# Youth in Transition: Longitudinal Comparisons of Youth Transitions in the UK using Cohort and Synthetic Cohort Data

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# Lay Summary

The primary aim of this thesis is to best understand the nature of inequality in aspects of young people’s transitions into adulthood. Through school, the labour market, and future development within timeframes of the selected datasets. Previous research has stated that variables of social stratification such as gender, social class, and ethnicity have strong and important implications for a young person’s transition into adulthood. Advanced quantitative methods are employed throughout this thesis to examine the historical and contemporary relationship these variables hold on youth transitions between the years of 1956-2000s.

The substantive findings… (come back to this when analysis is complete).

# Abstract

The primary aim of this thesis is to best understand the nature of inequality in aspects of young people’s transitions into adulthood. Through school, the labour market, and future development within the given timeframes of the selected datasets. The thesis contributes to sociology in three ways. First, it develops a historical account of youth transitions from the mid-20th century to the early 2000s. Second, it presents new empirical findings regarding the ‘missing’ generation by creating synthetic cohorts from the early 1980s-2000s. Thirdly, it provides a rigorous implementation of advanced quantitative methods, dealing with a variety of models, replication, missing data, and sensitivity analysis.

The thesis is structured into three parts. Part one explores the historical relationship of youth transitions starting from 1956 using the National Childhood Development Study (NCDS). This analysis is primarily a historical exercise, providing the ability to conduct sensitivity analyses around measures of social class and stratification. Particular attention is paid to missing data, with multiple imputation employed and assessed to see if there is any impact upon the findings of the models. Part two replicates using the British Cohort Study (BCS) providing an important historical timeline from the NCDS to BCS cohorts. Results where possible will be compared to provide a between-cohort assessment of the changing nature of youth transitions. Part three sees the construction of synthetic cohorts using the British Household Panel Survey (BHPS) and UK Household Longitudinal Study (UKHLS also known as Understanding Society). Replicating the models from previous datasets, part three provides a contemporary understanding of youth transitions that has hitherto been obstructed by a lack of available birth cohort data. Parts one-three provide a reflection about youth transitions within their given timeframes as well as an understanding of how those transitions have changed and been shaped by a variety of factors that have influenced the temporal context that individuals find themselves placed in.

# Acknowledgements

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(Finish acknowledgements when thesis is completed (and when my sanity has returned))

# Introduction

This thesis will make use of existing large-scale nationally representative longitudinal datasets to produce multivariate statistical analyses of youth transitions. The study of youth transitions has been a central element within the sociology of youth (Clarke, 1978). The transition - has emerged as a major research paradigm (Elder, 1994: 4). Social scientists engage in areas of human agency, the relation between individuals and changing society, as well as linked and interdependent lives (ibid).

Young people grow up in changing social and economic circumstances (Furlong and Cartmel, 1997). Transitions from education to employment, along with housing and domestic transitions, traditionally were inter-related (Coles, 2005). From what we know thus far, increasing numbers of young people remain in education for longer periods (Furlong and Cartmel, 1997). Living away from the parental home, and cohabitation outside of marriage are increasingly common (Murphy, 2000: 52; Seltzer, 2004: 926; Holdsworth and Morgan, 2005; Mulder, 2009). Young People now marry later, are more likely to have a first birth later, and have fewer children than in previous generations (Ermisch and Francesconi, 2000; Aassve et al, 2005: 283).

There is a large gap in the youth data portfolio between 1970 and the commencement of the Millennium Cohort Study (2002-2) (Gayle, 2005). This PhD addresses this data related challenge. It will use data from the British Household Panel Survey (1991-2009) and Understanding Society(the UK Household Longitudinal Study) (2009-) to construct synthetic cohorts of youth data. Data from the older birth cohorts and data from these synthetic cohorts will be used to study the youth transitions in a historical as well as life course context.

This PhD will focus on school-to-work transitions producing analyses of the various constituent parts that make up the youth transition whole: school level educational attainment, destinations after the mandatory school leaving age, and job market stability. By focusing particularly upon school-to-work transitions, detailed analysis into the historical and comparative contexts that make up the transition from education to the world of work will be undertaken.

# Literature Review:

## Theoretical Orientation:

### Youth Transitions: Life course, Structuration/Individualisation, and Late Modernity

There are three major social theory concepts in youth transition research. The first is the concept known as the life course. A term that seeks to do away with static ‘snapshot’ notions of sociology. Instead views the individual in a constant web of changing temporal context that is influencing the agent.

The life course approach has established itself as a substantively significant research paradigm within the last few decades (Elder, 1994: 4). The term ‘life course’ is a concrete multilevel phenomenon that is defined via the social trajectories of individuals through structured pathways of given institutions that form the developmental experience of a given individual (Elder, 1994: 5). These ‘structured pathways’ are interwoven with what Elder argued were ‘age-graded trajectories’ (ibid). These trajectories took the form of work, family, and housing transitions. Such transitions are always historically and temporally located, giving them specific form, and meaning (ibid). The structured pathways that are interwoven within the life course support an analysis that focuses upon inequalities in relation to race, class, gender, and other structural aspects of social life (Bernardi et al, 2019: 1).

The definition that Elder gives of the principle of agency: ‘’ individuals construct their own life course through the choices and actions they take within the opportunities and constraints of history and social circumstances’’ (Elder, 2003) also known as ‘’bounded agency’’ (Evans, 2007) is a concept that argues that agency of the individual is situational, and bounded to the circumstances of place and time (Bernardi et al 2019: 3).

By focusing upon a life course perspective, analysis can extend beyond static moments in time. This allows research to be expanded both in reference to within individual and between individual analysis. A life course approach appreciates the fact that structured pathways are temporally grounded and as such acknowledge that any youth transitions and trajectories must be understood within that embedded temporal context. The life course perspective lends itself to a study of youth transitions due to its focus upon the interdependence between life domains (ibid). This means that outcomes within one domain (say school) are interrelated with the outcomes and behaviours of other domains (say work). Finally, a life course perspective allows for insightful comparison across cohorts to study how such cohorts have responded differently to the consequences of their early transitions (Elder, 1994: 5).

Within the given time frame of this PhD research – studying youth transitions over an extended period of time (1960s onwards) - has the potential to be one of the longest detailed analyses of school-to-work transitions of its kind and offer significant differences in birth cohort exposure to different historical worlds (ibid). By integrating a life course perspective with the methodology of birth cohorts this PhD research is actively, exploring the age-graded patterns embedded in cultures, institutions, and social structures enabling a comparison across over 50 years of British society.

Within the literature the life course is often used as an umbrella term to cover a variety of concepts that (Brückner and Mayer, 2005: 31) argue are salient to the socio-historical elements of an individual from birth until death (Mayer, 2004). There were five concepts (Brückner and Mayer, 2005) developed in relation to the life course[[1]](#footnote-1).

The study of the life course of those individuals living within the latter half of the 20th century has identified three common developments that have impacted their life course trajectories: educational expansion, value changes, and the emancipation of women’s movements[[2]](#footnote-2) (Brückner and Mayer, 2005: 49).

The structure/agency dichotomy is replaced in a life course approach with an agency within structure (Diewald and Mayer, 2008: 7) theoretical modelling. The life course is embedded in the individual within social structures in a way that presents mutually interdependent sub-structures that act as mechanisms that steer individuals, the tightness of said social structures is dependent upon socio-temporal aspects that leave the room for individual decision-making or ‘agency’ (ibid). Over the course of an individual’s life course, there are times where due to social position, and other times due to socio-historical constraints, the individual experiences differing forms of social pressures and ability to impress themselves upon social structures in the forms of choice.

The concept of agency is impacted based on different temporal foci (Hitlin and Elder, 2007: 170). Understanding the life course requires a multidimensional notion of agency (Hitlin and Kirkpatrick Johnson, 2015: 1431), as such Hitlin and Elder (2007: 171) breakdown agency into four distinctive categories: existential, identity, pragmatic, and life course. The first, existential agency, refers to all action related to a fundamental level of human freedom – linked to Giddens’ notion that one might have acted otherwise (Hitlin and Elder, 2007: 177), identity agency refers to actions that are based on personalised social behaviour, pragmatic agency refers to the expression of action based on heuristic like devices of commonality, and finally, life course agency refers to actions with long term implications based upon an internal calculation of self-control, which reflexively guides decision making (Hitlin and Elder, 2007: 182).

The concept of life course and agency intersect. It highlights the socio-historical temporal constraints that are placed upon individual decision making for the future and also prompts a core methodological desire to investigate the aspirations, motivations, and desires that individuals hold in youth and to discover how that impacts later life decisions and results. These decisions are better yet described as ‘transitions’ (Hitlin and Elder, 2007: 182). Treating the individual as an active agent in the shaping of their biographies is important as it deters a deterministic theoretical orientation whilst maintaining that some individuals will structurally have more agentic opportunities based upon power relations (Hitlin and Kirkpatrick Johnson, 2015; Schmitt, 2021) also highlights a significant contribution to an individual’s later life outcomes.

The life course lends itself to longitudinal survey-based research. There are four points (Diewald and Mayer, 2008: 20) that argue for the best match of life course with predictive modelling, they are: to start as early as possible in the lifetime to exploit the endogeneity of individual development, to establish genetically sensitive sample designs, to exploit and use multi-level models to gather neighbourhood social contexts, and finally international replications to distinguish between universal and national phenomena. This PhD begins at the start of the youth phase to capture said endogeneity (due to the focus on youth transitions it is not feasible to study from birth like (Diewald and Mayer, 2008) is suggested so a ‘linked lives’ (Huinink and Feldhaus, 2009) objective cannot be achieved), with the addition of genetic markers in certain models in the form of reading and math assessments as well as the inclusion of multilevel models in the form of school/individual levels to emphasise that individual behaviour is embedded in a range of institutions (Huinink and Feldhaus, 2009: 305).

The literature (Huinink and Feldhaus, 2009: 304) also suggests that a comprehensive model must also focus upon the parents’ life course also – for example the timing of parenthood, if there is a breakdown in marriage etc. Parents’ life course has been shown to impact youth transitions as it refers to educational, occupational, and socioeconomic attainment (ibid). Extending this point further, life courses are not only subject to the historical circumstances of the time of the individual but also to the cumulative or even delayed effects of earlier historical times (Mayer, 2004) that in some instances manifest in parenthood.

To apply the life course more directly to the study of youth transitions, it is appropriate to breakdown how systems of education, occupation, and labour markets constitute and influence and individuals’ life course and in their expression of life course agency. Education as a system regulates the individual by implementing age-graded barriers and hierarchical and time-related credentials. The labour market through its regulatory function determines who is gainfully employed and who is unemployed which influences employment trajectories (Mayer, 2004: 164). The structure and hierarchy of occupations determines social position via segmentation and segregation which is in part determined by previous systems of employment and education. Functionally, the study of youth transitions is the study of the life course and systems of education, occupation, and labour markets constitute life domains onto which the life course manifests (Mayer, 2009). Mayer argues that these life domains are organised around three major life stages: the phase of education and preparation to work, the phase of active employment, and the phase of postretirement years (Mayer and Schoepflin, 2022: 196). These life stages vary in timing and sequencing depending on socio-historical context (Shanahan, 2000) which needs to be acknowledge for adequate sociological inquiry.

The second concept within youth transition literature is the structuration/individualisation thesis. Two competing theories that argue over the influence of social structures on decision making and agency. These two theories are related to the ‘life course’.

Structuration argues that structural factors like social class, gender, ethnicity still play an important role in shaping the lives of individuals and are indeed determinants for the individual who is pursuing the ‘imperative of living a life of one’s own’ (Beck, 2002). Individualisation argues that in place of these ‘collective guides’ (Gayle et al, 2009: 4) individualised identities that have greater scope beyond the mere structures (Murray, 2011: 26) they inhabit are able to create complex and subjective lifestyles that deviate from the much more rigid structures detailed above (Gayle et al, 2009: 5).

If the individualisation thesis were to be correct it would demonstrate itself empirically and repeatably. However, as Gayle et al (2009) found) the thesis’ strong claim against structures is not to be born out within the data. Pathways toward transition may have certainly altered, and even in some cases become more complex, but that does not mean there is support for ‘detraditionalisation’ (Gayle et al 2009). There has always been an element of navigation and choice within youth transitions. Though in the past the range of choice may have been narrower thus owing to a more homogenised pathway for those in past contexts (Goodwin and O’Connor, 2005: 4). Simply put, an increase in the complexity from getting from A to B does not in any way necessitate the declining importance of structural factors upon an individual’s negotiation of that journey. In other words, individualisation fails to account for the still apparently strong influence of structural elements on a person. Structuration appears to not appreciate the increasing levels of complexity that are placed upon such persons. In this then, it is best to call for a structured individualism thesis. One that recognises in a risk society, that whilst pathways are different and numerous, as empirical data (Roberts, 2003: 484) demonstrates they are still heavily influenced by the structures of society (Gayle et al, 2009: 26).Overall, the literature stresses the relevance of contextual factors that also highlights the important of individual agency (Steiner et al, 2021: 8).

The final concept is ‘late modernity’ entailing notions of risk and uncertainty in a society that provides individuals with more and more choice which promotes more and more risk.

Giddens coined the term ‘Late Modernity’ (Giddens *et al.*, 1991; Beck et al 1994). In the past more concrete certainties have given way to a more fluid and dynamic notion of adult identity and its development (Bynner, 1998: 31). These past certainties gave rise to stability; this current dynamicism gives rise to risk (Beck, 2014). This late modernity is characterised primarily by drastic social and economic transitions that enhance the overall uncertainty of adolescents within their occupational positions (Blustein, 1997: 6). There is debate over just how fluid certainty and choice has become, Gayle et al (2009) provides a more updated version of events that appears to review the late modernity outlook.

How individuals deal with risk and uncertainty is key to understanding the choices that they inevitably have to make. A key theory that is engaged with a great deal is a theory of rational action. In transition literature a sub-division of rational action is relative risk aversion theory (Holm and Jæger, 2008: 199). The theory of relative risk aversion (RRA) suggests that educational decision making is primarily motivated by an individual’s desire to be upwardly socially mobile but primarily to avoid downward social mobility (Van de Werfhorst and Andersen, 2005: 321; Holm and Jæger, 2008: 199). The theory that individuals of the same cognitive ability but different social class backgrounds gain differing levels of utility from the same educational choice (Holm and Jæger, 2008: 201) offers an explanation on the role of secondary effects (the persistence of social class on education over and above its influence upon cognitive ability).

## Historical Context

### The UK Educational System in Context

This thesis covers a time starting in 1956 until the 2000s. One of the core aspects of this thesis is an analysis on educational attainment and its subsequent influence on Labour market outcomes on young people’s transitions into adulthood. The education system of the UK has changed dramatically since 1956; mandatory schooling extended, the end of the tripartite system and the birth of comprehensivisation. The following gives context to these changes, and maps out how and who would be impacted by them. A child born in 1956 would have a very different interaction with the education system compared to one born in 1970.

The largest widescale reform in relation to the UK Education system since the suggestion of the Hadow (*Hadow Report*, 1929) to raise the mandatory school leaving age to 15 was the 1944 Education Act[[3]](#footnote-3). The 1944 Act saw sweeping reform to the UK Education system, pushing for comprehensive schooling and to raise the mandatory minimum school leaving age to 16. Prior to the 1944 Act and a turn towards comprehensivisation the UK was primarily focused upon a tripartite system (*Spens Report*, 1938) of modern, grammar, and technical schools. Whilst there was some pushback towards further egalitarian – most notably from the likes of T.S. Eliot ‘’In our headlong rush to educate everybody… we are lowering our standards, and more and more abandoning the study of those subjects by which the essentials of our culture… are transmitted; destroying our ancient edifices to make ready the ground upon which the barbarian nomads of the future will encamp in the mechanised caravans’’ (Jones, 2016).

Comprehensive schooling was not a system that was implemented simultaneously UK-wide. This is in part due to the decentralised philosophy that the English education system adopted in the mid-20th century (ibid.), as well as the differing times of implementation within the devolved administrations of the UK. Those individuals within Local Education Authority control (LEA) constitute members of the tripartite system of Education implemented under the Education Acts. This state funded Education constitutes three types of schools: Technical, Grammars, and Secondary Moderns. Grammar schools were considered places for the most academically able and had sixth form colleges typically attached so education support ranged from 11-18 years of age. Secondary moderns and technical schools provided a less academically rigorous curriculum and were generally where students went when they did not pass their 11+ and go on to grammar school. An important distinction of Secondary moderns is that they only covered education for students to the mandatory minimum age of 15 up until 1973, then 16 afterwards. Because of these tripartite division, much of the student population was divided at age 11 (Galindo-Rueda and Vignoles, 2004) which prompts deviations in educational attainment and further transitions down the life course

The 1950s according to Hobsbawn was ‘capitalisms golden age’ (ibid). The view that education was directly linked to the economic and social growth of society began to engrain itself within the social norms of British society – Prime Minister Callaghan’s Ruskin College speech is a demonstration of these values. It was under Callaghan that the notion of economising education became rooted within policy. Between the years of 1951 to 1975 spending on education rose from 6.5 per cent to 12.5 per cent of public expenditure. In other words, 3 per cent to 6.2 per cent of GDP (ibid).

Whilst education was becoming more open for all in Britain the outcomes for students was remaining unsatisfactory for a society with a changing occupational structure that demanded increased credentials for workers (ibid). In 1961 73 per cent of students from England and Wales left without ever having attempted a public examination – 90 per cent of Scottish students left education without any qualifications. This lack of outcomes caused some like A.J.P Taylor to take aim at secondar moderns in particular ‘’run away to sea rather than go to secondary modern’’ (ibid).

The Labour promise in 1964 that they would provide a ‘’grammar school education for all’’ (ibid) presented a desire to keep existing educational structures in place – like the grammar school – and provide that level of education to a universal audience of school children. This promise for grammar education for all was given in the same year that the Commonwealth Immigrant Advisory Council in 1964 stated that the proportion of migrant children at a school was not allowed to rise above 30 per cent – with an insistence that a national system cannot be expected to promote different values of different groups. The grammar education for all thus came with an asterix. This assimilationist practice was slowly coming to an end with the likes of the 1966 Local Government Act however. This Act gave resources to schools with large ethnic minority pupils. The Swann Report (*Swann Report*, 1985) abandoned assimilation in favour of integration (though vocal dissenters still existed such as Enoch Powell and his infamous 1968 speeches they were firmly a political minority).

The push towards inclusive education continued along ethnic and gender lines with the establishment of the Sex Discrimination Act in 1975 and the Bullock Report of the same year that sought to protect the rights women and girls in education and protect the rights of those with minority languages and cultures in the education system.

With increasing levels of education spending – in 1975 education spending was three times higher than in 1948 (ibid) – the process of doing away with tripartite education and replacing it with comprehensive schooling was well under way. In 1965, 92 per cent of students were in schools along tripartite lines. In, 1976, comprehensive schools accounted for 76 per cent of the secondary school population. This boom in spending however was relatively short lived, the 1966 sterling crisis, the 1973 recession, and subsequent economic slump saw a reduction of education spending – from 6.7 per cent in 1975 to 4.7 per cent in 1987.

Educational reform in the mid-1960s came in part with the introduction of the Certificate of Secondary Education (CSE) – an examination below GCE level. This reform once again however, displayed the regionalism embroiled in UK education. Northern Ireland for example did not receive the CSE until 1973, eight years after England and Wales.

The reign of Conservatism under Thatcher saw education spending never rise above 5.3 per cent of GDP during her tenure. During this time the OECD echoed much of Callaghan’s Ruskin speech by arguing that education’s major role should be on ‘’updating skills and competencies of individual workers’’ (ibid). In part due to the collapse of the manufacturing industry and the destruction of the youth labour market, more young people were turning to education instead of unemployment. The number of 17-year-olds attending school full time was 24 per cent in 1979 but rose to 60 per cent in 1994 (ibid) and by the end of 1990 20 per cent of people were in higher education compared to 12 per cent in the 1970s (ibid).

1988 saw the largest widescale reform of education since 1944. The Education Reform Act established the national curriculum and the establishment of the General Certificate of Secondary Education (GCSE) and removed the separate two-tier exam system at 16.

Whilst the broadening of education greatly increased participation and achievement for women and girls. The proportion of women entrants in higher education rose from 30 per cent in 1970 to more than 50 per cent in 1998 (ibid) - others such as ethnic minority students were being failed by the system (*Rampton Report*, 1981), with other reports detailing ‘unintentional’ racism as being widespread (*Swann Report*, 1985).

The Education system in the UK has thus faced several reforms. These have important implications for any cohort being studied and compared over this time frame. The changing structure of schooling under tripartite and comprehensive lines as well as the influences on education spending and policies and acts to promote diversity and inclusion are important to remember when modelling the impacts of attainment on future outcomes.

### The UK Labour Market in Context

The UK labour market went through a radical set of changes from the end of World War two to the present day. The decline of manufacturing, collapse of the youth labour market, and increasing levels of technological change and globalisation have all impacted youth transitions at different times and places. The following section seeks to detail important changes in the UK labour market and how that has impacted transitions to adulthood.

(Detail major recessions, decline in industry and GDP, collapse of youth labour market etc (below this, I want to cover some relevant literature on the labour market from 1960s to present day to ‘set the scene’)

### Destinations after mandatory schooling in context

## Empirical Literature

### Current Literature on the UK Education System

Educational attainment and qualifications are a strong determinant of later life chances; income, occupation, and opportunities (Goodman et al, 2011: 1). For this reason, the study of educational attainment forms a key aspect of youth transitions and as demonstrated by Goodman et al (2011), impacts life chances. The following section seeks to expand upon the literature of educational attainment.

The literature on educational attainment focuses primarily upon a social class dimension of a ‘wastage of talent’ for those from working class backgrounds not being able to fulfil their full potential due to their given social class even when controlling for cognitive ability (Bukodi *et al.*, 2014: 34). The socio-economic gap in higher educational attainment is in part explained by previous attainment at 16 (Croll and Attwood, 2013: 187), the same is true for attainment at 11 explaining attainment at 16 (Chowdry et al, 2010: 59). Large social class divisions in cognitive ability can be observed when children are still at primary school (Connelly and Gayle, 2019: 1) and ‘bottom sets’ in English classrooms are dominated by working class children compared to ‘upper sets’ dominated by the middle class (Goodman and Burton, 2012: 502) this pattern of attainment affecting attainment is not surprising. These social class divisions persist at all levels of educational attainment – whilst 62 per cent of students in Erikson et al’s (2005: 9731) study continue to A-level work, only 40 per cent of working-class students do so compared with 77 per cent of those from a salariat background (ibid).

Contemporary evidence suggests that both social class and ethnicity exert a far greater influence on GCSE performance than gender does (Connolly, 2006: 3; Sullivan, 2011: 234). To expand on this, whilst empirical research has found consistent levels of statistical significance of the impact that gender has upon educational attainment the substantive significance is normally fairly small (Connolly, 2006: 14), especially in comparison to the substantive effects of social class and ethnicity. Indeed, focusing upon ethnicity in particular, there are significant differences in attainment when comparing ethnic minorities and white British children even after for controlling for social class (Sutherland *et al.*, 2015: 9), the Joseph Rowntree Foundation for example has found that white British students make up more than three-quarters of low achievers and do worse than children from similar economic backgrounds that happen to be ethnic minorities (Stones, 2016: 173).

The majority of literature surrounding educational attainment uses GCSE attainment data – whilst GCSE results are not a formal basis for offers of higher education places, they have been proven to be an important predictor of further attainment and inform the higher education process (Croll and Attwood, 2013: 196).

Noden and West (2009) have stated that attending a ‘deprived’ school can impair educational attainment. A comparison of the least deprived 10 per cent and most deprived 10 per cent of schools find that high achieving children performed better at GCSE at the former compared to the latter by half a grade (Goodman and Burton, 2012: 510). The concept of ‘deprived’ schools is made worse by allocation of places of pupils into schools. There exists a ‘clustering of poverty’ within particular schools (Gorard and Siddiqui, 2019: 2). This segregation by social class is harmful to students and promotes worse opportunities for the most disadvantaged and has a knock-on effect of lowered aspirations and lower participation rates in later education (Hamnett et al, 2007: 1278; Gorard and Siddiqui, 2019: 2). Solely focusing upon the social background will not appropriately explain matters of educational attainment – school compositional effects have a considerable impact on school performance (Hamnett, Ramsden and Butler, 2007: 1255). Whilst individual level factors such as parental socioeconomic position (Playford and Gayle, 2016: 22) and aspirations are important in understanding school GCSE attainment, school compositional factors also need to be considered.

The UK Higher Education system has expanded from student numbers of 400,000 in the 1960s to 2,000,000 in the year 2000 (Blanden and Machin, 2004: 1). This expansion has not been equally distributed across social classes and attainment at higher education institutions has a socioeconomic gradient. Though this is more pronounced in contemporary cohorts compared to those in the 1960s (Blanden and Machin, 2004: 2).

Women have historically been under-represented in Higher-Education, though in 1992 the participation rates in England had caught up with those of men (Broecke and Hamed, 2008: 1). In a contemporary context, girls are more likely to be entered for A-levels, pass them, and do better than boys though this has not always been the case (ibid). The historical early transitions to domestic work that women faced set these individuals onto trajectories with little to no educational qualifications or vocational training which set them onto paths of lower socioeconomic attainment and a reliance upon marriage (Xue *et al.*, 2020).

Those students with high aspirations and expectations have higher school achievement than those with low aspirations and expectations (Baker *et al.*, 2014: 527; Khattab, 2015: 731). However, this is not the full picture, those from working class backgrounds may hold higher aspirations than what the labour market can support (St. Clair et al, 2013). Those children that have parents with higher aspirations for their children will typically have better outcomes (Gutman et al 2008: 6). On top of this, girls in comparison to boys, and ethnic minorities in comparison to white individuals will typically have higher aspirations (ibid).

Aspirations, and especially raising such aspirations cannot be the only aspect of education to look at when reflecting on how to enhance educational attainment and mobility. Indeed, this goes against the view of the 2010 White Paper on the importance of teaching that states ‘in far too many communities there is a deeply embedded culture of low aspiration that is strongly tied to long-term unemployment’ (Baker *et al.*, 2014: 526). Whilst aspirations are an important part in understanding educational attainment as a motivational resource, the systems of disadvantage that in part produce themselves in educational resources is highly stratified, as such, systems of inequality such as a privileged family social position must be taken into account alongside discussions of aspiration and family motivation (McCulloch, 2017). Aspirations are important to consider when examining school performance and educational attainment (Khattab, 2015: 745), though the causal ordering is not concretely defined (Berrington et al, 2016: 731), aspirations can be a predictor of educational achievement or an outcome of it (Baker *et al.*, 2014: 527).

Social class is significantly linked to occupational aspirations via educational attainment (Furlong and Biggart, 1999: 22; Winterton and Irwin, 2012: 858). The aspirations that certain individuals possess are stratified by gender (Furlong and Biggart, 1999: 15), these ideas concerning the suitability of occupations is formed at the early life stage – emphasising the importance of life course based approaches.

Aspirations of the parental guardians also impacts individual attainment, with a review finding evidence of an association between child’s aspirations and attainment as well as parental aspirations and child attainment (Gorard, 2012: 7). Other literature concurs (Hoskins and Barker, 2017: 2) but also emphasises the role that the state has in the potential mismatch of individual aspiration and eventual realisation of those aspirations. The government may desire individuals to aspire towards certain labour market or occupational roles that those individuals due to their own aspirations or influences from family units may not wish to enter – hence a mismatch (ibid).

Traditional social theory in this area is dominated by Bourdieu’s assessment that ‘the laws of the academic market-place determine aspirations by determining the extent to which they can be satisfied’ (Baker *et al.*, 2014: 528). The notion that there is a strong connection between aspirations and social background is embedded in a Bourdieusiananalysis of education. Rational choice inspired theories (like RRA theory) instead argue that aspirations are tied to rational assessments of current circumstances, whilst this does have some support (Biggart and Furlong, 1996: 253), there is data to suggest that aspirations regularly run ahead of the chances of them being realised (St. Clair et al, 2013; Baker *et al.*, 2014: 528; Macleod, 2018).

### Current Literature on the UK Labour Market

Young people entering the labour market for the first time no longer share common transition experiences with their peers (Goodwin and O’Connor, 2005). Changes within the transition processes are normally cited via labour market transformations, changes in youth unemployment, and the emergence of government schemes such as the youth training schemes (Goodwin and O’Connor, 2005; Winterton and Irwin, 2012: 859).

The earlier transitions of the 1950s and 1960s have in comparison to contemporary transitions been described by Vickerstaff (2003) as ‘single step’ transitions. A single step transition from school to the world of work was made possible due to the argued buoyancy of the labour market at that time (Goodwin and O’Connor, 2005: 14). The fact that following the second world war the vast majority of young people in the UK left education as soon as possible (Gayle et al, 2009) meant that so long as the labour market could support such transitions then young people would be certain to find work in a ‘single step’ fashion. The virtual collapse of the youth labour market in the early 1980s (ibid) changed the nature of the labour market, and thus changed the nature of the ‘single step’ transition. Indeed, support for this claim can be found in Lindley (1996: 24), whereby the high youth unemployment and underemployment in the 1980s is attributed less to school preparation and more on economic factors such as the labour market and the economic environment.

The 1990s whilst experiencing economic recession, had less of a catastrophic effect upon the youth labour market than what was experienced in the 1980s. In 1988 the Education Reform Act is oft held as one of the most important pieces of post-war education legislation (Gayle et al, 2009: 2) the structural and economic conditions that transformed and heavily impacted the 1980s environment were softened somewhat in the 1990s. Arguably new strains are now placed upon the labour market post 1988 due to the elongation of mandatory schooling and the school-to-work transitions, these new strains will be reflected upon and compared to past decades of youth transitions within the doctoral thesis. Important to point out however, is that whilst the labour market has indeed differentiated and faced major transformations, empirical evidence suggests that at least between the period of the 1970s to 1990s, there has been a considerable level of continuity in the pathways in which young people enter the labour market (Schoon *et al.*, 2001: 4). Though as stated earlier the later born cohorts of this time frame do experience more fluid transitions than their predecessors – unemployment being the most obvious side effect of this fluidity (ibid).

It has been suggested that young people’s decision to remain in education rather than entering the labour market straight after mandatory schooling is completed can be accounted for by the types of opportunities within local labour markets (Biggart and Furlong, 1996: 253). This is somewhat supported by the identification of the ‘discouraged worker’ – where labour markets see above average rates of unemployment it discourages young people from leaving school at the minimum age (ibid).

Given the time frame of the late 1980s to 1990s one of the most dramatic changes in the labour market is the decline of manual labour and heavy industries. Oof which labour was supplied almost entirely by the working classes. Due to these labour market changes, the 1990s in particular demonstrated a need for the working classes to adapt to education, and labour in differing ways (ibid) as the verification of ‘working class identity’ through ‘factory floor cultures’ was no more (ibid).

Overall, the labour market has transformed dramatically – a once sizeable market for unskilled labour has shrunk to an estimated half a million unskilled jobs (Goodman and Burton, 2012: 505). This change impacts upon people’s choices post-mandatory schooling, and also affects unemployment, first jobs and employment, as well as stability within the markets individuals have chosen to enter – all aspects worthy of analysis.

During the past higher education and in particular training prior to entering the work force provided a near certain chance of employment after successful completion. In comparison to contemporary generations, there is a larger association with repeated experiences of unemployment (Schoon *et al.*, 2001: 8). This has formed part of the explanation as to why individuals choose to stay in education to acquire credentials – as a substitute for unemployment (Cregan, 2001: 126).

Participation during mandatory schooling years can also have an effect on those not in education, employment, or training (NEET) status post-mandatory education. School exclusion for example increases the risk of becoming NEET at age 19/20, remaining economically inactive at 25/26, and experiencing higher unemployment risks (Madia *et al.*, 2022).

The changing nature of the youth labour market has had pronounced effects upon unemployment, non-employment, and NEET status for young individuals leaving schooling and entering the world of work for the first time. Since 1986 the non-employment rate of 16–25-year-olds hasn’t been lower than 15.1 per cent (in 2008). In 2010 it reached 20.5 per cent (Duckworth and Schoon, 2012: 39). Non-employment Is not a temporally static disadvantage for an individual, there is a significant wage penalty even after controlling for other factors such as education, there is a large wage gap at 23 for those individuals that have experienced 5+ months of unemployment compared to those with none or little youth unemployment (Gregg and Tominey, 2005: 494) – even 20 years later a wage scar of around 9-11 per cent persists (Gregg and Tominey, 2005: 506).

There is a gendered aspect to the non-employment rate – at least since the 1980s. Whilst the non-employment rate for men has risen slightly since the 1980s (Jones et al, 2003: 293) the non-employment rate for women has decreased to such a degree that it has actually increased the overall total share in employment for women (ibid).

When speaking to NEET status in particular, the literature suggests a socio-economic gradient. Those from the most precarious socioeconomic backgrounds are more likely to end up in prolonged NEET status, and those that stay in education, gain resources to avoid such a status come from traditionally advantaged backgrounds (Duckworth and Schoon, 2012: 47).

Ralston et al (2016: 203) provides evidence for an occupational scarring effect for those that attain NEET status. NEET status has negative effects on the occupational positions of individuals over the life course. Indeed, Ralston et al (ibid) suggest that NEET status actually has a widening level of negative consequences over that life course. In other words NEET status prompts an incremental disadvantage.

### Current Literature on Destinations after Mandatory Schooling

There are four main pathways that an individual may transition into after mandatory schooling is complete: they may continue their education in a traditional context, moving on into higher education, they may continue their education in a vocational context, they may go straight into employment and the world of work, or they may have a period of unemployment or NEET status (not in education or employed). The following section will reflect on literature within each of these pathway destinations.

Anders (2017: 381) has identified that a greater proportion of English 14-year olds expected to apply to university than ultimately make that decision to apply by age 21 – there is a continuing ‘falling off’ from age 14 onwards. University attendance has a large socioeconomic gradient (ibid), some of this gap is explained by prior educational attainment (Chowdry *et al.*, 2013), though a socio-economic gradient remains which is argued to have existed far before attendance at higher education institutions (ibid).

The intention to stay on within higher education is rather stable comparative to decisions to leave education (Croll, 2009: 400). Girls and those from more privileged socio-economic backgrounds are more likely to attain better grades and thus more likely to stay on within higher education after mandatory schooling (ibid). Even in a contemporary context, children from all socioeconomic backgrounds are more likely to stay on within higher education compared to the past but those from poorer backgrounds are still entering higher education as a less rapid rate compared to those from more well-off backgrounds (Galindo-Rueda et al, 2004: 3) (Galindo-Rueda et al 2004: 3)

A key theme of the research thus far is that the destination of higher education is one that is impacted heavily prior to university attendance. The impact from social class is evident throughout a child’s life – research has focused upon prior educational attainment (Croll, 2009; Winterton and Irwin, 2012; Chowdry *et al.*, 2013; Anders, 2017).

To give a temporal aspect to this discussion th, Payne states that between the late 1980s and mid 1990s they concur with similar findings that rates in full-time education grew rapidly (Payne et al 2001: 8). Not only that, but during this timeframe the growth in higher education rates was matched by falls in the proportion of young people who went into full time jobs (ibid).

By 1948 the proportion of 18-year-olds entering higher education was only 3.7 per cent of the population (Reay *et al.*, 2001: 5). The social class differences were very pronounced at the start of the 20th century. During the period of 1928 to 1947 8.9 per cent of boys from non-manual backgrounds attended university in comparison to 1.4 per cent of boys from manual ones (Glass, 1954). Whilst there has been a massive increase in university attendance in general, as well as within a social class dimension, as previous research suggests, a class dimension remains. This PhD thus agrees with (Reay *et al.*, 2001: 20) assessment that ‘the history of education is Britain if one overshadowed by class inequalities’.

Vocational training is not to be overlooked. Whilst the past is oft seen as engaging in smooth ‘single step’ (Vickerstaff, 2003) transitions, the apprenticeship model of transitions from school-to-work were substantively significant at the time. Vickerstaff (ibid) indicates that around 35 per cent of the male school-leaving age cohort during the ‘golden age’ (ibid) entered into apprenticeship like schemes. Not only do apprenticeship schemes present a different form of transition from higher education, but they also present a prolonged transition in their own sense. Increased levels of training prolong that initial step into a first job/career. Comparing the two, the wage premium gained from staying in education and gaining academic qualifications is typically higher than that gained from vocational qualifications, though this gap is reduced when the length of time taken to acquire these qualifications is taken into consideration (Dearden *et al.*, 2002: 249).

## Research Questions

The main aim of this thesis is to understand the nature of youth transitions within and between cohorts and how those transitions have changed over time reflecting upon the impact of social stratification, all the while employing a life course perspective to analysis. The project will thus focus on the following research questions:

1. What are the patterns of social inequality in youth transitions (e.g. within cohorts)?
2. How have patterns and trends in youth transitions changed over time (i.e. between cohorts)?
3. How have the social processes that underpin youth transitions changed over time?
4. How can youth transitions be more comprehensively understood within a life course perspective?

## Overview of Cohorts

This PhD uses the National Child Development Study (University of London 2020a; 2020b), the British Cohort Study (Bynner 2021; University of London 2021), and the British Household Panel Survey and Understanding Society (University of Essex 2022) to accomplish its aims of researching youth in transition within a UK context.

The British Cohort Study (1970) began when the children of the National Child Development Study (1958) were entering secondary school and moving into the youth phase. The BCS collects data on a ‘younger generation’ and is therefore a suitable data source for comparative analysis with the NCDS. The Millennium Cohort Study (MCS) began in 2000-02 and the most recent sweep of data was collected when the MCS members were age 17. Participants in the MCS are currently too young for comprehensive analyses of their transitions. The MCS is not suitable for this study which seeks to locate youth transitions within a life course perspective.

The absence of data on youth transitions from the 1990s onwards presents a major data obstacle. This project will overcome this obstacle by using data on young people collected within the British Household Panel Survey (1991-2009) and Understanding Society (2009 -). The British Household Panel Survey and Understanding Society include both prospectively and retrospectively collected measures, both of which will be utilized to construct synthetic cohorts of youth data that substitute the missing birth cohorts. The participants in the BHPS are also subsumed into Understanding Society which therefore provides a series of data that extends further into the adult phase of the life course.

Each of these datasets has a breadth of information on a range of topics not relevant to the purposes of this research. Unfortunately, particularly in relation to the older two datasets, a clear and concise codebook is not available. Each dataset comes with what are termed ‘data dictionary’s’ that provide information on the variables, labels, and position within the dataset (among other things). Also made available are the original scanned pdf documents of the questionnaires used for the sweeps required for analysis. Combining these two important documents and for the sake open science practices (clarity above all else) I have constructed my own codebooks[[4]](#footnote-4) of each of the dataset sweeps intended to be used for analysis within the doctoral project. The purpose of this is to produce a uniform codebook style for all datasets being used in the project and to combine some essential elements of the documents provided into one cohesive whole. The matching of variables to their full questions asked within the questionnaire. This enables an easier recognition of the utility of certain variables. The aim of this research is to make comparisons over time using different datasets. A key challenge in this comparison will be finding comparable variables to use over time – the production of data dictionary codebooks is to aid in that variable selection. What would be an attractive variable in one dataset may not exist in another, making the whole point of a comparable exercise rather pointless.

On extensive inspection and cross-referencing between data dictionaries and pdf questionnaires number of inconsistencies (particularly amongst the older datasets) has been found. Common clerical errors have been found in the data dictionaries - variables misnamed, type of data mislabelled etc. This could have potentially impacted variable selection and further analysis had these inconsistencies not been identified and rectified in my own codebooks.

## Panel and Cohort Surveys

### National Childhood Development Survey

The National Child Development Study (NCDS) was the second major nationally representative birth cohort study in the UK. It followed 17,415 participants all born within the same week in 1958 (Power and Elliott, 2006). For this PhD the sweeps up to age 23 are selected for intended use. The NCDS coming off the back of the first birth cohort (and its first few sweeps) mainly focused upon health-related outcomes- though as the children grew older, and eventually into adults more and more data was collected on other outcomes which are inclusive to the aims of this doctoral project- primarily educational and occupational outcomes.

Post-hoc the NCDS has been harmonised on many fronts with the British Cohort Study - the third major birth cohort study in the UK - particularly along socio-economic class harmonisation. This harmonisation has allowed for comparisons between datasets to be made easier by harmonising the occupational codes of the NCDS and BCS datasets.

The overarching theme of this doctoral project will be locating key youth transitions in the more comprehensive context of the life course (Elder, 1994). The work will seek to understand historical changes in the youth transitions through detailed comparative cohort analyses. The older birth cohort studies chosen for analysis, i.e. the National Child Development Study (1958) and the British Cohort Study (1970) support comparative analyses precisely because of such work leading to social class harmonisation. Primarily the datasets chosen to answer the research questions stated above will be required to have a certain level of data on educational attainment and economic activity. The extensive nature of the NCDS allows for a great variety of variables on this matter (Dearden *et al.*, 2002: 262), in particular the cohort surveyed at age 23 offers a full post-mandatory school history (Blanden and Machin, 2004: 9).

A primary reason for using the NCDS as the first dataset for analysis is that the school leaving age was raised to 16 years old in 1973 (Power and Elliott, 2006: 34), making the cohort members of the NCDS part of the first-year group to stay in school for this period of time and makes school leaving age a constant across all three proposed datasets.

### British Cohort Survey

The British Cohort Study (BCS) was the third major nationally representative cohort study within the UK. Starting in 1970 it followed 17,000 participants born within the same week (Elliott and Shepard 2006: 837). The cohort had repeated contact with participants from 1970 to 2021. For this reserach the 16, 26, and 30 sweeps are selected for intended use (though earlier sweeps may be used for explanatory variable selection). A full and detailed educational background history was taken for participants at age 30 in the BCS which is the rationalisation for including it within the analysis. The sample at age 26 and after, faces significant sample attrition and is primarily attributed to individuals moving and not being able to be traced (ibid).

The BCS unlike the NCDS was not primarily created with health outcomes in mind and so has a breadth of information on a range of social, economic, political, and educational matters in relation to the individual.

In contrast to the NCDS the BCS does not collect full details on employment and post-mandatory schooling for its sample until they reach age 30 – there is a survey conducted at age 26 but it is somewhat unsatisfactory for any rigour level of education or employment analysis (Blanden and Machin 2004: 9).

### British Household Panel Survey and UK Household Panel Survey

The British Household Panel Survey (BHPS) and Understanding Society (UKHLS) were two datasets, the BHPS was subsumed into the UKHLS by design. Those individuals subsumed into the UKHLS did so in the 2010-11 period. The BHPS originated with the study of 5,500 British households and contained 10,300 individuals (Murray, 2011: 75).

The BHPS produces information on educational background, recent educational attainment, and employment records (Murray 2011: 85). In terms of educational background, the BHPS records all qualifications obtained including at school, higher education and vocational qualifications (Jenkins and Sabates, 2007).

Both the BHPS and UKHLS are household panel surveys meaning that unlike the NCDS and BCS respondents were not recruited from birth within a certain week. To compare and contrast the three datasets over time synthetic cohorts will be created.

Within BHPS individuals are born between 1904 and 1985. Whilst it would at first seem best to take these birth years as individual cohorts, this would cause problems, biggest of which being taking a yearly approach would leave for an underwhelming sample size per year – in saying this, the work of Murray (2011) has demonstrated using the BHPS that yearly cohorts are sufficient for data analysis of educational data.

The construction of synthetic cohorts withing the BHPS will be achieved by splitting the BHPS waves or years of interview into school years – in other words pooling peoples of similar ages into a cut off point for when the school year starts in September (Murray 2011: 91). This in essence creates ‘synthetic’ cohorts for data analysis. By constructing synthetic cohorts in this way, the data will need to be limited to England and Wales as Scotland has different school years and age cut-off points for pupils (Murray 2011: 101).

Reflecting on Murray’s sample size of synthetic cohorts ranging from 1991-1999 the sizes range from a low of 97 in 1991 to a high of 146 in 1996- a table that presents this sample size can be found in appendix two of Murray (2011)**.** Thus, this research proposes to emulate Murray’s approach. The sample size is satisfactory for data analysis- including comparison with other datasets (Murray 2011). By maintaining a yearly cohort from 1991-1999 it also allows for a more fine-grained analysis of the time period.

## Structure of Thesis

This thesis is split into five consecutive chapters. The first deals with the National Childhood Development Survey and focuses upon a historical analysis of the first transition from school-to-work following the end of mandatory schooling at age 16. This analysis seeks to update previous work in the area of youth transitions by taking note of missing data – something which earlier studies either failed to do or couldn’t do because of lack of statistical techniques such as multiple imputation being unavailable at the time. This chapter also builds upon a sensitivity analysis of social class, seeking to compare social class measures over time to see if there is a relevant temporal element to social class construction that substantively impacts interpretations of subsequent models. Chapter two does the same but with the British Cohort Survey. Chapter three does the same but with the UKHLS… Chapter four is a comparative chapter that takes all available evidence thus far from each chapter cohort and contrasts them. This is also where substantive discussion of sensitivity analysis will take place. Finally, chapter five is a conclusion chapter.

# Chapter One: The National Childhood Development Survey: Youth Transitions in Education and Employment

## Introduction to Chapter One

The overarching concern that motivates this thesis is the theoretical understanding of historical changes in young people’s lives. To accomplish this, advanced and detailed understandings of youth transitions must be conducted. The first part of this thesis seeks to explore these youth transitions within the timeframe of the NCDS – from 1958 to 1981 – to establish patterns of social inequality within this cohort as well as to establish a comparative base for other cohorts to understand the changing nature of social processes that underpin youth transitions within the life course.

At the time of the NCDS cohort, young people were expected to be in full time education until the age of 16. At this age, individuals were typically expected to sit some form of examination. Most common for this time was the O-level or Ordinary level. After this period of examination and the end of mandatory schooling individuals are open to a level of choice in what and where they wish to take their lives next. Some choose to stay within education and attend a sixth-form college and go on to a university, others went straight into full-time employment, others went to training, and some experienced forms of unemployment.

Firstly, there is an examination of the pathway decision at the end of mandatory schooling. It provides detail into the temporal context that the NCDS cohort faced and provides a level of descriptive detail into the level of educational attainment that these individuals achieved prior to transitioning out of their mandatory schooling period.

Secondly, there is an examination of the role of parental socio-economic background in pathways after mandatory schooling using the NCDS. A key part of this section involves a sensitivity analysis of socio-economic background variables that include social class schema and social stratification scales. Sensitivity analysis is employed to check the robustness of results against alternative measures.

Finally, there is an investigation of the role of missing data. This involves the use of various statistical tools such as multiple imputation to understand if the level of missingness in previous chapters has a marked impact upon the statistical results and overall conclusions.

## Literature Review: NCDS Timeframe and Context

The NCDS cohort existed in a time of changing educational systems and labour market influences. The NCDS cohort were the first in the country to experience the rise of mandatory schooling to 16. They were also some of the first to experience a UK economy that had a declining interest in manufacturing and a shift to the services sector. A cohort that experienced the passing of laws protecting the rights of ethnic minorities and women in education and the workplace amongst many other changes. The following literature details the given situation that individuals faced within the NCDS timeframe and provides context for further investigation in this thesis.

### Education and Vocation

In terms of apprenticeships and training, when the NCDS cohort were 16 years old 40 per cent of male employees were apprenticed compared with only 8 per cent of females. But by age 23 virtually all individuals had left their apprenticeships (Blanchflower and Lynch, 1992: 240). For those that completed an apprenticeship, earnings were 5 per cent higher in a model that also included a set of highest qualification dummy variables (Blanchflower and Lynch, 1992 :247). Within the NCDS cohort training is found to lead to full-time employment (Schoon *et al.*, 2001) a phenomena that has broken down post-NCDS.

(Brunello and Rocco, 2017 :106) explore the potential disparity between vocational versus academic education and find that there is evidence of a trade-off, but only for real wages and only for the group with lower vocational education. Accordingly, the initial advantage given by vocational education decreases with age and turns into a disadvantage for both the individual and the aggregate economy. Further studies (Dearden *et al.*, 2002) have suggested that the wage premia gap is reduced between academic and vocational qualifications when the amount of time taken to acquire these qualifications is taken into account.

Low levels of qualifications and educational attainment are related to higher propensities toward unemployment (Bynner and Parsons, 2000 :246). Those that are unemployed also appear to hold the lowest levels of employment commitment – this is something that has worsened from the NCDS cohort to later birth cohorts (ibid). Unemployment is found within the NCDS cohort to have a scarring effect on potential earnings (Gregg, 2001; Bynner, 2012; Schoon, 2020) – the youth labour market thus plays an important role in establishing adult future earnings (Gregg, 2001 :628). Data suggests that a scar from early unemployment can have an estimated 12-15 per cent damaging impact on income at age 42 (Gregg and Tominey, 2005 :2). Childhood psychological distress has been found to have a three per cent point increase in the likelihood to be unemployed between ages 16 and 23 compared to non-distressed peers (Egan et al 2015 :11). Studies (Mousteri, Daly and Delaney, 2020) have also pointed to the fact that those that experience underemployment also are significantly more likely to face psychological distress.

Using principal components analysis, (Galindo-Rueda and Vignoles, 2005 :340) a cognitive ability variable was constructed and found to have an important determinant of individuals final qualification level as well as having an increased probability of individuals moving away from unemployment after an individual’s first unemployment spell (Niepel, 2010). Comparatively, cognitive ability appears to have a reduced impact on individuals of later birth cohorts compared to the NCDS cohort (Galindo-Rueda and Vignoles, 2005 :347). Cognitive effects are found to have a ‘class effect’, children from occupational advantaged social classes perform better on general cognitive ability tests (Connelly and Gayle, 2019 :9); instability, and economic and social strains from disadvantaged social class groups are suggested as a possible explanation for this effect. Further studies do acknowledge the apparent mobility of cognitive ability withing social class groupings (Feinstein, 2022 :226). Whilst cognitive ability falls into Boudon’s ‘Primary effects’ category, studies using NCDS data have found that ‘Secondary effects’ (expressed via educational choices) also have a significant impact on attainment and outcomes (Jackson *et al.*, 2007 :223).

The structure of the British education system has always been one of hierarchical selection. The grammar school has been an enduring institution throughout the various reforms to the education system. Work by (Galindo-Rueda and Vignoles, 2005) suggests that when selection is interacted with cognitive ability, children in the top of the ability distribution attained better educational outcomes if they were in a selective school system (Galindo-Rueda and Vignoles, 2005 :28). The structure of the school that an individual attends and its subsequent ‘school effects’ have been found to be significant in the outcomes of individuals (Jones, 2010). Effects including the teacher/pupil ratio, the ratio of expelled pupils to the total number, and the type of school are important to recognise in the modelling of attainment.

Individuals that choose to stay on at school post-16 are a small minority, and is low by OECD standards (Micklewright, 1989 :25). Those individuals from manual backgrounds compared to their non-manual peers were less likely to stay on post-16 (Micklewright, 1989 :37), further research concurs, stating that young people from working class backgrounds were less likely than middle class peers to remain in education (Schoon, 2007). There is however an incongruence in the wants and aspirations of children from working class backgrounds – of whom only 10 per cent wished to continue to further education, compared to 39 per cent of their parents (Schoon and Bynner, 2003 :25). When looking at educational attainment (Holm and Jæger, 2011 :1) it is important to consider that family background appears to have a decreasing level of influence as individuals proceed through educational transitions (from secondary to higher education).

### Labour Market

The implementation of sequence analysis under the likes of (Anders and Dorsett, 2017 :75) has been used to establish patterns of transition amongst school leavers entering the labour market. They find that whilst under the NCDS cohort there was a strong (91 per cent) amount of people entering into the labour market straight away, this has fallen to 37 per cent in recent times.

As (Anders and Dorsett, 2017 :100) claim, young-peoples employment is more sensitive than older peoples, (Bell and Blanchflower, 2010 :1) concur with this assessment. They focus upon the susceptibility that young people face in terms of negative effects that spells of unemployment have upon initial experiences of worklessness.

It wasn’t until the 1980s that failing to get qualifications became a hindrance to getting work in Britain (Bynner, 2005 :377). The labour market pre-1980s was able to absorb people into large numbers of unskilled jobs (ibid). Evidence from (Bynner, 2005 :378) has found that people who experience a period of time NEET are significantly more likely to lead a NEET status going forward post-21 years old (Bynner 2005: 378).

The collapse of the youth labour market in the early 1980s was not a sudden affair. Contributing factors such as the demise of heavy industry, the collapse of community networks, and the technological transformation of modes of production were all forces that the 1958 cohort were facing during their biographical lifespan (Bynner, 2012: 40). Something that is documented in detail with employment histories on a monthly basis (Leuze, 2010 :86).

There are a variety of ways studies have attempted to measure labour market outcomes: income and life satisfaction being two prominent measures. Another developed in part by Bynner et al (2002 :7) is the measure of depression in reference to job satisfaction rates. In a comparative study, Bynner et al (2002) found that satisfaction scores for both men and women were higher in the BCS70 than in the NCDS, noting an increasing level of dissatisfaction with labour market experiences.

Due to structural changes within the British labour market that started during the NCDS birth cohort time frame, part-time work began to grow from the 1950s – though this was synonymous with low-paid jobs and the service industry. Due to this, individuals that primarily occupied such part-time positions were typically women (Dex *et al.*, 1998 :79). (Dex and Bukodi, 2012) demonstrate a linkage between a transition from full-time to part-time work and a process of downward social mobility that primarily impacts women in the workforce.

Historically, the NCDS birth cohort didn’t experience a straightforward school-to-work transition. Teenagers that were still in education typically engaged in what is known as the youth labour market. Most of this work was part-time during educational studies (Dustmann *et al.*, 1996 :80). It is estimated that children worked on average between six and nine hours a week and modal earnings in the range of £1-£2 a week (Dustmann *et al.*, 1996 :86).

The Labour market during the period of the NCDS timeframe had a plentiful amount of ‘middling’ jobs (García-Peñalosa et al 2022) – accordingly around 30 per cent of those starting in middling occupations experienced upward social mobility in their mid-20s, the collapse of this ‘middling’ occupational market in the following decades has had a polarisation impact for social mobility.

In a comparative analysis, (Leuze, 2007) NCDS data demonstrates that the loose linkages between higher education and the labour market make it less likely than countries like Germany for individuals to end up in the upper professional and service sector.

Using Optimal Matching Analysis, (Martin et al, 2008) evidence states that of the NCDS cohort 96 per cent of men could be grouped into six of the largest clusters compared to 90 per cent for the BCS suggesting an increase in distinct pathways. For the NCDS, the predominant pattern was to leave school post-16 and move directly to a job (Schoon, 2007 :98)

In another comparative study, (Cebulla and Tomaszewski, 2013 :147) demonstrated that young people within the NCDS birth cohort were more likely to achieve their life aspirations compared to later cohorts – 60 per cent of the NCDS generation achieved their job objectives by the time they turned 23 (compared to 39 per cent of the BCS70). In respect to the gendered nature of achieving life aspirations, within the NCDS birth cohort, women were more likely to achieve their aspirations than men (Cebulla and Tomaszewski, 2013 :148). Women also appear to have higher occupational aspirations compared to men at a young age (Schoon 2007; Schoon, 2022).

In a study of three British cohorts including the NCDS, (Bukodi et al 2017) found that relative rates of intergenerational social class mobility have remained virtually unchanged. The chances of mobility and immobility have been at an essentially constant level across the mid to late 20th century. Class backgrounds still remain significant even after controlling for existing educational attainment (Kuha, Bukodi and Goldthorpe, 2021 :2061). Maintaining the theme of social class effects, (Iannelli, 2013) data suggests that curriculum selection at secondary school has an impact on social class destination primarily for those individuals already in advantaged social classes due to their propensity to select high value labour market based subjects such as English, maths, and science.

Intergenerational mobility has been found to be correlated with sons and daughters labour market earnings and years of schooling (Dearden and Machin 1997 :47).

### Family

Work is not the only factor in transition literature- (Berrington and Diamond, 2000) study the nature of first-partnership formation using a risk hazards model. Those individuals born in 1958 who cohabited in their first partnership tended to be less religious, lived outside a family and were more likely to have experienced the separation of their parents. The changing nature of the labour market and gender dynamics in the internalised pressures for both men and women to join the occupational fold has seen a elongation of the negotiating of family formation events taking place (Holdsworth and Elliott, 2001 :3). Evidence from (Hope et al, 1999 :381) demonstrates that when family formation does take place in the form of cohabitation and marriage, those that are divorced experience significantly more amounts of psychological distress compared to single and married individuals.

Educational attainment is not a matter of short-term decision making, but long-term effects impacted in part by family characteristics and dynamics. (Chevalier and Lanot, 2001 :8) find that in accordance with other studies of its nature, pupils from poorer family backgrounds are less likely to invest in education[[5]](#footnote-5). One of the key issues with the NCDS cohort is that data related to income etc was collected in 1974 during the three day week (include info in footnotes), thus it is unclear whether real or adjusted earnings were reported (Chevalier and Lanot, 2001 :11). This gives pause for thought when conducting any analysis using this data, as it could potentially be noisy.

## Data and Methods

This section explores the NCDS cohort in a more detailed manner. Firstly, NCDS data is formally introduced, detailing sample size, attrition rates, missing data etc. Secondly, an introduction into the measures that will be used in subsequent modelling is provided. Descriptive statistics are given. Finally, there will be a discussion of the type of analysis methods and how that analysis will be presented.

### Introduction to the NCDS data

The NCDS cohort originated in 1958 (when participants were born) and continues to present day. For analysis in this thesis only data up until age 23 (wave 4) is considered. Table XXXX details the sample size of the NCDS. At birth in 1958 the total cohort consisted of an eligible sample of 17,638 with 17,415 participants. By 1974 at age 16, the total cohort had increased to 18,558. This is due to the original sample being supplemented by migrants born in 1958. The number of participants at age 16 had fallen to 14,654, or 91.6 per cent of the eligible sample. This is a reduction in real participants from birth wave of 2,761. Of this reduction, 873 people died and a further 799 emigrated leaving 1,089 missing for reasons other than death or emigration.

The sample size at age 23 is significantly smaller than that of the initial sample, this sample attrition is primarily determined to be caused by not being able to trace participants (there is also a relatively low refusal rate – 7.1 per cent at age 23) (Power and Elliott 2006: 35). An issue that comes with sample attrition for the NCDS is that the size of certain ethnic minority populations back when the sample was first collected were small, meaning that attrition makes analysis of ethnic minority populations extremely difficult (ibid). The nature of the level of missing data in the NCDS suggests that there is no support for the position that the data is missing completely at random (Hawkes and Plewis, 2006: 489; Silverwood *et al.*, 2021: 3).

**Table 1.1 Participation in the NCDS from birth to 23 years**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Total cohort | Dead | Emigrants | Eligible sample | Participants | (% of eligible sample) |
| Birth – 1958 | 17638 | 0 | 0 | 17638 | 17415 | 98.7 |
| Age 7 – 1965 | 18016a | 821 | 475 | 16720 | 15425 | 92.3 |
| Age 11 – 1969 | 18287a | 840 | 701 | 16746 | 15337 | 91.6 |
| Age 16 – 1974 | 18558a | 873 | 799 | 16886 | 14654 | 86.8 |
| Age 23 – 1981 | 18558 | 960 | 1196 | 16402 | 12357 | 75.3 |

a The original sample was supplemented by migrants born in 1958

### Missing Data

Missing data is an essential component of any longitudinal data analysis – the major concern being that missing data and non-response is bound to affect the inferences made by the analysis of longitudinal studies (Hawkes and Plewis, 2006: 479; Silverwood *et al.*, 2021). The various factors that account for sample attrition in the datasets outlined above has the potential to present real issues as it relates to comprehensive data analysis. For the purposes of analysis those that exit the sample due to death or emigration are considered ‘natural’ exists from the original sample. Those however that either cannot be found, reject continued participation etc are individuals that we hold partial data on – being able to utilise this partial data within my analysis could be beneficial.

When dealing with missing data there are multiple methods to tackle the problem. The first is listwise deletion. Listwise deletion removes all observations from the data which have a missing value in one or more of the variables included in analysis. This is also known as Complete Case Analysis (CCA). A second method that deals with missing data is the use of survey weights. Survey weights take into account missingness, Inverse Probability Weighting (IPW) creates weighted copies of complete cases so as to remove selection bias introduced by missing data. (Add more about why this has not been done). A third and final method involves Multiple Imputation (MI). This method substituted missing data with substituted values[[6]](#footnote-6). Subsequent analysis uses CCA and MI to compare the substantive conclusions between the two and to understand if missingness impacts interpretation.

When dealing with missing data there are three primary types of classification. The first is missing completely at random (MCAR), meaning that missingness does not depend on observed or unobserved values. The second, being missing at random (MAR), meaning that given observed values missingness does not depend on the unobserved ones. Finally, missing not at random (MNAR) meaning that missingness depends on unobserved values (Silverwood et al 2021: 2). If data is found to be MAR then approaches like multiple imputation (MI), inverse probability weighting are made available – the former being extensively documented with the NCDS in particular in Hawkes and Plewis 2006).

When dealing with MI the subsequent question that naturally follows is how many imputations is sufficient? Silverwood et al (2021: 21) suggest that anything around 50 imputations would be sufficient for reliable estimation of point estimate and estimating p-values with little error. Though sometimes with large samples with sizeable missingness more imputations may be required.

### Missing Data in the NCDS

There are 12,450 individuals identified in the NCDS who indicated some form of economic activity. The previous chapter which conducted a complete records analysis has a sample of n=8,448. After using the variable related to the outcome of tracing and interview there are a total of 12,536 individuals within this sample[[7]](#footnote-7). There are 4,088 observations with missing data on at least one of the variables included for analysis. Of the 12,450 individuals: 86 were missing in economic activity, 26 in educational attainment, 1893 in housing tenure, 3779 on NS-SEC, 3,777 on CAMSIS, and 3,779 on RGSC. Sex has no missing data as it was recorded at wave 0 (so all individuals were included).

Patterns of missing data are presented in table 4.1. Within the NCDS sample, 67 per cent have complete records on all variables, 17 per cent are missing values only on housing tenure, a further 13 per cent missing on socio-economic measures, and 2 per cent missing values for housing tenure and socio-economic measures. Further missingness in the sample not presented in the table are <1 per cent.

Table 1.2 Missing data patterns for NCDS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Percent Complete (%) | Educational Attainment | Economic Activity | Housing Tenure | CAMSIS | NS-SEC | RGSC |
| 67 | **✓** | **✓** | **✓** | **✓** | **✓** | **✓** |
| 17 | **✓** | **✓** | **✓** |  |  |  |
| 13 | **✓** | **✓** |  |  |  |  |
| 2 | **✓** | **✓** |  | **✓** | **✓** | **✓** |
| <1 | **✓** |  | **✓** | **✓** | **✓** | **✓** |

### Introduction to measures for subsequent analysis

#### Economic Activity

The main outcome variable of interest is the main economic activity of month 201. This variable comes from sweep 4 (Age 23) of the NCDS. The Economic Activity of everyone was recorded retrospectively by the participant at age 23 at each month from when they turned 16 to when they turned 23. Information for the following variable comes from the data dictionary part 1 within the UK data service package of sweep 4 of the NCDS. Each month is recorded as a diary that covers one possible main activity defined as ‘Jobs’, ‘Full-time Education’, ‘Unemployment’, ‘Out of the labour force’, and ‘Fill-in-time’[[8]](#footnote-8). The monthly diary of economic activity filled out by participants was coded by a coder, resulting in unique values that fall outside of the range of these original categories.

The original economic activity variable for month 201 has 28 unique values. 3 of these are collapsed into an unemployment category, 2 into an out of the labour force category, 1 into a full-time education post-school category2 into a full-time employment category, 2 into a part-time employment category, 1 into missing data, and the rest into a training/apprenticeship category. For this last category a dominance approach was taken- any variation of training/apprenticeship alongside employment, education etc was taken to be training/apprenticeship. The training/apprenticeship category contains apprenticeships, TOPS, LGSS, and DBR training courses. The NCDS codes main economic activity in a way that creates six categories: Full-time employment, part-time employment, Full-time education, Part-time education, Unemployment, Out of Labour Force. Main Economic Activity is determined based on if that activity is done 21 hours or more per week for Education (Full and Part-time), a full-time job of more than 30 hours, a part-time job of less than 30 hours, unemployed if respondent is actively searching for work, and out of the labour force if all else is not false.

Re-coding this variable was a necessity to get at the nuance of some of the economic activity data. For example, a lot of data was coded as full-time employment – including training schemes, apprenticeships, and TOPs schemes[[9]](#footnote-9).

Economic activity at month 201 was chosen to be the variable for subsequent analysis as it represents the month of September 1974. This month was selected over say the first month mandatory schooling ended (July 1974 month 196) because O-level results had not been released until August of that year, thus it makes more sense when looking at the influence of educational attainment on economic activity prospects to wait until said attainment could have a possible impact.

Re-coding this variable translates into seven categories: Employment, Post-Schooling Education, School, Training & Apprenticeship, and Unemployment & OLF. Employment was collapsed from part-time and full-time into a singular employment category due to the negligible sample size of part-time work. Post-school education refers to credit received for completion of courses not in a school environment but given by an accredited college, trade school, workshops etc. School is defined as anyone that after completion of mandatory schooling at age 16 decided to continue education at school for A-levels etc. Training & Apprenticeship is defined by any individual undertaking a training, work, or apprenticeship related scheme. Finally, Unemployment and OLF is a combined category of all unemployed and those out of the labour force. Unfortunately for sample size reasons these two categories had to be combined for statistical power though it is recognised that there is a qualitative distinction between these two categories that may impact the statistical power presented within the models. A full breakdown can be found in table 1.1.

#### Educational Attainment

When studying educational attainment at the point of mandatory schooling an internally valid and widely used measure is the standard binary measure of ‘achieved five or more GCSEs at grades A\*-C’ or not (Connelly et al 2016: 3). Whilst some have proposed a more qualitative measure – looking at specific subjects as well as raw grades attained, it is more common to either treat GCSE attainment in terms of a binary, or as a set of count data (ibid). Given the timeframe of the NCDS cohort, GCSEs didn’t exist. O-Levels would be the closest approximate to GCSEs during this time and thus a similar operationalisation of O-Levels will be undertaken.

Mandatory schooling ended for these individuals at 16 years of age. The examination taken at this age would have been the O-level examination. For an educational attainment measure, number of O-levels passed appears to be the best overall fit. This variable was constructed from two separate variables – the first was a simple binary variable of whether an individual had any O-levels, the second, on condition of the first then asks how many O-levels that person had passed. Combining these two variables together produces a single count variable that includes the number of zeros. This attainment variable was then further recoded into a binary variable of less than five O-levels and greater than five O-levels. This was done for two reasons. The first is that within educational research, typically this binary approach is used with GCSEs so it may be useful to replicate here for O-levels. The second, more important reason for recoding is one of practicality. Keeping O-levels as a count variable means that the n is too low for some sub-categories when moving on to modelling.

#### Sex

Sex is a variable derived from sweep 0. It’s inclusion for analysis is because during the timeframe of the NCDS, gender dynamics played an important role in economic activity. The evolution of part-time work, the differences in populations out of the labour force, and those choosing to go on to higher education are all influenced by sex according to previous literature (Jones, 1986; Gayle et al, 2009; Duckworth and Schoon, 2012; Dorsett and Lucchino, 2013).

#### Race

Echoing the arguments for the inclusion of sex in models of analysis, the role of race also impacted individuals’ economic activity during the NCDS timeframe (Payne, 1995; Lindley, 1996; Gayle et al, 2009). The issue with the NCDS data however is that white people make up 98.3% of all participants. The resulting ethnic minority categories are thus too small to conduct useful analysis. Originally, the resultant variable was parametrised as ‘white’ and ‘non-white’. There were two major issues with this that resulted in the race variable being dropped from analysis. The first returns to the overall low sample of non-white participants when spread over five different economic activity sub-categories. This low number of observations results in low statistical power and thus would impact the entire model. The second is that missing data is a particular problem when it comes to race. The race variable accounted for 16 per cent of missingness in subsequent models. Ontop of these two primary concerns, a combined race category into white/non-white presents assumptions surrounding homogeneity within the non-white category that is not theoretically justifiable. For these reasons race was dropped from analysis.

#### Housing Tenure

Housing tenure has been used in previous analyses regarding educational attainment and labour market outcomes (Di Salvo and Ermisch, 1997; Duta et al, 2021). For subsequent analysis, tenure is a measure of whether an individual lives in their own home or not[[10]](#footnote-10). For this sample, 48.99 per cent of individuals own their own home compared to 51.01 per cent that do not.

#### Social Stratification and Socio-Economic Background: NS-SEC, CAMSIS, RGSC

Social stratification is the persistence of inequalities which occur or are reified across generations (Stopforth, 2020: 17). Inequalities can manifest themselves in terms of gender, ethnicity, social class etc. These social inequalities impact individuals in terms of their aspirations and desires, educational outcomes, labour market position, and destinations.

Socio-economic background is a cornerstone of social scientific research. There is no one universally agreed measure employed. There are two main schools of thought when attempting to capture socio-economic background. The first is a measure of social class which contemporarily employs occupation-based schema. The second are social stratification scales which instead rely on capturing a continuous measure.

Social class as a variable is one that has constant and consistent debate throughout sociological literature – even today whilst current schemas reign dominant, there is no universally held gold-standard of social class within empirical research. Three approaches that are used: social class schemes, social stratification scales, and the micro-class appro.

This PhD thesis seeks to find the most appropriate measure of social class to fit the given models of analysis. This is to find the most empirically useful schema to distinguish most effectively the analytical purposes in mind for this research (Bergman and Joye, 2001: 14). Multiple measures of social class will be reflected upon. This following section seeks to establish the major measures of social class and weigh their common strengths and weaknesses, which may affect model parsimony.

One element that is important to develop is the concept of time. Prestige scales, social class schemes, occupational grading all rely on rather static temporal procedures. Longer-term structural transformations of society will alter the underlying distribution of stratification over time (Lambert and Barnett, 2021: 191). The prestige and economic capital of a bank teller is very different from the start of the 1950s compared to present day. With each schema being constructed in different ways, it will be interesting to highlight the potential temporal implications within this research.

The NCDS provides occupational coding measures for father’s socio-economic position using a variety of measures. The measures provided are the Registrar General Class Schema, National Statistics Socio-Economic Classification, and the Cambridge Social interaction and Stratification scale. Occupational coding measures were taken in 1969. Unfortunately, no such occupational measures were taken for mothers making it impossible to employ a dominance approach. The first occupational measure gives a full six class categorisation[[11]](#footnote-11). This occupational measure had to be collapsed in order to appropriately conduct multiple imputation. The second occupational measure ranges from 2-13.5 of the National Statistics Socio-Economic Classification scale and so the most appropriate collapsing of the scale is into the three-category schema[[12]](#footnote-12). The last measure is continuous and as such no recoding was required.

The final three variables for subsequent analysis are all considered socio-economic variables. Two are social class schemas and one is a stratification scale. Multiple socio-economic measures are considered to see whether there are different patterns for different dimensions of social stratification both within cohorts and across them by comparising between cohort substantive findings. Three measures are included for sensitivity analysis of socio-economic measures across three separate models so a comparison between these measures can be made. The National Statistics Socio-economic Classification (NS-SEC) is a social class schema that indicates socio-economic position based upon occupation in a non-hierarchical format. The NCDS makes it possible to construct the full NS-SEC schema[[13]](#footnote-13). The Registrar General’s Social Class schema (RGSC) is a hierarchical class schema based on occupation. The occupational codes provided by the NCDS make it possible to construct the six-category schema of the RGSC. CAMSIS is a continuous measure that assumes categorical measures of socio-economic position are inferior to continuous ones. The occupational codes provided by the NCDS provides CAMSIS codes to conduct analysis with.

There are many other socio-economic measures. The rational for including the RGSC, NS-SEC, and CAMSIS are based upon theoretical diversity and empirical practicality. The most straightforward explanation as to why these three measures were included specifically is that these three measures are easily able to be constructed using the NCDS. An occupational coding file is provided for Sweep Two of the NCDS which enables the construction of the full RGSC and NS-SEC social class schemas as well as CAMSIS. All three socio-economic measures are constructed using a different theoretical orientation. The RGSC’s strict hierarchical nature separates itself from the NS-SEC that argues against a hierarchy for example. Both RGSC and NS-SEC are categorical gradational scales in comparison to the CAMSIS which is a single continuous measure. Other socio-economic measures were considered – for example the neo-Marxian social class schema developed by Wright (XXXX). This measure would provide an alternative social class schema that challenges the occupational dominance of the RGSC and NS-SEC. However, due to data limitations this schema can not be practically constructed.

The following section provides a detailed breakdown of each chosen social stratification measure, explaining their theoretical makeup and their analytical construction.

##### Registrar General Class Schema

The Registrar General’s Social Class (RGSC) is one of the oldest social class measures in the UK – first used in 1911 to show variation in infant mortality according to parents’ occupation(‘Annual report for the 1911 of the registrar-general’, 1913). The measure is built upon the assumption that society is graded based upon a hierarchy of occupations(Murray 2011: 67). The schema is broken into six distinction categories and rages from unskilled manual occupation to higher level professionals (ibid). The RGSC once formed the basis of all commonly used social classifications within Britain (Szreter 1984: 523) which gives the RGSC a widely known level of recognition. With that being said, alternative measures, such as the National Statistics Socio-Economic Classification have risen to prominence. The RGSC was a popular social class measure of its time (particularly around the 1980s). This temporal distinction remains important for subsequent sensitivity analyses in cross-comparisons between cohorts. The RGSC and other measures will be used to understand if the temporal element to the construction of social class impacts a models best fit.

The RGSC as Szreter (1984: 538) articulates, has five distinctive theoretical implications. The RGSC rests upon a theoretical assumption that social inequality exists within society. This social inequality is structured around a single scale of social position/status within society encapsulated within occupational categories. These occupational categories form a single uni-dimensional hierarchy across all of Britain.

The original creator of the schema, Stevenson, created the model of RGSC based upon an assumption that society is comprised of an upper middle, middle, and working class (Prandy, 1999: 468). This assumption is baked into the theoretical implications mentioned above.

The Full RGSC class schema is detailed below:

Table 1.3 RGSC Class Schema

|  |  |
| --- | --- |
| Class | Occupations |
| I | Professional Occupations |
| II | Intermediate Occupations |
| IIIN | Skilled Non-Manual Occupations |
| IIIM | Skilled Manual Occupations |
| IV | Partly Skilled Occupations |
| V | Unskilled Occupations |

##### The NCDS provides occupational codes and social-class categories so that the full RGSC class schema can be replicated and reproduced for subsequent analysis. National Statistics Socio-Economic Classification

Over the years, the work of Goldthorpe has produced a variety of social class schemas (the EGP schema, which was later updated by the EG schema). The most up to date version is the NS-SEC schema.

Central to Goldthorpe’s ideas on social class – and the development of social class schemas is employment relations. These employment relations are split into three distinctive formations: those that purchase labour and have authority over those they have purchased labour from, self-employed workers, and employees who sell their labour and are thus under the authority of employers (Bergman and Joye 2001: 12). It is within this differentiation of employment relations that gives rise to class-based patterns of social stratification (Williams, 2017). Like other social class schemas already mentioned, a central tendency for Goldthorpe’s study of social class rests upon an analysis of relationships (Goldthorpe and Marshall, 1992).

The full NS-SEC classification schema has 14 constituent parts but can be broken down into as few as three categories. This ability to break down the social class schema is attractive – particularly when using data that has limited sample sizes or complications related to multiple imputation convergence.

In testing the criterion-related validity of the Goldthorpe schema, Evans (1992: 211) found that the analysis found strong associations between class and indicators of employment conditions – consistent with the theoretical intentions embodied within the schema.

Table 1.4 NS-SEC Class Schema

|  |  |
| --- | --- |
|  | Analytical Variables for NS-SEC |
| Operational Categories | **Eight Classes** |
| L1  Employers in large establishments | 1  Higher Managerial |
| L2  Higher managerial occupations |
| L3  Higher professional occupations |
| L4  Lower professional and higher technical occupations | 2  Lower managerial and professional occupations |
| L5  Lower managerial ocuaptions |
| L6  Higher supervisory occuaptions |
| L7  Intermediate occupations | 3 Intermediate occupations |
| L8  Employers in small establishments | 4  Small employers and own account wrokers |
| L9  Own account workers |
| L10  Lower supervisory occupations | 5  Lower supervisory and technical |
| L11  Lower technical occupations |
| L12  Semi-routine occupations | 6  Semi-routine occupations |
| L13  Routine occupations | 7  Routine occupations |
| L14  Never worked and long-term unemployed | 8  Never worked and long-term unemployed |

As with the RGSC, the NCDS allows for replication of the full NS-SEC class schema. This will provide the basis for comparison and sensitivity analysis of socio-economic measures within this chapter.

##### CAMSIS

The Cambridge Social Interaction and Stratification scale (CAMSIS) is a subsequent evolution and development of the Cambridge scale. CAMSIS – similar to the Cambridge scale argues that individuals are embedded within socially moderated spaces and networks within which they engage in various social and economic interactions which are different from interactions with persons who are more distant from these networks (Bergman and Joye 2001: 34). The concept of social structure itself can and does change – there is no a priori assumption (ibid). Just as with the Cambridge scale, CAMSIS offers different scales for both men and women, ‘since holding the same occupation may have different implications for the persons’ social position, depending upon their gender’ (Bergman and Joye 2001: 36).

By its nature, CAMSIS does not delineate between concepts of class and concepts of status (Bergman and Joye 2001: 40). It’s continuous nature means that numerical values are attached to occupations, meaning the relative value of each occupational value is only meaningful in comparison to other occupations on the same scale (Connelly et al 2016: 7). This is meaningful when it comes to interpretation of the CAMSIS measure within models of analysis as the value of the coefficient is always going to be in relation to the comparison to other occupations along the CAMSIS scale.

As with RGSC and NS-SEC, CAMSIS codes are provided within the NCDS.

### Analysis Methods

This PhD has been undertaken via the ERSC Advanced Quantitative Methods stipend. This PhD is entirely composed of quantitative methods. Each section will provide in detail the methods employed. Methods and skills used throughout include handling complex social surveys, glmm models, synthetic cohort analysis, handling missing data, using panel data etc. All analyses have been undertaken using the software package Stata.

The project will employ multivariate statistical techniques to analyse youth transitions. The work will employ suitable statistical modelling techniques from the generalized linear modelling (glm) framework (McCullough and Nelder, 1989). Where appropriate the analysis of the panel data will make the logical extension to models in the generalized linear mixed modelling (glmm) framework (Hedeker, 2005). An innovative feature of the work will be a comparison between random effects models (see Wooldridge, 2010) and generalized estimating equations (gee models) (see Zeger et al 1988). Generalized estimating equations have largely been overlooked in sociological and educational studies as a method of estimating ‘population average’ effects in panel data, and they are likely to provide an interesting alternative approach to analysing repeated contacts data.

For the NCDS analysis three main statistical techniques shall be undertaken. Firstly, a CCA multinominal logistic regression will be undertaken of economic activity. Then a sensitivity analysis of socio-economic measures will be undertaken. Average marginal effects will be given, and the predicted probabilities of the chosen social class measure will be graphically presented. Finally, multiple imputation will be undertaken and compared to the CCA multinominal logistic regression.

## Descriptive Statistics

Table 1.4 shows the frequencies and summary statistics for the NCDS. Overall, 38.17 per cent of our sample is in full-time employment. Whilst 30.42 per cent remain in school 8.82 per cent moved on to full-time post school education. Unemployment and being out of the labour force makes up 3.10. Finally, 19.48 per cent of the sample are in some kind of training or apprenticeship scheme.

Educational attainment and sex are two key factors during this time period that are of particular interest. Table 1.5-1.7 breaks down economic activity by Sex and Educational Attainment. There is a substantive difference for both men and women in fulltime employment by whether they attained less than five O-levels or not. 20.24 per cent compared to 2.28 per cent of females were in full-time work. 12.97 per cent compared to 1.27 per cent of males were in full-time work. More women who achieved less than five O-levels appear to be in full-time employment compared to men, by over 7 per cent.

There are negligible differences between men and women when it came to school as their main economic activity across educational attainment. Those that received less than five O-levels made up 5.21 per cent of main economic activity for that grouping compared to 26.41 per cent of main economic activity for the greater than five O-level group.

A final thing to note, whilst there is a small difference between men and women in the greater than five O-level group for being in training/apprenticeships, only 2.82 per cent of women compared to 14.12 per cent of men in the less than five O-level grouping are in training/apprenticeships as their main economic activity. These descriptive statistics demonstrate that descriptively, there are differences in economic activity across educational attainment and sex that will be investigated for further analyses.

|  |  |  |
| --- | --- | --- |
| Table 1.5: Descriptive Statistics for Economic Activity | | |
|  | n | % |
| Economic Activity |  |  |
| *Employment* | 3,225 | 38.17% |
| *Post-Schooling Education* | 745 | 8.82% |
| *School* | 2,570 | 30.42% |
| *Training/Apprenticeships* | 1,646 | 19.48% |
| *Unemployment and OLF* | 262 | 3.10% |
| Educational Attainment |  |  |
| *<5 O-Levels* | 5,447 | 64.48% |
| *>5 O-Levels* | 3,001 | 35.52% |
| Sex |  |  |
| *Female* | 4,235 | 50.13% |
| *Male* | 4,213 | 49.87% |
| Housing Tenure |  |  |
| *Own Home* | 4,061 | 48.07% |
| *Don't Own Home* | 4,387 | 51.93% |
| NS-SEC |  |  |
| *Higher managerial, administrative and professional occupations* | 1,365 | 16.16% |
| *Lower managerial, administrative and professional occupations* | 1,186 | 14.04% |
| *Intermediate occupations* | 173 | 2.05% |
| *Small employers and own account workers* | 851 | 10.07% |
| *Lower supervisory and technical occupations* | 1,372 | 16.24% |
| *Semi-routine occupations* | 1,485 | 17.58% |
| *Routine occupations* | 2,016 | 23.86% |
| RGSC |  |  |
| *Professional* | 362 | 4.29% |
| *Managerial and Technical* | 1,738 | 20.57% |
| *Skilled non-manual* | 924 | 10.94% |
| *Skilled manual* | 3,501 | 41.44% |
| *Partly skilled* | 1,205 | 14.26% |
| *Unskilled* | 718 | 8.50% |
|  |  |  |
|  | Mean | SD |
| CAMSIS | 4.44 | 1.38 |
|  |  |  |
| n |  | 8448 |
| Data Source: NCDS | | |

Table 1.6 Descriptive Statistics for Economic Activity by Sex and <5 O-levels, unweighted

|  |  |  |  |
| --- | --- | --- | --- |
| Less than five O-Levels (%) | | | |
|  | Sex | | |
|  | Female | Male | Total |
| Economic Activity |  |  |  |
| Employment | 20.94 | 13.74 | 34.68 |
| Post-Schooling Education | 3.57 | 1.21 | 4.78 |
| School | 2.65 | 2.53 | 5.18 |
| Training/Apprenticeships | 2.97 | 13.94 | 16.92 |
| Unemployment and OLF | 1.72 | 1.20 | 2.91 |
| Overall Total | 31.85 | 32.62 | 64.48 |

Table 1.7 Descriptive Statistics for Economic Activity by Sex and =>5 O-levels, unweighted

|  |  |  |  |
| --- | --- | --- | --- |
| Five or more O-Levels (%) | | | |
|  | Sex | | |
|  | Female | Male | Total |
| Economic Activity |  |  |  |
| Employment | 2.24 | 1.25 | 3.49 |
| Post-Schooling Education | 2.60 | 1.43 | 4.04 |
| School | 12.65 | 12.58 | 25.24 |
| Training/Apprenticeships | 0.63 | 1.94 | 2.57 |
| Unemployment and OLF | 0.15 | 0.04 | 0.19 |
| Overall Total | 18.28 | 17.25 | 35.52 |

Table 1.8 Descriptive Statistics for Economic Activity by Sex and Total O-levels, unweighted

|  |  |  |  |
| --- | --- | --- | --- |
| Total O-levels (%) | | | |
|  | Sex | | |
|  | Female | Male | Total |
| Economic Activity |  |  |  |
| Employment | 23.18 | 15.00 | 38.17 |
| Post-Schooling Education | 6.18 | 2.64 | 8.82 |
| School | 15.31 | 15.12 | 30.42 |
| Training/Apprenticeships | 3.60 | 15.89 | 19.48 |
| Unemployment and OLF | 1.87 | 1.23 | 3.10 |
| Overall Total | 50.13 | 49.87 | 100.00 |

## Modelling Main Economic Activity

The main outcome variable is the main economic activity of individuals in September of 1974. This is the first month individuals were in when they received their O-level results after mandatory schooling. The first set of analyses estimate a multinominal logistic regression model. Table 2.1 details the deviance, change in deviance, change in degrees of freedom, the McFadden’s Adjusted Pseudo R2, AIC, and BIC measure to compare the null model with models of one explanatory variable. Whilst there are several R2 measures available, for brevity McFadden’s Adjusted Pseudo R2 will be the only one discussed at length. Table 2.2 details the same but through a sequential building of the null model with each subsequent independent variable added.

Table 1.9 Goodness-of-fit summaries for explanatory variables and Economic Activity

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Outcome Variable: Economic Activity | Deviance | Deviance (from Null) | d.f. (from Null) | McFadden’s Adjusted Pseudo R2 | AIC | BIC |
| Null Model | 23150.585 | - | - | - | 23158.585 | 23186.752 |
| Null Model + Educational Attainment | 18908.961 | 4,241.624 | 4 | 0.183 | 18924.961 | 18981.295 |
| Null Model + Sex | 22159.828 | 990.757 | 4 | 0.042 | 22175.828 | 22232.161 |
| Null Model + Tenure | 22328.736 | 821.849 | 4 | 0.035 | 22344.736 | 22401.069 |
| Null Model + NS-SEC | 21879.497 | 1,271.088 | 24 | 0.052 | 21935.497 | 22132.664 |

Explanatory variables are entered sequentially in the subsequent multiple logistic model following (Gayle and Lambert, 2009) example.

Table 1.10 Model building goodness-of-fit summaries for multiple logistic regression model of Economic Activity

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Outcome Variable: Economic Activity | Deviance | Deviance (from Previous) | d.f. (from Previous) | McFadden’s Adjusted Pseudo R2 | AIC | BIC |
| Null Model | 23150.585 | - | - | - | 23158.585 | 23186.752 |
| Null Model + Educational Attainment | 18908.961 | 4,241.624 | 4 | 0.183 | 18924.961 | 18981.295 |
| Null Model + Educational Attainment + Sex | 17921.387 | 987.574 | 4 | 0.225 | 17945.387 | 18029.888 |
| Null Model + Educational Attainment + Sex + Tenure | 17677.491 | 243.896 | 4 | 0.235 | 17709.491 | 17822.158 |
| Null Model + Educational Attainment + Sex + Tenure + NS-SEC | 17425.215 | 252.276 | 24 | 0.244 | 17505.215 | 17786.883 |

The results of the multinominal logistic regression model are reported in table 2.3. It is not possible to ascertain the significance parameters of variables other than in relation to the reference category (Firth, 2003). Quasi-variances were considered to overcome this reference category problem but considering this would only impact one variable – NS-SEC it was ultimately decided to not provide them. For this complete case analysis there are 6452 observations in total.

This output is using the reference category of full-time employment for two reasons. The first is that said category is has the largest sample of all economic activity sub-categories. The second is that a contrast with full-time employment is sociologically compelling. Contrasting full-time employment with other economic activity destinations like education or apprenticeships is temporally relevant given the possible impact that increasing the mandatory school leaving age, decline in manufacturing industry, rise in part-time work may have on the economic destinations of youth.

Unemployment and out of the labour force categories do not appear to be statistically significant in reference to full-time employment for economic activity destinations except for in one instance. Sex is statistically significant in both unemployment and out of the labour force at the p<0.01 level. Here we can see Men are more likely to be unemployed than women over being in full-time employment whereas women are more likely to be out of the labour force than men over being in full-time employment controlling for all other covariates.

There are three primary categories of economic activity that are of interest for further discussion. The first is education. Every variable is statistically significant at the p<0.001 level except for lower managerial occupations (p<0.05) and intermediate occupations (p<0.01). Those individuals that attain five or more O-levels at school have 1.87 the log odds of being in post-school education over employment in comparison to those individuals that received less than five O-levels. It is more likely for women to be in education over full-time employment (men have -0.44 log odds of being in education over full-time education). It is less likely for those that don’t own their own home (-0.79) than those that do, to be in post-schooling education over employment. Finally, when looking at social class, there is a downward trajectory of the odds of individuals being in education over full-time employment with higher managerial as reference. The most substantive differences in comparison to higher managerial class relates to semi-routine and routing occupations whereby both see -1.05 log odds of being in post-schooling education over employment. For a full breakdown of social class across each economic activity category see figure XXXX for the predicted probabilities.

The second category of interest is school. Every variable is statistically significant at the p<0.001 level. Individuals that attained five or more O-levels are 3.58 log odds of being in school over being in employment compared to those individuals that received less than five O-levels. Men are more likely by 0.40 times the log odds of being in school over employment compared to women. Those that don’t own their own home are less likely than those that do to be in school (by -0.69 log odds) over employment. Finally with respect to class, there is again a downward trend that shows those whose fathers are in routine occupations are less likely than those in higher managerial occupations of being in school over full-time employment, by -1.63 the log odds.

The final category of interest is training/apprenticeships. Educational Attainment, sex, housing tenure, and routine occupations are statistically significant at the p<0.001 level, semi-routine occupations are statistically significant at p<0.01, and lower managerial occupations are statistically significant at p<0.05. Individuals that attained five or more O-levels are 0.34 the log odds of being in training & apprenticeships over being in full-time employment. Men are 1.92 the log odds being in training/apprenticeships over full-time employment compared to women. Those that don’t own their own home are -0.31 the log odds to be in training over full-time employment in comparison to their home owning peers. Finally, when it comes to class, those whose fathers are in the routine occupations are -1.46 the log odds of being in training/apprenticeships over full-time employment.

The unemployment & OLF category presents no statistically significant results and thus will not be interpreted.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Table 1.11 Mlogit of Economic Activity | NS-SEC | | | Average Marginal Effects | | |
| Economic Activity | **Coef.** | **S.E** | **Sig.** | **Prob.** | **S.E** | **Sig.** |
| Employment | Ref. | (.) |  | (.) | (.) |  |
|  |  |  |  |  |  |  |
| Post-Schooling Education |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 1.87 | (0.10) | \*\*\* | 0.02 | (0.01) | \*\* |
| Sex |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  |
| *Male* | -0.44 | (0.09) | \*\*\* | -0.07 | (0.01) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.79 | (0.09) | \*\*\* | -0.04 | (0.01) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.40 | (0.15) | \*\* | -0.01 | (0.01) |  |
| *Intermediate Occupations* | -0.58 | (0.28) | \* | -0.00 | (0.02) |  |
| *Small Employers* | -1.02 | (0.18) | \*\*\* | -0.04 | (0.01) | \*\* |
| *Lower Supervisory & Technical Occupations* | -0.74 | (0.15) | \*\*\* | -0.02 | (0.01) |  |
| *Semi-Routine Occupations* | -1.05 | (0.16) | \*\*\* | -0.04 | (0.01) | \*\*\* |
| *Routine Occupations* | -1.05 | (0.15) | \*\*\* | -0.03 | (0.01) | \* |
| Intercept | -0.59 | (0.13) | \*\*\* |  |  |  |
|  |  |  |  |  |  |  |
| School |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 3.58 | (0.08) | \*\*\* | 0.57 | (0.01) | \*\*\* |
| Sex |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  |
| *Male* | 0.40 | (0.07) | \*\*\* | 0.01 | (0.01) |  |
| Housing Tenure |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.69 | (0.08) | \*\*\* | -0.05 | (0.01) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.58 | (0.13) | \*\*\* | -0.05 | (0.01) | \*\*\* |
| *Intermediate Occupations* | -1.15 | (0.26) | \*\*\* | -0.12 | (0.03) | \*\*\* |
| *Small Employers* | -1.24 | (0.15) | \*\*\* | -0.12 | (0.02) | \*\*\* |
| *Lower Supervisory & Technical Occupations* | -1.14 | (0.13) | \*\*\* | -0.12 | (0.01) | \*\*\* |
| *Semi-Routine Occupations* | -1.18 | (0.13) | \*\*\* | -0.11 | (0.02) | \*\*\* |
| *Routine Occupations* | -1.63 | (0.13) | \*\*\* | -0.16 | (0.01) | \*\*\* |
| Intercept | -0.62 | (0.11) | \*\*\* |  |  |  |
|  |  |  |  |  |  |  |
| Training & Apprenticeships |  |  |  |  |  |  |
| Educational Attainment | - | - | - |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 0.34 | (0.10) | \*\*\* | -0.17 | (0.01) | \*\*\* |
| Sex |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  |
| *Male* | 1.92 | (0.07) | \*\*\* | 0.24 | (0.01) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.31 | (0.07) | \*\*\* | -0.01 | (0.01) |  |
| NS-SEC |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.37 | (0.15) | \* | -0.02 | (0.02) |  |
| *Intermediate Occupations* | -0.30 | (0.26) |  | 0.01 | (0.03) |  |
| *Small Employers* | -0.10 | (0.15) |  | 0.05 | (0.02) | \*\* |
| *Lower Supervisory & Technical Occupations* | -0.12 | (0.14) |  | 0.04 | (0.02) | \*\* |
| *Semi-Routine Occupations* | -0.22 | (0.14) |  | 0.03 | (0.02) |  |
| *Routine Occupations* | -0.43 | (0.13) | \*\* | 0.02 | (0.01) |  |
| Intercept | -1.46 | (0.13) | \*\*\* |  |  |  |
|  |  |  |  |  |  |  |
| Unemployment & Out of Labour Force |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | -0.40 | (0.27) |  | -0.04 | (0.00) | \*\*\* |
| Sex |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  |
| *Male* | 0.02 | (0.13) |  | -0.01 | (0.00) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  |
| *Don't Own Home* | 0.19 | (0.15) |  | 0.01 | (0.00) | \*\* |
| NS-SEC |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.37 | (0.33) |  | 0.01 | (0.01) |  |
| *Intermediate Occupations* | -0.24 | (0.57) |  | 0.01 | (0.01) |  |
| *Small Employers* | -0.31 | (0.32) |  | -0.01 | (0.01) |  |
| *Lower Supervisory & Technical Occupations* | -0.53 | (0.30) |  | -0.00 | (0.01) |  |
| *Semi-Routine Occupations* | -0.09 | (0.28) |  | 0.00 | (0.02) |  |
| *Routine Occupations* | -0.12 | (0.27) |  | -0.00 | (0.01) |  |
| Intercept | -2.41 | (0.26) | \*\*\* |  |  |  |
|  |  |  |  |  |  |  |
| Number of observations | 8448 | | | | | |
| McFadden’s Adjusted Pseudo R2 | 0.244 | | | | | |
| Cox-Snell Pseudo R2 | 0.492 | | | | | |
| Nagelkerke Pseudo R2 | 0.526 | | | | | |
| AIC | 17505.22 | | | | | |
| BIC | 17786.88 | | | | | |
|  | \*\*\* p<.001, \*\* p<.01, \* p<.05 Data Source: NCDS  Note: Complete Case Analysis | | | | | |

Focusing on NS-SEC, figure 1.1 depicts the predicted probabilities at means of economic activity of those categories that were statistically significant. Predicted probabilities for each economic activity category are presented. There is a general upward trend for indiviudals to be in employment going down the class schema. The opposite can be said with respect to post-schooling education and school.

Log odds can be very difficult to interpret. As such they have been translated in marginal effects in table 2.4. Average Marginal effects display the average change in probability of being in one category of economic activity over employment given a change in the explanatory variable, holding all other variables at their constant.

The average marginal effects demonstrate there are marked differences in the probabilities of being in education and school over full-time employment depending on the class situation of the father of the individual. There is also a significant difference in economic activity depending upon the sex of the individual.

This model has been tested for the goodness of fit of two competing statistical models based on the ratio of their likelihoods in a likelihood-ratio test, and again with a Wald test. Both found that the hypothesis that all the coefficients associated with educational attainment, sex, tenure, and NS-SEC are simultaneously equal to 0 can be rejected at the 0.01 level.

Chart

Description automatically generated

Figure 1 Predicted Probabilities of Economic Activity by NS-SEC

The multinominal logistic regression model indicates there is a statistically significant effect of educational attainment, sex, housing tenure, and parental NS-SEC. Men and women seem to significantly differ on their economic activity outcomes, as do those that achieved greater than 5 O-levels and those that don’t own their own home. Finally, there appears to be a clear social class impact on economic activity. This last point will test the robustness of these findings so far using sensitivity analysis of parental social class using RGSC and CAMSIS.

### Sensitivity Analysis of Independent Variables

Whilst it is not appropriate to compare log odds across regression models the following sensitivity analysis will instead compare models following substantive conclusions. Goodness-of-fit statistics are provided and are assessed via BIC measures, and R2.

### Testing Measures of Parental Social Class

There are strong correlations between parental social class measures. Parental NS-SEC and Parental RGSC has a significant Chi-Square statistic at the p<0.001 level. Parental NS-SEC and CAMSIS have a significant Anova at the p<0.001 level.

Three separate multinominal logistic regressions are presented in table 3.1. The first model has been described at length in the previous section and uses NS-SEC. The second model uses CAMSIS and the third uses RGSC.

The substantive conclusions drawn from the analysis of the NS-SEC model do not change across all three models. In fact, it is remarkable how similar the coefficients are across the models. Looking specifically the the social stratification measures across the models, all produce substantively identical conclusions.

The goodness-of-fit statistics are similar for all three models. Differences in R2 measures exist but the small nature of these differences indicate the amount of variance explained across the three models is remains consistent. BIC differences are also small. The most parsimonious model is the RGSC schema. Considering BIC penalises models for estimating additional parameters it is not entirely surprising that it considers the RGSC to be a better fit than the NS-SEC schema. These differences are however small.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 1.12 Sensitivity analyses of alternative measures of parental social stratification |  | | |  |  |  |  |  |  |
|  | **NS-SEC** | | | **CAMSIS** | | | **RGSC** | | |
| Economic Activity | **Coef.** | **S.E** | **Sig.** | **Coef.** | **S.E** | **Sig.** | **Coef.** | **S.E** | **Sig.** |
| Employment | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
|  |  |  |  |  |  |  |  |  |  |
| Post-Schooling Education |  |  |  |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 1.87 | (0.10) | \*\*\* | 1.87 | (0.10) | \*\*\* | 1.89 | (0.10) | \*\*\* |
| Sex |  |  |  |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Male* | -0.44 | (0.09) | \*\*\* | -0.45 | (0.09) | \*\*\* | -0.44 | (0.09) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.79 | (0.09) | \*\*\* | -0.77 | (0.09) | \*\*\* | -0.80 | (0.09) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.40 | (0.15) | \*\* |  |  |  |  |  |  |
| *Intermediate Occupations* | -0.58 | (0.28) | \* |  |  |  |  |  |  |
| *Small Employers* | -1.02 | (0.18) | \*\*\* |  |  |  |  |  |  |
| *Lower Supervisory & Technical Occupations* | -0.74 | (0.15) | \*\*\* |  |  |  |  |  |  |
| *Semi-Routine Occupations* | -1.05 | (0.16) | \*\*\* |  |  |  |  |  |  |
| *Routine Occupations* | -1.05 | (0.15) | \*\*\* |  |  |  |  |  |  |
| CAMSIS |  |  |  | 0.29 | (0.03) | \*\*\* |  |  |  |
| RGSC |  |  |  |  |  |  |  |  |  |
| *Professional* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Managerial and Technical* |  |  |  |  |  |  | -0.49 | (0.27) |  |
| *Skilled Non-Manual* |  |  |  |  |  |  | -0.37 | (0.28) |  |
| *Skilled Manual* |  |  |  |  |  |  | -0.96 | (0.26) | \*\*\* |
| *Partly Skilled* |  |  |  |  |  |  | -1.16 | (0.28) | \*\*\* |
| *Unskilled* |  |  |  |  |  |  | -1.51 | (0.32) | \*\*\* |
| Intercept | -0.59 | (0.13) | \*\*\* | -2.60 | (0.18) | \*\*\* | -0.50 | (0.26) |  |
|  |  |  |  |  |  |  |  |  |  |
| School |  |  |  |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 3.58 | (0.08) | \*\*\* | 3.57 | (0.08) | \*\*\* | 3.60 | (0.08) | \*\*\* |
| Sex |  |  |  |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Male* | 0.40 | (0.07) | \*\*\* | 0.38 | (0.07) | \*\*\* | 0.40 | (0.07) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.69 | (0.08) | \*\*\* | -0.65 | (0.08) | \*\*\* | -0.71 | (0.08) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.58 | (0.13) | \*\*\* |  |  |  |  |  |  |
| *Intermediate Occupations* | -1.15 | (0.26) | \*\*\* |  |  |  |  |  |  |
| *Small Employers* | -1.24 | (0.15) | \*\*\* |  |  |  |  |  |  |
| *Lower Supervisory & Technical Occupations* | -1.14 | (0.13) | \*\*\* |  |  |  |  |  |  |
| *Semi-Routine Occupations* | -1.18 | (0.13) | \*\*\* |  |  |  |  |  |  |
| *Routine Occupations* | -1.63 | (0.13) | \*\*\* |  |  |  |  |  |  |
| CAMSIS |  |  |  | 0.41 | (0.03) | \*\*\* |  |  |  |
| RGSC |  |  |  |  |  |  |  |  |  |
| *Professional* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Managerial and Technical* |  |  |  |  |  |  | -0.96 | (0.23) | \*\*\* |
| *Skilled Non-Manual* |  |  |  |  |  |  | -0.95 | (0.24) | \*\*\* |
| *Skilled Manual* |  |  |  |  |  |  | -1.67 | (0.22) | \*\*\* |
| *Partly Skilled* |  |  |  |  |  |  | -1.76 | (0.24) | \*\*\* |
| *Unskilled* |  |  |  |  |  |  | -2.11 | (0.26) | \*\*\* |
| Intercept | -0.62 | (0.11) | \*\*\* | -3.47 | (0.16) | \*\*\* | -0.20 | (0.22) |  |
|  |  |  |  |  |  |  |  |  |  |
| Training & Apprenticeships |  |  |  |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 0.34 | (0.10) | \*\*\* | 0.35 | (0.10) | \*\*\* | 0.35 | (0.10) | \*\*\* |
| Sex |  |  |  |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Male* | 1.92 | (0.07) | \*\*\* | 1.91 | (0.07) | \*\*\* | 1.92 | (0.07) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.31 | (0.07) | \*\*\* | -0.31 | (0.07) | \*\*\* | -0.31 | (0.07) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.37 | (0.15) | \* |  |  |  |  |  |  |
| *Intermediate Occupations* | -0.30 | (0.26) |  |  |  |  |  |  |  |
| *Small Employers* | -0.10 | (0.15) |  |  |  |  |  |  |  |
| *Lower Supervisory & Technical Occupations* | -0.12 | (0.14) |  |  |  |  |  |  |  |
| *Semi-Routine Occupations* | -0.22 | (0.14) |  |  |  |  |  |  |  |
| *Routine Occupations* | -0.43 | (0.13) | \*\* |  |  |  |  |  |  |
| CAMSIS |  |  |  | 0.06 | (0.03) |  |  |  |  |
| RGSC |  |  |  |  |  |  |  |  |  |
| *Professional* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Managerial and Technical* |  |  |  |  |  |  | -0.44 | (0.26) |  |
| *Skilled Non-Manual* |  |  |  |  |  |  | -0.31 | (0.27) |  |
| *Skilled Manual* |  |  |  |  |  |  | -0.37 | (0.25) |  |
| *Partly Skilled* |  |  |  |  |  |  | -0.41 | (0.26) |  |
| *Unskilled* |  |  |  |  |  |  | -0.83 | (0.27) | \*\* |
| Intercept | -1.46 | (0.13) | \*\*\* | -1.93 | (0.15) | \*\*\* | -1.28 | (0.26) | \*\*\* |
|  |  |  |  |  |  |  |  |  |  |
| Unemployment & Out of Labour Force |  |  |  |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | -0.40 | (0.27) |  | -0.38 | (0.27) |  | -0.39 | (0.27) |  |
| Sex |  |  |  |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Male* | 0.02 | (0.13) |  | 0.02 | (0.13) |  | 0.02 | (0.13) |  |
| Housing Tenure |  |  |  |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Don't Own Home* | 0.19 | (0.15) |  | 0.16 | (0.15) |  | 0.19 | (0.15) |  |
| NS-SEC |  |  |  |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.37 | (0.33) |  |  |  |  |  |  |  |
| *Intermediate Occupations* | -0.24 | (0.57) |  |  |  |  |  |  |  |
| *Small Employers* | -0.31 | (0.32) |  |  |  |  |  |  |  |
| *Lower Supervisory & Technical Occupations* | -0.53 | (0.30) |  |  |  |  |  |  |  |
| *Semi-Routine Occupations* | -0.09 | (0.28) |  |  |  |  |  |  |  |
| *Routine Occupations* | -0.12 | (0.27) |  |  |  |  |  |  |  |
| CAMSIS |  |  |  | -0.10 | (0.06) |  |  |  |  |
| RGSC |  |  |  |  |  |  |  |  |  |
| *Professional* | Ref. | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Managerial and Technical* |  |  |  |  |  |  | 1.07 | (1.03) |  |
| *Skilled Non-Manual* |  |  |  |  |  |  | 0.40 | (1.06) |  |
| *Skilled Manual* |  |  |  |  |  |  | 0.83 | (1.02) |  |
| *Partly Skilled* |  |  |  |  |  |  | 1.17 | (1.03) |  |
| *Unskilled* |  |  |  |  |  |  | 1.11 | (1.03) |  |
| Intercept | -2.41 | (0.26) | \*\*\* | -2.19 | (0.30) | \*\*\* | -3.56 | (1.02) | \*\*\* |
|  |  |  |  |  |  |  |  |  |  |
| Number of observations | 8448 | | | 8448 | | | 8448 | | |
| McFadden’s Adjusted Pseudo R2 | 0.244 | | | 0.245 | | | 0.243 | | |
| Cox-Snell Pseudo R2 | 0.492 | | | 0.491 | | | 0.490 | | |
| Nagelkerke Pseudo R2 | 0.526 | | | 0.525 | | | 0.524 | | |
| AIC | 17505.22 | | | 17480.43 | | | 17531.12 | | |
| BIC | 17786.88 | | | 17621.27 | | | 17784.62 | | |
|  | \*\*\* p<.001, \*\* p<.01, \* p<.05 Data Source: NCDS  Note: Complete Case Analysis for NS-SEC, CAMSIS, RGSC | | | | | | | | |

The sensitivity analysis presented in table 3.1 shows that across the three models results are near identical. Based upon the NS-SEC model both CAMSIS and RGSC models show a marked downward trend for those in education, school, and for training & apprenticeships compared to employment. Table A14 in the appendix presents the marginal effects for the three models.

### Discussion and Conclusions

This chapter seeks to bring all the evidence and findings together in one cohesive piece. Best model fits are provided and discussed further at length.

## Missing Data in the NCDS

### Introduction

The following section seeks to compare a CCA and MI approach to estimate if there are any differences in the substantive conclusions reached. If differences are found, implications are then discussed.

A complete case analysis is only valid if data can be considered MCAR. If data is found to be MAR, then steps should be taken to address this potential bias in analysis. The gold standard to deal with MAR related data is MI.

### Multiple Imputation by Chained Equations

Multiple Imputation by Chained Equations is a tool developed to address missing data on all variables within a given model at the same time. It does this by filling in missing values in multiple variables iteratively by using chained equations Multiple imputation models are estimated using the mi suite in Stata. This suite is compatible with the svy suite and so can also adjust for complex survey design.

Whilst multiple imputation does help when it comes to missingness, it does have some drawbacks. Goodness-of-fit statistics for example are not able to be used – R2 and BIC most prominently. Therefore, it is not possible to assess the more appropriate or parsimonious model.

Whilst there is no clear consensus on the number of optimum imputations required to estimate the model (Silverwood *et al.*, 2021), 50 imputations is advised with checks performed after values have been imputed to see if more imputations are required. Basic tests were performed with 5 imputations before increasing this to 50. After 50 imputations were performed, basic tests were replicated, and the decision was made to up this to 100 as some variables were found to not be stable across iterations. At 100 imputations the results remained consistent and stable. Results of this stability can be found within the appendix.

The imputation model naturally includes all analytical variables included in the previous chapter. The imputation model also includes several auxiliary variables. These are broken down into two types. The first are variables that are predictive of both the probability of missingness and the underlying missing values themselves. The second are variables that are predictive of the underlying missing values only. Missing data in the NCDS is largely derived by non-response at a given sweep and auxiliary variables are selected from pre-determined sets of variables predictive of non-response at sweep 4 as seen in (Silverwood *et al.*, 2021).

There were 19 variables identified for inclusion in the imputation model. However, variables that are predictive of the chance of missing values but are not predictive of the underlying missing values themselves will not add any information to the model. Thus, the decision was made not to include such variables in the imputation model. From this 6 out of 19 variables are associated with economic activity with p<0.001 and so are included as auxiliary variables in the imputation model.

With a greater number of variables as our model has, convergence issues are probable. This risk is increased if a model has many categorical variables. Failure to converge was a consistent problem. Without resorting to re-coding analytical varaibales the decision was made to drop one of the auxiliary variables in order to produce an imputed model[[14]](#footnote-14).

The means and standard deviations of imputed values from each iteration of the imputation were checked and tabulations of each categorical variable to check the distributions of each variable against the imputations[[15]](#footnote-15).

The next models presented will be a comparison of a complete case analysis using NS-SEC from the previous chapter and the imputed model in table 4.2.

Overall, there is similarity between the complete case analysis and the imputed model. The substantive conclusions between CCA and MI models are near identical. There are some very slight differences in the log odds across educational attainment, sex, and housing tenure but these slight differences are not large enough to impact the substantive conclusions presented in the interpretation of the CCA model. The imputed model seems to confirm the substantive conclusions made from the CCA model.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table 1.13 Comparison of CCA NS-SEC vs Imputed NS-SEC |  | | |  |  |  |  |
|  | **CCA NS-SEC** | | | **Imputed NS-SEC** | | |
| Economic Activity | **Coef.** | **S.E** | **Sig.** | **Coef.** | **S.E** | **Sig.** |
| Employment | Ref. | (.) |  | (.) | (.) |  |
|  |  |  |  |  |  |  |
| Post-Schooling Education |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 1.87 | (0.10) | \*\*\* | 1.84 | (0.08) | \*\*\* |
| Sex |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  |
| *Male* | -0.44 | (0.09) | \*\*\* | -0.42 | (0.08) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.79 | (0.09) | \*\*\* | -0.84 | (0.08) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.40 | (0.15) | \*\* | -0.45 | (0.16) | \*\* |
| *Intermediate Occupations* | -0.58 | (0.28) | \* | -0.61 | (0.27) | \* |
| *Small Employers* | -1.02 | (0.18) | \*\*\* | -1.02 | (0.18) | \*\*\* |
| *Lower Supervisory & Technical Occupations* | -0.74 | (0.15) | \*\*\* | -0.79 | (0.15) | \*\*\* |
| *Semi-Routine Occupations* | -1.05 | (0.16) | \*\*\* | -1.05 | (0.16) | \*\*\* |
| *Routine Occupations* | -1.05 | (0.15) | \*\*\* | -1.08 | (0.15) | \*\*\* |
| Intercept | -0.59 | (0.13) | \*\*\* | -0.58 | (0.12) | \*\*\* |
|  |  |  |  |  |  |  |
| School |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 3.58 | (0.08) | \*\*\* | 3.52 | (0.07) | \*\*\* |
| Sex |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  |
| *Male* | 0.40 | (0.07) | \*\*\* | 0.44 | (0.06) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.69 | (0.08) | \*\*\* | -0.70 | (0.07) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.58 | (0.13) | \*\*\* | -0.61 | (0.14) | \*\*\* |
| *Intermediate Occupations* | -1.15 | (0.26) | \*\*\* | -1.23 | (0.26) | \*\*\* |
| *Small Employers* | -1.24 | (0.15) | \*\*\* | -1.21 | (0.15) | \*\*\* |
| *Lower Supervisory & Technical Occupations* | -1.14 | (0.13) | \*\*\* | -1.13 | (0.13) | \*\*\* |
| *Semi-Routine Occupations* | -1.18 | (0.13) | \*\*\* | -1.18 | (0.14) | \*\*\* |
| *Routine Occupations* | -1.63 | (0.13) | \*\*\* | -1.68 | (0.13) | \*\*\* |
| Intercept | -0.62 | (0.11) | \*\*\* | -0.57 | (0.11) | \*\*\* |
|  |  |  |  |  |  |  |
| Training & Apprenticeships |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 0.34 | (0.10) | \*\*\* | 0.31 | (0.09) | \*\*\* |
| Sex |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  |
| *Male* | 1.92 | (0.07) | \*\*\* | 1.96 | (0.06) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.31 | (0.07) | \*\*\* | -0.36 | (0.06) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.37 | (0.15) | \* | -0.42 | (0.15) | \*\* |
| *Intermediate Occupations* | -0.30 | (0.26) |  | -0.35 | (0.27) |  |
| *Small Employers* | -0.10 | (0.15) |  | -0.12 | (0.14) |  |
| *Lower Supervisory & Technical Occupations* | -0.12 | (0.14) |  | -0.15 | (0.13) |  |
| *Semi-Routine Occupations* | -0.22 | (0.14) |  | -0.23 | (0.13) |  |
| *Routine Occupations* | -0.43 | (0.13) | \*\* | -0.48 | (0.13) | \*\*\* |
| Intercept | -1.46 | (0.13) | \*\*\* | -1.50 | (0.12) | \*\*\* |
|  |  |  |  |  |  |  |
| Unemployment & OLF |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |
| *Less than five O-levels* | Ref. | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | -0.40 | (0.27) |  | -0.53 | (0.22) | \* |
| Sex |  |  |  |  |  |  |
| *Female* | Ref. | (.) |  | (.) | (.) |  |
| *Male* | 0.02 | (0.13) |  | 0.14 | (0.10) |  |
| Housing Tenure |  |  |  |  |  |  |
| *Own Home* | Ref. | (.) |  | (.) | (.) |  |
| *Don't Own Home* | 0.19 | (0.15) |  | 0.27 | (0.13) | \* |
| NS-SEC |  |  |  |  |  |  |
| *Higher Managerial* | Ref. | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.37 | (0.33) |  | -0.36 | (0.33) |  |
| *Intermediate Occupations* | -0.24 | (0.57) |  | -0.10 | (0.53) |  |
| *Small Employers* | -0.31 | (0.32) |  | -0.26 | (0.32) |  |
| *Lower Supervisory & Technical Occupations* | -0.53 | (0.30) |  | -0.55 | (0.31) |  |
| *Semi-Routine Occupations* | -0.09 | (0.28) |  | -0.09 | (0.28) |  |
| *Routine Occupations* | -0.12 | (0.27) |  | -0.08 | (0.26) |  |
| Intercept | -2.41 | (0.26) | \*\*\* | -2.40 | (0.25) | \*\*\* |
|  |  |  |  |  |  |  |
| Number of observations | 8448 | | | 12536 | | |
| Average RVI |  | | | 0.31 | | |
| Largest FMI |  | | | 0.40 | | |
|  | \*\*\* p<.001, \*\* p<.01, \* p<.05 Data Source: NCDS  Note: Comparison of CCA NS-SEC vs Imputed NS-SEC model | | | | | |

Additional checks on the imputed model are provided. First table XXXX [[16]](#footnote-16)details the reporting variance information about MI estimates. This contains information on within-imputation variances, between-imputation variances, total variances, relative increases in variance due to non-response (RVI), fractions of information about parameter estimates missing due to non-response (FMI, and relative efficiencies for using the chosen number of imputations. A high RVI corresponds to large amounts of missing data and/or that they are weakly correlated with other variables within the imputed model. The closer the RVI is to zero corresponds with the less effect missing data has upon a variable’s variance. The FMI on the other hand relates to the proportion of the total sampling variance that is due to missing data. The higher the FMI is relating to the greater number of imputations required for reliable results. The number of imputations should be roughly equivalent to the highest FMI percentage (which has been followed in this model). The relative efficiency indicates efficiency. The closer it is towards one indicates that the analysis has the right number of imputations.

According to the RVI scores across categories, NS-SEC and race are the only two analytical variables that have consistently high RVI scores. For all other analytical variables missing data has little effect upon their variance. Housing tenure, NS-SEC, and race all have relatively high FMI scores indicating that much of the total sampling variance is due to missing data. The FMI value of routine and manual for out of the labour force is the highest FMI value from the model with a value of 0.52. This value indicates that 50 imputations was appropriate. All variables have a relative efficiency close to one, also lending support to the notion that 50 imputations is an appropriate number.

Table XXXX provides information containing parameter-specific degrees of freedom (DF) and percentages of increase in standard errors due to nonresponse. The closer RVI is to zero, the larger the degrees of freedom regardless the number of imputations.

The smallest degrees of freedom correspond to routine and manual in the out of labour force category of 184.8. This is not surprising given its high RVI score. The highest degrees of freedom correspond to educational attainment and sex. This suggests that the loss of information due to non-response is the smallest for these analytical variables. The percentage increase in standard errors is largest for routine and manual in out of the labour force by 43.59 per cent and smallest for sex in unemployment by 0.51 per cent.

Need to format and paste tables of RVI and DF tables here…

### Discussion and Conclusions

The fact that the main substantive differences between the two models is situated within the unemployment and out of labour force categories is relevant. This indicates that missingness in these categories has a substantive impact upon the resulting interpretation and analysis of results. This provides evidence for a MAR assumption. As such the imputed model substantively better for analysis.

# Chapter Two: The British Cohort Study

## Introduction to Chapter Two

## Literature Review:

## BCS Timeframe and Context

### Education and Vocation

### Labour Market

### Family

## Data and Methods

### Introduction to the BCS data

### Introduction to measures for subsequent analysis

### Analysis Methods

# BCS Cohort: Pathways after Education

## Introduction

## Replicating analysis of NCDS

## Descriptive Statistics

## Modelling Educational Attainment

## Discussion and Conclusions

# BCS Cohort: Missing Data

## Missing Data in the NCDS

## Description of the Missing Data

## Missing Data for Independent Variables

## Multiple Imputation by Chained Equations

## Discussion and Conclusions

# Chapter Three: The Contemporary Context of the BHPS and UKHLS Synthetic Cohorts

## Introduction to Chapter Three

## BHPS and UKHLS Timeframe and Context

### Education and Vocation

### Labour Market

### Family

## Data and Methods

### Introduction to the BCS data

### Introduction to measures for subsequent analysis

### Analysis Methods

# Synthetic Cohorts at End of Mandatory Schooling a Replication Analysis

## Introduction

## Replicating Analysis

## Synthetic Cohorts

## Descriptive Statistics

## Modelling Educational Attainment

## Missing Data

## Discussion and Conclusions

# Synthetic Cohorts and Pathways after Education

## Introduction

## Replicating Analysis

## Descriptive Statistics

## Modelling Pathways after Mandatory Schooling

## Missing Data

## Discussion and Conclusions

# Synthetic Cohorts: Unemployment and the Labour Market

## Introduction

## Descriptive Statistics

## Modelling Unemployment

## Missing Data

## Discussion and Conclusions

# Missing data in the BHPS and UKHLS

## Introduction

## Missing Data

## Missing Data in the UKHLS

## Description of the Missing Data

## Missing Data for Independent Variables

## Multiple Imputation by Chained Equations

## Discussion and Conclusions

# Chapter Four: Youth Transitions in Comparative Perspective

# Chapter Five: Conclusions

## Introduction

## Substantive Conclusions

## Methodological Reflections

## Large Scale Social Science Surveys

## Final Remarks

# Appendix 1 – Figures and Tables

Figure A1

Chart, timeline, box and whisker chart

Description automatically generated

Table A1 Goodness-of-fit summaries for explanatory variables and Economic Activity (CAMSIS)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Outcome Variable: Economic Activity | Deviance | Deviance (from Null) | d.f. (from Null) | McFadden’s Adjusted Pseudo R2 | AIC | BIC |
| Null Model | 23150.585 | - | - | - | 23158.585 | 23186.752 |
| Null Model + Educational Attainment | 18908.961 | 4,241.624 | 4 | 0.183 | 18924.961 | 18981.295 |
| Null Model + Sex | 22159.828 | 990.757 | 4 | 0.042 | 22175.828 | 22232.161 |
| Null Model + Tenure | 22328.736 | 821.849 | 4 | 0.035 | 22344.736 | 22401.069 |
| Null Model + CAMSIS | 21827.528 | 1,323.057 | 4 | 0.056 | 21843.528 | 21899.861 |

Table A2 Model building goodness-of-fit summaries for multiple logistic regression model of Economic Activity (CAMSIS)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Outcome Variable: Economic Activity | Deviance | Deviance (from Previous) | d.f. (from Previous) | McFadden’s Adjusted Pseudo R2 | AIC | BIC |
| Null Model | 23150.585 | - | - | - | 23158.585 | 23186.752 |
| Null Model + Educational Attainment | 18908.961 | 4,241.624 | 4 | 0.183 | 18924.961 | 18981.295 |
| Null Model + Educational Attainment + Sex | 17921.387 | 987.574 | 4 | 0.225 | 17945.387 | 18029.888 |
| Null Model + Educational Attainment + Sex + Tenure | 17677.491 | 243.896 | 4 | 0.235 | 17709.491 | 17822.158 |
| Null Model + Educational Attainment + Sex + Tenure + CAMSIS | 17440.433 | 237.058 | 4 | 0.245 | 17480.433 | 17621.267 |

Table A3 Goodness-of-fit summaries for explanatory variables and Economic Activity (RGSC)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Outcome Variable: Economic Activity | Deviance | Deviance (from Null) | d.f. (from Null) | McFadden’s Adjusted Pseudo R2 | AIC | BIC |
| Null Model | 23150.585 | - | - | - | 23158.585 | 23186.752 |
| Null Model + Educational Attainment | 18908.961 | 4,241.624 | 4 | 0.183 | 18924.961 | 18981.295 |
| Null Model + Sex | 22159.828 | 990.757 | 4 | 0.042 | 22175.828 | 22232.161 |
| Null Model + Tenure | 22328.736 | 821.849 | 4 | 0.035 | 22344.736 | 22401.069 |
| Null Model + RGSC | 22020.214 | 1,130.371 | 20 | 0.047 | 22068.214 | 22237.214 |

Table A4 Model building goodness-of-fit summaries for multiple logistic regression model of Economic Activity (RGSC)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Outcome Variable: Economic Activity | Deviance | Deviance (from Previous) | d.f. (from Previous) | McFadden’s Adjusted Pseudo R2 | AIC | BIC |
| Null Model | 23150.585 | - | - | - | 23158.585 | 23186.752 |
| Null Model + Educational Attainment | 18908.961 | 4,241.624 | 4 | 0.183 | 18924.961 | 18981.295 |
| Null Model + Educational Attainment + Sex | 17921.387 | 987.574 | 4 | 0.225 | 17945.387 | 18029.888 |
| Null Model + Educational Attainment + Sex + Tenure | 17677.491 | 243.896 | 4 | 0.235 | 17709.491 | 17822.158 |
| Null Model + Educational Attainment + Sex + Tenure + RGSC | 17459.124 | 218.367 | 20 | 0.243 | 17531.124 | 17784.625 |

Table A5 Average marginal effects on the probability of Economic Activity

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | |  |  |  |  |  |  |
|  | **NS-SEC** | | | **CAMSIS** | | | **RGSC** | | |
| Economic Activity | **Prob.** | **S.E** | **Sig.** | **Coef.** | **S.E** | **Sig.** | **Coef.** | **S.E** | **Sig.** |
| Employment | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
|  |  |  |  |  |  |  |  |  |  |
| Post-Schooling Education |  |  |  |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |  |  |  |
| *Less than five O-levels* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | 0.02 | (0.01) | \*\* | 0.02 | (0.01) | \*\* | 0.02 | (0.01) | \*\*\* |
| Sex |  |  |  |  |  |  |  |  |  |
| *Female* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Male* | -0.07 | (0.01) | \*\*\* | -0.07 | (0.01) | \*\*\* | -0.07 | (0.01) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |  |  |  |
| *Own Home* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.04 | (0.01) | \*\*\* | -0.04 | (0.01) | \*\*\* | -0.04 | (0.01) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |  |  |  |
| *Higher Managerial* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.01 | (0.01) |  |  |  |  |  |  |  |
| *Intermediate Occupations* | -0.00 | (0.02) |  |  |  |  |  |  |  |
| *Small Employers* | -0.04 | (0.01) | \*\* |  |  |  |  |  |  |
| *Lower Supervisory & Technical Occupations* | -0.02 | (0.01) |  |  |  |  |  |  |  |
| *Semi-Routine Occupations* | -0.04 | (0.01) | \*\*\* |  |  |  |  |  |  |
| *Routine Occupations* | -0.03 | (0.01) | \* |  |  |  |  |  |  |
| CAMSIS |  |  |  | 0.01 | (0.00) | \*\*\* |  |  |  |
| RGSC |  |  |  |  |  |  |  |  |  |
| *Professional* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Managerial and Technical* |  |  |  |  |  |  | -0.00 | (0.02) |  |
| *Skilled Non-Manual* |  |  |  |  |  |  | 0.01 | (0.02) |  |
| *Skilled Manual* |  |  |  |  |  |  | -0.02 | (0.02) |  |
| *Partly Skilled* |  |  |  |  |  |  | -0.03 | (0.02) |  |
| *Unskilled* |  |  |  |  |  |  | -0.04 | (0.02) |  |
|  |  |  |  |  |  |  |  |  |  |
| School |  |  |  |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |  |  |  |
| *Less than five O-levels* | Ref | (.) |  | (.) | (.) |  | (.) | (.) | Ref |
| *Five or More O-levels* | 0.57 | (0.01) | \*\*\* | 0.56 | (0.01) | \*\*\* | 0.57 | (0.01) | \*\*\* |
| Sex |  |  |  |  |  |  |  |  |  |
| *Female* | Ref | (.) |  | (.) | (.) |  | (.) | (.) | Ref |
| *Male* | 0.01 | (0.01) |  | 0.01 | (0.01) |  | 0.01 | (0.01) |  |
| Housing Tenure |  |  |  |  |  |  |  |  |  |
| *Own Home* | Ref | (.) |  | (.) | (.) |  | (.) | (.) | Ref |
| *Don't Own Home* | -0.05 | (0.01) | \*\*\* | -0.04 | (0.01) | \*\*\* | -0.05 | (0.01) | \*\*\* |
| NS-SEC |  |  |  |  |  |  |  |  |  |
| *Higher Managerial* | Ref | (.) |  | (.) | (.) |  | (.) | (.) | Ref |
| *Lower Managerial* | -0.05 | (0.01) | \*\*\* |  |  |  |  |  |  |
| *Intermediate Occupations* | -0.12 | (0.03) | \*\*\* |  |  |  |  |  |  |
| *Small Employers* | -0.12 | (0.02) | \*\*\* |  |  |  |  |  |  |
| *Lower Supervisory & Technical Occupations* | -0.12 | (0.01) | \*\*\* |  |  |  |  |  |  |
| *Semi-Routine Occupations* | -0.11 | (0.02) | \*\*\* |  |  |  |  |  |  |
| *Routine Occupations* | -0.16 | (0.01) | \*\*\* |  |  |  |  |  |  |
| CAMSIS |  |  |  | 0.04 | (0.00) | \*\*\* |  |  |  |
| RGSC |  |  |  |  |  |  |  |  |  |
| *Professional* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Managerial and Technical* |  |  |  |  |  |  | -0.10 | (0.02) | \*\*\* |
| *Skilled Non-Manual* |  |  |  |  |  |  | -0.11 | (0.03) | \*\*\* |
| *Skilled Manual* |  |  |  |  |  |  | -0.18 | (0.02) | \*\*\* |
| *Partly Skilled* |  |  |  |  |  |  | -0.18 | (0.03) | \*\*\* |
| *Unskilled* |  |  |  |  |  |  | -0.20 | (0.03) | \*\*\* |
|  |  |  |  |  |  |  |  |  |  |
| Training & Apprenticeships |  |  |  |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |  |  |  |
| *Less than five O-levels* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | -0.17 | (0.01) | \*\*\* | -0.17 | (0.01) | \*\*\* | -0.17 | (0.01) | \*\*\* |
| Sex |  |  |  |  |  |  |  |  |  |
| *Female* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Male* | 0.24 | (0.01) | \*\*\* | 0.24 | (0.01) | \*\*\* | 0.24 | (0.01) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |  |  |  |
| *Own Home* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Don't Own Home* | -0.01 | (0.01) |  | -0.01 | (0.01) |  | -0.01 | (0.01) |  |
| NS-SEC |  |  |  |  |  |  |  |  |  |
| *Higher Managerial* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Lower Managerial* | -0.02 | (0.02) |  |  |  |  |  |  |  |
| *Intermediate Occupations* | 0.01 | (0.03) |  |  |  |  |  |  |  |
| *Small Employers* | 0.05 | (0.02) | \*\* |  |  |  |  |  |  |
| *Lower Supervisory & Technical Occupations* | 0.04 | (0.02) | \*\* |  |  |  |  |  |  |
| *Semi-Routine Occupations* | 0.03 | (0.02) |  |  |  |  |  |  |  |
| *Routine Occupations* | 0.02 | (0.01) |  |  |  |  |  |  |  |
| CAMSIS |  |  |  | -0.01 | (0.00) | \* |  |  |  |
| RGSC |  |  |  |  |  |  |  |  |  |
| *Professional* |  |  |  |  |  |  |  |  |  |
| *Managerial and Technical* |  |  |  |  |  |  | -0.01 | (0.03) |  |
| *Skilled Non-Manual* |  |  |  |  |  |  | 0.01 | (0.03) |  |
| *Skilled Manual* |  |  |  |  |  |  | 0.03 | (0.03) |  |
| *Partly Skilled* |  |  |  |  |  |  | 0.03 | (0.03) |  |
| *Unskilled* |  |  |  |  |  |  | -0.01 | (0.03) |  |
|  |  |  |  |  |  |  |  |  |  |
| Unemployment & Out of Labour Force |  |  |  |  |  |  |  |  |  |
| Educational Attainment |  |  |  |  |  |  |  |  |  |
| *Less than five O-levels* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Five or More O-levels* | -0.04 | (0.00) | \*\*\* | -0.03 | (0.00) | \*\*\* | -0.03 | (0.00) | \*\*\* |
| Sex |  |  |  |  |  |  |  |  |  |
| *Female* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Male* | -0.01 | (0.00) | \*\*\* | -0.01 | (0.00) | \*\*\* | -0.01 | (0.00) | \*\*\* |
| Housing Tenure |  |  |  |  |  |  |  |  |  |
| *Own Home* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Don't Own Home* | 0.01 | (0.00) | \*\* | 0.01 | (0.00) | \*\* | 0.01 | (0.00) | \*\* |
| NS-SEC |  |  |  |  |  |  |  |  |  |
| *Higher Managerial* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Lower Managerial* | 0.01 | (0.01) |  |  |  |  |  |  |  |
| *Intermediate Occupations* | 0.01 | (0.01) |  |  |  |  |  |  |  |
| *Small Employers* | -0.01 | (0.01) |  |  |  |  |  |  |  |
| *Lower Supervisory & Technical Occupations* | -0.00 | (0.01) |  |  |  |  |  |  |  |
| *Semi-Routine Occupations* | 0.00 | (0.02) |  |  |  |  |  |  |  |
| *Routine Occupations* | -0.00 | (0.01) |  |  |  |  |  |  |  |
| CAMSIS |  |  |  | -0.01 | (0.00) | \*\* |  |  |  |
| RGSC |  |  |  |  |  |  |  |  |  |
| *Professional* | Ref | (.) |  | (.) | (.) |  | (.) | (.) |  |
| *Managerial and Technical* |  |  |  |  |  |  | 0.02 | (0.01) | \* |
| *Skilled Non-Manual* |  |  |  |  |  |  | 0.01 | (0.01) |  |
| *Skilled Manual* |  |  |  |  |  |  | 0.02 | (0.01) | \* |
| *Partly Skilled* |  |  |  |  |  |  | 0.03 | (0.01) | \*\*\* |
| *Unskilled* |  |  |  |  |  |  | 0.04 | (0.01) | \*\*\* |
|  |  |  |  |  |  |  |  |  |  |
| Number of observations | 8448 | | | | | | | | |

Diagram

Description automatically generated

Figure 2 Stabilization of Iterations of mean and std. after burn-in periods for Aconn512

Chart, diagram

Description automatically generated

Figure 3 Stabilization of Iterations of mean and std. after burn-in periods for dconnage16dv46

Diagram

Description automatically generated

Figure 4 Stabilization of Iterations of mean and std. after burn-in periods for econ201

Chart, line chart

Description automatically generated

Figure 5 Stabilization of Iterations of mean and std. after burn-in periods for itoilet

Diagram

Description automatically generated with medium confidence

Figure 6 Stabilization of Iterations of mean and std. after burn-in periods for ns-sec

Diagram, histogram

Description automatically generated

Figure 7 Stabilization of Iterations of mean and std. after burn-in periods for obin

Diagram

Description automatically generated

Figure 8 Stabilization of Iterations of mean and std. after burn-in periods for tenure

Chart, line chart, histogram

Description automatically generated

Figure 9 Stabilization of Iterations of mean and std. after burn-in periods for toilet

Chart, histogram

Description automatically generated

Figure 10 Stabilization of Iterations of mean and std. after burn-in periods for water

# Data Citation

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1. They are; institutionalisation, standardisation, individualisation, pluralisation, and differentiation. They are argued to constitute the life-course and can potentially be independent of one another in the development of life course patterns. Institutionalisation of the life course refers to the normative rules that define temporal organisation – the age that children must stay in school for example. The standardisation of the life course refers to how specific events become popular or common for the population to experience in the same instance –(Brückner and Mayer, 2005) give the example of all workers retiring at age 65. Individualisation is a concept that argues people gain more control over the choices within their lives, with more pathways being open to the individual. Pluralisation refers to the increase in the number of states of life activity – this can refer to the diversification of family types, or the different strands of education that an individual can participate at the same age. Finally, differentiation refers to processes where the number of states across the life course increase- the publicly defined breakdown of education has increasingly seen to be divided into discrete categories of development. [↑](#footnote-ref-1)
2. These three map on to matters of social class, race, and gender [↑](#footnote-ref-2)
3. 1944 Education Act refers to the one implemented in England and Wales. Scotland received their act in 1945 and Northern Ireland in 1947. [↑](#footnote-ref-3)
4. Access to the codebooks can be found in the GitHub repository: https://github.com/Scott0atley/YouthTransitions [↑](#footnote-ref-4)
5. The family characteristics in this study refer to: parental education, fathers’ socio-economic group, number of siblings, adoption and race variables with additional variables included to capture neighbourhood effects such as whether the child was brought up on a council estate – social tenants make up around 24 per cent of households, with owner-occupiers making up 67 per cent (Di Salvo and Ermisch, 1997 :2). [↑](#footnote-ref-5)
6. Discussed at length in section below on Multiple Imputation [↑](#footnote-ref-6)
7. Variable n4118 used [↑](#footnote-ref-7)
8. This latter category can be considered an ‘Other’ category. [↑](#footnote-ref-8)
9. TOPs is the Training Opportunities scheme that was run by the Training Services Department of the Manpower Services Commission – it consists of a vocational guidance training course. [↑](#footnote-ref-9)
10. Either in Social Housing or privately rented accommodation. [↑](#footnote-ref-10)
11. Discussed further in the ‘Registrar General Class Schema’ section below [↑](#footnote-ref-11)
12. Again, discussed further in the ‘National Statistics Socio-Economic Classification’ section below [↑](#footnote-ref-12)
13. For a full descriptive breakdown see table 1.4 [↑](#footnote-ref-13)
14. The variable in question was acatnn236, a categorical variable. [↑](#footnote-ref-14)
15. See appendix for graphical visualisations of means and standard deviations of all imputed variables. [↑](#footnote-ref-15)
16. Tables in this section will be inserted at a later date, see .do file lines 952-955 for subsequent tables [↑](#footnote-ref-16)