to be excluded from the final modelling. However, when looked at on its own, or in a model with housing tenure, both area level social class and housing tenure were significant. This resonates with many previous studies showing the association between social class and educational outcomes (Erikson et al., 2005). It also shows that although housing tenure and social class are correlated, at the neighbourhood level they seem to be measuring different aspects, with housing tenure having an association with educational attainment over and above social class. This is an important finding, especially in the light of much of the mixed tenure literature positing that housing tenure mixing is a proxy for social class mixing (Tunstall and Fenton,

2006)[24]. Indeed, the findings suggest that many of the pathways shown in Figure 3-4 may in fact operate through an increase in owner occupied households rather than the resulting increase in higher socioeconomic status families. One possible explanation for this may be some of the policy initiatives to enable those on lower incomes to become homeowners, such as shared equity and help to buy, meaning that people from a wider range of social class classifications are now able to become owners (McKee, 2011). It is important to note that it was not possible to control for income in this study, which will be discussed further in the limitations in section 8.4.

The interviews with staff also reflected some of the pathways that were found in the literature around mixed tenure and educational outcomes, shown in Figure 3-4, such as an increase of owner occupied households in the area leading to the impact of deprivation being lessened, and the exposure of children and parents to those felt to be more 'aspirational' in turn led to an improvement in aspirations for other pupils. As well as this, some of the benefits that are felt to result from mixed tenure housing initiatives were reflected in the staff interviews, such as raised aspirations and the overcoming of social exclusion (Kearns and Mason, 2007), though interestingly (albeit perhaps unsurprisingly) the arena in which these benefits occurred was seen by staff to be the school rather than the neighbourhood. Staff at one of the schools, Parkside, talked explicitly about a change in the social mix of the school being, in part at least, due to the influx of families who had chosen to buy their housing in the area. These families were seen to be 'aspirational' for both themselves and their children. Interestingly, though this study shows that housing tenure itself (though of course not controlling for income) has an impact on educational attainment, through the interviews it could be seen that the most important characteristic ascribed to new incomers to the area was 'aspirational'. The links between housing aspirations and educational aspirations are potentially interesting but underexplored in the literature. The concept of aspirations in education are problematic, with some previous research challenging the widely held belief that poorer parents and pupils have lower aspirations than more

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[24] It is also important here to signpost the sensitivity analysis carried out that included social class in the final modelling (Appendix 11: Sensitivity analyses), and found that housing tenure was still significant, even with its inclusion.

affluent families, however poorer families and pupils have been found to have less capital with which to translate their aspirations into outcomes (Sosu and Ellis, 2014, St. Clair et al., 2013). The discussion of 'aspirational' families and pupils by staff, and the comparison they drew with other less 'aspirational' pupils, is interesting as 'enhancing aspirations' is seen as one of the main outcomes of neighbourhood improvement through urban regeneration, specifically mixed tenure housing policies (Tallon, 2013).

Interestingly, in both case study schools, housing improvement, rather than new builds, were discussed most by staff. Although improvements in current social housing, or moving already existing social tenants into newly built but still social rented housing is not part of a mixed tenure housing initiative, it is part of wider physical and housing-led regeneration strategy. This is interesting as it illustrates that staff were not only aware of regeneration policy, but were reporting that they had witnessed some of the wider outcomes from regeneration strategies, such as enhanced aspirations, and enabling people to benefit from opportunities (Tallon, 2013).

8.2.2 Mechanisms of neighbourhood effects

Neighbourhood effects literature states that people can be disadvantaged by where they live (Atkinson and Kintrea, 2001), and this was echoed by pupils in the case study schools. Pupils talked about the wider area in which they lived and in which the school was situated in generally quite negative terms. They described both negative and positive examples of neighbourhood effects, and were able to talk about what may be mechanisms of neighbourhood effects. At the neighbourhood level, these tended to be positive examples of social interactive mechanisms – collective socialisation through relationships with neighbours, and the social networks that they had at the street or small-neighbourhood level. However, there were also negative mechanisms reported – exposure to violence and anti-social behaviour, a lack of informal social control by parents, and in a wider geographical sense, isolation and lack of infrastructure (Galster, 2012). Stigma, an example of an institutional mechanism, was also discussed: pupils felt their school did not deserve its reputation, but was stigmatised due to geographical and institutional

mechanisms. The fact that the school was situated where it was and the behaviour of a minority of pupils resulted in giving it a worse reputation than if it had been in a different, less deprived area (Ellen and Turner, 1997, Galster, 2012). They also talked about environmental mechanisms: being exposed to crime, violence, drug and alcohol issues, as well as negative role models in adults and other young people, and geographical mechanisms, such as the area being isolated, and having poor infrastructure (Galster, 2012). Although attributed to the catchment area rather than individual neighbourhoods, staff talked about social interactive mechanisms such as collective socialisation, parental mediation, relative deprivation, and environmental mechanisms such as physical surroundings (Ellen and Turner, 1997, Buck, 2001, Galster, 2012).

8.2.3 Neighbourhood and school trajectories

How and why areas change over time is another important issue to consider. As seen in both the quantitative and qualitative findings, different areas and schools have different trajectories in terms of socioeconomic and demographic factors, even if they appear similar in other ways. Looking at changes by catchment area in chapter 5 illustrates the differences between areas, in terms of the socioeconomic and demographic characteristics of those who live there, and could be evidence of neighbourhood 'sorting' (Buck, 2001). Those with degree level qualifications in middle class professions tend to live in areas with similar people – they are more likely to be affluent and therefore be able to proactively enhance their social positioning through neighbourhood choice (Bridge, 2001). Those with fewer qualifications and further down the socioeconomic scale are less likely to be able to live in such areas, especially if they are social renters – social rented housing tends be less common in affluent areas. A further polarisation of the catchment areas between the two timepoints was found in terms of social class, level of adult education and social housing, with the catchments becoming less similar to each other over time. This reinforces one of the important concepts of neighbourhoods outlined by Lupton – neighbourhoods are shaped by other neighbourhoods, they do not exist in isolation and therefore must be seen alongside other places (Lupton, 2003a).

Although the thesis found evidence that the proportion of owner occupied households in a pupil's neighbourhood does have an association with their educational attainment, the overall changes in educational attainment were *not* explained by changes over time in neighbourhood or catchment tenure. However this lack of evidence is perhaps unsurprising due to the overall decrease in the proportion of owner occupied households across Glasgow over the time period, with small increases only seen in ten catchment areas. It is possible that this is particular to the ten year period covered by the data which included the financial crash of 2008, leading to a drop in the number of private sector new-builds in Glasgow (Glasgow City Council, 2016b).

The reasons for change in an area can be seen to be both internal and external to the area (Bashir and Flint, 2010) and many of the explanations behind these differing trajectories of the case study schools and areas were touched upon by staff and pupils in the findings in chapter 7: the historical context of an area, the lack of infrastructure, the reputation and stigma attached to places and to names, and the feeling that those who have the choice to leave an area tend to be those who are more 'aspirational'. The more recent trajectories of the case study schools were described by staff and pupils: Parkside had improved steadily over recent years, while Meadow Flats had a sharp improvement in educational attainment between the years that data was available, corresponding with an increase in the school roll, however both staff and pupils at Meadow Flats described a feeling that things were starting to decline again. Interestingly, although the schools differed in their trajectories, it was striking how similar the descriptions of the day to day working of the schools were, in terms of policies and attitudes – and how similar these were to the effective school factors such as ethos, strong management and leadership (Scheerens and Bosker, 1997). This supports the findings of school context research, as it suggest that there are school intake factors which impact how these 'effective school practices' are put into practice (Teese et al., 2007). However, the quest of this thesis goes slightly further than the impact of the school mix, as it explores how the context of two specific catchment areas affects this. The perception at Meadow Flats was that the social mix had changed in the school as they were now representing a wider range of those already living in the catchment area, with no mention of new residents moving into the area, while previously some parents had chosen to

send their children to non-catchment schools. At Parkside, staff had noticed new families moving into the area, therefore shifting the balance of the social mix of the catchment further to 'normality', rather than 'just deprived'.

Though schools in the same local authority may enact very similar policies, there can be differences in how these policies are implemented, and this seems to be dependent on the catchment area context of the school. The social mix of the catchment area does seem to have an impact on the implementation – Meadow Flats had some success while changing the social mix of the school to reflect more the mix of the catchment area, but without additional change in the mix of the catchment area (which is seemingly stalled in terms of new builds) there was not expected to be further positive change in school outcomes. The qualitative findings suggest that school based policies to improve educational attainment or reputation seem to be more sustainable in the long term when the catchment area is changing in terms of social mix. i.e. a combination of changes in school policy and process alongside changes in school context may be the best recipe for school improvement. Although changes from inside the neighbourhood – for example new housing for existing residents – can provide the basis for some improvement, for sustained improvement, change must come from outside in the form of additional new residents.

8.2.4 Other impacts on educational attainment

Overall, educational attainment rose across most of the schools between the two timepoints. Individual factors (gender, free school meal registration, ethnicity and looked after status) have all been found to be associated with an individual pupil's educational attainment (Buchmann and Dalton, 2002, Connelly and Furnivall, 2013, Duncan and Brooks-Gunn, 1999) and the findings of this study also confirm this. With the exception of ethnicity at timepoint 1, these associations persisted after all other factors at neighbourhood, catchment area and school were accounted for. Interestingly, these factors all had a lesser impact at timepoint 2 than at timepoint 1, suggesting that the influence of individual background factors on educational attainment may be getting weaker. Although it was not possible to include any family indicators, due to this information not being available in any of the data sources, it could be argued

that free school meal registration captures some of this family context, as entitlement is based on parental economic circumstances, though as with the other pupil characteristics the influence of this variable weakened between the two timepoints.

The strength of the effect of poverty on educational attainment was a recurrent theme through the literature, and was also found throughout this study. The majority of neighbourhood, catchment area and school factors that had the biggest impacts on individual educational attainment, such as social class, working status and housing tenure, were socioeconomic in nature, and poverty was a persistent theme throughout the interviews. However, this study also brought to the fore some of the causal pathways found in previous work, and outlined in Figure 3-4. Within the case study schools, individual and family level contexts were seen to be important by staff and pupils alike, with poverty especially seen to have a strong negative effect on individual educational attainment. This also resonated with much of the literature around poverty and schooling (Goodman and Gregg, 2010). Staff and pupils felt that due to poverty, some of the families and pupils were often lacking the cultural capital to engage with education, something that has been found in other work (Sullivan, 2001), and though there was a general understanding that economic circumstances are a structural issue, there was some feeling by staff that on an individual level families should take more responsibility in overcoming the issues they faced, again resonating with previous research (Lupton and Thrupp, 2013). Staff also talked about how pupils from deprived backgrounds were less likely to take up opportunities for further and higher education (Forsyth and Furlong, 2003).There were examples of the wide ranging impacts of poverty at the individual and family level discussed by staff as having a negative impact on educational achievement. It was associated with impacting on housing, for example overcrowding, and was also linked to social and behavioural problems, health and mental health issues of pupils and their carers, as well as addiction issues (Blanden and Gregg, 2004).

8.2.5 Different perspectives on change

As discussed in section 3.4.2, experiences of the changes within a neighbourhood can vary depending on the perception of the person asked, and can be affected by their age, residential status, and education (Bashir and Flint, 2010), as well as due to differing levels of involvement and stake within the neighbourhood (Forrest and Kearns, 2001). These aspects may go some way to explaining the differences between the staff and pupils interviewed in the case study schools.

Due to the administrative boundaries of the areas at which census data are available, data zones were used to represent pupils' neighbourhoods. However, pupils within the schools defined their neighbourhood much more locally, and in relative terms, in opposition to the wider area in which they lived, echoing findings from previous work with young people in Glasgow (Kintrea et al., 2011). They generally felt their neighbourhood was a good place to live, defined by the absence of the negatives that they perceived in the wider area – alcohol issues, violence, and gangs. For pupils, the concept of neighbourhood was not purely geographical, but also included the people living in the place, adding evidence to previous studies looking at the social definitions of place (Lupton, 2003a).

In contrast, staff tended to talk about the catchment area context as a whole as opposed to individual neighbourhoods, perhaps due to their professional rather than personal involvement in the area. In both schools, there was recognition by staff that the catchment areas had been through a period of change, with new developments and housing improvement in both, as well as demolition of sub-standard housing. These changes were seen to have the following effects on the existing residents: the first was that the communities in general had benefitted from improved infrastructure and general improvement in the area, which in turn had given residents more confidence and pride, as well as increased responsibilities and reduced anti-social behaviour. The second was through the perceived improved confidence and aspiration of residents who had directly benefitted from new housing. This was seen to boost both the confidence of the parents in the area and the confidence of the children coming into the school, making it easier to implement the policies and strategies that aimed to improve the school reputation and educational attainment. Thirdly, these improvements

subsequently made the school more attractive to those parents in the catchment area who would otherwise send their children to a different school, perceived by staff to be more aspirational, and therefore had positively changed the school's social mix.

Pupils at both schools felt that the school reputation suffered unfairly due to the reputation of the area, and that the school was supportive and put in a lot of effort to help its pupils, but unlike staff, did not feel that the reputation of the area or school had improved. Challenging behaviour was seen to have been dealt with, and pupils were aware of policies such as obligatory uniform wearing that had been brought in. There was little spontaneous mention by pupils of area change, possibly due to the relatively long timescales of change and the tendency of young people to stay in the same local areas (Bashir and Flint, 2010).

However, staff and pupil accounts of the areas and schools were similar in some ways – both were aware of the impact of poverty on individual pupils, they also saw the collective impact of the poverty of the catchment area (McKinney et al., 2012). The historic deprivation in the Meadow Flats catchment area was felt to have been exacerbated through selective residential migration processes, in which those with the resources to leave an area due to the perceived socioeconomic issues in the area, are able to do so. This has been found to both result from and compound concentrated deprivation (Friedrichs et al., 2003, Buck, 2001), and this idea of 'choosing' to leave a neighbourhood in order to enhance social positioning is a familiar one (Bridge, 2001).

8.2.6 The role of the school in social mix: passive or policy?

The contexts of all the schools were found to have changed between timepoint 1 and timepoint 2, with a drop in those registered for free school meals, a decrease in those identifying as White British/Irish, and an improvement in the overall educational attainment scores. Although these changes had not occurred evenly across all schools, it was felt by staff in the case study schools that they had experienced changes in terms of having a less deprived pupil mix and improving in educational attainment.

There was recognition by both staff and pupils of the two case study schools that the pupil body has a direct impact on how the school operates – that the school must respond to the 'needs and desires' of its pupils (Thrupp, 1999) – and that therefore a deprived catchment area context leads to direct impacts on the school. Administration took up a relatively large amount of staff time, as did liaising and meeting with other services such as social work. These findings echo the theories of school context research, in that a school mix dominated by low SES pupils can negatively affect school processes – in this case the composition of the school has direct effects on class management demands at the expense of subject teaching (Thrupp et al., 2002) through the impact of factors associated with poverty, for example disruptive behaviour (Bramley and Kofi Karley, 2007). The reaction of the pupils to these effects were in the main avoidance, but also a desire for stricter enforcement of rules.

These observations by school staff and pupils were supported by the analytical findings. The socioeconomic mix of the schools, as represented by school proportion of free school meal registration, was found to have a significant impact on educational attainment over and above the socioeconomic status (SES) of the pupils themselves (as represented by individual free school meal registration), adding to the evidence that school SES has an impact over and above individual SES (Paterson, 1991, Caldas and Bankston, 1997, Willms, 1986, Reynolds and Teddlie, 2001). However, in the fully adjusted model – with all pupil, neighbourhood, catchment area and school variables adjusted for – school proportion of free school meal registration became insignificant, suggesting that the impact of SES mix on individual educational attainment was less important than other contextual factors. Whole school educational attainment however, showed a strong association with individual educational attainment, even in the fully adjusted models for both timepoint 1 and timepoint 2, suggesting that even with all other individual, neighbourhood, catchment area and school characteristics adjusted for, the performance of the most recent cohorts of pupils had an association with individual pupil educational attainment. From the qualitative work it can be said that staff see the link here to be in pupil role models – that by seeing other pupils doing well it will boost the confidence of others in the school. These are reminiscent of the factors identified in 'good'

schools in school effectiveness research, such as school culture and ethos (Scheerens and Bosker, 1997).

One case study school, Meadow Flats, had an explicit policy to attempt to increase the number of higher SES pupils within the school in order to more easily implement policies associated with good schools (Thrupp, 1999), by attracting families that already lived in the catchment area and had thus far chosen to attend non catchment area schools. For staff at Meadow Flats, improving the reputation of the school was key to attracting those in the catchment area whom they felt would otherwise choose schools outside the catchment area for their children. This seems to be an example of trying to affect a reduction in stigma - a transformational effect of regeneration and more specifically, housing tenure mixing (Kearns and Mason, 2007). As stigmatisation has been associated with low self-esteem in children as well as adults, these policies can also be seen as a strategy to improve the confidence and esteem of the pupils within the school (Bramley and Kofi Karley, 2007).

Both schools were characterised by their responses to the circumstances of the more deprived pupils. As was found by Lupton and Thrupp, staff articulated the many ways in which they had tried to overcome the circumstances of pupils with a range of special initiatives, aimed at explicitly and implicitly mitigating the impact of poverty and associated issues on the school and pupils (Lupton and Thrupp, 2013). Factors such as ethos, strong management and leadership, a strong team and links with higher and further education institutions were all mentioned as reasons for improvements in educational attainment and positive post-school destinations. The strategies described by the staff strongly echoed the processes associated with 'successful' schools identified in school effectiveness research (Teese and Polesel, 2003). One of the much discussed issues associated with schools with a high proportion of low SES pupils, staff turnover (Lupton, 2004) was not actually mentioned during the staff interviews, and in fact all staff participants had been at the schools for long periods of time. However, this was not a representative sample of all staff within the school, and the fact that staff volunteered to take part in the interviews may have meant that only those who were interested in the subject area came forward, and were therefore more likely to be long time members of staff.

Both schools talked about changes in the catchment area leading to changes in the social mix of the school, albeit in different ways, as discussed in section 8.4.3. However, both schools had some idea of how the mix could impact on the school: it was articulated that as the pupil body becomes less deprived, pressure on the staff from dealing with the consequences of poverty and deprivation is lessened as a smaller proportion of the pupils have additional needs to be addressed. This was seen to impact in four ways: firstly, teacher time is freed up in the classroom as there are fewer disruptions; secondly, teacher time is freed up outside the classroom as those with a responsibility for pastoral care have less to deal with, and are more able to concentrate their efforts on the most needy pupils; thirdly, with a higher achieving pupil body, a wider range of subjects and study levels can be introduced, increasing choice for pupils; and fourthly, a kind of 'normalising effect', where non-deprived pupils become the 'norm'. This comparison to an implicit, non-deprived norm has been found in other work with deprived schools (Lupton and Thrupp, 2013). This seems to be reflective of the school context theory that posits that processes associated with good schools become easier to implement with a student body that is less skewed towards low SES pupils (Teese et al., 2007).

The findings from the two case study schools seem to suggest that though schools are aware of social mix and the impact that it can have on the running and outcomes of the school, whether changes in the social mix are passively accepted by the school or actively pursued depend on many factors such as the perceived trajectory of the area, and the reputation and performance of the school.

8.3 Unexpected findings

The vast majority of the findings in this study were in line with expectations from theory and literature. However, there were a few findings that were slightly more unexpected.

It was interesting that ethnicity though significantly associated with educational attainment for individual pupils, was insignificant at almost every other level. This was surprising due to recent research on the 'London effect' which has

shown that the proportion of ethnic minority students within a school can account for the 'London premium' – that pupil progress on standard measures in London is higher than the rest of England (Burgess, 2014), suggesting that the social mix of pupils in relation to ethnicity can have a positive impact on outcomes. However, it is possible that this could be explained by the account being taken of individual pupil ethnicity, or also that Glasgow – although ethnically mixed in the context of Scotland – is still relatively mono-ethnic compared to larger cities, such as London.

Generally, the lack of impact of catchment characteristics once other factors were accounted for – especially those that were significant in the baseline models – was unexpected, such as overall catchment area housing tenure and level of education. This was also true for proportion of school free school meals. However, it must be remembered that the catchment area is made up of the neighbourhoods, meaning that the same thing is being measured at different levels. It may also be the case that the catchment and school characteristics were much more likely to be closely aligned in a city such as Glasgow, but would possibly be less similar in an area with a stronger private education sector. Overall, this reinforces the importance of using methods that reflect the true structure of the data, for example not including neighbourhood characteristics could have led to assigning catchment characteristics too much significance. Additionally, some of the coefficients went in the opposite direction to that anticipated. However, often these variables were insignificant, and it is possible that although as much action as possible was taken to improve model stability, the models may still have been slightly unstable due to their complexity and/or due to the presence of other collinear variables within the models (Field, 2007).

It was also interesting that there were no significant between-school differences in individual educational attainment after all variables were accounted for, i.e. that the differences between schools could be explained by pupil, neighbourhood and catchment area/school characteristics. Although this piece of work is not claiming to have looked at true "school effects" – for one thing the modelling did not control for prior educational attainment – this finding seems to support the school mix effect, that the socioeconomic mix of the

school has an impact on determining individual educational attainment in pupils (Thrupp, 1995).

8.4 Limitations

8.4.1 Data

There are of course several limitations to this piece of work. This was not a longitudinal study of the same pupils over time, primarily as the interest was in the effect of housing tenure on outcomes, and the source of such information at a local scale - census data for neighbourhoods and catchment areas - was only available for 2001 and 2011. Additionally, pupils in Scotland only undertake exams and have recorded educational attainment outcomes for the last three years of school, only one of which is mandatory.

Many of the characteristics that have been found to have an association with educational attainment, such as family level factors, individual or family physical or mental health, parental social class or housing tenure, were not able to be controlled for in this analysis. This was due to them being unavailable in the data.

Only S4 pupils were used in the final analysis, which looked at one measure of educational attainment. This was mainly because I wanted to capture the educational attainment of the fullest possible range of pupils within each school; results for S4 as the last compulsory year of schooling represent such a measure. However this aspect does not necessarily give the full picture of how the school is performing overall.

Although pupils were assigned a home neighbourhood based on their postcode, it was not possible to ascertain the length of time which the pupil had lived in the neighbourhood, and thus their length of exposure to its effects (Musterd et al., 2012). Though in the individual year models pupils were able to be cross classified between neighbourhoods and catchments/schools, for the model that combined data from both timepoints to look at changes over time, pupils who lived in a neighbourhood not within their catchment area had to be removed, as the model would not run with cross classification enabled. This meant that only

pupils who attended their local school were included. It is possible therefore that the results could have been affected by pupils whose parents chose to send them to other schools – and could therefore be thought of as more 'aspirational' – who were not included in this final piece of analysis. This also reduced the sample size, however as the model would not have been able to be run otherwise, a pragmatic approach to remove these cases was taken.

The data from Glasgow City Council was a combination of school census and Scottish Qualifications Agency data, meaning that the pupil data contained every pupil recorded in each school. Although at first glance this looks like a strength, the pupil census contains the information of all pupils who are present on the specific census day. With schools in less affluent areas tending to have higher absences (Zhang, 2003), this could lead to the possibility that poorer pupils are underrepresented in the data to a small degree.

Free school meal registration was used as a proxy for poverty at both individual and school level. Although a common proxy, this measure has been criticised for failing to capture a full range of pupils in deprived circumstances, both due to it being an opt-in measure (Iniesta-Martinez and Evans, 2012), and also because of those who are not eligible, such as those experiencing in-work poverty (Hobbs and Vignoles, 2007). However, recent work has found that the predictive power of free school meals for pupil attainment is only slightly lower than other measures (Ilie et al., 2017).

It is also important to acknowledge the small scale nature of the qualitative component, and the impact this may have had on the data generated. Although the case studies were designed to be small scale, as they formed a small part of the overall work - which was, as a thesis, bound by time and resource - it must be noted that only five teachers and ten pupils across two schools were interviewed. Though the findings are possibly not able to be generalized more widely due to this, they still add an important element to this thesis by exploring the views and experiences of staff and pupil who had experienced catchment areas with a rise in owner occupation.

It should also be noted that I had little control over the selection of the participants for the qualitative interviews, as outlined in the methods section 4.7.3.1, and that the pupil data may have been influenced by the possibility that teachers 'cherry picked' pupils that they thought would represent the school well. Additionally, due to the nature of the pupils I was speaking to – those who had stayed on past the required legal age into 6[th] year – the sample may have been biased towards those who would be seen as more aspirational. This was perhaps exacerbated by the fact that I was unable to use opt-out consent - which is a more inclusive method of allowing participation in research - as had been originally planned, as outlined in 4.7.8. Additionally, at Meadow Flats five of the six pupils I spoke to were male, which may have skewed the findings.

8.4.2 Timing

The qualitative research was carried out in 2015, while the quantitative data looks at the time period between 2001 and 2011 for census variables, and 2003 and 2012 for school and individual pupil variables. This meant that the data on the changes that had occurred within the catchment areas and schools was from several years prior to when the interviews took place. Although measures were put in place to try and minimise any effects – for example speaking to staff and pupils that had been in both the school and area, respectively, for a certain length of time – it is possible that this difference in timing had an impact on the findings.

8.4.3 Scale of neighbourhood analysis

One of the criticisms of neighbourhood effects research is that due to data availability, neighbourhoods are often measured using arbitrary administrative boundaries, which bear little relation to actual neighbourhoods. As discussed in the methods, census output areas (COAs) were originally planned to be used as neighbourhoods. COAs are the smallest administrative level at which census data are available – in 2011 the maximum number of households in a COA was 78 (National Records of Scotland, 2013a). However, COAs were so small that they did not have enough S4 secondary pupils living in them to do any meaningful analysis of pupils within neighbourhoods. Therefore, data zones were used. Although perhaps not conceptually a perfect representation of neighbourhood,

using data zone not only meant that there were enough pupils living within each one to give a meaningful comparison, but that the same data zones could be looked at across the two timepoints for the over-time analysis. The problem of scale is not an easy one to address, as residents of neighbourhoods may always define their neighbourhood differently. However, with administrative boundaries attempting to take into account geographical boundaries such as roads, it is possible that the mismatch is immaterial.

8.4.4 Income

There is much discussion in the literature about whether housing tenure mixing is in actual fact just a delivery system for creating income mix within areas (Tunstall and Fenton, 2006). As income is not available as a census variable, it was not possible to control for this completely in this study. This was one of the reasons that the social class characteristic was included, as it is generally highly correlated with income measures. As discussed in section 4.6.10, social class was extremely collinear with housing tenure at both timepoints and at both neighbourhood and catchment area - suggesting they were measuring similar dimensions - and therefore was not included in the final analysis. However, as a sensitivity analysis, a version of each fully adjusted model was run which included social class at both neighbourhood and catchment. While this risked model instability, neighbourhood housing tenure stayed significant over and above social class, as it had done in the fully adjusted model (Appendix 11), therefore illustrating that neighbourhood housing tenure has an association with educational attainment over and above social class.

8.5 Strengths

As far as I am aware, this is the first time that individual pupil data has been linked with administrative neighbourhood, and catchment area/school-level data in Glasgow to explore the impact of context characteristics on individual educational attainment, or the influence over time. The findings have implications for both educational and housing policies, and add to the evidence base for the influence of both school contexts and neighbourhood effects.

This thesis was concerned with looking at how a macro level policy, mixed tenure housing policy, could impact on a micro level outcome, individual educational attainment, while also taking into account the other contexts in which the individual operates and is influenced - trying to identify the links between layers of the ecological model of influence on pupil and school performance (Bronfenbrenner, 1989). In this way, the mixed methods approach, utilising multilevel modelling and semi-structured interviewing, allowed these levels of influence to be considered, and linked the methodological approach directly with the theoretical approach.

By looking at educational attainment in a wide framework that included individual and school characteristics, along with neighbourhood and catchment area, it was possible to get some insight into the complex landscape in which individual pupils operate, and how these contexts interact with each other.

8.6 Implications for policy

These findings have several implications for policy at individual school, Glasgow City Council and Scottish Government level.

School

It should be noted that individual educational attainment was associated with many of the individual, neighbourhood, catchment area and school characteristics, therefore schools should recognise that they alone cannot take the full responsibility for making up the attainment gap between more and less affluent pupils. Though there has been some recent work around what practical actions schools can take to mitigate the effects of poverty (Child Poverty Action Group in Scotland, 2015), research has shown that the attainment gap cannot be addressed by schools alone (Sosu and Ellis, 2014).

Local Authority

The study found that there is an influence of neighbourhood housing tenure on pupil outcomes: the proportion of owner occupiers in the data zone of residence impacts on their educational attainment over and above all other

characteristics. In terms of housing policy, it could be argued that these findings suggest that there is a case for policies that focus on mixing housing tenure within close, neighbourhood settings. For example, not having a socially rented estate in one bit of a catchment area and a private development in another could be desirable. Figure 8-1 below shows different versions of housing tenure mixing – this thesis would suggest that 'pepper potting', or an integrated spatial configuration of housing tenures, may be the most effective in terms of educational outcomes.

Figure 8-1: Types of housing tenure mixing

Segregated	Segmented	Integrated
Groups are concentrated, or in close proximity but with a clear division, e.g. a main road.	Alternating segments. Each group occupying a block or pocket, e.g. a cul-de-sac.	Groups sharing the same street, or on a home-by-home basis: 'pepper-potted'.
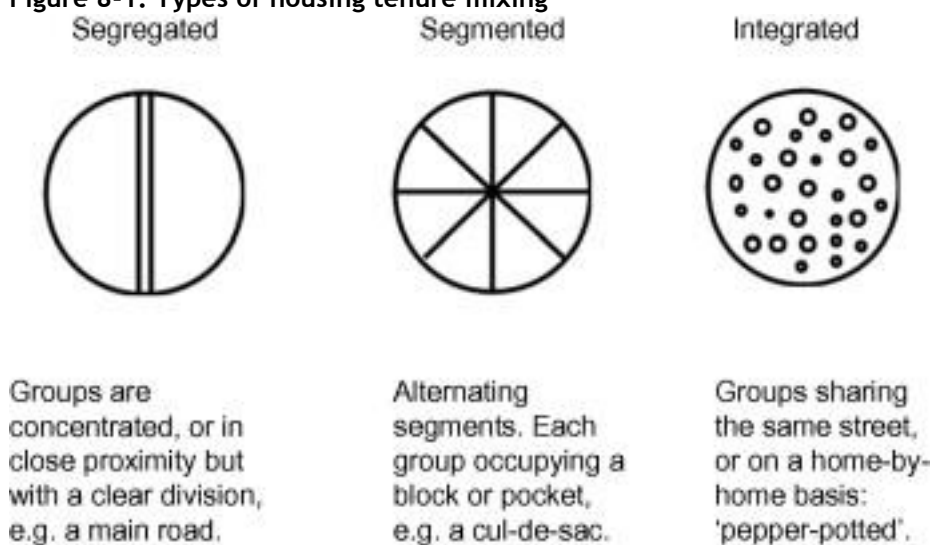
Source: Kearns, McKee, et al. 2013, reproduced with permission

The findings also suggest that housing improvement alone is unlikely to lead to better outcomes for those living there, and would have most impact if it was part of a programme of improvement.

In terms of educational policy, it could be argued from these findings that by limiting school placement requests and ensuring that most pupils within a catchment area attended their local school, the issue of leakage of pupils to other schools outside their catchment area could be addressed, thus rebalancing the social mix of pupils within schools in less affluent areas. However, a possible implication of limiting placement requests could be an increase in parents choosing private education for their children, thus further entrenching inequalities.

Scottish Government

The evidence that such a wide range of individual, neighbourhood, catchment area and school characteristics are associated with educational outcomes seems to suggest that a more holistic, contextual approach should be considered in policies that aim to improve individual circumstances and outcomes, and recognition that issues such as housing and schooling cannot be addressed separately and that school-based policies – although hugely important – are not enough to address disparities in educational attainment. A recent report from the Joseph Rowntree Foundation (JRF) found that 'If schools are to close the [educational attainment] gap, they must be supported by anti-poverty strategies aimed at reducing income inequality' (Sosu and Ellis, 2014: 39). What had the strongest impact in the modelling was the whole school educational attainment, and a possible way of distributing this more evenly among schools could be through housing tenure mixing of neighbourhoods.

Due to the restricted numbers of social rented housing units being built currently in the UK, social rented housing can often end up only accommodating those that are the most vulnerable and in the greatest need. Alongside this, the dominant discourse espousing the preferability of owner occupation means social housing can be stigmatised, resulting in those who most need to be included in society often being excluded. It is possible that a more mixed community could be produced by offering a wider range of people the option of social rented housing, or by increasing the volume of social rented housing being built across a range of neighbourhoods. A reduction in the stigma surrounding social renting housing could also be beneficial, perhaps through locating social housing in areas that are already less stigmatised and ensuring that it is built to the same standard as private housing. More responsible media coverage would be another route to de-stigmatisation (Atkinson and Jacobs, 2008).

Although this work has shown that changes in the housing tenure structure could impact on individual educational outcomes, the main thread running through the thesis has been the negative impact that poverty has on neighbourhoods and pupils. Therefore addressing poverty and reducing socioeconomic inequality should continue to be a key focus of the Scottish Government, whether this be

through a more human rights based approach to social security (Scottish Government, 2017g) a more progressive tax system (Scottish Parliament, 2017) or a new approach such as basic income (Scottish Government, 2017a).

8.7 Reflections on the research process

An important part of research, and in particular qualitative research, is to think critically about how the researcher may have impacted on the project and participants. Reflections were recorded as field notes and are quoted throughout. The next few sections reflect upon the qualitative component of this research, whilst in section 8.8 on future research, both the qualitative and quantitative elements are considered.

8.7.1 Interpersonal power dynamics

The distribution of power in qualitative research, especially when young people are the participants, has been much debated in methodological and ethical works. This power imbalance is not just present between young people and researchers, but power hierarchies also exist in class, gender and ethnicity, amongst others (Elwood and Martin, 2000). Not only are the participants in an interview disadvantaged inherently due to being the 'researched' and not the 'researcher', but due to the lower status young people have in comparison to adults, interviews with young people mean they can be doubly disadvantaged (Eder and Fingerson, 2002), before even taking into account the possible differences in power and status between a PhD researcher from a university and a pupil at secondary school.

Aiming to try and make the research experience less intimidating for the pupils, work went into ensuring that the interviews were conducted in quite a relaxed and informal way, as this extract from field notes illustrates:

> *I deliberately dressed down for the interviews, and made sure to introduce myself by my first name in order to distinguish myself from the teachers…When I listened back to the interviews I was aware that with the pupil interviews I used much less formal language, often referring to the interviews as 'a chat', and on listening back to the interviews I notice that I used more slang than I had during the staff interviews. Whether this*

actually made much difference to either the comfort of the pupils or to the interviews was difficult to tell.

8.7.2 School setting

Power dynamics can be further entrenched by the spatial hierarchies of the interview: 'social interactions have inherent power dynamics that operate or are simultaneously manifest at different spatial spaces' (Elwood and Martin, 2000: 652). Some research around young people and interviewing suggests avoiding school based interviewing, as schools are a place where young people have less power than adults (Spencer and Doull, 2015) and also classroom-like setups can cause participants to feel that there are right and wrong answers (Eder and Fingerson, 2002). However, as the schools had been approached to facilitate the research, and parental consent had been contingent on the school setting, the interviews had to be conducted within them. As far as possible however, as the extract from my field notes shows, attempts were made to make the interview spaces as friendly as possible:

In the first school, I was given a small, windowless room that seemed to be used generally as a meeting room/sick room. The set up was four chairs around a table. In order to try and make it seem slightly less formal, I turned two of the chairs to face each other over the corner of the table, so there was still somewhere to lean on and place the recorder on, but even so it felt slightly less like there was a barrier between us … The second school gave me a much larger room, with big windows. There were a couple of table and chair set ups in the room so I chose the smaller of the two and put the chairs at an angle as I'd done in the first room.

In both schools I left the door open if there was no interview currently taking place. Interviews with both staff and pupils took place in the same rooms.

Some of the interviews with the school pupils were very challenging. One or two participants were very wary of the research, and some seemed to have either very few opinions on their neighbourhood or were unwilling to discuss them during the interviews. This was probably not helped by some of the pupils having the idea that they were coming to the room to complete a survey, and they were then asked to talk in depth. This was a strong learning point – the importance of managing the expectations of participants, and also better communication. In future work of this kind, the importance of being able to

communicate with possible participants beforehand, in order to familiarise them with the research and what to expect, would be key. Similarly, giving participants the choice of undertaking a one-person or two-person interview could be another important way of allowing young participants to feel they have more control and choice in the research process. Although paired interviews were decided against when the methodology was being designed, to enable participants to speak more freely about their school and neighbourhood, it is possible that in some of the cases where it was clear that the participant struggled with the subject that having a friend present may have helped.

The pupils were quick to bring up the good things about their school. All were clearly proud of their school and were keen to demonstrate the ways in which it helped them and other pupils. It is possible that this was a reaction to the research process itself – as discussed above although information on why the research was taking place and what it would be about had been provided to the school prior to the interviews, and was on both the parent and pupil information sheet, the pupils did not seem quite sure why the research was taking place. It is also possible that this was due to the pupils themselves – by speaking to pupils in the final year of school, all participants had stayed past the compulsory years of schooling, and were possibly already more engaged with school than others. Additionally, pupils who were felt would represent the school well could have been encouraged by staff to take part. As part of the winding down part of the interview, the pupils were asked if there was anything that they thought we were going to talk about but didn't. Although most were reticent, there were some examples of pupils who thought that they were going to be interviewed about different subjects, including one who seemed amazed that I was not there to ask him about knife crime. This illustrates a further important learning point – the pupils were very aware of the reputation and socioeconomic circumstances of their area and schools, and future research must be careful not to further stigmatise pupils.

8.7.3 Timing of the fieldwork

As mentioned in the methods section 4.7.7, all fifteen interviews were conducted over two consecutive days due to the availability of the schools. It is

possible that this may have had some detrimental effects on the fieldwork, as can be seen in this extract from field notes:

> *It's possible that due to tiredness on my part I was less responsive than I would usually be during an interview. While listening back to the interviews – especially those conducted towards the end of the day - I became aware that there were some points where I felt I had not made the most of opportunities presented to me by not probing well or fully enough.*

Although frustrating, the fieldwork timing was necessary to ensure the interviews were completed fully and within time, and, most importantly, at a time that was most suitable to the schools.

8.8 Future research

It would be interesting to conduct future research trying to tease out the mechanisms by which the influence of neighbourhood housing tenure on educational attainment occurs. This could be approached in a qualitative way – perhaps sampling neighbourhoods by proportion of owner occupiers, and using more creative methods with young people – to overcome some of the methodological difficulties found during the interviews - to create maps of their neighbourhood that detail the social networks of themselves and their parents. Although work has been done on this area, it has mostly been quantitative (Ainsworth, 2002, Gonzales et al., 1996) and from a US perspective (Leventhal and Brooks-Gunn, 2000). Interesting recent work has been conducted looking at the networks of pupils in schools using a combination of multilevel modelling and network analysis, which could possibly be applied to examining the extent of mixing between the children of owner occupiers and social renters within schools (Tranmer et al., 2014).

As the qualitative part of the thesis was necessarily small and exploratory, it would be interesting to expand this work into schools which both have not had an increase in owner occupation, and also those with already high levels of owner occupation in the catchment area. This would allow explorations of the differences and similarities between how the schools operate, their processes

and implementation, and also how they feel that wider contextual factors influence educational attainment both individually and cumulatively.

Another possible piece of future research would be to repeat the modelling approach with the addition of 2021 census data attached to pupil level data of around the same time. As discussed in the methods section, some information contained in the GCC data was not usable in this analysis due to it only being collected for the most recent years of the school data. For example, pupil post-school destination was only available for the latter timepoint, however if collected going forward it could be included as an outcome, in an alternative to educational attainment. As well as other educational outcomes, it could also be interesting to repeat the analysis using other pupil outcomes, such as wellbeing measures, in order to explore individual and contextual effects.

8.9 Summary of findings

This section gives a brief summary of some of the most pertinent findings, firstly relating to the effects of housing tenure and neighbourhood social mix on pupil educational attainment, and secondly on school catchment and school social mix effects on pupil educational attainment.

1. Housing tenure and neighbourhood social mix on pupil educational attainment

- The proportion of owner occupied households in a pupil's neighbourhood has an association with their educational attainment, over and above other individual, neighbourhood, catchment and school factors.

- However, individual factors such as gender, poverty, and looked after status still have a significant association with educational attainment.

- Educational attainment is influenced by a complex mix of individual and contextual factors, with school staff attributing many differences in individual attainment to poverty.

- Pupils identified mechanisms of neighbourhood effects operative in their neighbourhood, both positive, such as collective socialisation and social

networks, and negative, including lack of informal social control, stigma, being exposed to crime and violence, negative role models, the area being isolated and poor infrastructure.

- School staff associated owner occupation with aspiration of parents and children.

2. Catchment and school social mix effects on pupil educational attainment

- The social mix of a school (as represented by proportion of pupils registered for free school meals) has an association with individual pupil educational attainment over and above their individual free school meal status, though not once all other neighbourhood, catchment area and school factors were taken into account.

- The proportion of pupils in the school who had recently gained five or more credit qualifications had the strongest association with individual educational attainment at catchment and school level.

- Area change was seen by staff as occurring in two ways: improvement for those already in the area, and through new people moving into the area because of improvements.

- Poverty in the catchment area was seen by staff and pupils as having detrimental effects on those living in the area, both outside the school and within the school.

- Positive changes to social mix within the school were seen by staff to make it easier to enact school policies intended to increase attainment and improve the reputation of the school.

- The school and catchment area were seen by staff to have a two-way relationship, with positive changes in one being reflected in the other and vice versa. Thus, external changes in catchment area social mix were seen to affect internal school social mix, which in turn influenced the effectiveness of school improvement policies.

8.10 A final reflection

The influence on a person's life of all the different contexts, and interactions between those contexts, is vast. This thesis looked at one outcome – though an important one – out of many possibilities and tried to analyse the importance of some of these contexts, and understand how they impacted on each other through those who experience them daily.

This thesis set out to find out whether mixed tenure housing policies have had an impact on educational attainment in Glasgow. However, the answer is not a straightforward one. Although this research has found that there are indications that mixed tenure housing policy could have an impact on individual educational attainment, the comparative nature of neighbourhoods must be taken into account. Although differences between areas and schools can be accounted for by adjusting for differing contextual characteristics at different levels, in real life, differences cannot be explained away but are a lived experience for those that live and work there, and must be acknowledged – though 'neighbourhood effects' per se were not found, the effects of neighbourhood were clear and present.

As a final remark, this thesis has shown that in the context of Glasgow it is possible for careful mixed tenure housing policy at the neighbourhood level to make a difference to individual pupil educational outcomes, and that the mix of pupils within the school has an impact on outcomes over and above pupil deprivation. Importantly, it also shows that the schools in Glasgow do not significantly differ in educational attainment outcomes once other factors have been accounted for. The thesis provides clear evidence that policies focused on schools alone are unlikely to make a difference to the educational attainment gap, and while policies aimed at introducing processes identified with 'good schools' can make a difference, wider contexts must also be considered.

Appendices

Appendix 1: Census data variable source and full categories and detailed construction information

All census data were downloaded from the Scotland's Census Data Warehouse (http://www.scotlandscensus.gov.uk/ods-web/data-warehouse.html#introductiontab), and for each variable the worksheet reference the data were extracted from are given.

Housing tenure

At timepoint 1, data were extracted from worksheet UV64 of the 2001 census output, at timepoint 2 they were extracted from QS405SC of the 2011 census output.

Appendix Table 1: Structure of census housing tenure variable

Owned: Owned outright
Owned: Owned with a mortgage or loan
Shared ownership (part owned and part rented)
Social rented: Rented from council (local authority)
Social rented: Other social rented
Private rented: Private landlord or letting agency
Private rented: Employer of a household member
Private rented: Relative or friend of household member
Private rented: Other
Living rent free

NS-SEC

At timepoint 1, data were extracted from UV31, and at timepoint 2 they were extracted from QS607SC

Appendix Table 2: Structure of census NS-SEC variable

1	Employers in large organisations
2	Higher managerial and administrative occupations
3.1	Higher professional occupations: Traditional employees
3.2	Higher professional occupations: New employees
3.3	Higher professional occupations: Traditional self-employed
3.4	Higher professional occupations: New self-employed
4.1	Lower professional and higher technical occupations: Traditional employees
4.2	Lower professional and higher technical occupations: New employees
4.3	Lower professional and higher technical occupations: Traditional self-employed
4.4	Lower professional and higher technical occupations: New self-employed
5	Lower managerial and administrative occupations
6	Higher supervisory occupations
7.1	Intermediate occupations: Intermediate clerical and administrative occupations
7.2	Intermediate occupations: Intermediate sales and service occupations
7.3	Intermediate occupations: Intermediate technical and auxiliary occupations
7.4	Intermediate occupations: Intermediate engineering occupations
8.1	Employers in small establishments: Employers in small establishments in industry, commerce, services etc.
8.2	Employers in small establishments: Employers in small establishments in agriculture
9.1	Own account workers: Own account workers (non-professional)
9.2	Own account workers: Own account workers (agriculture)
10	Lower supervisory occupations
11.1	Lower technical occupations: Lower technical craft occupations
11.2	Lower technical occupations: Lower technical process operative occupations
12.1	Semi routine occupations: Semi-routine sales occupations
12.2	Semi routine occupations: Semi-routine service occupations
12.3	Semi routine occupations: Semi-routine technical occupations
12.4	Semi routine occupations: Semi-routine operative occupations
12.5	Semi routine occupations: Semi-routine agricultural occupations
12.6	Semi routine occupations: Semi-routine clerical occupations
12.7	Semi routine occupations: Semi-routine childcare occupations
13.1	Routine occupations: Routine sales and service
13.2	Routine occupations: Routine production
13.3	Routine occupations: Routine technical
13.4	Routine occupations: Routine operative
13.5	Routine occupations: Routine agricultural
14.1	Never worked
14.2	Long-term unemployed
15	Full-time students
16	Occupations not stated or inadequately described
17	Not classifiable for other reasons

These are then broken down into seven categories:

Appendix Table 3: Structure of seven category census NS-SEC variable

1	Higher managerial, administrative and professional occupation
2	Lower managerial, administrative and professional occupations
3	Intermediate occupations
4	Small employers and own account worker
5	Lower supervisory and technical occupations
6	Semi-routine occupations
7	Routine occupations

Qualifications

At timepoint 1, data were extracted from UV25, at timepoint 2 they were extracted from QS501SC

Appendix Table 4: Structure of census qualifications variable

No qualifications
Level 1: O Grade, Standard Grade, Access 3 Cluster, Intermediate 1 or 2, GCSE, CSE, Senior Certificate or equivalent, GSVQ Foundation or Intermediate, SVQ level 1 or 2, SCOTVEC Module, City and Guilds Craft or equivalent
Level 2: SCE Higher Grade, Higher, Advanced Higher, CSYS, A Level, AS Level, Advanced Senior Certificate or equivalent, GSVQ Advanced, SVQ level 3, ONC, OND, SCOTVEC National Diploma, City and Guilds Advanced Craft or equivalent
Level 3: HNC, HND, SVQ level 4 or equivalent, other post-school but pre-Higher Education qualifications not already mentioned (including foreign qualifications), other school qualifications not already mentioned (including foreign qualifications)
Level 4: Degree, Postgraduate qualifications, Masters, PhD, SVQ level 5 or equivalent; Professional qualifications (for example, teaching, nursing, accountancy); Other Higher Education qualifications not already mentioned (including foreign qualifications)

Ethnic mix

At timepoint 1, data were extracted from UV10, at timepoint 2 they were extracted from KS201SC.

Appendix Table 5: Structure of census ethnicity variable

White Scottish
Other White British
White Irish
Gypsy / Traveller
White Polish
Other White
Mixed or multiple ethnic group
Pakistani, Pakistani Scottish or Pakistani British
Indian, Indian Scottish or Indian British
Bangladeshi, Bangladeshi Scottish or Bangladeshi British
Chinese, Chinese Scottish or Chinese British
Other Asian
African, African Scottish or African British
Other African
Caribbean, Caribbean Scottish or Caribbean British
Black, Black Scottish or Black British
Other Caribbean or Black
Arab, Arab Scottish or Arab British
Other Ethnic Group

Family structure

At timepoint 1 data were extracted from UV68, at timepoint 2 they were extracted from QS116SC.

Appendix Table 6: Structure of census family structure variable

One person, Aged 65 and over
One person, Other
One family and no others, All aged 65 and over
Married couple family, No children
Married couple family, With one dependent child
Married couple family, With two or more dependent children
Married couple family, All children non dependent
Same-sex civil partnership couple family, No children
Same-sex civil partnership couple family, With one dependent child
Same-sex civil partnership couple family, With two or more dependent children
Same-sex civil partnership couple family, All children non dependent
Cohabiting couple family, No children
Cohabiting couple family, With one dependent child
Cohabiting couple family, With two or more dependent children
Cohabiting couple family, All children non dependent
Lone parent family With male head, With one dependent child
Lone parent family With male head, With two or more dependent children
Lone parent family With male head, All children non dependent
Lone parent family With female head, With one dependent child
Lone parent family With female head, With two or more dependent children
Lone parent family With female head, All children non dependent
Other household types, With one dependent child
Other household types, With two or more dependent children
Other household types, All in full-time education
Other household types, All aged 65 and over
Other

Working

At timepoint 1 data were extracted from UV28, at timepoint 2 they were extracted from QS601SC.

Appendix Table 7: Structure of census economic activity variable

Economically active (excluding full-time students): In employment: Employee, part-time
Economically active (excluding full-time students): In employment: Employee, full-time
Economically active (excluding full-time students): In employment: Self-employed with employees, part-time
Economically active (excluding full-time students): In employment: Self-employed with employees, full-time
Economically active (excluding full-time students): In employment: Self-employed without employees, part-time
Economically active (excluding full-time students): In employment: Self-employed without employees, full-time
Economically active (excluding full-time students): Unemployed: Seeking work and available to start in 2 weeks or waiting to start a job already obtained
Economically active full-time students: In employment: Employee, part-time
Economically active full-time students: In employment: Employee, full-time
Economically active full-time students: In employment: Self-employed with employees, part-time
Economically active full-time students: In employment: Self-employed with employees, full-time
Economically active full-time students: In employment: Self-employed without employees, part-time
Economically active full-time students: In employment: Self-employed without employees, full-time
Economically active full-time students: Unemployed: Seeking work and available to start in 2 weeks or waiting to start a job already obtained
Economically inactive: Retired
Economically inactive: Student
Economically inactive: Looking after home or family
Economically inactive: Long-term sick or disabled
Economically inactive: Other

Gender was provided in both school census data and also in SQA data, so all data were cross tabulated and checked for consistency. At timepoint 1 just over 50% of the pupils were female, and just under 50% were male. At timepoint 2, almost 51% of the pupils were male, with just over 49% female.

Appendix Table 8: 2003 and 2012 descriptive statistics for gender

Timepoint 1: Pupil gender	Frequency	Percent
Female	2,538	50.1
Male	2,530	49.9
Total	5,068	100
Timepoint 2: Pupil gender	Frequency	Percent
Female	2,144	49
Male	2,230	51
Total	4,374	100

The ethnic background of the pupil was recorded as one of 20 categories, however for analysis these were collapsed into three categories: both White

British/Irish; Other; and not known. These specific categories were chosen on the basis that the classifications changed between timepoint 1 and timepoint 2. I had originally wanted to use language spoken at home, however this was not available for both timepoints. The other possibility for this variable was using national identity, as for example, unlike ethnicity, it distinguishes between, for example, Indian and Indian Scottish. However, national identity had a large proportion of 'not known' responses for pupils at both timepoints, therefore it was decided to use the ethnicity measure as the basis for the variable. Although ethnicity still contained some 'not known' responses – with nearly 3% at timepoint 1, and 1.4% at timepoint 2, this seemed the most pragmatic option. At timepoint 1, almost 88% of pupils identified as being White British/Irish, with over 9% identifying as being from the other ethnicity categories. At timepoint 2, just over 83% of pupils identified as White British/Irish, with over 15% identifying as the other ethnicity categories.

Appendix Table 9: 2003 and 2012 descriptive statistics for ethnicity

Timepoint 1: Pupil ethnicity	Frequency.	Percent
White British/Irish	4,445	87.7
Other	478	9.4
Not known	145	2.9
Total	5,068	100
Timepoint 2: Pupil ethnicity	Frequency	Percent
White British/Irish	3,645	83.3
Other	670	15.3
Not known	59	1.4
Total	4,374	100

The free school meal status of the pupil - whether or not the pupil was registered for free school meals – was recorded in the school census data. Free school meal status is often used as a proxy for socioeconomic status as eligibility is based on parental income. Parents are able to claim free school meals for their children if they are receiving income support; job seekers allowance; child tax credit and if their joint annual income does not exceed £16,105 (correct as

of May 2016), or universal credit
(http://www.gov.scot/Topics/Education/Schools/HLivi/schoolmeals/FreeSchool Meals). At timepoint 1, just over 41% of pupils were registered for free school meals, while at timepoint 2, this figure had fallen to 30.3%.

Appendix Table 10: 2003 descriptive statistics for free school meals

Timepoint 1: Pupil free school meal status	Frequency	Percent
Not registered for free school meals	2,983	58.9
Registered for free school meals	2,085	41.1
Total	5,068	100
Timepoint 2: Pupil free school meal status	Frequency	Percent
Not registered for free school meals	3,048	69.7
Registered for free school meals	1,326	30.3
Total	4,374	100

Looked after status indicated whether a pupil was looked after or not. The 'looked after' category includes all looked after pupils, including those that are looked after by a guardian other than either parent at home and those in residential care. At timepoint 1, 0.8% of the pupils were looked after, and at timepoint 2 this figure was 2.7%.

Appendix Table 11: 2003 descriptive statistics for looked after status

Timepoint 1: Pupil looked after status	Frequency	Percent
Not looked after	5,026	99.2
Looked after	42	0.8
Total	5,068	100

Timepoint 2: Pupil looked after status	Frequency	Percent
Not looked after	4,257	97.3
Looked after	117	2.7
Total	4,374	100

Timepoint 1: Pupil looked after status	Frequency	Percent

Appendix 2: Variance Inflation Factor testing

Timepoint 1

As can be seen in Table 12, the VIF of the majority of the explanatory variables is high, suggesting that there is strong collinearity in the presence of all the variables. As housing tenure at both neighbourhood housing tenure and catchment area housing tenure are the main explanatory variables of interest, they will be kept in. Before the next run, catchment area NS-SEC was removed.

Appendix Table 12: VIF of timepoint 1 level 2 and 3 variables

Variable	VIF
Catchment NS-SEC	168.53
Catchment tenure	82.38
Catchment education	81.58
Catchment working	63.74
Neighbourhood NS-SEC	34.80
Catchment SIMD	31.40
Neighbourhood working	16.28
Neighbourhood education	13.25
School free school meals	12.30
Catchment family structure	10.57
Neighbourhood tenure	9.61
Catchment ethnic mix	9.41
School educational attainment	8.70
School ethnic mix	6.44
Neighbourhood SIMD	5.06
Neighbourhood family structure	3.16
School denomination	2.28
Neighbourhood ethnic mix	1.90

As can be seen in Table 13, there are still quite a few variables with very high VIF. As catchment area housing tenure is one of our variables of interest, catchment area working was removed before the next run.

Appendix Table 13: VIF of timepoint 1 level 2 and 3 variables, minus catchment area NS-SEC

Variable	VIF
Catchment tenure	80.39
Catchment working	34.65
Neighbourhood NS-SEC	34.00
Catchment SIMD	31.01
Neighbourhood working	16.16
Catchment education	14.83
Neighbourhood education	12.89
School free school meals	11.68
Catchment family structure	10.37
Neighbourhood tenure	9.61
Catchment ethnic mix	9.28
School educational attainment	7.42
School ethnic mix	6.19
Neighbourhood SIMD	5.06
Neighbourhood family structure	3.16
School denomination	2.25
Neighbourhood ethnic mix	1.88

Table 14 shows that neighbourhood NS-SEC is now the variable with the highest VIF. The variable neighbourhood NS-SEC was removed.

Appendix Table 14: VIF of timepoint 1 level 2 and 3 variables, minus catchment area NS-SEC; and catchment area working

Variable	VIF
Neighbourhood NS-SEC	34.00
Catchment SIMD	30.94
Catchment tenure	27.96
Neighbourhood working	16.11
Neighbourhood education	12.87
School free school meals	9.69
Neighbourhood tenure	9.54
Catchment education	9.49
Catchment ethnic mix	7.74
School educational attainment	7.23
Catchment family structure	7.15
School ethnic mix	5.60
Neighbourhood SIMD	5.01
Neighbourhood family structure	3.15
School denomination	2.08
Neighbourhood ethnic mix	1.87

Table 15 shows that the variable with the highest VIF is now catchment area SIMD, the SIMD measure at level 3. This was removed before the next run.

Appendix Table 15: VIF of timepoint 1 level 2 and 3 variables, minus catchment area NS-SEC; catchment area working; and neighbourhood NS-SEC

Variable	VIF
Catchment SIMD	30.9
Catchment tenure	27.83
School free school meals	9.68
Catchment education	9.49
Neighbourhood tenure	9.48
Catchment ethnic mix	7.74
School educational attainment	7.22
Catchment family structure	7.14
Neighbourhood working	5.67
School ethnic mix	5.59
Neighbourhood education	5.05
Neighbourhood SIMD	4.83
Neighbourhood family structure	3.09
School denomination	2.08
Neighbourhood ethnic mix	1.85

As can be seen from Table 16, all of the remaining individual explanatory variables VIF are now under 10, the chosen cut off. The models were then rerun in MLwiN using the level 2 and 3 explanatory variables shown in Table 7.

Appendix Table 16: VIF of timepoint 1 level 2 and 3 variables, minus catchment area NS-SEC; neighbourhood NS-SEC; catchment area working; and catchment area SIMD

Variable	VIF
School free school meals	9.65
Catchment tenure	9.45
Neighbourhood tenure	9.37
School educational attainment	6.90
Catchment ethnic mix	6.58
Catchment family structure	6.39
Catchment education	6.15
Neighbourhood working	5.66
School ethnic mix	5.47
Neighbourhood education	5.04
Neighbourhood SIMD	4.76
Neighbourhood family structure	3.08
School denomination	2.07
Neighbourhood ethnic mix	1.85

This was then repeated for timepoint 2.

Timepoint 2

As can be seen in Table 17, ten of the variables have a VIF of over 10.

Catchment area level NS-SEC has the highest VIF and will be removed.

Appendix Table 17: VIF of timepoint 2 level 2 and 3 variables

Variable	VIF
Catchment NS-SEC	174.72
Catchment education	107.71
Catchment tenure	44.02
Catchment working	37.86
Catchment SIMD	32.74
School ethnic mix	28.81
Catchment ethnic mix	25.57
Neighbourhood NS-SEC	23.07
Catchment family structure	12.92
Neighbourhood education	12.80
Neighbourhood tenure	7.10
School free school meals	6.50
School educational attainment	6.22
Neighbourhood working	5.67
Neighbourhood SIMD	4.70
Neighbourhood family structure	3.04
Neighbourhood ethnic mix	2.77
School denomination	1.25

Table 18 shows the VIF with catchment area level NS-SEC removed. This has had a large impact on the VIF of the other explanatory variables. Catchment area housing tenure had the next highest VIF but is our variable of interest, therefore the level 3 SIMD measure, catchment area SIMD, the second highest VIF, will be removed.

Appendix Table 17: VIF of timepoint 2 level 2 and 3 variables, minus catchment area NS-SEC

Variable	VIF
Catchment tenure	42.44
Catchment SIMD	30.15
Catchment education	26.03
School ethnic mix	24.20
Catchment ethnic mix	24.17
Neighbourhood NS-SEC	21.76
Catchment working	14.55
Neighbourhood education	12.40
Catchment family structure	12.14
Neighbourhood tenure	7.06
Neighbourhood working	5.59
School educational attainment	5.53
School free school meals	5.44
Neighbourhood SIMD	4.68
Neighbourhood family structure	3.04
Neighbourhood ethnic mix	2.72
School denomination	1.23

Table 19 shows the VIF with level 3 SIMD removed. The catchment area level ethnic mix now has the highest VIF and will be removed.

Appendix Table 18: VIF of timepoint 2 level 2 and 3 variables, minus catchment area NS-SEC and catchment area SIMD

Variable	VIF
Catchment ethnic mix	24.15
School ethnic mix	23.31
Neighbourhood NS-SEC	21.57
Neighbourhood education	12.31
Catchment education	11.37
Catchment family structure	11.12
Catchment tenure	10.25
Catchment working	8.95
Neighbourhood tenure	6.97
Neighbourhood working	5.59
School educational attainment	5.46
School free school meals	5.41
Neighbourhood SIMD	4.66
Neighbourhood family structure	3.04
Neighbourhood ethnic mix	2.72
School denomination	1.21

With the catchment area level ethnic mix now removed, Table 20 shows that neighbourhood level NS-SEC has the highest VIF.

Appendix Table 19: VIF of timepoint 2 level 2 and 3 variables, minus catchment area NS-SEC; catchment area SIMD and catchment area ethnic mix

Variable	VIF
Neighbourhood NS-SEC	21.49
Neighbourhood education	12.25
Catchment education	11.36
Catchment family structure	10.85
Catchment tenure	10.12
Catchment working	8.94
Neighbourhood tenure	6.97
Neighbourhood working	5.58
School educational attainment	5.39
School free school meals	5.31
Neighbourhood SIMD	4.66
Neighbourhood family structure	3.04
School ethnic mix	2.84
Neighbourhood ethnic mix	2.65
School denomination	1.20

Table 21 shows the VIF after the removal of catchment area level SIMD. Only three variables now have a VIF of over 10, the largest being catchment area level education, which will be removed.

Appendix Table 20: VIF of timepoint 2 level 2 and 3 variables, minus catchment area NS-SEC; catchment area SIMD; catchment area ethnic mix and neighbourhood NS-SEC

Variable	VIF
Catchment education	11.35
Catchment family structure	10.80
Catchment tenure	10.12
Catchment working	8.75
Neighbourhood tenure	6.16
Neighbourhood education	5.98
School educational attainment	5.36
School free school meals	5.30
Neighbourhood SIMD	4.60
Neighbourhood working	3.68
Neighbourhood family structure	2.91
School ethnic mix	2.82
Neighbourhood ethnic mix	2.03
School denomination	1.20

Table 22 shows all remaining variables with a VIF of under 10.

Appendix Table 21: VIF of timepoint 2 level 2 and 3 variables, minus catchment area NS-SEC; catchment area SIMD; catchment area ethnic mix; neighbourhood NS-SEC and catchment area education

Variable	VIF
Catchment tenure	7.19
Catchment working	6.97
Neighbourhood tenure	6.14
Neighbourhood education	5.77
School free school meals	4.73
Neighbourhood SIMD	4.58
School educational attainment	4.50
Catchment family structure	4.13
Neighbourhood working	3.65
Neighbourhood family structure	2.89
School ethnic mix	2.65
Neighbourhood ethnic mix	2.00
School denomination	1.17

Appendix 3: Proportional odds assumption

This appendix shows the coefficients for each of the variables considered for the analysis, for 2003 and 2012.

Appendix Table 22: 2003 proportional odds coefficients

Timepoint 1 proportional odds coefficients		
Level 2 – Neighbourhood		
Tenure	-2.377	0.161
	-2.254	0.118
	-2.724	0.131
Education	-3.900	0.431
	-3.780	0.295
	-4.561	0.251
Working	-4.619	0.334
	-4.210	0.244
	-5.070	0.259
Family structure	-5.063	0.419
	-5.394	0.345
	-8.419	0.489
Ethnic mix	-0.718	0.404
	-0.886	0.303
	-1.272	0.296
SIMD	-0.669	0.058
	-0.585	0.036
	-0.592	0.028
NS-SEC	-4.910	0.381
	-4.509	0.264
	-5.364	0.252
Level 3 – Catchment area / School		
Tenure	-2.770	0.256
	-2.707	0.200
	-3.417	0.233
Education	-2.700	0.419
	-2.317	0.308
	-3.577	0.321
Working	-6.375	0.591
	-6.047	0.446
	-7.443	0.489
Ethnic mix	-1.694	0.764
	-1.327	0.577
	-3.207	0.627
Family structure	-6.757	0.773
	-6.755	0.646
	-11.894	0.943
NS-SEC	-4.160	0.450

	-3.773	0.338
	-5.233	0.372
SIMD	1.488	0.148
	1.433	0.113
	1.988	0.133
Educational attainment	-4.776	0.459
	-5.258	0.321
	-7.432	0.424
Denomination (**ND**/RC)	-0.062	0.073
	-0.177	0.056
	-0.048	0.066
Free school meals	-3.136	0.297
	-3.263	0.252
	-4.618	0.328
Ethnic mix	-0.549	0.317
	-0.184	0.242
	-1.297	0.264

Appendix Table 23: 2012 proportional odds coefficients

Timepoint 2 proportional odds coefficients

Level 2 – Neighbourhood		
Tenure	-1.593	0.312
	-1.896	0.150
	-1.928	0.139
Education	-1.207	0.601
	-2.020	0.293
	-3.314	0.239
Working	-3.312	0.695
	-3.480	0.341
	-3.731	0.331
Family structure	-3.887	1.040
	-5.222	0.518
	-6.645	0.557
Ethnic mix	0.701	0.492
	0.576	0.249
	-0.177	0.249
SIMD	-0.355	0.082
	-0.406	0.037
	-0.447	0.027
NS-SEC	-2.794	0.640
	-3.532	0.305
	-4.059	0.257
Level 3 – Catchment area / School		
Tenure	-0.761	0.555
	-1.852	0.271
	-1.755	0.258
Education	-0.125	0.608
	-1.076	0.298
	-2.436	0.277
Working	-2.444	1.367
	-4.675	0.663
	-5.721	0.644
Ethnic mix	-0.383	0.933
	-0.328	0.444
	-1.693	0.414
Family structure	-0.094	1.864
	-5.126	0.879
	-8.369	0.941
NS-SEC	-0.618	0.769
	-2.259	0.376
	-3.577	0.358
SIMD	-0.203	0.29
	-0.866	0.14
	-1.221	0.142
Educational attainment	-2.206	0.777
	-3.622	0.384
	-4.948	0.376
Denomination (**ND**/RC)	0.003	0.149

	-0.165	0.072
	-0.170	0.069
Free school meals	-1.784	0.812
	-3.014	0.394
	-3.824	0.366
Ethnic mix	-0.312	0.554
	-0.382	0.264
	-1.177	0.242

Appendix 4: Email to head teachers

Dear [head teacher],

My name is Oonagh Robison, and I am a PhD student at Glasgow University. I have been working with Glasgow City Council Education Services to use school and census data to look at how changes in catchment areas might affect secondary schools. As part of this research I am looking to conduct some interviews with a small number of staff and pupils in schools across the city that have experienced some catchment area change. I am writing to you as the catchment area of [school name] experienced changes between 2001 and 2011, and I would be very interested in conducting some interviews in your school.

I am aiming to conduct the fieldwork in June of this year, and would be looking to speak to 2-3 members of staff, preferably that have been at the school since around 2001, and between 6 and 8 pupils in 5th/6th year. The interviews should be able to be conducted within one school period, meaning that they should fit into free periods in the pupils' time. Both the interviewees' names and the name of the school would be changed to protect anonymity, and the project has been given ethical approval by both Glasgow University and Glasgow City Council.

I've attached the information sheets for both staff and pupils to this email, but please let me know if you would like any other information. The research is of course entirely voluntary, and if you are at all interested in taking part I'd be absolutely happy to come in to tell you more about the project. However if there is another member of staff who you would prefer me to get in touch with please do not hesitate to let me know.

I very much look forward to hearing from you.

Kind regards,
Oonagh Robison

Appendix 5: Pupil topic guide

Pupils

Explain about research:
- want to talk about if where you live has changed, and about your school.
- Everything you say will be anonymous, but quotes may be used for my thesis and for research papers, however this will be under a different name. Happy for you to choose that name and will use if possible, except where name is same or similar to someone else taking part, or someone chooses same name as you.
- You can stop the interview at any time without giving a reason.
- Any questions?
- Thank you so much for taking part!
- Ask to sign consent form.

School

- Can you tell me a bit about your school? How would you describe it to someone who had never been?

  o What do you like about it?

  o What do you not like about it?

- How would you change it if you were in charge?

- Have you seen changes to the school since you've been here?

  o Who's coming here
  o Teachers
  o How the school runs?

Neighbourhood

- Where do you live? (Show on map – say page number/street name out loud)

- How long have you lived in neighbourhood? In same house?

- Can you describe the neighbourhood for me?

  o What do you like about it?

  o What do you dislike about it?

- Have there been any changes in your neighbourhood?
  o What were they? (probe for regen)

- Do you have friends that live in your neighbourhood?

    o How close do they live?

    o How long have you been friends?

    o What are they like?

    o Who? How long? Live near? What are they like?

- I'd like to talk a bit about who your friends are in the school.
- Are the people you're friends with in the neighbourhood your friends at school?
    o How close do they live?

    o How long have you been friends?

    o What are they like?

- Who? How long? Live near? What are they like?

Wrap up – is there anything that you'd like to add? Anything that you thought we'd talk about but didn't?

Thank for taking part.

Appendix 6: Staff topic guide

Interview schedule for staff

Explain about research:
- Want to discuss how school and neighbourhood have changed.
- Everything you say will be anonymous, but quotes may be used for my thesis and for research papers, however this will be under a different name.
- You can stop the interview at any time without giving a reason.
- Any questions?
- Thank you so much for taking part!
- Ask to sign consent form.

School

- What is your role in the school?
    - o (probe for teaching/pastoral roles)

- How long have you been at school?

- Where have you taught before? (Get a feel for areas)

- I'd just like you to tell me a bit about the school – how would you describe it?

- What are some positive aspects of the school?

- And negative aspects?

- In the time you've been here have there been any changes to the school?
    - o Probe for:
        - change in pupils
        - Change in management
        - Change in processes
        - Change in focus

- Have changes impacted on school?
    - o How?

- (If not done already) Can you describe the pupils here for me?
    - o (probe for social mix)

- Have you noticed any changes in the pupils since you've been here?
    - o What are they?
        - Positive?
        - Negative?

- Have changes impacted on school? How?
    - o Probe for how it's run
    - o Processes

Neighbourhood

- Can you describe the neighbourhood the school is in for me?

- Have you noticed any changes in the neighbourhood since you've been here?

- Have changes impacted on school?

- How?

Wrap up – is there anything that you'd like to add? Anything that you thought we'd talk about but didn't?

Thank for taking part.

Appendix 7: Ethics form

University of Glasgow | College of Social Sciences

COLLEGE ETHICS COMMITTEE FOR NON CLINICAL RESEARCH INVOLVING HUMAN SUBJECTS

EAP - APPLICATION FORM FOR ETHICAL APPROVAL

This application form should be typed, and submitted electronically. **All questions must be answered**. "Not applicable" is a satisfactory answer where appropriate.

(Instructions: In Word format, click on shaded area within box to enter text, boxes will expand as required).

Applications should be submitted **at least one month in advance** of the intended start date for the data collection to allow time for review and any amendments that may be required.

1 Applicant Details

1.1 Project Title Tenure mixing in Glasgow: does it result in changed neighbourhood and school mix, and if so, does it make a difference to educational outcomes for pupils?
1.2 Name of Applicant Oonagh Robison
1.3 School/Subject/Cluster/RKT Group College Social Science, MRC/CSO Social and Public Health Science Unit
1.4 Student I.D. or Staff Number 0404694r

2 This Project is:

Staff Research Project ☐	**Postgraduate Research** ☒	Submit application through Research Ethics System https://frontdoor.spa.gla.ac.uk/login/
Postgraduate Taught ☐	**Undergraduate** ☐	Submit application via email to School Ethics Administrator: see College ethics website for contact http://www.gla.ac.uk/colleges/socialsciences/info/students/ethics/whotocontact/
(Programme Convenors Only) **Full Course Project within a PGT or UG Programme** ☐		Submit application via email to School Ethics Administrator: see College ethics website for contact http://www.gla.ac.uk/colleges/socialsciences/info/students/ethics/whotocontact/

2.2   Programme Title: *Student applicants only*

PhD

2.3   Ethical Risks: Application will NOT be considered if this section is blank

Supervisors should complete section **2.3a**   **Staff applicants** should complete section **2.3b**

2.3a COMMENTS FROM SUPERVISOR: (All Student Applications) *Comment on the research ethics risks involved in the project*

There are four main areas of ethical consideration involved in this research project:

1. Privacy and Confidentiality of Data: Recordings and transcripts from pupil and staff interviews can be held securely and anonymised as per normal practice for qualitative research and the approach is described below. The bigger risk is the handling of the large data-set provided by GCC Education Services which contains anonymised records for all pupils in Glasgow schools. The researcher will be governed by the terms of a legal agreement signed by the Council's and University's legal officers which seeks to ensure the physical and electronic security of the data. The data will be held on password protected PCs, only accessible to the researcher and supervisory team. The supervisors will ensure that no data or results are presented which could identify an individual pupil. The data can only be used for the purposes of this research, the terms of inquiry for which have been approved by GCC.

2. Confidentiality of the Schools: Although the schools will not be named in the research, it is possible that at some point, school identities could be inferred from their characteristics as presented in the analysis. Although there is no stipulation from GCC that schools should not be identified, if we think this is likely we would alert GCC to this possibility and seek their guidance on the presentation of the findings.

3. Informed Consent: There are issues about informed consent for both the pupils and staff to be interviewed, because they are being accessed through the schools. Staff may well be nominated by the management staff as relevant to the project and suitable for interview. In this case, all that can reasonably be done is to ask the staff at interview to confirm that they are free and willing to participate and ask them to sign a consent form to that effect. Relevant pupil groups, or classes of pupils, may be nominated by the school, but participation will be the pupil's decision, i.e. the pupils will not be nominated by the school. Parents of pupils will be informed and asked to consent to their child's participation, and individual pupils will be asked again if they wish to take part at the time of the interview.

4. Research Burden: For both staff and pupils there will be pressures of time and potential disruption to learning by virtue of taking part in the research. Liaison with the school should help to select interview times which minimise the burden and disruption. Pupil interviews will be restricted to the duration of a typical time slot within the school timetable.

I have checked this application and approve it for submission for review to the Ethics Committee.

Supervisor's Name ..... **Marion Henderson** .... **Date . 10/11/14** ....

Risk Assessment: *(UG and PGT applications only). Does this application qualify for a low risk review or fall within the applicable programme parameters? Please refer to* **Low Risk Research Guidance** *on College ethics webpages for clarification.* http://www.gla.ac.uk/colleges/socialsciences/info/students/ethics/forms/

YES ☐ NO ☐

2.3b RISK ASSESSMENT FROM STAFF APPLICANT: (All Staff Applications) *Comment on the research ethics risks involved in the project*

Not applicable

2.4 All Researcher(s) including research assistants and transcribers *(where appropriate)*

Title and Surname	First Name	Phone	Email *(This should normally be a University of Glasgow email address)*
Mrs Robison	Oonagh	0141 353 7500	o.robison.1@research.gla.ac.uk

All Supervisor(s) Principal First (where applicable)

Title and Surname	First Name	Phone	Email (This should normally be a University of Glasgow email address)
P: Dr Henderson	Marion	0141 353 7500	marion.henderson@glasgow.ac.uk
Professor Kearns	Ade	0141 330 5049	ade.kearns@glasgow.ac.uk
Dr Gray	Linsay	0141 353 7500	linsay.gray@glasgow.ac.uk

2.5   External funding details

Note. If this project is externally funded, please provide the name of the sponsor or funding body.

Sponsor/Funding Body: MRC/CSO SPHSU

3   Project Details

3.1a   Start date for your **data collection** and **end date of data collection involving human subjects.** *Refers to data collection for the research covered in this application.*

From: (dd/m/yyyy) 01/03/2015	To: (dd/m/yyyy) 31/12/2015

3.1b   Proposed **end** date for your **research project.** This should be when you expect to have completed the full project and published the results - (e.g expected date of award of PhD, book publication date)

To: (dd/m/yyyy) 01/06/2017

3.2   Justification for the Research

Why is this research significant to the wider community? *Outline the reasons which lead you to be satisfied that the possible benefits to be gained from the project justify any risks or discomfort involved.*

This project will explore whether regeneration with a focus on tenure mixing has led to changes both within the neighbourhood and within the school, and if so, whether this has impacted on both school and individual outcomes.

Expanding our knowledge on what affects school outcomes, specifically what improves school outcomes, is important as educational attainment impacts on outcomes such as health, well-being, life expectancy and earnings (Gregg and Machin 2001). It is known already that there are disparities between the educational attainment of those from affluent backgrounds and those from less affluent backgrounds. Research which identifies ways in which such socioeconomic disparities can be addressed is vital for the development of policy.

Glasgow consistently performs poorest out of all Local Authorities in Scotland in terms of educational outcomes, and as a whole, is the most deprived city in Scotland. In 2012, by the Scottish Index of Multiple Deprivation, just over a third of all of the datazones in the most deprived 10% across Scotland were located in Glasgow City (Scottish Government 2012), while just over 11% of the Scottish population live in the city (National Records of Scotland 2014). Over a fifth of the population of the city were income deprived, compared to just over 13% nationally (Scottish Government 2012). Due to the predominantly catchment-based school intakes in Scotland, schools located in deprived areas tend to draw predominantly deprived intakes.

Glasgow has been the site of an abundance of regeneration initiatives in the past century, and in the last two decades approaches have leaned toward the idea of mixed communities – that mixing in terms of income and tenure may reduce negative neighbourhood effects (Galster 2007).

This project will provide evidence as to whether housing and planning policy has impacted on educational outcomes in Glasgow.

3.3 Research Methodology and Data Collection

3.3a Method of data collection *(Tick as many as apply)*

Face to face or telephone interview *(attach a copy of the interview themes. This does not need to be an exact list of questions but does need to provide sufficient detail to enable reviewers to form a clear view of the project and its ethical implications.) Attached at Appendix A in supporting documents.*	☒
Focus group *(provide details: themes or questions. This does not need to be an exact list of questions but does need to provide sufficient detail to enable reviewers to form a clear view of the project and its ethical implications. Also information on recording format)*	☐
Audio or video-recording interviewees or events *(with consent)*	☒
Questionnaire *(attach a copy)*	☐
Online questionnaire *(provide the address/ or paper copy if not yet available online)* http://	☐
Participant observation *(attach an observation proforma)*	☐
Other methdology *(please provide details – maximum 50 words)* Secondary quantiative analysis of educational data for pupils and schools provided by Glasgow City Council Education Services and census data to examine changes in social mix in both neighbourhoods and schools.	☒

3.3b   Research Methods

Please explain the reason for the particular chosen method, the estimated time commitment required of participants and how the data will be analysed *(Use no more than 250 words)*.

Quantitative analysis of educational and census data will be used in order to examine how the social mix in neighbourhoods and schools has changed over the past ten years, and also to look at whether changes in the social mix of schools or neighbourhoods are associated with changes in school outcomes, such as attainment.

Individual interviews with school pastoral staff and pupils will be carried out in order to explore the findings from the quantitative analysis of educational and census data. It is important not only to quantify the changes in schools and neighbourhoods resulting from housing policy, but also to explore how these changes have affected the running of the school and the experience of being a pupil within both the school and neighbourhood. S5 pupils will be approached to take part in the research as not only will most be over 16 at the time of the research, but as the research will be carried out in June they will have advanced to their 6[th] year timetable, meaning that they are the most senior pupils currently at the school, and that interviews will be able to take place in free periods.

Two schools will be selected on the basis of their changes in social mix. These findings will form part of the quantitative data analysis and therefore the specific schools cannot be anticipated. The schools to be approached will be forwarded to the committee as part of the Education Services Research Evaluation Questionnaire..

Interviews with pupils will be limited by the time slots available in the school day, so will last no longer than 50 minutes, or the length of a school period. Staff interviews will be dependent on the time of day the interview is taking place - if during school hours time will be banded by period length, however if out of school hours, the interview could last longer. It is not anticipated that interviews will last longer than an hour.

Data will be transcribed and then analysed thematically.

3.4   Confidentiality & Data Handling

3.4a   Will the research involve: *Tick all that apply*

Participants consent to being named?	☐
De-identified samples or data (i.e. a reversible process whereby identifiers are replaced by a code, to which the researcher retains the key, in a secure location?	☒
Subject being referred to by pseudonym in any publication arising from the research?	☒
Anonymised samples or data (i.e. an irreversible process whereby identifiers are removed from data and replaced by a code, with no record retained of how the code relates to the identifiers. It is then impossible to identify the individual to whom the sample of information relates)?	☐
Complete anonymity of participants (i.e. researchers will not meet, or know the identity of participants, as participants are part of a random sample and are required to return responses with no form of personal identification)?	☐
Any other methods of protecting the privacy of participants? (e.g. use of direct quotes with specific, written permission only; use of real name with specific, written permission only): *provide details:*	☐

3.4b **Which of the following methods of assuring confidentiality of data will be implemented?**
 Tick all that apply

Note: The more ethically sensitive the data, the more secure will the conditions of storage be expected to be.

Location of Storage Storage at University of Glasgow	☒
Stored at another site *(provide details, including address)*	☐
Paper Data to be kept in locked filing cabinets	☒
Data and identifiers to be kept in separate, locked filing cabinets	☒
Electronic Access to computer files to be available by password only	☒
Other Any other method of securing confidentiality of data in storage: *provide details:* The treatment of the pupil level data is governed by a legal agreement between Glasgow City Council and the University of Glasgow, which seeks to ensure the security and confidentiality of the data. Professor Ade Kearns, supervisor of this project, is the signatory on this agreement, and Oonagh Robison is named on the agreement as having permission to use the data. The University holds this agreement in the contracts office.	☐

3.5 **Access to Data**

3.5a Access by named researcher(s) and, where applicable, supervisor(s), ☒
examiner(s), research assistants, transcribers

3.5b Access by people **OTHER** than named researcher(s)/Supervisor(s), ☐
 examiner(s), research   assistants, transcribers

Please explain by whom and for what purpose: The data will be accessible by the researcher, the supervisors, and examiners, as it will form part of a PhD thesis.

3.5c **Retention and Disposal of <u>Personal</u> Data**

"(personal data means data which relate to a living individual who can be identified –
(a) From those data, or
(b) From those data and other information which is in the possession of, or is likely to come into the possession of, the data controller, and includes any expression of opinion about the individual and any indication of the intentions of the data controller or any other person in respect of the individual." Data Protection Act 1998 c.29 Part 1 Section 1

The 5th Principle of the Data Protection Act (1998) states that personal data must not be kept for longer than is necessary based on the purpose for which it has been collected. Please explain and as appropriate justify your proposals for retention and/or disposal of any **personal** data to be collected.

*Where appropriate (and it normally will be appropriate) explain **when** and **how** the data you have collected will be destroyed.* Data will be kept for ten years after fieldwork has been completed, and then destroyed, in accordance with MRC policy. Audio and electronic documents will be deleted and paper copies will be shredded at the end of the 10 year period.

3.5d   Retention and Disposal of <u>Research</u> Data

(For Postgraduate and Staff Research University of Glasgow Research Guidelines expect data to be retained for 10 years after completion of the project) Please see University Code of Good Practice in Research for guidance,
http://www.gla.ac.uk/services/postgraduateresearch/pgrcodeofpractice/

> Please explain and as appropriate justify your proposals for retention and/or disposal of **research** data to be collected.
>
> Paper material (e.g. transcripts) will be stored in locked, secure conditions at the SPHSU whist the data is being processed. Electronic information that could identify participants or premises will be stored separately to research data. Data used for analytical purposes will be anonymised and shall not include any identifying information. All computers (desk top and laptop) and other mobile devices used to store or transport confidential information will be encrypted and password protected. Any emails containing confidential or sensitive information will also be encrypted and password protected.

3.6   Dissemination of Results.

3.6a   Results will be made available to **participants** as: *(Tick all that apply)*

Note: Intended method of dissemination ought normally to take account of the age, capacities and situation of participants.

Written summary of results to all	☐	Copy of final manuscript *(e.g. thesis, article, etc)* presented if requested	☒
Verbal presentation to all (information session, debriefing etc)	☐	Presentation to representative participants *(e.g. CEO, school principal)*	☒
Dissertation	☐	Other or None of the Above *Please explain* Briefing paper for Glasgow City Council Education Services. Briefing paper for pupils and staff provided if requested.	☒

3.6b   Results will be made available to peers and/or colleagues as: *(Tick all that apply)*

Dissertation	☐	Journal articles	☒
Thesis *(e.g. PhD),*	☒	Book	☒
Submission	☐	Conference Papers	☒
Other or None of the Above *Please explain*			

3.7   **Participants**

3.7a   **Target Participant Group** (Please indicate the targeted participant group by ticking all boxes that apply)

Students or Staff of the University	☐	Adults *(over 18 years old and competent to give consent)*	☒
Children/legal minors *(under 18 years old)*	☒	Adults *(over 18 years who may not be competent to give consent)*	☐
Young people aged 16-17 years	☒		

3.7b   **Will the research *specifically* target participants with mental health difficulties or a disability?**

YES   ☐   NO   ☒

If YES, please explain the necessity of involving these individuals as research participants

3.7c   **Number of Participants** *(if relevant give details of different age groups/activities involved)*

Sixteen - eight from each of two schools. It is expected that two teachers invoved with pastoral care from each school will be interviewed, as well as between 4-6 S5 pupils in each school.

3.7d (i)   Explain how you intend to recruit participants.

Initial contact with Glasgow City Council will be made using their Education Services Research Evaluation Questionnaire. If permission is received, schools will be sent a brief letter explaining the research, with a view to setting a meeting where the aims of the study and requirements in relation to the school staff and pupils can be further discussed. As I am aiming to interview S5 pupils, I would be aiming to recruit staff who deal with S5, such as year heads and pastoral care. An information sheet for staff participants has been provided in Appendix B in participant information, and a consent form is provided in Appendix G in consent forms. In terms of recruiting pupils, a similar approach will be undertaken. If possible either myself or a pastoral care teacher will introduce the study in registration or PSE class, and will take names of those interested. Those interested will be given an information sheet (Appendix C in participant information) and parental consent form (Appendix D in consent form). It is envisaged that pupil interviews will take place over the lunchbreak so as not to disrupt pupil lessons, however this will be discussed with each individual school. At the time of the interviews pupils will be asked to fill in a consent form (Appendix F) that will reiterate the information they have been given in the the pupil information sheet. No payment or incentive will be offered to participants. At all times I will follow procedures laid out by Glasgow City Council.

3.7d (ii) Incentives

If payment or any other incentive (such as a gift or free services) will be made to any participants please specify the source and the amount of payment to be made and/or the source, nature and where applicable the approximate monetary value of the gift or free service to be used. Please explain the justification for offering payment or other incentive.

Not applicable

3.7e   Dependent Relationship

Are any of the participants in a dependent relationship with any of the investigators, particularly those involved in recruiting for or conducting the project? *(For example, a school pupil is in a dependent relationship with their teacher. Other examples of a dependent relationship include student/lecturer; patient/doctor; employee/employer)*

YES   ☒   NO   ☐

If YES, explain the relationship and the steps to be taken by the investigators to ensure that the subject's participation is purely voluntary and not influenced by the relationship in any way.

Pupils are in a dependent relationship with their teachers and school. Communications with managerial and teaching staff, both in writing and verbally, will clearly state that pupil participation must be voluntary; pupils and parents have a right to withdaw with no questions asked at any stage of the project. The information sheet and parental consent forms will reiterate the voluntary nature of participation. The researcher will verbally remind the pupils of the voluntary nature of the study and the right to withdraw both before and just after data collection.

3.7f   Location of Research

University of Glasgow	☐
Outside Location *Provide details of outside locations, including as much information as possible.* I propose to approach two schools that will be identified by the first quantiative stage of the project. Interviews with staff and pupils will take place on school property.	☒

4   Permission to Access Participants

4.1a   Will subjects be identified from information held by another party?
(eg. a Local Authority, or a Head Teacher, or a doctor or hospital, other organisation or Glasgow University class lists)

YES   ☒   NO   ☐

If YES describe the arrangements you intend to make to gain access to this information including, where appropriate, any other ethics committee that will be applied to.

Glasgow City Council will be approached for permission, using the GCC Research Evaluation Questionnaire. Following University of Glasgow College of Social Sciences ethical approval, Head Teachers at our candidate schools will be approached.

4.1b   Permissions/Access

Permission is usually required to gain access to research participants within an organisation (e.g. school, Local Authority, Voluntary Organisation, Overseas institution)

Is this type of permission **applicable to** this application?   YES   ☒   NO   ☐

    If Yes:

    Is evidence of this permission **provided with** this application?

    YES   ☐   NO   ☒

    OR is it to follow?

    YES   ☒   NO   ☐

    (If this is the case, this should be forwarded to Ethics Administrator as soon as it is available.)

    Permission will be sought from Glasgow City Council once University ethical approval has been granted, following which evidence will be forwarded to the administrator.

4.1c   Does this application involve the survey of University of Glasgow students?

YES   ☐   NO   ☒

*If YES, separate permission to survey students needs to be obtained prior to any such survey being undertaken. Normally this permission should be sought from the **appropriate authority after** ethical approval has been granted. (See application form notes for detail). Once obtained, a copy of this permission should be forwarded to the Ethics Administrator.*

4.1d   Is this application being submitted to another ethics committee, or has it been previously submitted to another ethics committee?

YES   ☐   NO   ☒

(If YES, please provide name and location of the ethics committee and the result of the application.)

5   Informed Consent

If you require information on the age of legal capacity please refer to the Age of Legal Capacity (Scotland) Act 1991 available at: http://www.legislation.gov.uk/ukpga/1991/50/contents

5.1a   Have you attached your Information Sheet (also known as Plain Language Statement (PLS)) **for participants?**

The Information Sheet is written information in plain language that you will provide to participants to explain the project and invite their participation. **Contact details for Supervisor** if applicable and **College Ethics Officer MUST** be included. Please note that a copy of this information must be given to the participant to keep.

YES   ☒   NO   ☐

If NO please explain

5.1b   How will informed consent by individual participants or guardians be evidenced?

Note: In normal circumstances it will be expected that written evidence of informed consent will be obtained and retained, and that a formal consent form will be used: A copy of which should be should be provided.

If written evidence of informed consent is not to be obtained a **substantial** justification of why not should be provided.

(Note: Please ensure that you have checked the box for all types of consent to be used, eg signed consent form for interviews/ implied for questionnaires.)

Signed consent form	☒	Recorded verbal consent	☒
Implied by return of survey	☐	Other *Provide details*	☐

*Justification if written evidence of informed consent is **not** to be obtained and retained:*

6   Monitoring

Describe how the project will be monitored to ensure that the research is being carried out as approved (e.g. give details of regular meetings/email contact). The researcher will attend regular meetings with the supervisors to discuss progress. An email will be sent weekly to the supervisors explaining what has been achieved in the week prior.

7   Health and Safety

Does the project have any health & safety implications?

YES   ☒   NO   ☐

If YES, please outline the arrangements which are in place to minimise these risks A fieldwork risk assessment will be carried out to determine any risk to the researcher. Personal safety measures will be in place to limit the risk to the researcher in travelling alone to interviews throughout Glasgow, including through the use of MRC's Communicare system for lone travellers. Otherwise, the researcher will take normal precautions as they would travelling for other purposes. Pupil participation in the study will be in their regular place of education, presenting no additional risks. The researcher is a member of the Protecting Vulnerable Groups (PVG) scheme.

8   Insurance

Have you checked that this research does not come under the exclusions to the University insurance cover for research?

YES ☒   NO ☐

The University insurance cover is restricted in certain, specific circumstances, e.g., the use of hazardous materials, work overseas, research into pregnancy and conception and numbers of participants in excess of 5000. All such projects must be referred to Research Strategy and Innovation Office before ethical approval is sought. Advice or authorisation given must be included with this application.

Please visit:
http://www.gla.ac.uk/services/rsio/forstaffcampusonly/researchgovernanceframeworkandclinicaltrials/section4insuranceandindemnity/ for information.

9   Protection of Vulnerable Groups and Disclosure

Does this project require PVG clearance?

YES ☒   NO ☐

If Yes, evidence that this has been obtained **MUST** be provided with this application. Please see Appendix E in supporting documents.

If application for PVG registration is currently in progress, please provide details here:

The Protection of Vulnerable Groups (Scotland) Act 2007 came into effect on 28 February 2011. This replaced the previous Disclosure Scotland checking system for individuals who work with children and/or protected adults. The University is a Registered Body under this legislation.

Please consult the University Protection of Vulnerable Groups Scheme webpages
http://www.gla.ac.uk/services/humanresources/policies/p-z/protectionofvulnerablegroupsscheme/ for guidance.

10   UK and Scottish Government Legislation

Have you made yourself familiar with the requirements of the **Data Protection Act (1998)** and the
Freedom of Information (Scotland) Act 2002?

YES ☒   NO ☐

If NO please explain

(See Application Guidance Notes for further information. In addition visit http://www.gla.ac.uk/services/dpfoioffice/ for guidance and advice on the Act).

Please ensure you have read the eight basic Principles underlying the Data Protection Act 1998 [DPA]
that protect the rights and freedoms of individuals with respect to the processing of their personal data.

The **Freedom of Information Act 2002** ["FOI"] provides a general right of access to most of the recorded information that is held by the University. The Act sets out a number of exemptions/exceptions to this right of access.

11 Declarations by Researcher(s) and Supervisor(s)

The application will NOT be accepted if this section is blank

- The information contained herein is, to the best of my knowledge and belief, accurate.

- I have read the University's current human ethics guidelines, and accept responsibility for the conduct of the procedures set out in the attached application in accordance with the guidelines, the University's Code of Conduct for Research and any other condition laid down by the University of Glasgow Ethics Committee and the College of Social Sciences Ethics Committee.

(Full details of the University's ethics guidelines are available at:
http://www.gla.ac.uk/research/aimsassessmentandpolicies/ourpolicies/ethicshomepage/)

- I and my co-researcher(s) or supporting staff have the appropriate qualifications, experience and facilities to conduct the research set out in the attached application and to deal effectively with any emergencies and contingencies related to the research that may arise.

- I understand that **no** research work involving human participants or data collection can commence until ethical approval has been given by the either the School Ethics Forum (UG & PGT students only) or the College of Social Sciences Ethics Committee (for PGR students and Staff).

This section MUST be completed to confirm acceptance of Code of Conduct. If there is no scanned signature then please type the names and date into the boxes below.

	Signature	Date
Researcher *(All applicants)*		24/02/15
Principal Supervisor *(Where applicable)*		24/02/15

End of Application Form ....

Applications should be submitted electronically as follows:

➤ **Postgraduate Research Student (PGR) and <u>Staff</u> applications submission:**

Please upload the completed form, along with any other required documents by logging in to the Research Ethics System at - https://frontdoor.spa.gla.ac.uk/login/ this will then be considered by the College Research Ethics Committee.

PGR students are required to upload their application which is then forwarded to their named supervisor for approval and submission to the Ethics Committee.

➤ **Undergraduate and Postgraduate Taught Student (UG & PGT) applications:**

Should be sent to their School Ethics Forum (SEF) via email to their local administrative contact.
Please see contact details on College ethics website. http://www.gla.ac.uk/colleges/socialsciences/info/students/ethics/

For these student applications, there are <u>two options for submitting Supervisor approval</u>:

1   The student e-mails the application to their supervisor, who checks it and submits it to their local SEF contact (UG and PGT only)

Or

2   The student e-mails the application to the SEF contact and the supervisor sends a separate e-mail to the appropriate administrative point of contact giving the details of the application and confirming approval for the submission.

Appendix 8: Glasgow City Council Research Evaluation Questionnaire

GLASGOW CITY COUNCIL

EDUCATION SERVICES

RESEARCH EVALUATION

QUESTIONNAIRE

Research Evaluation Questionnaire

Introduction

In Glasgow City Council Education Services there is a policy of evaluating all requests for research access made to the department or any section of it.

This is intended to co-ordinate and organise research proposed or being carried out within Education Services. This will also avoid any excessive demands on staff resources and ensure the protection of client confidentiality.

In order to reach a decision regarding your request for access we need information on your proposal. This should be provided in the questionnaire attached. We apologise if any of the information it requires duplicates information given in your initial approach to the department but would assure you that your co-operation in this will assist us in arriving at a speedier conclusion.

The Procedure

On receipt of your completed application, your proposal will be considered by the Education Research Steering Group where a recommendation will be made. You will then be informed as soon as possible thereafter of the decision.

Please return your completed questionnaire and address any queries to:

PPR Team
Education Services
Glasgow City Council
City Chambers East,
40 John Street,
Glasgow, G1 1JL

Tel: (0141) 287 3556
E-Mail: PPR@education.glasgow.gov.uk

GLASGOW CITY COUNCIL EDUCATION SERVICES

RESEARCH EVALUATION QUESTIONNAIRE

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1.   RESEARCH DETAILS

(a)   Name of Researcher: Oonagh Robison

(b)   Designation: PhD Research Student

(c)   Organisation: University of Glasgow / Medical Research Council

(d)   Address: 200 Renfield Street, Glasgow, G2 3QB

(e)   Day Time Telephone Nos.:   0141 353 7500 / 07967 200 719

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2.   CLEARANCE

(a)   Have you submitted your proposal elsewhere? No.

(b)   Has it been accepted? N/A.

(c)   Do you intend to submit the proposal elsewhere? No.

1. **THE PROJECT**

Please complete this section about your proposed project.

(a) Project Title: Tenure mixing in Glasgow: does it result in changed neighbourhood and school mix, and if so, does it make a difference to educational outcomes for pupils?

(b) Overall Aim of Project: This project will explore whether regeneration with a focus on tenure mixing has led to changes both within the neighbourhood and within the school, and if so, whether this has impacted on both school and individual outcomes.

2. **THE PROJECT (continued)**

(c) What methodology is to be applied?:

Face to face semi structured in depth interviews with teachers and sixth year pupils.

(d) Particular aim of request to Glasgow City Council:

To seek permission to contact between four and six schools, with aim of recruiting two schools to the study.

To then request access to 2-3 members of staff, and 4-6 pupils in each school.

It is hoped that fieldwork will be carried out in June 2015, when the 2014/15 5th year pupils begin their 6th year timetables.

Interviews with pupils will be limited by the time slots available in the school day, so will last no longer than 50 minutes (or the length of the school period). Staff interviews will be dependent on the time of day the interview is taking place – if during school hours time will be banded by period length, however if out of school hours interview could last longer, however it is not anticipated that interviews will last

longer than an hour.

Interviews with school pastoral staff and pupils are being sought in order to explore the findings of the quantitative component of the project, which will examine how the social mix in neighbourhoods and schools has changed over the past ten years, and also to look at whether changes in the social mix in schools or neighbourhoods are associated with changes in school outcomes, such as attainment. It is important to explore how any changes have affected the running of the school and the experience of pupils within both the school and the neighbourhood. S5 pupils will be approached to take part in the research as they can offer observations of how the surrounding area and the school has changed, if at all, in recent year. S5 pupils will also mostly be over 16 at the time of the research, and as the research will ideally take place in June 2015, they will have advanced to their 6th year timetable meaning that interviews will be able to take place in free periods.

4. VALUE TO GLASGOW CITY COUNCIL EDUCATION SERVICES

What benefit will the project offer?:

This project will explore whether regeneration, with a focus on tenure mixing, has led to changes both within the neighbourhood and within the school, and if so, whether this has impacted on both school and individual outcomes.

It is known that there are disparities between the educational attainment of pupils from affluent backgrounds and those from less affluent backgrounds. Research

which identifies ways in which such socio economic disparities can be addressed is vital for the development of policy.

Due to the predominantly catchment-based school intakes in Scotland, schools located in deprived areas tend to draw predominantly deprived intakes. Previous research has suggested that students tend to benefit from being in a school with a greater proportion of higher socio economic status pupils, and this project will provide evidence as to whether housing and planning policy has impacted on educational outcomes in Glasgow through changing the socio economic mix of secondary schools.

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1. STAFF INVOLVEMENT

Please state, as specifically as you can, the Education Services staff from whom you will need time, how much time, and for what purpose.

An example is shown below – please try to provide equivalent information about your proposal.

STAFF	PURPOSE	TIME	WHEN
PPR team	*Identifying a sample of 10 pupils.*	*2 Hours*	*Late May*
Head Teacher	*For interviewing about pupils identified above*	*5 x 1 hour*	*Early June*

5(a)

STAFF	PURPOSE	TIME	WHEN
Pastoral care teachers	Interview about changes in local area / school mix.	4 x 1 – 11/2 hours	Early June

5(b) On what basis have you arrived at the estimates you have given in 5(a)?

PILOT STUDY ☐
RESEARCH ELSEWHERE ☐
OWN ESTIMATE ☒
ADVICE ☐

IF ADVICE, FROM WHOM: _____

_____

1. INFORMATION SOUGHT

(a) What is the nature of the information (and/or records) to which access is sought? (Please explain as fully as possible.)

The information sought is data from in depth, semi structured interviews with

members of staff who have ideally been at the school for ten years or more, and

with 6th year pupils who have lived in the catchment area and attended the school

since 1st year.

The interviews will cover the following themes:

- perceptions of neighbourhood / neighbourhood change

- impact of neighbourhood / neighbourhood change on school

- perceptions of school / school change

- impact of school / school change on educational outcomes

The interviews will be audio recorded and transcribed by the researcher, and the

transcripts analysed thematically.

INFORMATION SOUGHT (Continue)

(a)　　How will this information be used?:

 Initially this information sought will be used as the basis for the qualitative portion

 of a mixed methods PhD thesis. The findings may also be used to inform journal

 articles and conference papers. A short report for GCC Education Services

 will also be provided.

(b)　　How will this information be stored (manual files/computer systems etc.)　and
 for how long?:

Data will be kept for ten years after fieldwork has been completed, and then reviewed

 in accordance with Medical Research Council policy. At the end of the ten year

 period, where appropriate, audio and electronic documents will be deleted and

 paper copies will be securely shredded.

(a)   If applicable, please include a copy of your research design/questionnaire to support your proposed research, and tick the box below. (This will normally be necessary **before** approval can be recommended.

Questionnaire enclosed: YES ☐   NO ☒

Please note: as the interviews are semi-structured, they do not adhere to a strict questionnaire, but instead are shaped around themes. These themes can be found in section 6a.

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1.   CONFIDENTIALITY

What assurances can you give relating to the <u>security</u> of confidential information collected relating to clients, staff or premises?

(a)   Within <u>manual</u> records/files etc.?

<u>All data and confidential information will be stored in locked filing cabinets within</u>

<u>the Social and Public Health Science Unit, with any information that could be used to</u>

<u>identify participants kept separate from data. Only the researcher will have</u>

<u>access to the filing cabinets</u>

(b)   Within computer systems?

<u>All access to computer files will be password protected, and only the researcher and</u>

supervisors will have access to them. In accordance with MRC policies all computers,

 laptops and memory sticks are password protected and encrypted.

(a)   What assurances can you give, that clients, staff or premises would be non-
        identifiable in any published material?

All participants will be assigned a pseudonym, and any direct quotes from participants

will use their pseudonym only. All participating schools will also be given a

pseudonym, and areas in which schools are in will not be named, but only described.

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1.   **REPORT**

(a)   **When is your final report due?**

       MONTH: September   **YEAR:** 2016

(b)   **Will a copy be sent to this department prior to publication?**
       **(to: Principal Officer of Planning, Performance and Research -address as shown
       previously.)**

       YES   ☐
       NO   ☒

If not, please give a reason and a date by which a copy of the report will be sent.

The research will form the basis of a PhD thesis, so will not be published,

however a short report of the findings will be prepared for GCC Education Services if

required.

1.   ADDITIONAL SUPPORTING INFORMATION

Please use this section to add any further information which you feel would assist us in consideration of your request, or enclose supporting information with your completed form.

This research forms the qualitative component of a PhD studentship from the Medical

Research Council Chief Scientist Office Social and Public Health Sciences Unit

(MRC/CSO SPHSU) at Glasgow University.

It is being supervised by Professor Ade Kearns, Professor of Urban

Studies at Glasgow University, Dr Marion Henderson, Senior Investigator Scientist,

and Dr Linsay Gray, Senior Investigator Scientist at the MRC/CSO SPHSU. The

research is looking at schools in Glasgow in the context of regeneration, and is part of

GoWell, a research and learning programme that aims to investigate the impact of

investment in housing, regeneration and neighbourhood renewal on the health and

wellbeing of individuals, families and communities over a ten year period.

The quantitative component of the PhD uses data from GCC Education Services

As well as census data from 2001 and 2011 to explore how both catchment areas and

schools in Glasgow have changed in terms of socio economic mix, and whether any

changes have resulted in changes in educational outcomes for the schools. This

qualitative component aims to unpack the quantitative findings by finding out

firsthand from school staff and pupils how the catchment area and school have

changed.

Consent for pupil interviews will be sought from both parents and the pupils

themselves, and information sheets and consent forms can be forwarded if required.

Ethical approval has been granted for this project by the University of Glasgow, and a

copy of this agreement can be forwarded for info if required.

The principal researcher, Oonagh Robison, is a member of the PVG scheme, and a

copy of this certificate has been attached after section 10 of this document.

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1.   RESEARCH CONTRACT

1.   I confirm that the above details are correct and that I will inform Education
Services if there is any change to the proposal agreed.

2.   I confirm that if there is any disagreement over the interpretation of the results
that this will be noted in any publication.

3.   I also confirm that a copy of the research report will be provided to Education
Services prior to publication (unless other arrangements have been agreed.)

Researcher's Name: Oonagh Robison

Researcher's Signature: Oonagh R——

Date: 5/   3/   2015

Appendix 9: Information and consent forms

University of Glasgow | College of Social Sciences

Neighbourhood and school change

Information sheet for staff

We would like to invite you to participate in a research study. Before you decide to take part, it is important for you to understand why the study is being done and what it will involve.

What is the study about?
This study forms part of a PhD looking at the effects of housing and planning policy in Glasgow on the social mix of neighbourhoods and schools in Glasgow, and in turn potentially upon educational outcomes for pupils and schools.

Who is carrying out the study?
This study is being undertaken by Oonagh Robison, a PhD researcher at the Medical Research Council's Social and Public Health Sciences Unit (MRC SPHSU) at the University of Glasgow. The study is being supervised by Dr Marion Henderson, Professor Ade Kearns and Dr Linsay Gray of the University of Glasgow.

What does the study involve?
We would like to invite you to take part in an interview at the school with Oonagh Robison. The interview will explore your views on the social mix of the school, the neighbourhood surrounding the school, any changes in the neighbourhood to do with regeneration, and if neighbourhood change has had any impacts on the school. Two schools have been selected to take part, and two members of staff and six pupils from each school will be asked to participate.

How long will the interview take?
The interview will take around an hour.

Who will see the answers from the interview?
Your interview will be digitally recorded and then transcribed. At this point the interview will be anonymised and a pseudonym given to your answers. Quotes from the interview may be used in the PhD thesis and in any publications from the research. You will not be identifiable from these quotes, and every care will be taken to ensure that the school is not identifiable, although there is the possibility the school identity may be inferred by a reader or third party.

Who do I contact for further information about the study?

If you have any questions about the study, please call Oonagh Robison at the MRC SPHSU on 0141 353 7500 or email o.robison@sphsu.mrc.ac.uk.

If you have any questions about the conduct of this study, you can contact the College Ethics Officer, Dr Muir Houston, on 0141 330 4699, or at muir.houston@glasgow.ac.uk, or Dr Gillian Fergie: gillian.fergie@glasgow.ac.uk, 0141 353 7500.

Neighbourhood and school change

Information sheet for pupils

We would like to invite you to participate in a research study. Before you decide to take part, it is important for you to understand why the study is being done and what it will involve.

★ We want to find out about what you think of the mix of people in your school and where you live, and any recent changes to these. We would like you to help us to do this by taking part in an interview.

★ Two schools have been selected to take part, and two members of staff and six pupils from each school will be asked to participate.

★ There are no right or wrong answers to any of these questions (so you don't need to try to work out what we want). We just want to know what you **really** think and feel.

★ We will ask you some questions and you will be able to ask if you do not understand any of the questions.

★ The interview will be recorded, but no-one apart from the researcher will ever listen to the recording.

★ Your answers will be anonymous – we will not tell anyone your name and no-one will be able to tell it was you. Every care will be taken to make sure no-one can tell what school you are from.

★ You will be referred to by a different name, and we are happy for you to choose that name at the interview.

★ Your answers will be used as part of a PhD thesis, and anonymised quotes from the interview may be used in presentations or publications.

★ It is very important that you agree if you want to be involved. Do you have any questions about what we are asking you to do? Please ask if there is anything else you want to know before you decide to take part.

Thank you for taking part!

Neighbourhood and school change

Information sheet for parents

We would like to invite your child to participate in a research study. Before you decide whether to give your consent or not, it is important for you to understand why the study is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

If you wish your child to take part, please sign and return the slip overleaf within two weeks of receiving this information sheet.

What is the study about?
This study forms part of a PhD looking at the effects of housing and planning policy in Glasgow on the social mix of neighbourhoods and schools, and in turn how they might affect educational outcomes for pupils and schools. Two schools have been selected to take part, and two members of staff and six pupils from each school will be asked to participate.

Who is carrying out the study?
This study is being undertaken by Oonagh Robison, a PhD researcher at the Medical Research Council / Chief Scientist Office Social and Public Health Sciences Unit (MRC/CSO SPHSU) at the University of Glasgow. The study is being supervised by Dr Marion Henderson, Professor Ade Kearns and Dr Linsay Gray of the University of Glasgow. The MRC/CSO SPHSU is a recognised centre of health-related social science research. It has multi-disciplinary research staff with considerable expertise in health related research. The Unit has played a leading role in the study of young people's health and lifestyle for many years.

Permission to carry out this research has been received from Glasgow City Council Education Services. Oonagh is a member of the Protecting Vulnerable Groups scheme (PVG), managed by Disclosure Scotland.

What does the study involve?
We would like your child to take part in an interview at the school with Oonagh. The interview will explore your child's views on their neighbourhood, any changes in their neighbourhood to do with regeneration, and if neighbourhood change has had any impact on their school.

How long will the interview take?

The interview will last around 50 minutes.

Who will see the answers from the interview?
Your child's interview will be digitally recorded and then transcribed. At this point any information that could identify your child will be removed and a different name will be used. Quotes from the interview may be used in the PhD thesis and in any publications from the research, but your child will not be identifiable. Every care will be taken to ensure that the school is not identifiable, although there is the possibility that the school identity could be inferred by a third party.

Should I discuss this with my child?
We have enclosed an information sheet that pupils will be given prior to taking part in the interview so that you can discuss the project with your child.

If you do <mark>NOT</mark> want your child to take part in the research
You don't need to do anything – only pupils who return a consent form will be able to take part.

Who do I contact for further information about the study?
If you have any questions about the study, please call Oonagh Robison at the MRC SPHSU on 0141 353 7500 or email o.robison@sphsu.mrc.ac.uk.

If you have any questions about the conduct of this study, you can contact the College Ethics Officer, Dr Muir Houston, on 0141 330 4699, or at muir.houston@glasgow.ac.uk, or Sally Stewart, Survey Manager MRC SPHSU: sally.stewart@glasgow.ac.uk, 0141 330 1670.

✂---

☐ I consent for my child to take part in the neighbourhood and school change study

Name of child   _____

Signature of carer/parent   _____

Date   _____

Please return to your child's school as soon as possible.

Neighbourhood and school change

Consent form for pupils

We would like to invite you to participate in a research study. Before you decide to take part, it is important for you to understand why the study is being done and what it will involve.

★ We want to find out about what you think of the mix of people in your school and where you live, and any recent changes to these. We would like you to help us to do this by taking part in an interview.

★ Two schools have been selected to take part, and two members of staff and six pupils from each school will be asked to participate.

★ There are no right or wrong answers to any of these questions (so you don't need to try to work out what we want). We just want to know what you **really** think and feel.

★ We will ask you some questions and you will be able to ask if you do not understand any of the questions.

★ The interview will be recorded, but no-one apart from the researcher will ever listen to the recording.

★ Your answers will be anonymous – we will not tell anyone your name and no-one will be able to tell it was you. Every care will be taken to make sure no-one can tell what school you are from.

★ You will be referred to by a different name, and we are happy for you to choose that name at the interview.

★ Your parents or carers have agreed to you taking part. However it is very important that you agree if you want to be involved. Do you have any questions about what we are asking you to do? Please ask if there is anything else you want to know before you decide to take part.

★ You can stop the interview at any time without giving a reason.

University of Glasgow | College of Social Sciences

Neighbourhood and school change

Consent form for pupils

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

3. I agree to this interview being recorded using a digital recording device. I understand that the audio recording is confidential, and that information replicated in text will be anonymised.

4. I give permission for brief extracts of what I say to be used for research purposes (including research publications and reports), which will be anonymised to protect my identity.

_____

I agree to take part in the neighbourhood and school change study.

Name   _____

Signature   _____

Date   _____

![University of Glasgow | College of Social Sciences]

Neighbourhood and school change

Consent form for staff

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

3. I agree to this interview being recorded using a digital recording device. I understand that the audio recording is confidential, and that information replicated in text will be anonymised.

4. I give permission for brief extracts of what I say to be used for research purposes (including research publications and reports), which will be anonymised to protect my identity.

_____

I agree to take part in the neighbourhood and school change study.

Name   _____

Signature   _____

Date   _____

Appendix 10: Extract from coding frame

Coding frame: pupils
- Neighbourhood
  - Immediate
    - Positive attitude
    - Negative attitude
  - Wider
    - Positive attitude
    - Negative attitude
  - Reputation
    - Stigma
    - Perception vs reality
    - Source
  - Poverty
  - Anti social behaviour
    - Gangs
    - Violence
    - Drinking
    - Smoking
    - Drugs
  - Physical aspects
    - Dereliction
    - Mess
  - Change
    - Lack of
    - Demolition
    - Surface
  - Poor parenting
  - Infrastructure
- Home
  - Family
  - Friends
  - House
- School
  - Attitude towards
    - Positive
    - Negative
  - Impact of catchment
  - Reputation/stigma
  - Difference (lack of)
  - Other pupils
    - Behaviour
    - Attitudes
  - Strategies

- o Policies
  - Uniform
  - Discipline
- o Performance
- o Teachers
  - Positive
  - Negative
- o Support
  - Academic
  - Pastoral

Coding frame: staff
- Catchment / school context
  - o Socioeconomic
    - Poverty
    - Deprivation
  - o Historical
    - Heavy industry
  - o Structural
    - Employment
  - o Political
    - Conservative policies
- Pupils
  - o Family
    - Chaotic families
    - Drug / alcohol dependency
  - o Background
    - Lack of success in education
    - Lack of higher education
  - o Parents
    - Skills
    - Own education
    - Aspirations
    - Mental health
  - o Issues
    - Confidence
    - Aspirations
    - Opportunities
    - Mental health
    - Gaps in education
- School
  - o Leakage
  - o Reputation
  - o Surroundings schools
    - comparisons

- o Time
  - Disruptions
  - Administration
  - Pastoral
  - Links with other agencies
  - Parents

  - o Educational attainment
  - o Role of school
    - Academic
    - Pastoral
    - Overcoming background
    - 'achievement'
    -
  - o Policies
    - Uniform
    - Educational attainment
    - Reputation
    - Social mix
- Change
  - o Area
    - New housing
    - Demolition
    - Infrastructure
  - o School
    - Management
    - Policies
    - Attitude
    - Pupils

Appendix 11: Sensitivity analyses

This appendix outlines the sensitivity analyses that have been conducted throughout the analysis process.

Firstly, the analysis for 2003 and 2012 was repeated using private rented households as the housing tenure coefficients.

Secondly, the fully adjusted model was repeated with the addition of NS-SEC at both neighbourhood and catchment level.

Thirdly, the fully adjusted model was repeated with housing tenure at both neighbourhood and catchment level included as separate coefficients.

Appendix Table 24: 2003 private renting as housing tenure coefficient

Timepoint 1 - private rented as tenure	Model A		Model B		Model C		Model D		Model E	
Level 1 – Pupil	**Coef**	**p-value**	**coef**	**p-value**	**coef**	**p-value**	**coef**	**p-value**	**coef**	**p-value**
Gender (**male**/female)	-0.479	<0.001	-0.479	<0.001	-0.477	<0.001	-0.475	<0.001	-0.476	<0.001
Free school meals (**fsm**/no fsm)	-1.019	<0.001	-1.017	<0.001	-0.820	<0.001	-0.820	<0.001	-0.819	<0.001
Ethnicity (**white**/non white)	-0.261	0.013	-0.273	0.011	-0.163	0.121	-0.166	0.110	-0.149	0.148
Looked after status (LA/**not LA**)	2.168	<0.001	2.162	<0.001	2.160	<0.001	2.162	<0.001	2.161	<0.001
Level 2 – Neighbourhood										
Tenure			0.295	0.576	-0.061	0.912	-0.068	0.902	-0.137	0.805
Education					-0.519	0.315	-0.655	0.208	-0.538	0.321
Working					-1.090	0.002	-1.053	0.002	-1.026	0.003
Family structure					-1.554	<0.001	-1.496	0.002	-1.370	0.004
SIMD					-0.279	<0.001	-0.274	<0.001	-0.273	<0.001
Level 3 – Catchment / School										
Tenure							1.524	0.310	1.445	0.388
Education									1.345	0.239
Family structure									-2.015	0.134
Attainment									-4.607	<0.001
Denomination (**ND**/RC)									-0.219	0.030
Free school meals									1.431	0.062
	VPC		**VPC**		**VPC**		**VPC**		**VPC**	
School VPC	5.96%	0.003	6.01%	0.003	3.50%	0.005	3.47%	0.006	0.95%	0.075
Neighbourhood VPC	6.49%	<0.001	6.44%	<0.001	1.42%	0.080	1.27%	0.129	1.48%	0.096

Appendix Table 25: 2012 private renting as housing tenure coefficient

Timepoint 2 - private rented as tenure	Model A		Model B		Model C		Model D		Model E	
Level 1 – Pupil	**Coef**	**p-value**	**coef**	**p-value**	**coef**	**p-value**	**coef**	**p-value**	**coef**	**p-value**
Gender (**male**/female)	-0.425	<0.001	-0.425	<0.001	-0.439	<0.001	-0.438	<0.001	-0.445	<0.001
Free school meals (**fsm**/no fsm)	-0.869	<0.001	-0.868	<0.001	-0.731	<0.001	-0.732	<0.001	-0.735	<0.001
Ethnicity (**white**/non white)	-0.2	0.026	-0.196	0.033	-0.232	0.044	-0.235	0.013	-0.237	0.014
Looked after status (LA/**not LA**)	1.488	<0.001	1.485	<0.001	1.407	<0.001	1.412	<0.001	1.410	<0.001
Level 2 – Neighbourhood										
Tenure			-0.026	0.941	1.502	<0.001	1.463	0.001	1.312	0.002
Education					-1.470	0.007	-1.539	0.005	-1.427	0.008
Working					-0.150	0.727	-0.087	0.839	-0.074	0.869
Ethnic mix					0.581	0.085	0.610	0.065	0.632	0.062
Family structure					-1.463	0.029	-1.213	0.032	-1.035	0.073
SIMD					-0.250	<0.001	-0.257	<0.001	-0.261	<0.001
Level 3 – Catchment / School										
Tenure							0.247	0.778	2.680	0.014
Working									3.259	0.023
Family structure									-5.073	<0.001
Attainment									-4.454	<0.001
Denomination (**ND**/RC)									-0.185	0.090
Free school meals									2.199	0.022
Ethnic mix									0.393	0.523
	VPC		**VPC**		**VPC**		**VPC**		**VPC**	
School VPC	4.61%	0.006	4.67%	0.005	3.14%	0.007	3.25%	0.008	1.25%	0.080
Neighbourhood VPC	3.46%	0.004	3.38%	0.007	0.35%	0.424	0.38%	0.386	0.48%	0.317

Appendix Table 26: 2003 Model E plus NS-SEC

Timepoint 1 - with NS-SEC	Model E	
Level 1 – Pupil	Coefficient	p-value
Gender (**male**/female)	-0.476	<0.001
Free school meals (**fsm**/no fsm)	-0.814	<0.001
Ethnicity (**white**/non white)	-0.137	0.183
Looked after status (LA/**not LA**)	2.193	<0.001
Level 2 – Neighbourhood		
Tenure	-0.794	0.013
Education	0.359	0.634
Working	1.095	0.206
Family structure	-0.530	0.392
SIMD	-0.187	0.001
NS-SEC	-2.434	0.049
Level 3 – Catchment / School		
Tenure	-3.408	0.003
Education	-4.322	0.058
Family structure	2.831	0.063
NS-SEC	8.078	0.018
Attainment	-4.252	<0.001
Denomination (**ND**/RC)	-0.241	0.015
Free school meals	1.910	0.007
	VPC	
School VPC	0.83%	0.100
Neighbourhood VPC	1.34%	0.096

Appendix Table 27: 2012 Model E plus NS-SEC

Timepoint 2 - with NS-SEC	Model E	
Level 1 – Pupil	Coefficient	p-value
Gender (**male**/female)	-0.439	<0.001
Free school meals (**fsm**/no fsm)	-0.717	<0.001
Ethnicity (**white**/non white)	-0.218	0.025
Looked after status (LA/**not LA**)	1.438	<0.001
Level 2 – Neighbourhood		
Tenure	-0.599	0.050
Education	0.213	0.778
Working	1.985	0.004
Ethnic mix	0.236	0.529
Family structure	0.396	0.626
SIMD	-0.203	<0.001
NS-SEC	-2.592	0.017
Level 3 – Catchment / School		
Tenure	1.529	0.027
Working	-4.506	0.013
Family structure	-8.105	<0.001
NS-SEC	5.034	<0.001
Attainment	-4.877	<0.001
Denomination (**ND**/RC)	-0.157	0.124
Free school meals	1.860	0.036
Ethnic mix	1.137	0.013
	VPC	
School VPC	0.96%	0.146
Neighbourhood VPC	0.30%	0.442

Appendix Table 28: 2003 Model E with housing tenure as separate coefficients

Timepoint 1 - with separate coefficients		Model E	
Level 1 – Pupil		Coef	p-value
Gender (**male**/female)		-0.474	<0.001
Free school meals (**fsm**/no fsm)		-0.815	<0.001
Ethnicity (**white/**non white)		-0.127	0.218
Looked after status (LA/**not LA**)		2.181	<0.001
Level 2 – Neighbourhood			
Tenure	<5 foundation	-0.887	0.008
	>5 foundation	-0.746	0.016
	>5 general	-0.957	0.004
Education		-0.987	0.031
Working		-0.092	0.848
Family structure		-0.510	0.368
SIMD		-0.182	0.001
Level 3 – Catchment / School			
Tenure	<5 foundation	-0.353	0.614
	>5 foundation	-0.323	0.630
	>5 general	-0.839	0.213
Education		1.551	0.036
Family structure		-0.768	0.545
Attainment		-4.556	<0.001
Denomination (**ND**/RC)		-0.237	0.023
Free school meals		1.632	0.065
		VPC	
School VPC		0.98%	0.067
Neighbourhood VPC		1.13%	0.190

Appendix Table 29: 2012 Model E with housing tenure as separate coefficients

Timepoint 2 - with separate coefficients		Model E	
Level 1 – Pupil		Coef	p-value
Gender (**male**/female)		0.058	<0.001
Free school meals (**fsm**/no fsm)		0.066	<0.001
Ethnicity (**white**/non white)		0.095	0.024
Looked after status (LA/**not LA**)		0.182	<0.001
Level 2 – Neighbourhood			
Tenure	<5 foundation	0.455	0.042
	>5 foundation	0.329	0.003
	>5 general	0.325	0.005
Education		0.546	0.014
Working		0.561	0.038
Ethnic mix		0.327	0.027
Family structure		0.770	0.852
SIMD		0.055	<0.001
Level 3 – Catchment / School			
Tenure	<5 foundation	1.262	0.564
	>5 foundation	1.182	0.644
	>5 general	1.192	0.663
Working		3.143	0.374
Family structure		2.586	0.401
Attainment		1.301	<0.001
Denomination (**ND**/RC)		0.128	0.134
Free school meals		1.451	0.249
Ethnic mix		0.648	0.390
School VPC		1.81%	0.073
Neighbourhood VPC		0.36%	0.391

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