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How do parental resources affect child well-being?

Evidence from birth cohort studies

A thesis submitted in fulfilment of the requirements for the degree of PhD,

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Under the Supervision of Dr Yekaterina Chzhen

Submitted under the Department of Sociology,

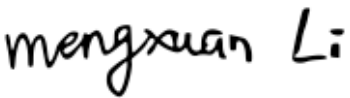
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2025

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Declaration of co-authorship

This signed declaration describes the contribution of the candidate and the co-author to each of the papers in this thesis to identify the candidate's independent contribution to each work.

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Paper one: Parental investment or parenting stress? Examining the links between poverty and child development in Ireland

Mengxuan Li is the first author of this paper. This paper was co-authored with Dr Yekaterina Chzhen and was published in *European Societies* in November 2023. Mengxuan Li compiled the literature review, developed the theoretical framework and conducted the analyses. Dr Yekaterina Chzhen provided advice and feedback on the theoretical framework crucially introducing concept of multidimensional poverty, Annette Lareau's theories on family investment, and the statistical analyses, specifically structural equation models. Dr Yekaterina Chzhen also aided in the development of the theoretical model and data analysis drawing on her expertise in multidimensional poverty. She assisted with interpreting the findings and with the editing of the different drafts of the paper.

Paper two: Insecure maternal employment and children's behaviour difficulties: Evidence from the longitudinal study of Australian children

Mengxuan Li is the first author of this paper. This paper was co-authored with Dr. Yekaterina Chzhen and was published in *Social Science & Medicine* in July 2024. Mengxuan Li compiled the literature review, developed the theoretical framework, conducted the statistical analyses and wrote the original drafts of the paper. Dr. Yekaterina Chzhen

advised on fixed effects statistical analyses and provided advice and editing on the findings and multiple drafts of the paper.

Paper three: Household occupational class and children's Graduate Certificate of Secondary Education outcomes: Evidence from the UK Millennium Cohort Study

Mengxuan Li is the first author of this paper. This paper was co-authored with Dr Yekaterina Chzhen and is. Mengxuan Li compiled the literature review, the theoretical framework, conducted the analyses and wrote the original drafts of the paper. Dr Yekaterina Chzhen provided advice and feedback on the theoretical framework. She also aided in the development of the theoretical model and data analysis drawing on her expertise in educational inequality and assisted with editing and feedback on subsequent drafts of the paper. This paper is being prepared for submission to the *British Educational Research Journal*.

Paper four: Immigrant optimism in Ireland: parental expectations of children's educational attainment

Mengxuan Li is the first author of this paper. This paper was co-authored with Dr. Yekaterina Chzhen and is, at the time of writing, in the preparation of submission to *Research in Social Stratification and Mobility*. Mengxuan Li developed the theoretical framework, compiled the literature review, conducted the analyses and wrote the initial manuscript draft of this paper. Dr Yekaterina Chzhen provided advice and feedback on the theoretical framework and analyses and assisted with editing and feedback on subsequent drafts of the paper.

Statement by the co-author:

I hereby confirm that the doctoral candidate's described contribution to the work where I am

listed as co-author is correct, and I consent to including the work in the named dissertation.

Signed:  (Yekaterina Chzhen)

Date: 30th September 2024

Summary

Household resources has shaped the child well-being from early childhood. This thesis uses high-quality longitudinal data from large-scale birth cohort studies and analyses the various channels through which resources affect children's well-being from infancy to adolescence in Ireland, Australia and the UK. It draws on the two main theoretical approaches, Family Investment model (FIM) and Family Stress model (FSM). It comprises four empirical papers to examine the role of household poverty (Paper 1 - Ireland), maternal labour market status and contract type (Paper 2 - Australia), family occupational class (Paper 3 - UK) and parental migration background (Paper 4 – Ireland) in children's (non) academic and/or mental health outcomes.

Paper 1 investigates the relationship between multidimensional household poverty and cognitive and behavioural development during the formative years of childhood (from 9 months to 9 years), using nationally representative longitudinal data from Growing Up in Ireland (GUI) for the cohort of children born in 2007-2008. The results indicate substantial inequalities in Irish children's cognitive and behavioural outcomes at age 9 by multidimensional poverty duration. Children with at least one spell in poverty (out of four interviews) have worse cognitive and behavioural outcomes. Dynamic structural equation models provide evidence in support of a hybrid family investment/family stress model. The adverse effects can be directly through household financial situation and indirectly via parental investment on child and parenting stress.

Paper 2 explores another potential channel between household resources and child well-being via parental employment. It investigates the relationship between insecure maternal employment and child behaviour difficulties from the age of 4 to 16 using seven waves of data from The Longitudinal Study of Australian Children (LSAC). Employing fixed effects models that accounted for unobserved time-invariant heterogeneity, it found that children whose mothers were casual contract employees or economically inactive had greater behaviour difficulties, on average, than their peers whose mothers were permanent or fixed-term employees. To understand the mechanism through which insecure parental employment may affect their children's well-being, we drew on the FIM and FSM to test hypotheses about the economic and psycho-social processes that may explain maternal employment differences in children's outcomes. It is maternal mental

health and intra-family relationships quality, rather than household financial strain, that explained the association between insecure (casual contract) maternal employment and child behaviour difficulties.

Paper 3 focuses on household socioeconomic status (SES) and their children's educational outcome at the end of compulsory schooling in the United Kingdom. Using nationally longitudinal birth cohort - the Millennium Cohort Study - for children between the ages of 7 and 17 to disentangle the contributions of demographic and socio-economic family characteristics, children's early cognitive skills, and maternal language ability on children's General Certificate of Secondary Education (GCSE) outcomes in adolescence. Firstly, it documents differences in children's GCSE qualifications by their parental occupational socio-economic status. Second, it models the mechanisms through which household class contributes to the educational achievement gap between the ages of 7 and 17 years through a stepwise regression and interaction analysis about early cognitive ability and parental cognitive ability. It shows that parental occupational class is a significant predictor of children's performance in GCSE exams, with children from higher occupational classes, such as managerial or professional backgrounds, performing better than those from lower classes. One third of the effect is mediated by children early cognitive ability, and this effect is moderated by maternal cognitive ability.

Paper 4 investigates the differences in educational expectations between immigrant and native parents in Ireland using Growing Up in Ireland study. It aims to understand of secondary effects by examining differences in parental expectations of the future educational attainment of their secondary school children by migration background. Ireland as a context known for high tertiary attainment but with limited research on migration-related educational inequalities due to is a new destination country for migrants. Focusing on first-generation immigrants and their second-generation children, this study shows that immigrants are less likely to report 'realistic' expectations of their children's future attainment according to their children's previous academic achievement, highlighting a "paradox of immigrant optimism."

Overall, this thesis focus on the different kinds of household resources and a range of child outcomes, discusses each of these mechanisms and tests them empirically. These findings contribute to disentangling the complex combination of those channels play within family and our understanding of the intergenerational social inequalities. It tries to understand

how inequalities build across childhood and are transmitted from parent to their child. Then how public policy and social interacts with the formation of inequalities. The thesis explores how public policy can be designed to ameliorate social/educational inequalities for children from disadvantage backgrounds and its long-lasting impacts.

Acknowledgment

At this moment, I have indeed completed my PhD thesis. This is an astonishing moment for me—overwhelming and filled with gratitude and reflection. Growing up as an only child, I shared a unique and close bond with my parents, and I became highly attuned to the challenges our family faced. I witnessed how my mother, a working mom, managed her job while coordinating my school schedule and, at times, sending me to extracurricular courses. She navigated the constant juggle of work, household responsibilities, and childcare in a dual-income family with grace and determination.

From the very beginning of my PhD journey, my research topic has sparked my interest. Childhood is undeniable a critical period in life, and I have always been curious about the impact of parental investment and how our families shape who we become. I am incredibly fortunate to have had a loving and supportive upbringing, thanks to my mother, Juan, my father, Xinhong, and my grandmothers, Lanjun and Xuebi I am deeply grateful to them for teaching me resilience and perseverance, while also imparting life's true values. Their persistent love and care have been my greatest motivation, and it is to them that I dedicate this thesis.

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1 Chapter 1

1.1 Motivation and background

A large multidisciplinary literature has documented the relationship between household material resources and child outcomes on a range of well-being indicators, including health, education and life satisfaction. This is not only because poor households tend to have other characteristics, such as lower levels of education, that are associated with both poverty and adverse child outcomes. A systematic review of the evidence on the causal effects of household income on children in wealthy countries over the past 30 years highlights significant impacts on cognitive development, educational achievement and socio-behavioural functioning, with mixed results for health and no data on subjective well-being (Cooper and Stewart 2021). Analyses of the United Kingdom Millennium Cohort Study show that persistent relative income poverty has a greater cumulative negative effect on children's cognitive development between the ages of 3 and 11 than episodic poverty (Dickerson and Popli 2016; Schoon et al. 2012). At age 14, persistent income poverty is associated with poor physical health and socio-behavioural adjustment, but is only weakly associated with depressive symptoms or subjective well-being (Lai et al. 2019; Rees 2019).

Household resources can influence children's well-being and life experiences in both visible and invisible ways. These resources include both material and non-material capitals held by parents that contribute to their children's developmental, health, educational, and socio-economic outcomes. Research also points to differences in household cultural capital (Sullivan 2001) and parental human capital (Dearden et al. 2011; Schoon et al. 2012) across social classes and how this leads to intergenerational inequalities. Previous research has primarily identified six main types of these resources: interpersonal, economic or material investments, information, genetic factors, social networks, and skills.

Economic hardship not only leaves parents struggling to provide their children with the material necessities, such as nutritious food, warmth and appropriate clothing, but also takes a toll on their development and psychological well-being (Feinstein et al. 2007). Extensive empirical research suggests that economic problems have detrimental effects

on a range of child and adolescent outcomes (Brooks-Gunn and Duncan 1997a; McLoyd 1998; Vasilyeva et al. 2018), including lower cognitive development (Chzhen and Bruckauf 2019; Gershoff et al. 2007a), behavioural problems (Brooks-Gunn and Duncan 1997a; Evans and English 2002), reduced social competence (Bolger et al. 1995a), and physiological stress (Evans and English 2002).

Work and family are two critical and interrelated components of adulthood, and work-related experiences may spill over into the family (Inanc 2018). While economic hardship directly impacts children, it also intersects with work-family dynamics, where employment instability can exacerbate family stress. A robust body of literature indicates that precarious employment and unemployment can lead to future disadvantage in the labour market, such as lower earnings. For affected workers, potential consequences include significant material hardship, marital discord, poor physical and mental health for adults in the family, and family stress and strained parent-child relations (Coelli 2004; Farber et al. 1993; Kalil and Ziol-Guest 2008; Kessler et al. 1987; Price et al. 2002). The negative association between household economic disadvantage and child well-being is well established (Bolger et al. 1995b; Brooks-Gunn and Duncan 1997a; Feinstein et al. 2007; McLoyd 1998; Vasilyeva et al. 2018).

In addition to job security, the occupational class of the household itself is related to children's educational achievement (Barg and Klein 2024; Jæger 2007; Sullivan et al. 2021). Differences in occupational class are not only linked to household income but also to other factors such as wage progression, job security, benefits and future career opportunities. Strong evidence suggests that child educational outcomes are socially stratified (Stopforth et al., 2021). For instance, middle-class parents tend to consciously, and sometimes unconsciously, promote their children's skills (Lareau 2011). The intergenerational skills transmission (Blanden et al. 2007a; Grönqvist et al. 2017) has been shown to affect both their cognitive (Anger and Heineck 2010; Hanushek et al. 2023) and non-cognitive abilities (Attanasio et al. 2020; Mayer et al. 2004), both of which are usually strongly correlated with educational achievement (Deary et al. 2007; Jencks et al. 1979; Mackintosh 2011; Roth et al. 2015).

Socio-economic inequalities in education arise from differences in achievement (primary effects) and educational choices (secondary effects), net of achievement (Jonsson and

Erikson 1996). There are significant differences in educational attainment by immigrant background in Europe (van Tubergen et al. 2004). Even second-generation immigrants tend to have lower levels of educational attainment than their native peers (Heath et al. 2008). In some contexts, ethnic differences in educational attainment could be explained by social class differences, such as parental education and occupational class (van De Werfhorst and van Tubergen, 2007), as educational investments may appear to be more costly for lower socio-economic groups (Becker and Hecken 2009). At the same time, immigrant parents who see education as a route to social mobility often have higher aspirations for their children (Goyette and Xie 1999).

Despite this interdisciplinary body of evidence, there are still gaps in our understanding of the causal processes through which family resources affect child outcomes. This project examines various types of parental resources, including household material resources, parental employment, occupational status and immigrant status, in four separate papers. It investigates the main mechanisms through which household resources affect child outcomes, including parental income, occupation, employment, education, parenting behaviour, and psychological well-being. The first paper studies the relationship between poverty dynamics and child development. The second focuses on the association between parental insecure employment and child behavioural problems. The third paper examines occupational class and children's educational outcomes. The last paper looks at differences by immigrant background in parents' expectations of their children's educational attainment.

Addressing these research objectives will provide insights into which policies and interventions can be most effective in reducing childhood inequality and mitigating its effects. Drawing on the two main theoretical approaches to explaining the impact of parental resources on children, the Family Investment Model and the Family Stress Model, the project will do this through an international case study perspective. Longitudinal data from birth cohort studies in Ireland, Australia and the UK will be used.

The remainder of this chapter is structured as follows. It begins with a review of the current literature on the relationship between parental resources and child well-being. It then presents the overarching research questions that drive this dissertation and the

theoretical framework that underpins it. It then provides the rationale for the selection of the country case studies, the datasets used in this project, and methodological considerations. Finally, it summarises the main findings of the four empirical chapters.

1.2 Previous research

1.2.1 Parental resources and children's cognitive development/education

Numerous studies have found that poverty and/or low socio-economic status (SES) are associated with poor cognitive development in childhood. The finding that family background plays a prominent role in the shaping of child educational outcomes (Parker et al., 2016) has been supported by both quantitative research (Linver et al. 2002; Sohr-Preston et al. 2013) and qualitative research (Lareau 2011). SES is often measured as a combination of parental educational level, household income and occupational status, which represent different types of capital (Guo and Harris 2000; Yeung et al. 2002). Household income refers to financial or economic capital, while parental education and occupation measure human capital (R. D. Conger and Dogan 2007; R. D. Conger and Donnellan 2007; Hoff et al. 2002; Oakes and Rossi 2003) or cultural capital (Bourdieu 1986). Lower-educated parents are less able to keep up with children's schoolwork, whereas parents with higher levels of education may be more likely to prioritise educational attainment, either by directly stimulating their children's learning or by utilising specialised extracurricular tutoring or training (Bae and Wickrama 2015).

Child poverty also affects children's life chances and adult outcomes more broadly (Strelitz and Lister 2008). Blanden and Machin (2007, p. 20) found "a very sharp rise in the association between educational attainment and family income". Bradbury et al. (2015a) used child cohort studies of four countries - the US, the UK, Canada and Australia - to study the relationship between family resources in early childhood and child cognitive development. They found that educational achievement is strongly linked to family resources and investment in children during the pre-school years, such as kindergarten attendance, books available at home, and home learning activities. In England, the government acknowledged that "poverty is the biggest single indicator of low educational achievement" (House of Commons Education and Skills Committee 2003, p. 20). Even

though access to education is often seen as a pathway to improved life opportunity, the association between poverty and poor educational achievement remains strong (Preston 2008). Using UK birth cohort data from the Millennium Cohort Study, Hansen and Joshi (2007) found that by the age of three, some disadvantaged children are lagging a full year behind their better-off peers in terms of cognitive development, social skills and school readiness. The results are supported by Schoon et al. (2010) and their more recent research (Schoon et al. 2012). After examining the effect of persistent poverty, they suggest that there is a significant negative relationship between persistent financial hardship and children's cognitive development, and that these effects can be mitigated by positive parenting. Using a structural equation model (SEM) approach, Dickerson and Popli (2016) demonstrate that the persistent poverty in early childhood has cumulative negative effect on cognitive development. Caro et al. (2009) also adapted the cumulative advantage theory to examine the trajectory of Canadian students' academic achievement from 7 to 15 years old. They found that the SES gradient in academic achievement is relatively stable during early childhood, but it increases as students' progress through school. Skopek and Passaretta (2020) examined the relationship between children's achievement gap and parental education in Germany and found that the large gap is present even before children enter school. McMullin et al. (2020) also highlighted substantial social gradients in children's early cognitive ability by household income in Ireland.

1.2.2 Parental resources and children's socioemotional development

Parental resources also contribute to differences in children's social development from an early age (Headey 2008). Despite the imperfect links between income and quality of life, children growing up in more advantaged households tend to have better well-being outcomes (Duncan 1991). Children who have experienced poverty are at a higher risk of depression and lower subjective well-being than those who have not (Rees 2019). Meanwhile, children develop various 'soft skills' through interactions within their families, such as perseverance and self-discipline (McCormack and Atance 2011). Thus, the family environment may also play an important role in determining these dimensions of personality, such as openness to experience or emotional stability (Anger 2012).

Household poverty can negatively affect children's positive personality and social competence (K. J. Conger et al. 2012). Furthermore, lower-income parents are more likely to have an authoritarian parenting style, with less involvement with the child (Belsky et al. 1996; Rholes et al. 2006; Tharner et al. 2012). Using longitudinal data from the US, Conger et al (1992, 1993, 1994) find that harsh parenting is associated with "adolescent maladaptive problems", even including delinquent behaviours.

West (2007) shows that school attendance tends to be lower for pupils with higher levels of socio-economic disadvantage in the UK. Elder Jr et al (1985) examine the role of parental behaviour (e.g., rejecting, non-supportive) in linking household economic hardship to child well-being during the Great Depression. They further differentiate the results according to the gender of the parents. For example, fathers' rejecting behaviour increased with economic hardship, while mothers' parenting behaviour was not significantly affected by income loss. After examining the influence of economic pressure on parenting styles, Juon and Neppi (2019) suggest that parental positivity and positive parenting are essential factors in protecting young children's competence. On the other hand, economic hardship increases maternal psychological distress, which is negatively related to supportive parenting, and leads to behavioural problems in children. Hardaway and Cornelius (2014) find an indirect relationship between household economic distress and adolescent drinking problems through parenting style. In addition, Mistry et al. (2002) find an association between changes in parenting quality due to financial stress and changes in child behaviour, such as increased hyperactivity and aggression.

1.3 Research questions

The present research project aims to improve our understanding of the processes through which different family resources affect children's outcomes. The dissertation addresses each of the four main research questions in a separate paper:

1. How and why does household poverty matter for children's cognitive and behavioural development?
2. How and why does parental work status affect children's behavioural development?

3. How and through which channels is parental social class related to children's educational outcomes at the end of compulsory schooling?
4. How do parents' expectations of their children's educational attainment vary by immigrant background, before and after controlling for SES?

1.4 Theoretical framework

1.4.1 *Family investment model (FIM)*

The FIM theorises the links between family resources (i.e. economic, social and cultural capital) and child outcomes. The key mechanism is that parents with higher socioeconomic status are able to purchase enrichment materials and invest in a greater quantity and quality of experiences for their child (Yeung et al. 2002). Thus, the relationship between parental resources and child outcomes must be mediated by practices related to child development. Thus, it is not financial wealth per se that leads to improvements in children's literacy and numeracy, but the fact that it can facilitate access to educational activities and materials (Linver et al. 2002). Related to this is the notion that poverty is the result of a lack of resources, rather than the consequence and embodiment of a particular set of behaviours, values and aspirations for learning (Strelitz and Lister 2008). Vasilyeva et al. (2018) highlight that investments made in early childhood have greater benefits for children's later development. From an economic perspective, investing in children's early cognitive skills would increase the rate of return on later investments in children, meaning that "skills beget skills and capabilities foster future capabilities" (Heckman 2013, pp. 32–33). Parents, therefore, play a prominent role in determining the nature and conditions of the learning environments during the critical early years of children's development.

In addition, since Bourdieu's book *Distinction*, researchers have assessed the class differences in 'cultural capital' to explain children's outcomes across social class groups (Bourdieu 1984a). Cultural capital favours children from more privileged backgrounds and can confer advantages in many ways. For example, higher SES parents will invest more in their children's development than lower SES parents who instead prioritise more immediate household needs (R. D. Conger and Donnellan 2007; Lareau 2002; Schofield et

al. 2012). In addition to material resources, parental time and home learning activities are also seen as investments in children's development. One mechanism is the intergenerational transmission of specialised skills subject to monopoly. Another is through the 'imposition' of institutionalised assessment standards to reinforce social norms (Lareau and Weininger 2003). Furthermore, Lareau claims that there is a different 'logic of childrearing' between different social backgrounds (Lareau 2011). She argues that parents from affluent families tend to engage in 'concerted cultivation', actively developing their children's skills explicitly and implicitly. In contrast, working-class and poor parents tend to focus on the 'accomplishment of natural growth'. As such, they do not necessarily see the concerted development of children, particularly through organised leisure activities, as an essential aspect of good parenting. Rather than eliciting their children's opinions or persuading them through reasoning, they tend to use directives and maintain the boundary between adult and child (Lareau 2011). Lareau has also suggested that, despite tremendous economic pressures, children in poor households often live more "childlike" lives, with more autonomy from adults and control over their extended leisure.

1.4.2 Family stress model (FSM)

It is widely recognised that poverty creates economic pressures on parents and indirectly affects children through its impact on parental experiences, relationships and behaviour (Brooks-Gunn and Duncan 1997a; K. J. Conger et al. 2000). The Family Stress Model (FSM) focuses on the links between economic hardship, parental behaviour and a wide range of adverse child outcomes (Conger et al., 2000). Family economic hardship can be measured by low household income, financial recession, high debt relative to assets, or whether the family qualifies for means-tested social assistance benefits (Schofield et al. 2012). In particular, the FSM suggests that both social and economic situations affect children's developmental outcomes (R. D. Conger and Donnellan 2007). For a recent review of the FSM framework, see Masarik and Conger (2017).

Conger and Conger (2002) find a positive association between economic hardship and economic pressure in families. The latter includes lack of basic material needs (e.g., food or clothing), inability to pay bills or make ends meet, and difficulty affording necessary

expenses (e.g., medical care, health insurance). Economic pressure can lead to the caregiver's emotional distress (e.g., depression, anxiety, anger), which in turn would be detrimental to the caregiving relationship and frustrate supportive parenting (Neppl et al. 2015). For example, Conger et al. (2000) suggest that family stress affects parent-child interactions by reducing the quality of parental responsiveness, which in turn would affect child development.

1.5 Data and methods

1.5.1 Country selection

The project uses a multi-country, multi-year design, drawing on nationally longitudinal survey data from Australia, Ireland and the UK. They are included as liberal regime welfare states¹ according to Esping-Andersen (1999, p. 85) and English-speaking nations based on Castles and Obinger (2008, p. 332). Liberal welfare states tend to value individualism and have less generous social policies, including low levels of public spending and the weak development of social citizenship rights (Castles 2010). They also tend to have lower levels of taxation and redistribute income through the tax system rather than the benefit system, which tends to favour the middle classes most (Howard 1999). Compared to other welfare states (conservative and social-democratic model), liberal regime states tend to have a 'work first' type rules (Barbier 2004), including 'liberal work-ethic norms' (Esping-Andersen 1990, p. 26) and policies aiming to 'making work pay' (Clegg 2015) through many in-work benefits. These countries also tend to have lower levels of family services and higher childcare costs². Thus, the last global economic and financial crisis may have had a more direct impact on household resources and family economic circumstances in liberal regimes.

Liberal market economies also lead to high flexibility and competition with poor employment protection legislation, high earnings inequality and a high incidence of low paid work (Gallie 2007). According to the OECD³ (2020) employment protection indicators,

¹ Including Canada, United States, United Kingdom, New Zealand, Australia and Ireland

² See OECD measures of childcare costs and related work incentives

³ Source: *OECD Employment Protection Legislation Database*, <http://oe.cd/epl>.

Australia was ranked bottom 6th across OECD countries in strictness of regulation of hiring temporary workers from 2013 to 2019. Ireland and the UK were also below the OECD average. Parents involved in insecure work with low social benefits may experience poor well-being, which would also affect the well-being of their children.

The patterns of economic growth were quite dissimilar in Ireland, the UK and Australia during the study period (from the 2000s to the late 2010s). During the two decades they had different experiences of the last global economic and financial crisis and recovery. Ireland had the fastest growth of all OECD countries in the first decade of the century, followed by a deep recession triggered by the global financial crisis. Since the 2008 recession, Ireland has faced the “bursting of the property bubble, a collapse of property-related tax revenues, falling asset values, a major banking crisis and a ballooning fiscal deficit” (Watson et al. 2015, p. 231). In contrast, based on changes in economic output, government debt and deficit as well as unemployment and income poverty indicators, Australia recovered quickly. In other words, while Ireland was one of the hardest hit economies, Australia was one of the countries that weathered the crisis relatively well (Cantillon et al 2017).

1.5.2 Data

The project will use data from birth cohort studies in Ireland, Australia and the UK, which track the development of large samples of children from one or more birth cohorts. All studies collect a rich set of demographic and socio-economic indicators; child outcomes in education, health and socio-emotional well-being; and parental indicators of wealth, education, socio-economic status, immigration status, employment and subjective well-being. Although the three surveys are not directly comparable, there are considerable similarities in their design and focus. Table 1 shows the distance between the waves of data collection and the age of each cohort of children in each study/wave.

“Longitudinal study for Australian Children” tracks two cohorts: an “Infant” cohort of 5,000 children aged 0-1 years and a “Child” cohort of 5,000 children aged 4-5 years in 2003/04 – the first wave of data collection. Eight waves of data have already been collected.

“Growing Up in Ireland” (GUI) follows two cohorts: an “Infant” cohort of 11,134 children who were 9 months old in the first wave in 2008 and a “Child” cohort of 8,568 children who were 9 years old in 2007 (just before the outbreak of the financial crisis in Ireland).

The Millennium Cohort Study is an ongoing survey of a single cohort of children born at the turn of the millennium in the UK. It follows the lives of 18,818 children at the initial sweep in 2001.

Table 1.1 Country, cohort, year (study child age)

	Growing Up in Ireland	Growing up in Australia	Millennium Cohort Study
Cohort	Infant Cohort (born 2008)	K Cohort (born 1999/2000)	Born 2000
Data (year/age)	2008 (9 months) 2011 (age 3) 2013 (age 5) 2015/16 (age 7/8) 2017 (age 9) 2021 (age 13)	2003/4 (4-5 years) 2005/6 (age 6-7) 2007/08 (age 8-9) 2009/10 (age 10/11) 2011/12 (age 12/13) 2013/14 (age 14/15) 2015/16 (age 16/17) ...	2001 (9 months) 2004 (age 3) 2006 (age 5) 2008 (age 7) 2012 (age 11) 2015 (age 14) 2018 (age 17) ...

* The data waves used in the project, are in bold

Papers 1 and 4 use nationally representative longitudinal data from the "Growing Up in Ireland" (GUI) study, 2008 infant cohort. Paper 2 uses data for Cohort K (born in 2003/4) from the Longitudinal Study of Australian Children (LSAC). Paper 3 uses data from waves 1, 4, 6 and 7 of the Millennium Cohort Study .

The GUI, LSAC and MCS each focus on different household resources, but all have well-established measures for assessing variation in children’s cognitive and socio-emotional development. Ireland, Australia and the UK are liberal democracies that share similarities in their culture, history, policies and institutions, and have enjoyed solid economic growth before the 2009 crisis, but were affected by the downturn to very different degrees. Paper 1 focuses on the material resources of households – hence Ireland (GUI) during the economic recession and its aftermath is an appropriate setting for this study. Australia is

the focus of Paper 2 because LSAC provides the most detailed data on parental work status and contract type. Paper 3 uses the UK as its study setting because the MCS contains data on state examination results at the end of compulsory schooling (age 15/16). Ireland is the case study for Paper 4 because it is a relatively under-researched recent destination for immigrants.

1.5.3 Methodological considerations

Measurements

In Paper 1, monetary poverty is measured as low disposable household income from all sources after taxes and benefits. Although we could use 60% of the national median income as the poverty line, cohort studies differ too much methodologically from the annual living conditions surveys that produce nationally representative median income estimates. Instead, following most other GUI-based studies, we use the bottom quintile of the wave-specific household income distribution as a measure of monetary poverty. We also use material deprivation measures of enforced lack of socially perceived necessities and financial strain information (ability to make ends meet). We then combine low income, financial strain and material deprivation into a measure of multidimensional poverty.

For Paper 2, using LSAC data, information on parental employment is collected in the parental surveys using self-completed questionnaires. It consists of detailed information on primary and secondary child carers' occupation, work status, work contract type, working hours etc.

In Paper 3, data from selected waves of the MCS are employed to operationalise parental occupational class using standardised classifications (based on the NS-SEC), with categories such as managerial/professional, intermediate, and lower occupational classes. The primary outcome is children's educational outcomes, measured by GCSE exam results, while mediator variables include the child's early cognitive ability and maternal verbal test scores.

Paper 4 uses data from the GUI study, where parental expectations are measured via survey responses detailing the level of education parents anticipate for their child. All the children are born in or moved to Ireland before 9 months old, and migration background is defined by the parents' country of birth – distinguishing between native Irish, British, Other Anglo countries, Western European, Eastern European, African, Asian and rest of world (mainly South American) groups.

Child well-being outcomes in all four papers include standardised tests of cognitive ability (or school exam results) and/or parental assessments of behavioural problems. Key predictor variables include parental education, parental occupation, parental employment, household income, parental self-reports of subjective well-being and mental health, family structure, the home learning environment, and ethnic or migration background.

Statistical analysis

All four papers use longitudinal data from several waves of birth cohort studies, but only Papers 1 and 2 fully exploit the panel data nature of these studies (i.e. by employing dynamic structural equation models or fixed effects regression models). Papers 3 and 4 use children's outcomes from earlier waves as predictors of their later outcomes.

Paper 1 estimates the association between poverty duration and child cognitive and behavioural outcomes. Children's outcomes at the latest available wave are then regressed on a poverty history indicator (categorised as never in poverty; once only; intermittent; persistent) and several controls/confounders. Secondly, dynamic structural equation models are estimated using data on outcomes from all the waves to test hypotheses about the timing and duration of poverty as well as the mechanism of its influence (e.g. via home learning environment, parental mental health).

Paper 2 estimates fixed effects regression models exploiting within-child variation in parental employment, household income and child development outcomes over time. Fixed effects regression helps to account for time-invariant unobservable individual or family characteristics.

Papers 3 and 4 estimate ordinary least squares regression models using predictors from earlier waves than the outcome. Paper 3 utilises OLS to estimate the association between occupational class and academic performance, while mediation analyses assess the extent to which early cognitive ability and maternal test scores account for the observed disparities. Paper 4 employs OLS to examine the relationship between migration background and educational expectations, in interaction with prior academic performance (as measured by cognitive test scores at age nine), controlling for household socio-economic status, parental education, and the home learning environment.

1.6 Chapter overview

The remainder of this dissertation is structured as follows. Chapters 2-5 refer to four separate empirical papers, each examining different channels through which family resources may affect child outcomes, with their own literature reviews, methods, analyses and discussion. Chapter 6 summarises the main findings of this project, identifies their policy implications, acknowledges the limitations of the research design and suggests avenues for future research.

Chapter 2 uses the Family Stress Model and the Family Investment Model to examine how the duration of multidimensional household poverty (based on low household income, material deprivation, and financial strain) explains variation in children's cognitive ability and behavioural problems as they grow older. Chapter 3 examines another potential channel through which household resources may affect children – parental employment (e.g., insecure contracts, unemployment). Chapter 4 investigates the relationship between parental occupational class and children's educational outcomes in the UK, controlling for other family resources, such as household income, parental education and ability to make ends meet. Chapter 5 explores differences in educational expectations between immigrant and native parents in Ireland, a context known for high levels of tertiary attainment but with limited research on migration-related educational inequalities.

Bibliography

- Anger, S. (2012). *The Intergenerational Transmission of Cognitive and Non-Cognitive Skills during Adolescence and Young Adulthood* (SSRN Scholarly Paper No. ID 2142491). Rochester, NY: Social Science Research Network.
<https://doi.org/10.2139/ssrn.2142491>
- Anger, S., & Heineck, G. (2010). Do smart parents raise smart children? The intergenerational transmission of cognitive abilities. *Journal of Population Economics*, 23(3), 1105–1132. <https://doi.org/10.1007/s00148-009-0298-8>
- Attanasio, O., De Paula, A., & Toppeta, A. (2020). The Persistence of Socio-Emotional Skills: Life Cycle and Intergenerational Evidence. *SSRN Electronic Journal*.
<https://doi.org/10.2139/ssrn.3696191>
- Bae, D., & Wickrama, K. A. (2015). Family socioeconomic status and academic achievement among Korean adolescents: linking mechanisms of family processes and adolescents' time use. *The Journal of early adolescence*, 35(7), 1014–1038.
- Barbier, J.-C. (2004). Systems of social protection in Europe: Two contrasted paths to activation, and maybe a third. *Labour and Employment Regulation in Europe, PIE- Peter Lang: Brussels*, 233–254.
- Barg, K., & Klein, M. (2024). Maternal Occupation-Specific Skills and Children's Cognitive Development. *Sociology*, 58(1), 118–139.
<https://doi.org/10.1177/00380385231159005>
- Becker, G. S., & Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics*, 4(3, Part 2), S1–S39. <https://doi.org/10.1086/298118>
- Becker, R., & Hecken, A. E. (2009). Why are Working-class Children Diverted from Universities?—An Empirical Assessment of the Diversion Thesis. *European Sociological Review*, 25(2), 233–250. <https://doi.org/10.1093/esr/jcn039>
- Belsky, J., Woodworth, S., & Crnic, K. (1996). Trouble in the Second Year: Three Questions about Family Interaction. *Child Development*, 67(2), 556–578.
<https://doi.org/10.2307/1131832>
- Blanden, J., Gregg, P., & Macmillan, L. (2007). Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability and Education. *The Economic Journal*, 117(519), C43–C60. <https://doi.org/10.1111/j.1468-0297.2007.02034.x>

- Blanden, J., & Machin, S. (2007). *Recent changes in intergenerational mobility in Britain*. Sutton Trust London.
- Bolger, K. E., Patterson, C. J., Thompson, W. W., & Kupersmidt, J. B. (1995a). Psychosocial Adjustment among Children Experiencing Persistent and Intermittent Family Economic Hardship. *Child Development*, 66(4), 1107–1129. <https://doi.org/10.2307/1131802>
- Bolger, K. E., Patterson, C. J., Thompson, W. W., & Kupersmidt, J. B. (1995b). Psychosocial Adjustment among Children Experiencing Persistent and Intermittent Family Economic Hardship, 24.
- Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste*. Harvard university press.
- Bourdieu, P. (1986). The forms of capital. Handbook of theory and research for the sociology of education. JG Richardson. *New York, Greenwood*, 241(258), 19.
- Bradbury, B., Corak, M., Waldfogel, J., & Washbrook, E. (2015). *Too Many Children Left Behind: The U.S. Achievement Gap in Comparative Perspective*. Russell Sage Foundation.
- Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual review of psychology*, 53(1), 371–399.
- Brooks-Gunn, J., & Duncan, G. J. (1997a). The Effects of Poverty on Children. *The Future of Children*, 7(2), 55. <https://doi.org/10.2307/1602387>
- Brooks-Gunn, J., & Duncan, G. J. (1997b). The effects of poverty on children. *The Future of Children*, 7(2), 55. <https://doi.org/10.2307/1602387>
- Caro, D. H. (2009). Socio-economic status and academic achievement trajectories from childhood to adolescence. *Canadian Journal of Education*, 32(3), 558–590.
- Castles, F. G. (2010, July 15). The English-Speaking Countries. *The Oxford Handbook of the Welfare State*. <https://doi.org/10.1093/oxfordhb/9780199579396.003.0043>
- Castles, F. G., & Obinger, H. (2008). Worlds, families, regimes: Country clusters in European and OECD area public policy. *West European Politics*, 31(1–2), 321–344.
- Chzhen, Y., & Bruckauf, Z. (2019). Household income and sticky floors in children's cognitive development: Evidence from the United Kingdom Millennium Cohort

- Study. *Longitudinal and Life Course Studies*, 10(3), 307–326.
<https://doi.org/10.1332/175795919X15628474680691>
- Clegg, D. (2015). The demise of tax credits. *The Political Quarterly*, 86(4), 493–499.
- Coelli, M. B. (2004). *Farber et al., 1993*. unpublished mimeo, University of British Columbia.
- Conger, K. J., Martin, M. J., Reeb, B. T., Little, W. M., Craine, J. L., Shebloski, B., & Conger, R. D. (2012). Economic hardship and its consequences across generations.
- Conger, K. J., Rueter, M. A., & Rand D. Conger. (2000). The role of economic pressure in the lives of parents and their adolescents: the family stress model.
- Conger, R. D., & Conger, K. J. (2002). Resilience in Midwestern Families: Selected Findings from the First Decade of a Prospective, Longitudinal Study. *Journal of Marriage and Family*, 64(2), 361–373. <https://doi.org/10.1111/j.1741-3737.2002.00361.x>
- Conger, R. D., Conger, K. J., Elder, G. H., Lorenz, F. O., Simons, R. L., & Whitbeck, L. B. (1992). A Family Process Model of Economic Hardship and Adjustment of Early Adolescent Boys. *Child Development*, 63(3), 526–541.
<https://doi.org/10.1111/j.1467-8624.1992.tb01644.x>
- Conger, R. D., Conger, K. J., Elder, G. H., Lorenz, F. O., Simons, R. L., & Whitbeck, L. B. (1993). Family economic stress and adjustment of early adolescent girls. *Developmental psychology*, 29(2), 206.
- Conger, R. D., & Dogan, S. J. (2007). Social class and socialization in families. *Handbook of socialization: Theory and research*, 433–460.
- Conger, R. D., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual review of psychology*, 58, 175–199.
- Conger, R. D., Ge, X., Elder Jr, G. H., Lorenz, F. O., & Simons, R. L. (1994). Economic stress, coercive family process, and developmental problems of adolescents. *Child development*, 65(2), 541–561.
- Cooper, K., & Stewart, K. (2021). Does Household Income Affect children’s Outcomes? A Systematic Review of the Evidence. *Child Indicators Research*, 14(3), 981–1005.
<https://doi.org/10.1007/s12187-020-09782-0>

- Dearden, L., Sibieta, L., & Sylva, K. (2011). *The socio-economic gradient in early child outcomes: Evidence from the Millennium Cohort Study* (Working Paper No. 11,03). IFS Working Papers. <https://www.econstor.eu/handle/10419/47494>. Accessed 19 September 2024
- Deary, I. J., Strand, S., Smith, P., & Fernandes, C. (2007). Intelligence and educational achievement. *Intelligence*, 35(1), 13–21. <https://doi.org/10.1016/j.intell.2006.02.001>
- Dickerson, A., & Popli, G. K. (2016). Persistent poverty and children's cognitive development: evidence from the UK Millennium Cohort Study. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 535–558.
- Duncan, G. J. (1991). The economic environment of childhood. *Children in poverty: Child development and public policy*, 23–50.
- Elder Jr, G. H. (1996). Human lives in changing societies: Life course and developmental insights. *Developmental science*, (s 31), 62.
- Elder Jr, G. H., Van Nguyen, T., & Caspi, A. (1985). Linking family hardship to children's lives. *Child development*, 361–375.
- Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton University Press.
- Esping-Andersen, G. (1999). *Social foundations of postindustrial economies*. OUP Oxford.
- Evans, G. W., & English, K. (2002). The Environment of Poverty: Multiple Stressor Exposure, Psychophysiological Stress, and Socioemotional Adjustment. *Child Development*, 73(4), 1238–1248. <https://doi.org/10.1111/1467-8624.00469>
- Farber, H. S., Hall, R., & Pencavel, J. (1993). The incidence and costs of job loss: 1982-91. *Brookings papers on economic activity. Microeconomics*, 1993(1), 73–132.
- Feinstein, L., Hearn, B., Renton, Z., & Abrahams, C. (2007). *Reducing inequalities: Realising the talents of all*. Jessica Kingsley Publishers.
- Gallie, D. (2007). Production regimes and the quality of employment in Europe. *Annu. Rev. Sociol.*, 33, 85–104.
- Gershoff, E. T., Aber, J. L., Raver, C. C., & Lennon, M. C. (2007). Income is not enough: Incorporating material hardship into models of income associations with parenting and child development. *Child development*, 78(1), 70–95.

- Goyette, K., & Xie, Y. (1999). Educational Expectations of Asian American Youths: Determinants and Ethnic Differences. *Sociology of Education*, 72(1), 22–36. <https://doi.org/10.2307/2673184>
- Grönqvist, E., Öckert, B., & Vlachos, J. (2017). The Intergenerational Transmission of Cognitive and Noncognitive Abilities. *Journal of Human Resources*, 52(4), 887–918. <https://doi.org/10.3368/jhr.52.4.0115-6882R1>
- Guo, G., & Harris, K. M. (2000). The mechanisms mediating the effects of poverty on children's intellectual development. *Demography*, 37(4), 431–447.
- Hansen, K., & Joshi, H. (2007). Millennium Cohort Study second survey A user's guide to initial findings. *Centre for Longitudinal Studies*, 198.
- Hanushek, E. A., Jacobs, B., Schwerdt, G., van der Velden, R., Vermeulen, S., & Wiederhold, S. (2023, April). Where Do STEM Graduates Stem From? The Intergenerational Transmission of Comparative Skill Advantages. Working Paper, National Bureau of Economic Research. <https://doi.org/10.3386/w31186>
- Hardaway, C. R., & Cornelius, M. D. (2014). Economic hardship and adolescent problem drinking: Family processes as mediating influences. *Journal of youth and adolescence*, 43(7), 1191–1202.
- Headey, B. (2008). Poverty is low consumption and low wealth, not just low income. *Social Indicators Research*, 89(1), 23–39. <https://doi.org/10.1007/s11205-007-9231-2>
- Heath, A. F., Rothon, C., & Kilpi, E. (2008). The Second Generation in Western Europe: Education, Unemployment, and Occupational Attainment. *Annual Review of Sociology*, 34(Volume 34, 2008), 211–235. <https://doi.org/10.1146/annurev.soc.34.040507.134728>
- Heckman, J. J. (2013). *Giving kids a fair chance*. Mit Press.
- Hoff, E., Laursen, B., Tardif, T., & Bornstein, M. (2002). Socioeconomic status and parenting. *Handbook of parenting Volume 2: Biology and ecology of parenting*, 8(2), 231–52.
- House of Commons Education and Skills Committee. (2003). Secondary Education: Pupils' Achievement. <https://publications.parliament.uk/pa/cm200203/cmselect/cmeduski/513/51302.htm>. Accessed 11 May 2021

- Howard, C. (1999). *The hidden welfare state*. Princeton University Press.
- Inanc, H. (2018). Unemployment, Temporary Work, and Subjective Well-Being: The Gendered Effect of Spousal Labor Market Insecurity. *American Sociological Review*, 83(3), 536–566. <https://doi.org/10.1177/0003122418772061>
- Jæger, M. M. (2007). Educational Mobility Across Three Generations: The Changing Impact of Parental Social Class, Economic, Cultural and Social Capital. *European Societies*, 9(4), 527–550. <https://doi.org/10.1080/14616690701449568>
- Jencks, C., Bartlett, Susan, Corcoran, Mary, Crouse, James, Eaglesfield, David, Jackson, Gregory, et al. (1979). *Who Gets Ahead? The Determinants of Economic Success in America*. Basic Books, Publishers, 10 East 53rd Street, New York, NY 01122 (\$17. Accessed 1 June 2024
- Jeon, S., & Neppl, T. K. (2019). Economic pressure, parent positivity, positive parenting, and child social competence. *Journal of Child and Family Studies*, 28(5), 1402–1412.
- Jonsson, J. O., & Erikson, R. (Eds.). (1996). *Can Education Be Equalized? The Swedish Case in Comparative Perspective*. Stockholm, Sweden: Westview Press, Boulder. https://www.academia.edu/15451548/Can_Education_Be_Equalized_The_Swedish_Case_in_Comparative_Perspective. Accessed 29 February 2024
- Kalil, A., & Ziol-Guest, K. M. (2008). Parental employment circumstances and children's academic progress. *Social Science Research*, 37(2), 500–515.
- Kessler, R., Turner, J., & House, J. (1987). Intervening processes in relationship between unemployment and health. *Psychological medicine*, 17, 949–61. <https://doi.org/10.1017/S0033291700000763>
- Lai, E. T. C., Wickham, S., Law, C., Whitehead, M., Barr, B., & Taylor-Robinson, D. (2019). Poverty dynamics and health in late childhood in the UK: evidence from the Millennium Cohort Study. *Archives of Disease in Childhood*, 104(11), 1049–1055. <https://doi.org/10.1136/archdischild-2018-316702>
- Lareau, A. (2002). Invisible inequality: Social class and childrearing in black families and white families. *American sociological review*, 747–776.
- Lareau, A. (2011). *Unequal childhoods: Class, race, and family life*. Univ of California Press.

- Lareau, A., & Weininger, E. B. (2003). Cultural capital in educational research: A critical assessment. *Theory and Society*, 32(5/6), 567–606.
- Linver, M. R., Brooks-Gunn, J., & Kohen, D. E. (2002). Family processes as pathways from income to young children's development. *Developmental psychology*, 38(5), 719.
- Mackintosh, N. (2011). *IQ and Human Intelligence*. OUP Oxford.
- Masarik, A. S., & Conger, R. D. (2017). Stress and child development: a review of the Family Stress Model. *Current Opinion in Psychology*, 13, 85–90.
<https://doi.org/10.1016/j.copsyc.2016.05.008>
- Mayer, S. E., Duncan, G., & Kalil, A. (2004). Like Mother, Like Daughter? SES and the Intergenerational correlation of Traits, Behaviors and Attitudes. *Working Papers*.
<https://ideas.repec.org//p/har/wpaper/0415.html>. Accessed 26 September 2024
- McCormack, T., & Atance, C. M. (2011). Planning in young children: A review and synthesis. *Developmental Review*, 31(1), 1–31.
- McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American psychologist*, 53(2), 185.
- McMullin, P., McGinnity, F., Murray, A., & Russell, H. (2020). What you do versus who you are: Home-learning activities, social origin and cognitive skills among young children in Ireland. *European Sociological Review*, 36(4), 610–625.
<https://doi.org/10.1093/esr/jcaa012>
- Mistry, R. S., Vandewater, E. A., Huston, A. C., & McLoyd, V. C. (2002). Economic well-being and children's social adjustment: The role of family process in an ethnically diverse low-income sample. *Child development*, 73(3), 935–951.
- Neppl, T. K., Jeon, S., Schofield, T. J., & Donnellan, M. B. (2015). The impact of economic pressure on parent positivity, parenting, and adolescent positivity into emerging adulthood. *Family relations*, 64(1), 80–92.
- Oakes, J. M., & Rossi, P. H. (2003). The measurement of SES in health research: current practice and steps toward a new approach. *Social science & medicine*, 56(4), 769–784.
- OECD. (2020). *OECD Employment Outlook 2020: Worker Security and the COVID-19 Crisis*. OECD. <https://doi.org/10.1787/1686c758-en>
- Preston, J. (2008). The urgency of postsecondary education for Aboriginal peoples. *Canadian Journal of Educational Administration and Policy*, (86).

- Price, R. H., Choi, J. N., & Vinokur, A. D. (2002). Links in the chain of adversity following job loss: How financial strain and loss of personal control lead to depression, impaired functioning, and poor health. *Journal of Occupational Health Psychology, 7*(4), 302–312. <https://doi.org/10.1037/1076-8998.7.4.302>
- Rees, G. (2019). Poverty and children's wellbeing at 14 years old. *Child Poverty Action Group*. <https://cpag.org.uk/welfare-rights/resources/article/poverty-and-children%E2%80%99s-wellbeing-14-years-old>. Accessed 11 May 2021
- Rholes, W. S., Simpson, J. A., & Friedman, M. (2006). Avoidant Attachment and the Experience of Parenting. *Personality and Social Psychology Bulletin, 32*(3), 275–285. <https://doi.org/10.1177/0146167205280910>
- Roth, B., Becker, N., Romeyke, S., Schäfer, S., Domnick, F., & Spinath, F. M. (2015). Intelligence and school grades: A meta-analysis. *Intelligence, 53*, 118–137. <https://doi.org/10.1016/j.intell.2015.09.002>
- Schofield, T. J., Conger, R. D., Conger, K. J., Martin, M. J., Brody, G., Simons, R., & Cutrona, C. (2012). Neighborhood disorder and children's antisocial behavior: The protective effect of family support among Mexican American and African American families. *American Journal of Community Psychology, 50*(1–2), 101–113.
- Schoon, I., Cheng, H., & Jones, E. (2010). Resilience in children's development. *Children of the twenty-first century: The first five years, 2*, 235–248.
- Schoon, I., Jones, E., Cheng, H., & Maughan, B. (2012). Family hardship, family instability, and cognitive development. *J Epidemiol Community Health, 66*(8), 716–722.
- Skopek, J., & Passaretta, G. (2020). Socioeconomic Inequality in Children's Achievement from Infancy to Adolescence: The Case of Germany. *Social Forces, (soaa093)*. <https://doi.org/10.1093/sf/soaa093>
- Sohr-Preston, S. L., Scaramella, L. V., Martin, M. J., Neppl, T. K., Ontai, L., & Conger, R. (2013). Parental socioeconomic status, communication, and children's vocabulary development: A third-generation test of the family investment model. *Child development, 84*(3), 1046–1062.
- Stopforth, S., Gayle, V., & Boeren, E. (2021). Parental social class and school GCSE outcomes: two decades of evidence from UK household panel surveys.

- Contemporary Social Science*, 16(3), 309–324.
<https://doi.org/10.1080/21582041.2020.1792967>
- Strelitz, J., & Lister, R. (2008). *Why money matters: Family income, poverty and children's lives*. Save the Children UK.
- Sullivan, A. (2001). Cultural Capital and Educational Attainment. *Sociology*, 35(4), 893–912. <https://doi.org/10.1017/S0038038501008938>
- Sullivan, A., Moulton, V., & Fitzsimons, E. (2021). The intergenerational transmission of language skill. *The British Journal of Sociology*, 72(2), 207–232.
<https://doi.org/10.1111/1468-4446.12780>
- Tharner, A., Luijk, M. P. C. M., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Jaddoe, V. W. V., Hofman, A., et al. (2012). Infant Attachment, Parenting Stress, and Child Emotional and Behavioral Problems at Age 3 Years. *Parenting*, 12(4), 261–281. <https://doi.org/10.1080/15295192.2012.709150>
- Van De Werfhorst, H. G., & Van Tubergen, F. (2007). Ethnicity, schooling, and merit in the Netherlands. *Ethnicities*, 7(3), 416–444.
<https://doi.org/10.1177/1468796807080236>
- van Tubergen, F., Maas, I., & Flap, H. (2004). The Economic Incorporation of Immigrants in 18 Western Societies: Origin, Destination, and Community Effects. *American Sociological Review*, 69(5), 704–727.
<https://doi.org/10.1177/000312240406900505>
- Vasilyeva, M., Dearing, E., Ivanova, A., Shen, C., & Kardanova, E. (2018). Testing the family investment model in Russia: Estimating indirect effects of SES and parental beliefs on the literacy skills of first-graders. *Early Childhood Research Quarterly*, 42, 11–20. <https://doi.org/10.1016/j.ecresq.2017.08.003>
- Watson, D., Whelan, C. T., Maître, B., & Williams, J. (2015). Family economic vulnerability & the Great Recession: an analysis of the first two waves of the Growing Up in Ireland study. *Longitudinal and Life Course Studies*, 6(3).
<https://doi.org/10.14301/llcs.v6i3.331>
- West, A. (2007). Poverty and educational achievement: why do children from low-income families tend to do less well at school? *Benefits*, 15(3), 283–297.

Yeung, W. J., Linver, M. R., & Brooks–Gunn, J. (2002). How money matters for young children's development: Parental investment and family processes. *Child development*, 73(6), 1861–1879.

2 Chapter 2

Poverty dynamics and child development in Ireland

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Abstract

Although a wealth of literature has documented negative consequences of poverty for child development, specific mechanisms of influence are less evident. This study investigates the relationship between multidimensional household poverty and cognitive and behavioural development during the formative years of childhood (from 9 months to 9 years), using nationally representative longitudinal data from Ireland for the cohort of children born in 2007-2008. The results indicate substantial inequalities in Irish children's cognitive and behavioural outcomes at age 9 by multidimensional poverty duration. Children with at least one spell in poverty (out of four interviews) have worse cognitive and behavioural outcomes. Dynamic structural equation models provide evidence in support of a hybrid family investment/family stress model. Although family investment processes account for some of the cumulative effects of childhood poverty on cognitive outcomes, family stress processes help explain the links between poverty and both cognitive and behaviour outcomes in early childhood. Overall, poverty is strongly related to child outcomes over time via the direct effects of current poverty on child outcomes and path dependency in both poverty and child outcomes over time. There are also indirect effects via the two child outcomes reinforcing each other as children grow older (with the effects of behaviour problems dominating those of cognitive ability), even as the parental investment and maternal stress pathways become less pronounced.

Key words: early childhood, child poverty, cognitive ability, behaviour problems, Growing Up in Ireland.

2.1 Introduction

A large quantitative research literature has documented the association between poverty and children's outcomes within a range of well-being indicators, including cognitive ability, education, and social and behavioural development (Van Lancker and Vinck 2019). Children from low income households do worse, on average, in cognitive tests (Gregg *et al.* 2008) and in emotional and behavioural development assessments (Blanden *et al.* 2007b; Davies and Woitach 2008). Meanwhile, qualitative research has emphasised the negative consequences of poverty for children's well-being and relationships (Ridge 2002; Treanor 2020). However, it is difficult to disentangle any effect that household income may have in and out of itself from that of its correlates, such as parental education, occupational class, or neighbourhood quality.

Moreover, to the extent that income impacts children's outcomes, the specific pathways and mechanisms remain poorly understood. In a systematic review of experimental, quasi-experimental and observational longitudinal studies on the relationship between household income and child outcomes, Cooper and Stewart (2021) noted both direct causal effects of household income on children's cognitive and behavioural development and indirect effects via parental well-being and the home environment. However, many of these studies were from the United States, and the evidence base was richer for cognitive than non-cognitive outcomes. The positive effects of income were more pronounced among those whose incomes were lower to start with.

At the same time, low household income is not necessarily a sufficient indicator of poverty as a predictor of child outcomes. Poverty is a multidimensional concept that – at least in the European Union – is usually measured using indicators of low disposable household income, enforced lack of socially perceived necessities (i.e. material deprivation), and difficulty making ends meet (i.e. financial strain) (Guio *et al.* 2018). A study using birth cohort data for the United Kingdom found that a combination of all three of these indicators of poverty was associated with the highest levels of child behaviour problems (Schenck-Fontaine and Panico 2019). It highlighted the importance of considering the multidimensional nature of poverty in analyses of child development. A recent study using Irish birth cohort data showed that it is financial strain rather than household income that is associated with behaviour problems in middle childhood and

adolescence (Gibbons *et al.* 2023). An earlier study using US data found that material hardship (a latent factor based on deprivation and financial strain indicators) mediated the effect of household income on family processes (Gershoff *et al.* 2007b).

The present study adds to this literature by investigating the association between multidimensional poverty and children's cognitive and behavioural development between the ages of 9 months and 9 years in Ireland. Using four waves of longitudinal data for the 2008 birth cohort from the nationally representative “Growing Up in Ireland” (GUI) study in a dynamic structural equation modelling framework, we aim to disentangle the direct contemporaneous effects of poverty on child outcomes from the indirect effects accruing over time via earlier poverty, outcomes, parental investments, and parental stress. By observing children (within their households) at the ages of 9 months, 3 years, 5 years, and 9 years, we elucidate the roles of parental investments and parental stress as mediators of poverty during the formative years of childhood. The period up to 9 years of age is critical for cognitive, social, emotional, and physical development (see Britto *et al.* 2013).

The two main theoretical perspectives to analyse the effects of poverty (and socio-economic inequality more broadly) on children's outcomes are the Family Investment Model (FIM) and the Family Stress Model (FSM). The FIM posits that parents use their financial, social, and human capital to foster their children's skills and well-being (Bradley and Corwyn 2002b; Heckman 2006; Lareau 2011). Meanwhile, the FSM postulates the links between economic hardship, economic pressure, parental psychological distress, inter-parental and parent-child relationships, and, finally, child outcomes (see Masarik and Conger, 2017).

Both models enjoy substantial multi- and inter-disciplinary empirical support, but they are usually employed separately. FIM-based studies tend to analyse differences in cognitive ability and educational outcomes (Duncan *et al.* 2017). FSM is primarily used to predict child mental health, subjective well-being, and behavioural adjustment (Chzhen *et al.* 2021; Ponnet 2014), but several FSM-based studies focussed on education-related outcomes (Justice *et al.* 2019; Schoon, Hope, *et al.* 2010).

The two models can also be incorporated into a hybrid one to analyse cognitive and behavioural development. A growing evidence base provides support for doing so. For example, Yeung *et al.* (2008) examined both family investment and family stress processes as mediators of household income effects on cognitive and behavioural

outcomes at age 3-5, using data from the 1997 Child Development Supplement of the US Panel Study of Income Dynamics. They found that the home learning environment played a significant role in mediating the effect of income on children's cognitive outcomes, while maternal emotional stress and parenting practices did so for behaviour outcomes, but the model including all the mediating pathways performed better than the ones focusing on separate pathways. Meanwhile, Gershoff *et al.* (2008) estimated 'hybrid' models with parental investment, parenting stress and parenting behaviour as mediators of family income effects on children's cognitive and behaviour outcomes at the age of 6, using US data from the Early Childhood Longitudinal Study. They too found that parental investment mediated the effects of household income on children's cognitive outcomes, but parenting stress and behaviours did so for both behavioural outcomes and cognitive outcomes. More recently, Layte (2017) used longitudinal data from the UK Millennium Cohort Study to analyse the role of the home learning environment and parental mental health as mediators in the relationship between social class, child cognitive ability and behavioural problems, and teacher-assessed educational performance using. Parental mental health and parental investments (e.g. reading to the child at age 3) had direct effects both on child cognitive ability and behavioural adjustment, supporting a hybrid FIM-FSM model.

2.2 Background

2.2.1 Poverty and child development: Evidence from longitudinal studies

A growing body of evidence from longitudinal studies has found the link between household poverty and children's outcomes. Using British birth cohort data, Dickerson and Popli (2016) identified large cumulative negative effects of persistent poverty on children's cognitive development between the ages of 3 and 7. Hansen and Joshi (2007) showed that by the age of three, some disadvantaged children were lagging a full year behind their better-off peers in terms of cognitive development, social skills, and school readiness. The results are supported by Schoon *et al.* (2010), who further suggested that the significant negative relationship between persistent financial hardship and children's cognitive development could be mitigated by positive parenting in the UK.

Birth cohort studies show that it is not only differences between poor and non-poor households that are related to inequalities in children's outcomes, but there is an income gradient more generally. Using data for Ireland (i.e. GUI), McMullin *et al.* (2020) documented a substantial household income gradient in children's cognitive ability at the ages of 3 and 5. Washbrook *et al.* (2014) showed that higher income in early childhood was associated with higher cognitive ability scores and fewer behaviour problems in middle childhood, based on English birth cohort data from the Avon Longitudinal Study of Parents and Children. In a cross-country comparative study of children's early cognitive development, Bradbury *et al.* (2019) found larger gaps in children's test scores between high-income and middle-income households in the US than in Australia, Canada or the UK, while the gaps between middle-income and low-income households were largely similar. They explain this finding as evidence of a greater concentration of non-monetary resources among high-income households in the US.

Longitudinal studies have also been invaluable for establishing the associations between family resources more generally and children's cognitive development. Bradbury *et al.* (2015a) found that educational achievement was strongly tied to family resources and investment in children during the pre-school period, such as centre-based childcare, books available at home, and home-learning activities in Australia, Canada, the US, and the UK. Caro *et al.* (2009) tested the trajectory of Canadian students' academic achievement from 7 to 15 years old and found that the socio-economic status gradient in academic achievement was stable in early childhood but increased during school years. Meanwhile, Skopek and Passaretta (2021) found that achievement gaps by parental education in Germany were already large by the time children started school and remained stable throughout the school years. Similar findings were documented for the Netherlands and the UK (Passaretta *et al.* 2022). A recent analysis of GUI data by McGinnity *et al.* (2022) showed that occupational social class differentials in reading achievement at age 9 persisted even after accounting for vocabulary scores at age 3, early childhood education and care attendance, and length of school exposure.

Poverty also contributes to differences in children's mental health and social and behavioural development from an early age. By the age of 14, British children with at least one spell in income poverty had a higher risk of stress, emotional and behavioural difficulties, and low subjective well-being than those who had not been in income poverty

(Rees 2019). Meanwhile, British children living in families experiencing both material deprivation and financial strain were at the highest risk of behaviour problems at age 7 (Schenck-Fontaine and Panico 2019). Financial strain was associated with greater externalised behavioural difficulties in Irish adolescents (Gibbons *et al.* 2023).

2.2.2 Current study

We build on this literature by integrating the FIM and FSM frameworks to analyse the consequences of multidimensional poverty for both cognitive and behavioural development in early to middle childhood. First, we document differences in children's outcomes at age 9 by the number of waves they had been in multidimensional poverty. Second, we model the mechanisms through which household poverty affects cognitive and behavioural development between the ages of 9 months and 9 years.

We operationalise the main FIM channel as parental activities stimulating children's learning (e.g. reading to the child at age 3) and the key FSM pathway as parenting stress reported by the mother. FIM predicts that poverty will affect children's cognitive and behavioural development primarily via parental activities rather than directly (Hypothesis 1), while FSM emphasises parental psychological distress and inter-family relationships as the key mediators (Hypothesis 2). A hybrid model suggests that both pathways underlie the association between poverty and child outcomes over time (Hypothesis 3). We also explore the possibility that cognitive and behavioural outcomes reinforce each other over time (Hypothesis 4).

2.2.3 The Irish case

The Irish context is particularly relevant to the study of longer-term consequences of poverty for child development because of the economic crisis of 2008-2011 that followed more than ten years of the 'Celtic Tiger' boom. Between the onset of the economic crisis in 2008 and the first signs of economic recovery in 2013, the levels of material deprivation, income poverty and financial strain have risen sharply, particularly among families with children (Nolan and Maître 2017). Thus, using longitudinal data for 2008-2017, we focus on a period of substantial macro-economic turbulence and fluctuation in household incomes when many families with children would experience

economic hardship at least once. Indeed, other studies using data from GUI documented reductions in household incomes (Layte and McCrory 2018a), subjective perceptions of the recession (Reinhard *et al.* 2018), widespread parental job loss (Mari and Keizer 2021), and increased difficulty making ends meet (Watson *et al.* 2016) at GUI Wave 2 in 2011.

Substantial fluctuation in poverty indicators in the GUI sample over the course of the Great Recession helps analyse the short and longer-term consequences of multidimensional poverty for children. Indeed, other studies have utilised the exogenous shock of the Great Recession and GUI's data collection spanning the crisis and its aftermath to better understand the role of changing household economic circumstances for children. For example, Sprong *et al.* (2022) described the socio-demographic characteristics of Irish households with children that experienced different trajectories of economic hardship during the recession and recovery. Mari and Keizer (2021) estimated the effects of parental job loss on child cognitive ability and behaviour problems. Layte (2022) analysed the effects of financial strain on children's performance in state examinations. Gibbons *et al.* (2023) studied the effects of changes in household income, financial strain, and material deprivation on internalised and externalised behavioural difficulties in early to middle childhood and in adolescence.

2.3 Method

2.3.1 *Growing up in Ireland and the study sample*

We use data for the '08 Cohort from the GUI study (<https://www.growingup.gov.ie/>). It collects a rich set of household demographic and socio-economic indicators as well as child cognitive and behavioural outcomes. The '08 cohort is a nationally representative sample of around 11,000 children born in 2008, randomly sampled from the Child Benefit register that includes all children resident in Ireland. GUI families were visited for the first time in 2008/2009 when the study child was 9 months old (Wave 1) and followed up again when the child was 3 years old (Wave 2, 2011), 5 years old (Wave 3, 2013) and 9 years old (Wave 4, 2017). See Thornton *et al.* (2013) for further details of the GUI sampling methodology.

Our study sample includes those who took part in each of these four waves ($N = 7,507$). To account for non-random attrition across the waves, we re-weight our data using

the weighting factors provided in the GUI dataset specifically for this balanced sample. This is important because children from less socio-economically advantaged backgrounds were under-represented at Wave 4 and the longitudinal weights adjust for that (Quail *et al.* 2019). However, these weights do not correct for non-random non-response to survey questions. Income variables are particularly vulnerable to item non-response (see Table 1). Therefore, we estimate our multivariate models (i.e., dynamic structural equation models) using the maximum likelihood with missing values estimator. It draws on all the available information instead of listwise deleting any observation with a missing value on any of the variables in the analysis. Therefore, our analytic sample includes all 7,507 households who took part in all four waves, even if they did not give valid responses to every question. For comparison, a balanced sample based on listwise deletion of missing values would include only 5,000 households.

Wave 1 data collection coincided with the onset of the financial and economic crisis in Ireland. Yet it was in fact at Wave 2 (2011) that households with children experienced some of its worst effects, which were compounded by the austerity measures the government introduced after the 'bail-out' by the European Union and the International Monetary Fund in 2010. According to monthly seasonally adjusted unemployment statistics for the 25-74 age group (CSO, 2021), unemployment peaked at 13% between Waves 2 and 3 and fell to its pre-crisis levels of around 5% by the time of the age 9 data collection in 2017.

2.3.2 Measures: Outcomes, predictors, and mediators

When the study child was 9 months old, the primary caregiver answered a battery of questions from the Ages and Stages Questionnaire, 2nd edition (ASQ-2). The primary caregiver is almost always the mother of the study child (99.9% at Wave 1, 98.4% at Wave 2, 97.9% at Wave 3 and 97.4% at Wave 4). We refer to the primary caregiver as the mother from here onwards for simplicity. ASQ-2 is a screening tool to check an infant's progress in the areas of communication, gross motor skills, fine motor skills, problem solving, and personal-social development (Squires *et al.* 1999). Following Nixon *et al.* (2013), we rely on the 10-month interval ASQ-2 questionnaire as the one most appropriate for 9-month-olds. The continuous scores for each sub-scale (0-60) load on one latent factor, which

accounts for 43% of the total variance in these items in the unweighted Wave 1 sample. We use this as a measure of both cognitive development and behavioural development at 9 months.

Trained interviewers administered age-appropriate cognitive ability tests in the child's home at ages 3, 5 and 9. Two British Ability Scales (BAS) tests were used at ages 3 and 5: Naming Vocabulary and Picture Similarity (Elliot *et al.* 1996). We use the corresponding standardised test scores available in the GUI user database that adjust for the differential difficulty of the items. Following Jones and Schoon (2008) and Chzhen and Bruckauf (2019), who used BAS scores from the UK Millennium Cohort Study, we derive latent cognitive ability scores using principal component analysis in each wave. The two sub-scales load on one factor, which explains 70% of the total variance in these sub-scales at age 3 and 64% at age 5.

A different batch of cognitive assessments were administered at age 9: the Drumcondra Primary Reading Test Revised (DPRT-R) and the Selective Attention Test (SAT). The DPRT-R is based on the Irish national primary school curriculum (Educational Research Centre 2007). We use the logit scores provided in the GUI user database, which adjust for the difficulty of the items and the child's age at interview. Meanwhile, the SAT assesses children's ability to locate 80 small symbols on a map within a minute, while ignoring distracting information. It measures attentional capacity rather than reading ability or curriculum knowledge (Manly *et al.* 1999). We use the number of correctly identified symbols out of 80 alongside the DPRT-R logit score to derive a latent cognitive ability factor. The resulting factor explains 56% of the total variance. We normalise it to have the mean of 100 and the standard deviation of 15 for use in descriptive analyses (Figure 3).

We use the Strengths and Difficulties Questionnaire (SDQ) (R. Goodman 1997) to measure children's behavioural development at ages 3, 5 and 9. We employ the total score on each of the four (mother-reported) sub-scales: emotional symptoms, conduct problems, hyperactivity/inattention, and peer relationship problems. Responses to each item include 'Certainly true', 'Somewhat true', and 'Not true', resulting in the scores from 0 to 10 on each sub-scale and from 0 to 40 in total. Higher scores correspond to more difficulties. The four sub-scales load on one factor in each wave, explaining 45% of the total variance at age 3, 48% at age 5 and 52% at age 9.

Each wave of the GUI study collects data on annual disposable household income (from all sources) after taxes and benefits, adjusted for household size and composition using the Irish equivalence scale. This scale is very similar to the modified OECD scale used by Eurostat. The national relative income poverty measure in Ireland is the share of the population living in households with annual disposable equivalised income below 60% of the national median. The measure is rooted in Townsend's (1979) theory of relative deprivation, as it benchmarks one's own position in the national income distribution to the level of income that would approximate "the minimum acceptable way of life in the member state in which they live" (European Council 1984, p. 1) According to this measure, the share of children under 18 in Ireland living in income-poor households fluctuated around 20% between 2008 and 2017 (Central Statistics Office, 2019).

Yet we do not have a reliable measure of the national median income to replicate the official Irish relative income poverty indicator in the GUI sample. Official poverty statistics use data from the nationally representative cross-sectional annual Statistics on Income and Living Conditions survey, which differs substantially from the GUI study in its sampling methods and the dates of data collection. Therefore, we use 60% of the wave-specific median as the income poverty line in each wave. This produces the rates of 20% in Wave 1, 16% in Wave 2, 16% in Wave 3 and 17% in Wave 4. The falling or stable poverty rate during a recession is an artefact of linking the poverty line to the national (or sample) median income, which fell during the recession. Yet this income poverty measure still captures the spirit of Townsend's relative poverty approach because it allows us to compare the outcomes of the poorest children to their better-off peers even at a time of changing macro-economic circumstances.

However, the issue of the poverty line aside, low household income does not automatically mean that people are living in poverty (Mack and Lansley 1985; Townsend 1979). For example, some households can draw on savings and other assets in times of hardship (Lister 2004), while even higher income households may have significant needs that their incomes do not meet. Therefore, we also include measures of material deprivation and financial strain in the analysis. We define financial strain using the mother's response to the question about the household's ability to make ends meet. This ranges from 1 'with great difficulty' to 6 'very easily'. We recoded this into a binary

variable where 1 indicates 'with difficulty or great difficulty' and 0 'with some or no difficulty'.

We measure material deprivation using nine items referring to the household's ability to afford goods or activities that are customary in the Irish society. These are: eating meals with meat, chicken, or fish (or a vegetarian equivalent) every second day; having a roast joint at least once a week; buying new rather than second-hand clothes; each household member having a warm waterproof coat; two pairs of strong shoes; replacing worn-out furniture; keeping the home adequately warm; having family for friends for a drink or meal once a month; buying presents for family or friends at least once a year. Households that report enforced lack of two or more of these nine items are counted as materially deprived in our descriptive analysis (see Figures 3 and 4). We use the ordinal (0-9) material deprivation measure in our structural equation models.

To create a measure of multidimensional poverty history for our descriptive analyses (Figures 3 and 4), we count the number of waves in which the study child lived in a multidimensionally poor household. We construct a measure that draws on low income, material deprivation and financial strain: those who are subject to at least two of these 'dimensions' are counted as multidimensionally poor. We then combine those who were in multidimensional poverty in all four waves (from 9 months until 9 years) as well as those who experienced poverty in any three waves into the group that experienced persistent poverty. As a result, 78.5% of the age 9 (Wave 4) sample who took part in all four waves were never in multidimensional poverty, 13.4% experienced it once, 5.6% twice ('intermittent') and the remaining 2.5% were in persistent multidimensional poverty.

Parental investment in the child's early learning was assessed at ages 3 (Wave 2) and 5 (Wave 3) using questions about the frequency of age-appropriate cognitively stimulating activities. However, very little such information is available at Wave 1. We use the question about how often the child's mother talked to the baby while doing other things, scored on a 5-point-scale from 1 "Never" to 5 "Always".

At Wave 2 (age 3), the mother reported how many days in an average week anyone at home: reads to the child; helps the child learn ABC or alphabet; helps the child learn numbers or counting; helps the child learn songs, poems, or nursery rhymes; plays board games with the child; paints, draws or colours with the child. These items are scored

on a 7-point scale from 0 to 7 days a week. They form a reliable scale ($\alpha = 0.70$) and load on one latent factor (accounting for 40% of the total variance).

At Wave 3 (age 5), the mother reported how often she: played with the child using toys, games, or puzzles; visited the library; read to the child; used a computer with the child in educational ways; and went on educational trips together (e.g., to museums, farms). Each item was scored on a 5-point scale from 1 “Never” to 5 “Every day”. These five items form a scale with modest internal consistency ($\alpha = 0.45$) but removing any of these items does not increase the reliability of the scale, so we kept them all. All these items load on one factor (accounting for 33% of the total variance).

We use self-reported information on parenting stress. It is measured using the six-item parenting stressors sub-scale of the Parental Stress Scale (Berry and Jones 1995). It potentially taps into both the parental psychological distress and disrupted parenting aspects of the FSM. Mothers are asked if they agree or disagree with statements regarding their relationship with the child: Caring for my child sometimes takes more time and energy than I have to give; The major source of stress in my life is my child; Having a child leaves me little time and flexibility in my life; Having a child has been a financial burden; It is difficult to balance different responsibilities because of my child; Having a child has meant having too few choices and too little control over my life. The questions are scored on a 5-point scale from 1 “Strongly Agree” to 5 “Strongly Disagree”. We reverse code these items so that higher values refer to greater stress. These parenting stress items load on one factor, accounting for 43% of the total variance at Wave 1, 47% at Wave 2 and 49% at Wave 3. The Cronbach's alpha for each wave is acceptable: 0.73 for Wave 1, 0.77 for both Wave 2 and Wave 3.

Maternal depression – measured using an 8-item version of the Centre for Epidemiological Studies Depression Scale – could be used instead of parenting stress to operationalise a key FSM pathway. However, maternal depression exhibits less variation over time than parenting stress and may have a shared unobserved genetic component with children's behavioural difficulties. Having re-estimated our models using maternal depression instead of parenting stress, our findings were qualitatively the same (see Table S9 in Supplementary Materials). Table 1 summarises the definition of outcomes, predictors and mediators used in each wave.

Table 2.1 Measures of outcomes, predictors, and mediators

	Age 9 months	Age 3 years	Age 5 years	Age 9 years
Cognitive ability	ASQ-2	BAS	BAS	DPRT-R; SAT
Behaviour problems	ASQ-2	SDQ	SDQ	SDQ
Poverty	Disposable household income below 60% of the median wave-specific median; material deprivation; financial strain.	Disposable household income below 60% of the median wave-specific median; material deprivation; financial strain.	Disposable household income below 60% of the median wave-specific median; material deprivation; financial strain.	Disposable household income below 60% of the median wave-specific median; material deprivation; financial strain.
Home learning environment	Frequency of talking to the baby (1 item).	Frequency of age-appropriate cognitively stimulating activities.	Frequency of age-appropriate cognitively stimulating activities.	
Parental stress and parent-child relationship	Parenting Stressors sub-scale.	Parenting Stressors sub-scale.	Parenting Stressors sub-scale.	

Table 2 shows summary statistics for each wave. The rates of material deprivation and financial strain peaked at Wave 3 (2013). Most children in the sample live with two parents rather than one, have a mother with upper secondary education or lower rather than tertiary education, and have no or just one other child under 18 in the household (who is not necessarily a full sibling) rather than two or more.

Table 2.2 **Summary statistics of study variables**

	Age 9 months		Age 3 years		Age 5 years		Age 9 years	
	M (SD)	N	M (SD)	N	M (SD)	N	M (SD)	N
Low household income (<i>ref.</i> 60% of the median or above)	0.20	7,507	0.16	7,507	0.16	7,507	0.17	7,507
Material deprivation (<i>ref.</i> not materially deprived)	0.06	7,489	0.07	7,500	0.12	7,500	0.07	7,483
Financial strain (<i>ref.</i> not reporting financial strain)	0.13	7,501	0.22	7,502	0.26	7,503	0.13	7,487
Material deprivation	0.25 (0.8)	7,489	0.33 (0.8)	7,500	0.47 (1.1)	7,500	0.3 (0.8)	7,483
Multidimensionally poor (1 or more dimensions)	0.27	7,485	0.33	7,497	0.37	7,498	0.26	7,477
Multidimensionally poor (2 or more dimensions)	0.09	7,485	0.11	7,497	0.14	7,498	0.09	7,477
ASQ_problem solving score (0-60)	46.1 (13.3)	7,094						
ASQ_gross motor score (0-60)	32.1 (16.7)	7,481						
ASQ_fine motor score (0-60)	51.5 (11.1)	7,277						
ASQ_communication score (0-60)	44.8 (11.4)	7,463						
ASQ_personal social score (0-60)	43.9 (11.8)	7,408						
COG_Picture Similarity (20-80)			52.6 (10.8)	7,356	58.3 (10.68)	7,452		
COG Naming Vocabulary (20-80)			50.7 (12.7)	7,153	55.1 (12.1)	7,437		
COG Drumcondra reading logit (45-135)							98.5 (15.2)	7,250
COG Selective attention test (0-80)							31.9 (9.30)	7,252
Parent's report	SDQ_emotional problems_parent report (0-10)		1.41 (1.42)	7,504	1.61 (1.73)	7,505	2.11 (2.08)	7,498
	SDQ_conduct problems (0-10)		2.20 (1.84)	7,503	1.54 (1.52)	7,505	1.17 (1.41)	7,499
	SDQ_hyperactivity problems (0-10)		3.26 (2.20)	7,502	3.43 (2.52)	7,504	3.25 (2.63)	7,499
	SDQ_peer problems (0-10)		1.22 (1.40)	7,504	1.05 (1.36)	7,504	1.14 (1.55)	7,499
	SDQ_total score (0-40)		8.08 (4.65)	7,502	7.63 (5.01)	7,504	7.67 (5.67)	7,498
Teacher's report	SDQ_emotional problems_teacher report (0-10)				1.35 (1.87)	7,071	1.58 (2.07)	6,856
	SDQ_conduct problems (0-10)				0.77 (1.37)	7,073	0.69 (1.40)	6,857
	SDQ_hyperactivity problems (0-10)				3.16 (2.88)	7,072	2.73 (2.75)	6,857

SDQ_peer problems (0-10)					1.03 (1.50)	7,070	0.96 (1.57)	6,857
SDQ_total score (0-40)					6.31 (5.45)	7,070	5.97 (5.79)	6,855
<i>Parental investment</i>								
Talking to baby (1-5)	4.5 (0.9)	7,506						
ABC or alphabet (0-7)			3.9 (22.4)	7,504				
Numbers or counting (0-7)			5.2 (2.0)	7,504				
Songs, poems or nursery rhymes (0-7)			5.2 (2.0)	7,503				
Paint, draw, colour or play-doh (0-7)			5.0 (2.0)	7,504				
Read to child (0-7)			5.5 (2.0)	7,504	4.5 (0.9)	7,505		
Play games (1-5)			4.3 (2.3)	7,501	4.1 (0.9)	7,506		
Visit library (1-5)					2.2 (1.1)	7,504		
Use computer in educational ways (1-5)					2.5 (1.3)	7,506		
Educational visits (1-5)					2.9 (0.7)	7,506		
<i>Maternal stress</i>								
Time & Energy (1-5)	3.1 (1.3)	7,501	2.3 (1.2)	7,425	2.3 (1.2)	7,408		
Main source (1-5)	1.9 (1.0)	7,501						
Time & flexibility (1-5)	3.0 (1.2)	7,496	1.5 (0.8)	7,426	1.4 (0.8)	7,408		
Financial burden (1-5)	2.2 (1.0)	7,492	2.1 (1.1)	7,424	1.9 (1.0)	7,406		
Responsibilities (1-5)	2.5 (1.1)	7,485	1.7 (0.9)	7,424	1.6 (0.9)	7,409		
Choice & control (1-5)	2.0 (0.9)	7,500	1.9 (1.0)	7,423	1.7 (0.9)	7,409		
Doing enough (1-5)			2.9 (1.2)	7,423	3.0 (1.3)	7,409		
Female child (<i>ref.</i> male)	0.49	7,507						
Mother has tertiary education (<i>ref.</i> upper secondary or less)	0.27	7,503	0.30	7,495	0.29	7,505		
Three or more children in the family (<i>ref.</i> one or two)	0.25	7,507	0.35	7,507	0.44	7,507		
Single parent family (<i>ref.</i> couple family)	0.16	7,507	0.17	7,507	0.16	7,507		

Source: Growing Up in Ireland '08 Cohort. Longitudinal weights used.

2.3.3 Estimation

To account for the dynamic nature of child development, we draw on the value-added plus lagged inputs model of skill formation for both cognitive ability and behavioural functioning (Todd and Wolpin 2007). The child's cognitive (see Figure 1) and behavioural outcomes (see Figure 2), measured in each wave, are a function of previous outcomes and previous 'inputs' (i.e. parental investment in cognitively stimulating activities and maternal stress). Following Dickerson and Popli (2016), who modelled children's cognitive development between the ages of 3 and 7 in a dynamic structural equations framework using data from the UK Millennium Cohort Study, we use current multidimensional poverty (from here onwards: poverty, for simplicity) as a predictor of child outcomes in each wave. This allows us to disentangle the direct contemporaneous effects of poverty on child outcomes from the indirect effects accruing over time via the effects of poverty on parental investment and parental stress. Thus, cognitive ability (behaviour difficulties) at the age of 9 months is our baseline outcome, predicted only by household poverty at that time. From age 3 to age 9, however, child outcomes are predicted by prior outcomes, prior parental 'inputs,' and current poverty. However, to allow for persistence of poverty, we also include auto-regressive pathways from poverty in one period to poverty in the subsequent period.

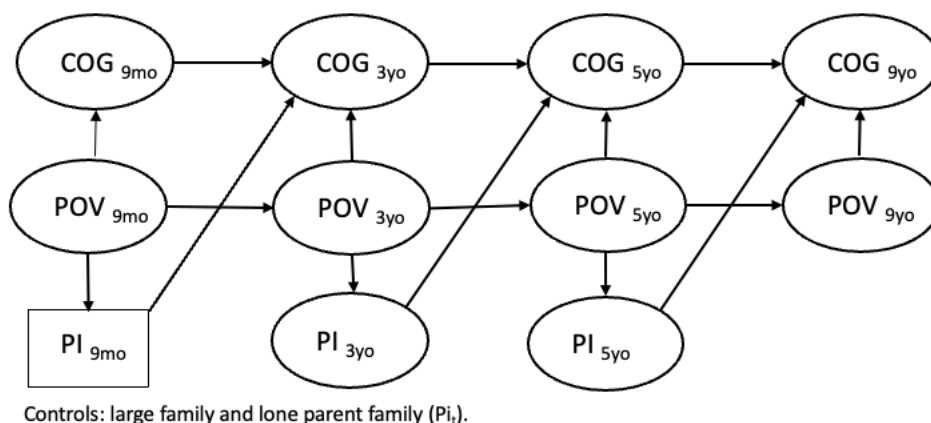
Using the counterfactual approach to mediation analysis (see VanderWeele, 2015), poverty is the exposure or treatment, parental investment and parental stress are the mediators, and child cognitive ability and behaviour problems are the outcomes. In this causal framework, the direct effect of poverty is its 'impact' at a fixed level of the mediators. It is the expected difference in the outcome associated with a change in poverty level if parental investment/stress are the same at all levels of poverty. Meanwhile, the indirect effect is the effect of changes in poverty (or material well-being) that act solely through parental investment or stress.

However, in our dynamic 'lagged inputs' model, it is prior parental investment/stress that mediate prior poverty, while contemporaneous poverty has direct effects on children's outcomes. Thus, while the mediators of theoretical interest are parental investment and parenting stress, we have additional mediators in the model

(prior outcomes and current poverty) to account for the cumulative nature of children's cognitive and behavioural development and for persistence in poverty over time. For example, outcomes at the age of 3 are a function of 1) the outcomes at age 9 months, which mediate the effect of poverty at that time, 2) current poverty, which mediates the effect of poverty at 9 months and 3) parental investment/stress at 9 months, which also mediate the effect of poverty in that period. If the direct contemporaneous effect of poverty is not statistically significantly different from zero, we would conclude that the effects of poverty are primarily via the mediating mechanisms, in line with Hypotheses 1 and 2. In other words, for children with similar levels of ability or behavioural problems, parental 'inputs' and poverty - all measured at an earlier age – there would be no differences in current ability/behaviour by current household poverty.

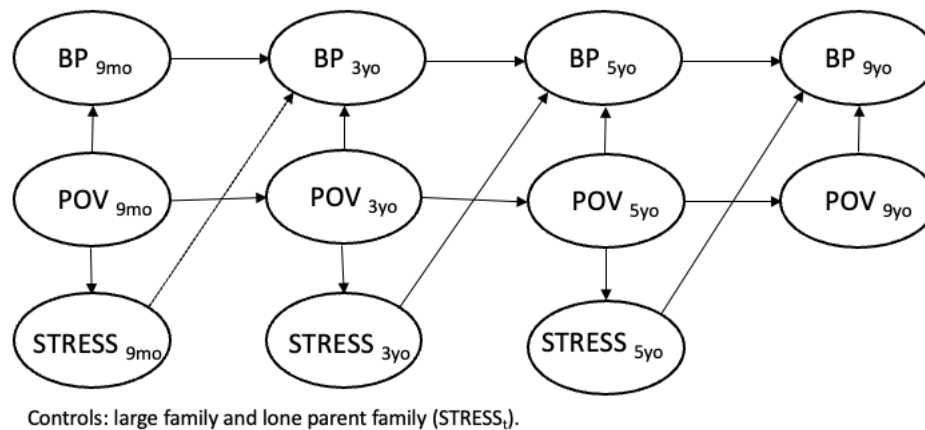
To interpret the estimates of this model in a causal framework, several assumptions need to be met. First, there should be no exposure-mediator interactions. This would mean that the direct effect of poverty on child outcomes is the same across all levels of parental investment/parenting stress. However, the model does not include a direct pathway from prior poverty to current outcomes, only indirect ones, while current poverty is directly associated with current outcomes, without mediators. Second, there should be no unmeasured confounders in the link between poverty and the mediators or between mediators and the outcomes. This assumption is investigated in the robustness checks.

Figure 2.1: Main hypothesised relations between poverty, parental investment and child cognitive ability



*See Equations 1 and 3

Figure 2.2: Main hypothesised relations between poverty, maternal stressors, and child behaviour problems



*See Equations 2 and 4

We model child outcomes, household poverty, parental investment, and maternal stress as latent (unobserved) variables that are represented by a set of manifested (observable) variables. Children's cognitive development is measured using ages and stages questionnaires (at 9 months, Wave 1), Naming Vocabulary and Picture Similarity from the British Ability Scales (age 3 and 5, Waves 2-3), and the Drumcondra Primary Reading Test-Revised and the Selective Attention Test (age 9, Wave 4). Child behaviour problems are measured using ages and stages questionnaires in Wave 1 and the four SDQ sub-scales in Waves 2-4. Note that higher ASQ scores refer to age-appropriate development, while higher SDQ scores refer to greater behaviour problems. For the items that are similar across any two subsequent waves, we allow the error terms to be correlated (i.e. Naming Vocabulary scores at ages 3 and 5, Picture Similarity scores at ages 3 and 5; SDQ sub-scales at ages 3 and 5, and 5 and 9).

Poverty is measured using three binary variables in each wave: disposable household income (adjusted for household size and composition using the Irish equivalence scale) below 60% of the wave-specific median, material deprivation, and financial strain. Parental investment is measured using the frequency of parental engagement in age-appropriate cognitively stimulating activities with the child in Waves

1-3. Maternal stress is measured using 6 items of the parenting stressors sub-scale of the Parental Stress Scale (Berry and Jones 1995) in Waves 1-3.

We estimate a series of structural equation models (SEM) separately for latent cognitive ability (1) and behaviour problems (2) in Stata 17 using the maximum likelihood with missing values estimator. Instead of using modification indices to obtain a model with the best possible fit, we specify the hypothesised pathways and accept the results if the standardised root mean squared residual (SRMR) is below 0.08 (Hu and Bentler 1999). The SEM approach allows us to estimate multiple structural and measurement equations simultaneously and calculate both direct and indirect structural effects.

$$COG_t = \lambda_{11t}COG_{t-1} + \lambda_{12t}PI_{t-1} + \lambda_{13t}POV_t^C + \varepsilon_{1t} \quad (1)$$

$$BP_t = \lambda_{21t}BP_{t-1} + \lambda_{22t}STRESS_{t-1} + \lambda_{23t}POV_t^B + \varepsilon_{2t} \quad (2)$$

where,

- $COG_t(BP_t)$: Latent cognitive ability (or behaviour problems) of the child at time t ;
- PI_{t-1} (or $STRESS_{t-1}$): Parental investment (or maternal stress) in the preceding wave;
- $POV_t^{C,B}$: multidimensional poverty;
- λ_t : coefficients of time-varying predictors;
- ε_t : Error terms, assumed to be independent across children/families and over time.

Similarly, parental investment (maternal stress) is a latent variable associated with some covariates. These include time-varying household poverty and two family characteristics: whether there are three or more children in the household (including the study child) and whether the mother has a co-resident partner. Both large family status and lone parent status are associated with child poverty in Ireland (Maître *et al.* 2020) and they can also affect parental investment and maternal stress. The estimates of the effects of poverty are thus net of family structure, a potential confounder.

$$PI_t = \lambda_{3t}X_t^{PI} + \delta_{3t} \quad (3)$$

$$STRESS_t = \lambda_{4t}X_t^{Stress} + \delta_{4t} \quad (4)$$

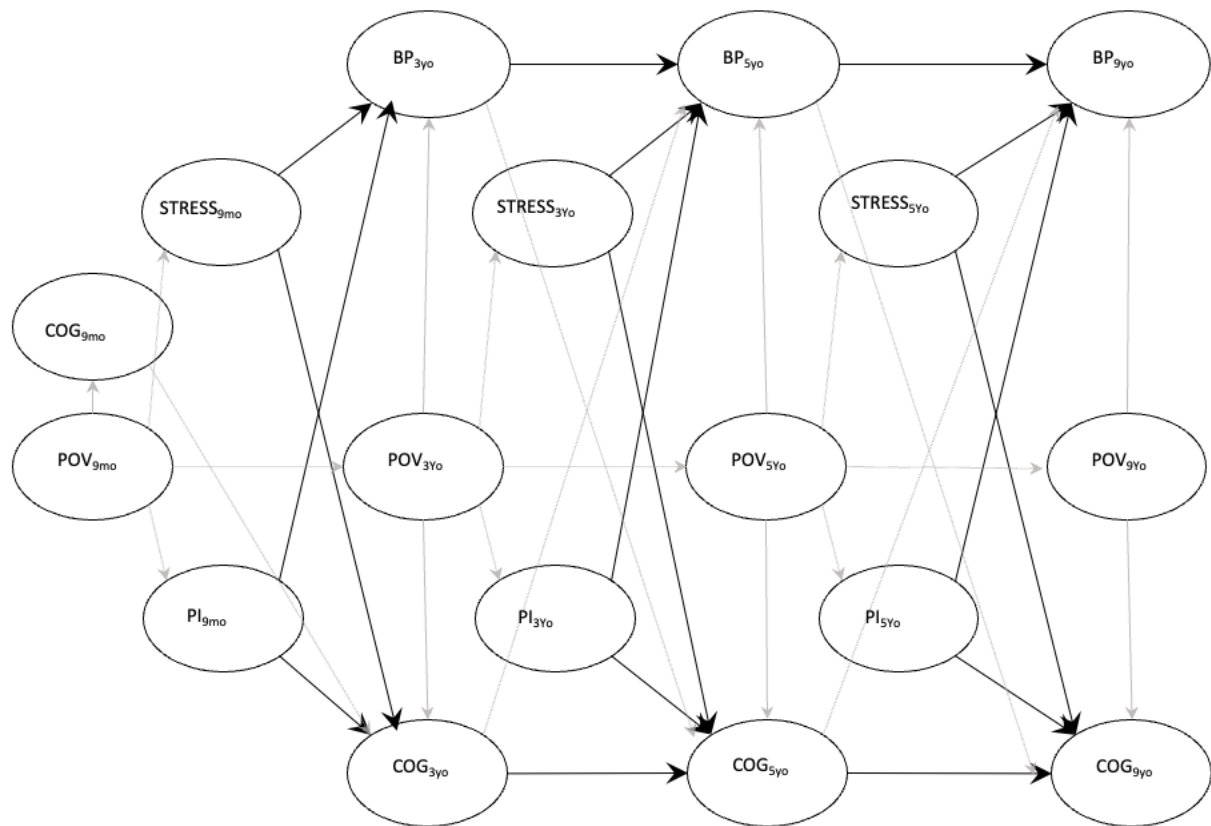
Figures 1 and 2 illustrate the main hypothesised relations between predictors and outcomes embedded in the above equations. Cognitive ability (behaviour problems) are a function of current poverty, prior cognitive ability (behaviour problems), and prior parental investment (maternal stress). The latter are a function of current poverty. From Wave 2 onwards, poverty is a function of prior poverty status. This means that experiencing poverty in early childhood can affect later child outcomes both directly (i.e., concurrently) and indirectly via the effects on prior outcomes (and, thus, prior poverty) and prior home learning environment (maternal stress).

Finally, to address all four hypotheses simultaneously, we test a hybrid FIM+FSM model for cognitive ability and behaviour problems which includes prior maternal stress and home learning environment (Figure 3). This is a more complex model than the first two because it includes both child outcomes simultaneously and allows for the reciprocal cross-lagged pathways between them. Cognitive ability at time t is now a function of not only cognitive ability at time $t-1$ (as well as poverty at time t , parental investment at $t-1$ and maternal stress at $t-1$), but also behavioural problems at $t-1$, and vice versa (see Equations 5 and 6). Since both cognitive ability and behavioural problems at Wave 1 are measured by developmental progress at 9 months (ASQ-2), it predicts these outcomes at age 3, and the cross-lagged portion of the model involves the period from age 3 to age 5 to age 9. Comparing the magnitude and direction of the reciprocal cross-lagged coefficients helps establish the relative strength of their effects on each other (Selig and Little 2012). Figure 3 represents this structural equation model graphically.

$$COG_t = \lambda_{11t}COG_{t-1} + \lambda_{12t}PI_{t-1} + \lambda_{13t}POV_t^C + \lambda_{14t}BP_{t-1} + \lambda_{15t}STRESS_{t-1} + \varepsilon_{1t} \quad (5)$$

$$BP_t = \lambda_{21t}BP_{t-1} + \lambda_{22t}STRESS_{t-1} + \lambda_{23t}POV_t^B + \lambda_{24t}COG_{t-1} + \lambda_{25t}PI_{t-1} + \varepsilon_{2t} \quad (6)$$

Figure 2.3: Main hypothesised relations between poverty, parental investment, maternal stressors, child cognitive ability and child behaviour problems



Controls: large family and lone parent family (PI_t ; $STRESS_t$)

*See Equations 5 and 6

We also carry out a series of robustness checks. First, we check for dynamic complementarity of child outcomes and parental inputs/stress by allowing child outcomes at an earlier age to influence parental inputs/stress at a later age. Second, we re-estimate our main models separately by maternal educational status measured when the child was 9 months old (those without a tertiary degree vs those with a tertiary degree) to investigate if the pathways of influence are the same in both groups or if maternal education is an important moderating variable. Third, we check if the behaviour problems findings would differ if internalised and externalised symptoms were analysed separately. Fourth, we re-estimate the main models with controls for maternal education to assess the sensitivity of the coefficients to another potential confounder (in addition to family structure). We do not include maternal education in our main results to avoid over-controlling.

Data are available to apply via: <https://www.growingup.ie/>, and our replication package is available online (<http://doi.org/10.5281/zenodo.8268737>)

2.4 Results

2.4.1 Poverty duration and child outcomes at age 9

Figure 4 shows differences by income poverty duration in mean cognitive ability scores that are derived from two separate age-appropriate tests and are standardised to have a mean of 100 (SD = 15) at age 9. Children in households that never experienced two or more dimensions of poverty (i.e. low income, material deprivation or financial strain) have statistically significantly higher cognitive ability scores than those who experienced poverty in just one wave ('one-off'), two waves ('intermittent') or three or four waves ('persistent') from the age of 9 months onwards ($p < 0.001$). These are substantively large differences: children who were never in poverty score one-half of a standard deviation higher on the cognitive ability scale than those in persistent poverty. However, there are no statistically significant differences in cognitive ability scores between those in one-off, persistent, or intermittent poverty.

Figure 2.4: Differences in child cognitive ability scores at age 9 by income poverty history

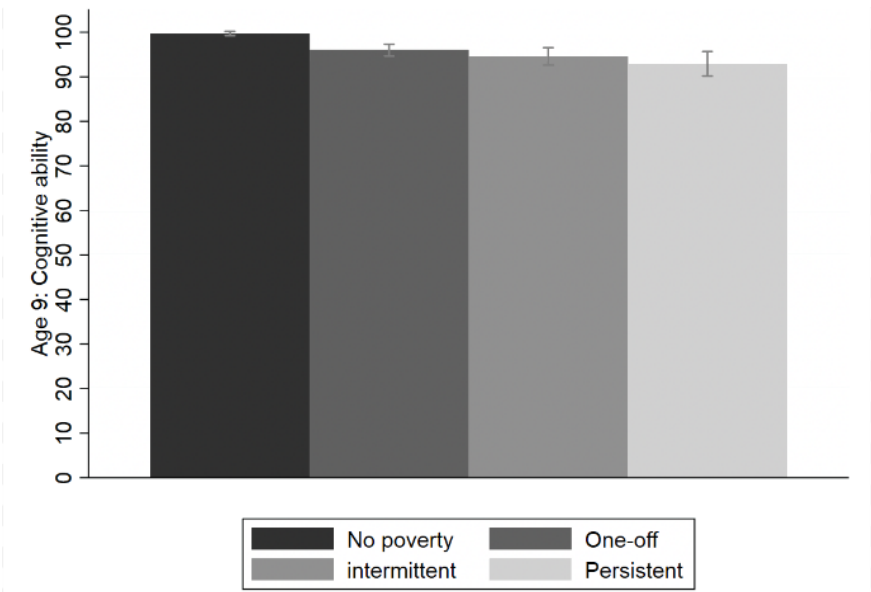
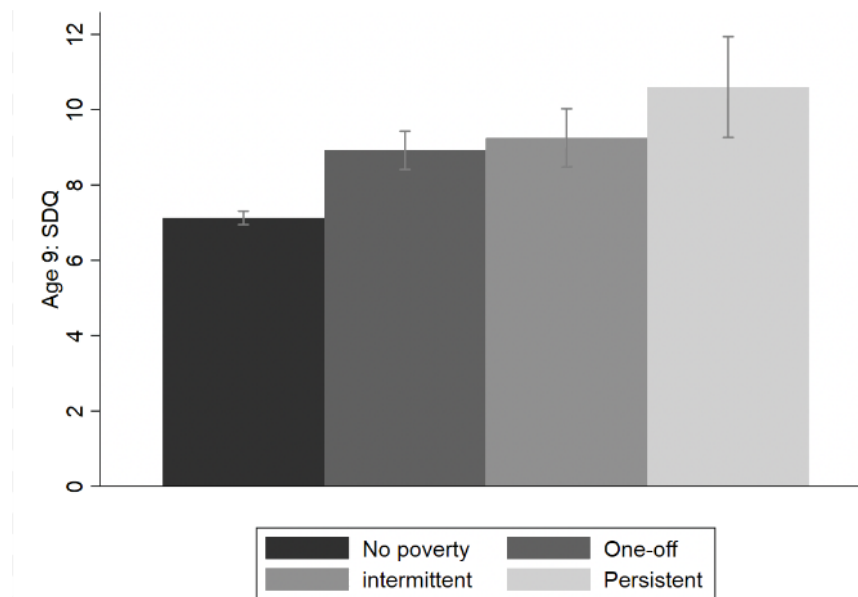


Figure 5 shows differences in mean SDQ scores by poverty duration. The SDQ score is a sum of the emotional, conduct, hyperactivity, and peer problems sub-scales, where higher scores indicate greater behaviour problems. Children who have never been in

poverty have lower SDQ scores than their counterparts who experienced poverty at least once ($p < 0.001$). However, there are no statistically significant differences in SDQ scores among those who experienced poverty once or more than once.

Figure 2.5: Differences in child SDQ scores at age 9 by income poverty history



Poverty, home learning environment, maternal stress and child outcomes

Table 3 reports the standardised coefficients from a dynamic structural equation model of cognitive ability (see Equations 1 and 3, and Figure 1). It focuses on the family investment pathways between poverty and child cognitive development (see Hypothesis 1).

Everything else being equal, household poverty is statistically significantly negatively associated with the child's cognitive ability at the ages of 3, 5 and 9 years, but not at the age of 9 months. Children's cognitive ability is associated with their previous test scores: a 1 SD difference in cognitive ability scores at the age of 9 months is associated with 0.23 SD ($p < 0.001$) higher cognitive scores at age 3, on average; a 1 SD difference in cognitive ability scores at age 3 is associated with a 0.72 SD ($p < 0.001$) higher predicted score at age 5, and a 1 SD difference at age 5 is associated with a 0.84 SD ($p < 0.001$) difference at age 9.

Meanwhile, parental investment at an earlier age is positively associated with cognitive test scores at the ages of 5 and 9, but these effects are substantively small. Everything else being equal, a 1 SD difference in the parental investment score at age 3 is associated with a 0.05 SD ($p < 0.05$) higher predicted cognitive ability score at age 5, and a 1 SD difference in the parental investment score at age 5 is associated with a 0.09 SD ($p < 0.05$) higher predicted cognitive ability score at age 9.

Thus, poverty can influence current cognitive ability not only directly but also indirectly via the prior parental investment and cognitive ability pathways as well as due to poverty persistence over time. Controlling for large family and lone parent status, poverty is associated with lower parental investment scores at age 5 ($B = -0.28$; $p < 0.001$), but not at the earlier waves. The total (direct and indirect) effect of poverty on cognitive ability at age 9 is a substantial -0.30 SD ($p < 0.001$) at age 9 months, -0.34 SD ($p < 0.001$) at age 3, and -0.17 SD ($p < 0.001$) at age 5. This is due to the direct effects of poverty on cognitive ability at ages 3, 5 and 9, indirect effects of poverty via the effect of parental investment at age 5 on cognitive ability at age 9 and strong path dependency in both poverty and cognitive ability over time.

Table 2.3 Standardised coefficients of latent predictors from a structural equation model of cognitive ability and parental investment

Wave		Current wave				Next wave			
		Cognitive ability		Parental investment		Poverty		Cognitive ability	
		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.007	0.029	-0.027	0.027	0.874***	0.022		
	Large family			-0.041**	0.016				
	Lone parent			0.018	0.024				
	Cognitive ability (ASQ)							0.229***	0.023
	Parental investment							0.032	0.020
Age 3	Poverty	-0.295***	0.026	-0.072	0.028	0.918***	0.020		
	Large family			-0.112***	0.019				
	Lone parent			0.057*	0.023				
	Cognitive ability							0.721***	0.021
	Parental investment							0.049*	0.020
Age 5	Poverty	-0.070**	0.024	-0.280***	0.033	0.874***	0.027		
	Large family			-0.217***	0.021				
	Lone parent			0.036	0.030				
	Cognitive ability							0.842***	0.049
	Parental investment							0.085*	0.032
Age 9	Poverty	-0.102***	0.030						

N = 7,507; Coefficient of determination (CD) = .839. Standardised Root Mean Square Residual (SRMR) = .055. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on cognitive ability at 9 years: -0.299*** at 9 months; -0.340*** at 3 years; and -0.172*** at age 9.

*** $p < .001$. ** $p < .01$. * $p < .05$.

Table 4 shows the standardised coefficients from a dynamic structural equation model of behaviour problems (see Equations 2 and 4, and Figure 2), which focuses on the family stress pathways between poverty and children's behavioural development (Hypothesis 2). Poverty is associated with statistically significantly higher behaviour problems at ages 3, 5, and 9, everything else being equal. Poverty also predicts maternal stress when the child is 9 months, 3 years, and 5 years old, with standardised coefficients ranging from 0.21 SD to 0.28 SD ($p < 0.001$). In turn, maternal stress measured in the previous wave is associated with statistically significantly higher problem behaviour scores at ages 3, 5 and 9, with the largest association at age 3 ($B = 0.25$, $p < 0.001$). There is also substantial stability in behavioural problems over time. For example, a 1 SD difference in behaviour problem scores at age 3 is associated with a 0.74 SD higher predicted score at age 5 ($p < 0.001$), while a 1 SD difference at age 5 is associated with 0.72 SD higher scores at age 9 ($p < 0.001$), everything else being equal. The cumulative effects of poverty on behaviour problems at 9 years via prior problems and maternal stress, as well as path dependency in poverty and behaviour problems over time, is 0.26 SD ($p < 0.001$) for poverty experienced at 9 months, 0.26 SD ($p < 0.001$) at 3 years and 0.14 SD ($p < 0.01$) at 5 years.

Table 2.4 Standardised coefficients of latent predictors from a structural equation model of behaviour problems and maternal stress

Wave		Current wave				Next wave			
		Behaviour problems		Maternal stress		Poverty		Behaviour problems	
		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.031	0.029	0.276***	0.030	0.859***	0.022		
	Large family			0.041	0.018				
	Lone parent			0.028	0.027				
	Behaviour problems (ASQ)							-0.153***	0.025
	Maternal stress							0.248***	0.024
Age 3	Poverty	0.224***	0.027	0.232***	0.029	0.920***	0.02		
	Large family			-0.182***	0.015				
	Lone parent			0.075**	0.024				
	Behaviour problems							0.742***	0.021
	Maternal stress							0.099***	0.02
Age 5	Poverty	0.082**	0.025	0.207***	0.031	0.859***	0.026		
	Large family			-0.167***	0.015				
	Lone parent			0.099***	0.024				
	Behaviour problems							0.718***	0.018
	Maternal stress							0.057**	0.020
Age 9	Poverty	0.074***	0.023						

N = 7,507; Coefficient of determination (CD) = 0.831. Standardised Root Mean Square Residual (SRMR) = .079. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on behaviour problems at 9 years: 0.262*** at 9 months; 0.260*** at 3 years; and 0.135*** at age 9.

***p<.001. **p<.01. *p<.05.

Table 5 reports the standardised coefficients from a hybrid model of cognitive ability and behaviour problems (see Hypothesis 3) that incorporates both the family investment and family stress pathways. It also allows the two child outcomes to predict each other over time (see Hypothesis 4). Poverty is directly associated with both cognitive ability and behaviour problems at ages 3, 5 and 9, with the coefficients comparable in size to those from the separate models of cognitive ability (Table 3) and behaviour problems (Table 4). Similarly, the auto-regressive paths for poverty, cognitive ability and behaviour problems are similar to those in the separate models. It is the added pathways that make the hybrid model different. Thus, everything else being equal, higher maternal stress when the child is 9 months old is associated with greater behaviour problems (but not cognitive ability) at age 3, while prior parental investment (i.e. the frequency of talking to the infant) is not a statistically significant predictor of either outcome. Since poverty predicts greater maternal stress when the child is 9 months old, maternal stress mediates the effects of poverty on behaviour problems at age 3. Similarly, poverty is associated with lower parental investment and greater maternal stress at age 3, but only maternal stress is then associated with greater behaviour problems at age 5. Parental investment at age 3 is not significantly associated with either child outcome at age 5. This is likely because both prior child outcomes are now controlled for simultaneously. Notably, behaviour problems at age 3 predict statistically significantly lower cognitive development at age 5 ($B = 0.09, p < 0.01$). Thus, one of the pathways between poverty at age 3 and child outcomes at age 5 is via behaviour problems at age 3.

Further, behaviour problems at age 5 are associated with lower cognitive development at age 9 ($B = -0.22, p < 0.001$), controlling for prior cognitive development, parental investment, and maternal stress, as well as current poverty. Similarly, cognitive ability at age 5 is associated with fewer behaviour problems at age 9 ($B = -0.08, p < 0.001$), controlling for prior behaviour problems, parental investment, and maternal stress, as well as current poverty. The cross-lagged coefficient of behaviour problems is larger in absolute terms than the reciprocal coefficient of cognitive ability, and a Wald test shows that the two coefficients are statistically significantly different from each other ($p < 0.01$). This suggests that behaviour problems dominate the mutually reinforcing relationship

between the two aspects of child development: behaviour problems are a better predictor of cognitive ability than vice versa.

Meanwhile, controlling for prior development outcomes and current poverty, parental investment at age 5 is associated with greater behaviour problems at age 9 ($B = 0.08$, $p < 0.01$) and not with cognitive ability, while maternal stress is a significant predictor of both higher cognitive ability ($B = 0.13$, $p < 0.001$) and greater behaviour problems ($B = 0.05$, $p < 0.05$). These are substantively small associations, and some of them have counterintuitive signs. This may be due to the inclusion of the cross-lagged pathways between the two child outcomes, which already contain the effects of parental investment and maternal stress at the earlier ages.

Finally, the cumulative effects of poverty at the age of 9 months, 3 years, and 5 years on the age 9 outcomes are comparable to those in the separately estimated models, even though the pathways of influence are now more complicated. Poverty is still strongly related to child outcomes over time via the direct effects of current poverty on child outcomes and path dependency in both poverty and child outcomes over time. There are also indirect effects via the two child outcomes reinforcing each other as children grow older, even as the parental investment and maternal stress pathways are less pronounced.

Table 2.5 Standardised coefficients of latent predictors from a structural equation model of cognitive ability, behaviour problems, maternal stress and parental investment

		Current wave								Next wave					
		Cognitive ability		Behaviour problems		Parental investment		Maternal stress		Poverty		Cognitive ability		Behaviour problems	
		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.039	0.029	-0.039	0.029	-0.041	0.027	0.28***	0.018	0.871***	0.021				
	Large family					-0.038	0.016	0.00041	0.018						
	Lone parent					0.025	0.025	0.023	0.027						
	Cognitive and behavioural development (ASQ)											0.225***	0.023	-0.157***	0.024
	Parental investment											0.027	0.020	0.008	0.018
	Maternal stress											-0.016	-0.016	0.240***	0.025
Age 3	Poverty	-0.293**	-0.027	0.244***	0.027	-0.097**	0.029	0.24***	0.03	0.923***	0.020				
	Large family					-0.108***	0.018	-0.185***	0.015						
	Lone parent					0.066**	0.024	0.070**	0.024						
	Cognitive ability											0.707***	0.021	-0.035	0.023
	Behaviour problems											-0.085**	0.027	0.733***	0.021
	Parental investment											0.039	0.021	-0.001	0.02
Age 5	Maternal stress											0.037	0.021	0.099***	0.02
	Poverty	-0.059*	0.025	0.077**	0.026	-0.30***	0.033	0.21***	0.031	0.863***	0.026				

	Large family	-							
		0.218***	0.021	-	0.169***	0.015			
	Lone parent	0.05	0.030		0.094***	0.024			
	Cognitive ability						0.842***	0.048	-
							0.080***		0.022
	Behaviour problems						-		
							0.223***	0.035	0.715***
	Parental investment						0.034	0.033	0.076**
									0.027
	Maternal stress						0.125***	0.026	0.048*
									0.02
Age 9	Poverty	-							
		0.0	0.032	0.074**	0.026				
		76*							

N = 7,505; Coefficient of determination (CD) =0.852. Standardised Root Mean Square Residual (SRMR) = .066. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on cognitive ability at 9 years: -0.324*** at 9 months; -0.342*** at 3 years; and -0.116*** at age 9. Total effects of poverty on behaviour problems at 9 years: 0.278*** at 9 months; 0.273*** at 3 years; and 0.111*** at age 9.

***p<.001. **p<.01. *p<.05.

2.4.3 Robustness checks

We checked for dynamic complementarity of child outcomes and parental inputs/stress by allowing child outcomes at an earlier age to influence parental inputs/stress at a later age. Table S1 in Supplemental Information reports the results of a structural equation model of cognitive ability identical to the one in Equation 1 but with an additional pathway from cognitive ability at age 3 to parental investment age at 5. This coefficient is positive and statistically significant: a 1SD difference in cognitive ability at age 3 is associated with 0.2 SD greater parental investment score at age 5 ($p < 0.001$), everything else being equal. In the next period, parental investment at age 5 is no longer statistically significantly associated with cognitive ability at age 9. However, the total effects of earlier poverty on cognitive ability at age 9 are nearly identical to those in the main model.

Similarly, Table S2 shows that behavioural problems at age 3 are significantly associated with greater maternal stress at age 5, but the total effects of poverty at earlier ages on behavioural problems at age 9 are similar to the estimates in the main model. This alternative specification suggests that poverty at age 9 months is associated with greater maternal stress, which in turn is associated with greater child behavioural problems at age 3. These, in turn, are related to greater maternal stress at age 5. Meanwhile, poverty has a direct effect on behavioural problems at ages 3, 5 and 9. Overall, these alternative models indicate that the relationship between parental investment (stress) and cognitive (behavioural) development may be mutually reinforcing and at least in part triggered by poverty at an early age.

In a second series of checks, we re-estimated our main models allowing the coefficients to vary by maternal educational status (those without a tertiary degree vs those with a tertiary degree at Wave 1). Table S3 shows the results for cognitive ability. Although the findings are similar to those in the main model in Table 3, there are several differences to be noted. The effect of parental investment at age 9 months (i.e. frequency of talking to the infant) on cognitive ability at age 3, the effect of poverty at age 3 on parental investment at age 3, and the effects of poverty on cognitive ability at ages 5 and 9, are all greater for children whose mothers are university educated. The total effects of

poverty on cognitive ability at age 9 are then larger in higher educated families. Meanwhile, the effect of poverty at age 3 on behaviour problems are larger in higher educated families, even as the effect of poverty on maternal stress at ages 3 and 5 is larger for lower educated families (Table S4). The total effects of poverty on behaviour differences at age 9 are comparable for the two sub-groups.

To check if the associations between poverty and child outcomes may be confounded by other dimensions of family socio-economic status, we re-estimated our main models (Equations 1-4) with additional controls for maternal educational attainment (i.e. those without a tertiary degree vs those with a tertiary degree at Wave 1). Table S4 shows children whose mothers are tertiary educated have substantially higher cognitive ability scores, on average, at ages 3 years, 5 years, and 9 years ($p < 0.001$). Maternal education is associated with statistically significantly higher parental investment at ages 3 ($p < 0.05$) and 5 ($p < 0.001$). However, the direct contemporaneous effects of poverty are only slightly attenuated compared to the corresponding estimates in Table 3 and the total effects of poverty are only somewhat smaller. Meanwhile, Table S7 shows that children whose mothers are tertiary educated have lower behaviour problems scores at age 3 ($p < 0.001$), but there are no statistically significant associations at ages 5 or 9. Tertiary educated mothers have higher levels of parenting stress ($p < 0.001$) in all the waves. The direct and total effects of poverty on behaviour problems are somewhat attenuated compared to the corresponding estimates in table 4, but remain of the same sign and statistical significance.

We also checked if the behaviour problems findings would differ if internalised and externalised symptoms were analysed separately. Tables S7 and S8 in Supplemental Information report the results of a specification equivalent to that in Table 4 separately for internalised and externalised symptoms, respectively. Poverty is associated with higher internalised symptoms scores at ages 3 and 9, while prior maternal stress is associated with higher internalised symptoms at ages 3, 5 and 9. The cumulative effects of poverty for internalised symptoms at age 9 via maternal stress and prior symptoms are 0.25 SD ($p < 0.001$) for poverty experienced at 9 months, 0.26 SD ($p < 0.001$) at 3 years, and 0.13 SD at age 5.

Poverty is associated with higher externalised symptoms scores at ages 3 and 5, while prior maternal stress is associated with higher externalised symptoms at ages 3, 5

and 9. The total effects of poverty on externalised symptoms at age 9 via maternal stress and prior symptoms are 0.22 SD ($p < 0.001$) for poverty experienced at 9 months, 0.22 SD ($p < 0.001$) at 3 years, and 0.10 SD ($p < 0.001$) at 5 years. These results suggest that dividing behaviour problems into internalised and externalised symptoms does not alter the main findings, while producing less precisely estimated coefficients in dynamic SEM models.

2.5 Discussion

This study investigated the relationship between child poverty and child development, using a unique Irish longitudinal dataset for the period 2008-2017, when many households experienced at least one instance of economic hardship. Our key contributions are two-fold. First, we establish the differences in children's cognitive and behavioural outcomes at age 9 by the number of instances of multidimensional poverty since the age of 9 months. We demonstrate that even one instance of poverty is harmful to child development. Second, unlike other studies that documented similar patterns using longitudinal data from birth cohort studies in Ireland and the UK (Maître *et al.* 2020; Rees 2019), we investigate the theoretical mechanisms through which poverty affects child development over time. We focus on the family investment and family stress processes as well as the potentially mutually reinforcing relationships between children's cognitive and behavioural development outcomes. We are contributing to the longitudinal studies literature that draws on both family investment and stress processes in explaining socio-economic differences in children's cognitive and behavioural outcomes in early to middle childhood (Layte 2017, 2022) and to the related body of evidence that operationalises poverty as not solely based on household income (Gershoff *et al.* 2007b; Gibbons *et al.* 2023; Schenck-Fontaine and Panico 2019).

First we document substantial inequalities in Irish children's cognitive and behavioural outcomes by multidimensional poverty duration. Children with at least one spell in poverty (out of four interviews) since the age of 9 months have substantially worse cognitive and behavioural outcomes at age 9. Poverty is measured as household experience of two or more dimensions of economic hardship simultaneously (i.e., low income, financial strain, or material deprivation). We use this conservative definition of

multidimensional poverty for descriptive statistics. In multivariate analyses, poverty is a latent factor based on the three indicators of economic hardship.

Overall, these results suggest that persistent multidimensional poverty is particularly harmful to children's outcomes, but even a one-off spell in poverty can matter. This is in line with findings in Maître *et al.* (2020), who documented similar patterns using data from Growing Up in Ireland, and Rees (2019), who found lower well-being in terms of cognitive ability, physical health, and emotional and behavioural difficulties among children with more extensive histories of poverty in the UK.

Second, we test hypotheses derived from the family investment and family stress literatures using dynamic structural equation models to understand these channels of influence. Although the links between poverty and adverse children's outcomes are well documented descriptively (Van Lancker and Vinck 2019), our study is among the few to analyse the specific channels through which poverty affects children's cognitive and behavioural development. In a series of models estimated separately for: 1) cognitive ability, poverty and parental investment and 2) behaviour problems, poverty and maternal stress, we find that family investment processes – based on information about the cognitively stimulating activities that parents engage in with their young children – account for some but not all of the cumulative effects of childhood poverty on cognitive ability test scores. Similarly, family stress processes – manifested in maternal stress – play a key role in explaining the links between poverty and behaviour problems in early to middle childhood, but do not fully explain the relationship between poverty and child outcomes over time. These results only partially support our initial hypotheses 1 and 2 because our family investment and stress measures do not fully account for the association between poverty and child development outcomes. This could be because we included these measures in separate models.

In contrast, the more complex model, which includes both child development outcomes and both mediating channels simultaneously, sheds light on all four of our hypotheses. Here we find some evidence in support of a hybrid family investment and family stress model. Poverty is associated with lower parental investment and greater parental stress at ages 3 and 5. Controlling for prior cognitive ability and behaviour problems, prior maternal stress is associated with greater behavioural problems at age 5

but not with cognitive ability, while prior parental investment is no longer associated with either of the two child outcomes at that age.

The picture gets more complicated in the period between age 5 and age 9, when the two child outcomes already contain the effects of poverty, parental investment, and maternal stress at the earlier ages. Prior maternal stress is associated with greater behaviour problems at age 9 as well as with greater cognitive ability. This can be interpreted as follows: among the children with similar levels of poverty at age 9, cognitive and behavioural outcomes at age 5 as well as parental investment at age 5, those whose mothers experienced greater levels of parenting stress (when the children were 5) had higher cognitive ability scores at age 9. Although the temporal ordering of the measures helps preclude reverse causality, this may still indicate that greater cognitive ability leads to greater parental anxiety. Meanwhile, although parental investment at age 5 is positively associated with cognitive ability at age 9, we also observe a small but statistically significant association between higher intensity of home learning activities at age 5 and greater behaviour problems at age 9. Since most children are already at school at age 5 (McGinnity *et al.* 2022), this may suggest a compensatory relationship: parents invest more in children who are more at risk of behaviour problems. Although further work is needed to focus specifically on the potentially compensatory effects of parental investment and stress processes, this is in line with Washbrook *et al.*'s (2014) finding that some of the income-mediating pathways can have opposing associations different child outcomes. Importantly, we find that behavioural problems are stronger predictors of cognitive ability than vice versa, suggesting that greater behaviour problems may impede children's ability to learn, everything else being equal, while greater cognitive ability is not necessarily a protective factor for the development of behaviour problems. Further, both parental investment and maternal stress are related to behavioural problems. This indicates that behavioural problems may mediate the effects of poverty and family processes on child cognitive development.

Overall, our hybrid model results contrast somewhat with Layte (2017) who found more conclusive evidence in support of a hybrid model using data from the first four sweeps (up to age 7) from the UK Millennium Cohort Study. Both the home learning environment and maternal psychological distress directly affected both child cognitive ability and behaviour problems, controlling for parental social class and household income.

In contrast, we find that maternal stress plays a more important role as a mediator of poverty overall. Some of the differences in our findings may be due to different research questions, data, measures, and methods used. Importantly, Layte (2017) focused on social class rather than poverty or material well-being. More research is needed to contrast the roles of family investment and family processes in children's cognitive and behavioural development over time. Moreover, it would be useful to have data on children's own perceptions of hardship and economic pressure, complementing parental reports. A recent adaptation of the standard FSM that relied on data from both parents and children showed that economic hardship can affect children more directly and immediately than via parental distress (Chzhen *et al.* 2021).

Our analysis has several limitations. First, although we used longitudinal weights designed to account for differential panel attrition and a maximum likelihood with missing values estimator to adjust for item non-response, our findings are based on nationally representative data for a specific cohort (i.e., those born in 2008 and resident in Ireland at the age of 9 months). These findings need to be replicated using longitudinal data for a different country, cohort, or period.

Second, we could only rely on the measures available in the GUI dataset. Thus, we do not have measures of child cognitive ability or behaviour problems at the ages of 9 months. We used ages and stages questionnaires as baseline measures for both outcomes, which is a valid measure of early developmental delays (Gollenberg *et al.* 2010). We showed that ASQ at 9 months is strongly predictive of both higher cognitive ability scores and lower behaviour problem scores at age 3. We also rely on parent-reported measures of children's behaviour problems, which could have been biased downward (i.e. towards fewer problems). Teacher-reported measures are available when the children are aged 5 and 9, but they have more missing values than parental reports. Similarly to other studies (A. Goodman *et al.* 2010), parent and teacher reports are moderately but statistically significantly ($p < 0.001$) correlated for each sub-scale age ages 5 and 9 (see Tables S10-S11 in the Annex). It does not appear that parents tend to under-report their children's behaviour problems: teacher reports of SDQ sub-scales are lower, on average, than parental reports (see Table 2).

Third, our results may not necessarily be interpreted as causal, despite engaging with causal theories of child development and causal mediation frameworks. Our dynamic

structural equation models estimate outcomes between the ages of 9 months and 9 years, using key predictors from prior waves, but reverse causation in later years may still be a problem if parents adjust their home learning actions based on their perceptions of their child's cognitive ability, or if maternal mental health is affected by the child's behaviour difficulties. While Dickerson and Popli (2016) found no evidence of reverse causality in parental inputs and cognitive ability in a similar study using UK data, our robustness checks show that higher cognitive ability at age 3 is associated with greater parental investment at age 5. Similarly, greater behaviour problems at age 3 are associated with greater maternal stress at age 5. However, the cumulative effects of childhood poverty remain robust to alternative specifications of the intermediate pathways. Poverty at the earlier ages triggers a series of reactions that culminate in substantial cognitive and behavioural inequalities by age 9 via both family investment and family stress processes, with some unexplained direct effects of current poverty remaining.

Furthermore, we cannot discount the possibility of unmeasured confounders. We included family size and lone parent status in the baseline (age 9 months) equations because there are differences by family structure in poverty, parental investment/stress and child outcomes. When we further controlled for maternal education in sensitivity analyses, the results were qualitatively the same. However, there are other potential confounders that we cannot account for using our data, such as genetic information.

We also assume that there are no interactions with potential confounders. However, we have found some evidence for our dynamic structural equation models performing somewhat differently in for households with lower and higher educated mothers. When we re-estimated our main models (Figures 1-2) allowing all the coefficients to vary by maternal education (i.e. with or without a university degree), we observed that the total effects of poverty on cognitive ability are somewhat larger in higher educated families, with no sub-group differences behaviour problems. Meanwhile, Mari and Keizer (2021) found larger effects of parental job loss on children's behaviour problems at age 5 among those with tertiary-educated mothers, with no sub-group differences for cognitive ability, using the same survey. This suggests that differences in material hardship may translate into greater inequalities in children's outcomes among higher educated families, who are at a lower risk of poverty overall. If education is a proxy for the non-income dimensions of socio-economic status, this implies a moderating

relationship. Since socio-economic status is a complex concept that taps into different aspects of social position (Bradley and Corwyn 2002b), further work is needed to disentangle the relationship between different aspects of household socio-economic status (i.e. material well-being, education and occupational social class), family inputs and child outcomes.

There are other avenues for further research. Given the complex dynamic nature of socio-economic inequalities in family processes and child development, sociologists could rely more on the causal mediation methods developed in epidemiology. For example, there are approaches for handling multiple mediators (VanderWeele and Vansteelandt 2014) and mediator-outcome confounding (Wodtke and Zhou 2020). A recent application of the latter in sociology is Mari and Keizer's (2021) analysis of parental job loss and children's outcomes. Furthermore, advances in genetics (e.g. polygenic scores) and sociogenomics (Mills and Tropf 2020) offer novel directions for the study of socio-economic inequalities in child development.

2.6 Concluding Remarks

Despite these limitations, a key strength of our study lies in analysing both cognitive and behavioural outcomes during an important developmental window from infancy (9 months) to middle childhood (9 years). We use data from a unique Irish study for the period 2008-2017, when many households experienced hardship due to the Great Recession and austerity policies. We show that experiencing poverty from age 3 is particularly harmful to both cognitive and behavioural development. This is due to indirect cumulative effects over time via family processes (i.e., the parental investment in cognitively stimulating activities; parenting stress) and strong persistence in cognitive and behavioural development. This is consistent with an interdisciplinary body of work highlighting the early years as a key developmental window and calling for a special focus on the early years in anti-poverty policies (see Dickerson and Popli (2016)). However, we also find substantial direct effects of poverty on child outcomes at later ages, even after controlling for prior outcomes and prior parental 'inputs'. This means that public policies need to continue supporting families past the earlier ages. In fact, we do not observe any differences by household poverty in children's developmental milestones at age 9 months, but only from age 3 onwards.

Our findings have other potential policy implications. Since parental investment and parenting stress mediate the effects of poverty, interventions can be designed that improve their levels among the poor. Thus, poorer households need to be enabled to engage in cognitively stimulating activities with their children while experiencing less parenting stress. However, we also observed direct associations between poverty and children's outcomes even after adjusting for these mediators. This suggests that a more effective approach may be tackling poverty itself. Thus, rather than prioritising parent-focussed behavioural interventions, tax-benefit systems can redistribute incomes to reduce relative income poverty while accessible and affordable services can reduce financial strain and material deprivation. A better understanding of the family processes through which poverty affects children's outcomes is valuable without implying that efforts to improve disadvantaged children's outcomes must focus solely on these processes, while ignoring poverty and wider socio-economic inequality.

Thus our study contributes to the emerging literature that combines the family investment and stress processes in explaining socio-economic differences in children's outcomes (Layte 2017, 2022). It also speaks to the broader literature on child poverty and its consequences, highlighting the value of longitudinal birth cohort data. Although cross-sectional studies highlight the factors associated with higher risks of poverty at a point in time, they cannot distinguish between groups who spend only a brief time in poverty and those who remain poor. Longitudinal studies demonstrate that while most income poverty is short-term, substantial minorities suffer from persistent poverty (Goodin *et al.* 1999; Headey 2008; Rees 2019). Persistent lack of income not only leads to debt (Lea *et al.* 1995) but also exacerbates long-term anxiety and stress (Rowlingson and McKay 2005). As children depend on their caregivers and are not responsible for their household circumstances, especially at younger ages, child poverty is both unfair and inefficient (Brooks-Gunn and Duncan 1997a). It undermines meritocracy and equality of opportunity, standing in the way of all children reaching their full potential.

References

- Berry, J. O. and Jones, W. H. (1995) 'The Parental Stress Scale: Initial Psychometric Evidence', *Journal of Social and Personal Relationships* 12: 463–472.
- Blanden, J., Gregg, P. and Macmillan, L. (2007) 'Accounting for intergenerational income persistence: noncognitive skills, ability and education', *The Economic Journal* 117: C43–C60.
- Bradbury, B., Corak, M., Waldfogel, J. and Washbrook, E. (2015) *Too many children left behind: The U.S. achievement gap in comparative perspective*, Russell Sage Foundation.
- Bradbury, B., Waldfogel, J. and Washbrook, E. (2019) 'Income-Related Gaps in Early Child Cognitive Development: Why Are They Larger in the United States Than in the United Kingdom, Australia, and Canada?', *Demography* 56: 367–390.
- Bradley, R. H. and Corwyn, R. F. (2002) 'Socioeconomic Status and Child Development', *Annual Review of Psychology* 53: 371–399.
- Britto, P. R., Engle, P. L. and Super, C. M. (2013) *Handbook of early childhood development research and its impact on global policy*, Oxford University Press.
- Brooks-Gunn, J. and Duncan, G. J. (1997) 'The effects of poverty on children', *The Future of Children* 7: 55.
- Caro, D. H., McDonald, J. T. and Willms, J. D. (2009) 'Socio-economic status and academic achievement trajectories from childhood to adolescence', *Canadian Journal of Education* 32: 558–590.
- Central Statistics Office (2019) *Ireland's UN SDGs 2019 - Report on indicators for goal 1 no poverty*, Database, <https://www.cso.ie/en/releasesandpublications/ep/p-sdg1/irelandsunsdgs2019-reportonindicatorsforgoal1nopoverity/poverty/>.
- Central Statistics Office (2021) *Data from: Seasonally adjusted monthly unemployment* [dataset]. Available from: https://ws.cso.ie/public/api.restful/PxStat.Data.Cube_API.ReadDataset/MUM01/XLSX/2007/en [Accessed 15 Oct 2023].
- Chzhen, Y. and Bruckauf, Z. (2019) 'Household income and sticky floors in children's cognitive development: Evidence from the United Kingdom Millennium Cohort Study', *Longitudinal and Life Course Studies* 10: 307–326.

- Chzhen, Y., Howarth, C. and Main, G. (2021) 'Deprivation and intra-family conflict: Children as agents in the Family Stress Model', *Journal of Marriage and Family* 84: 121–140.
- Cooper, K. and Stewart, K. (2021) 'Does Household Income Affect children's Outcomes? A Systematic Review of the Evidence', *Child Indicators Research* 14: 981–1005.
- Davies, P. T. and Woitach, M. J. (2008) 'Children's emotional security in the interparental relationship', *Current Directions in Psychological Science* 17: 269–274.
- Dickerson, A. and Popli, G. K. (2016) 'Persistent poverty and children's cognitive development: evidence from the UK Millennium Cohort Study', *Journal of the Royal Statistical Society Series A (Statistics in Society)*: 535–558.
- Duncan, G. J., Magnuson, K. and Votruba-Drzal, E. (2017) 'Moving Beyond Correlations in Assessing the Consequences of Poverty', *Annual Review of Psychology* 68: 413–434.
- Educational Research Centre (2007) *Drumcondra primary reading test–Revised. Levels 3–6 administration manual and technical manual, Database*, <https://www.erc.ie/2007/12/31/publications-2007/>
- Elliot, C. D., Smith, P. and McCulloch, K. (1996) British ability scales second edition (BAS II) Administration and scoring manual, London: Nelson.
- European Council (1984) *Council decision of 19 December 1984 on specific Community action to combat poverty, database*, <http://op.europa.eu/en/publication-detail/-/publication/88ac0e06-40ac-4c7b-8cdb-77e780688bd6/language-en>. Accessed 4 June 2021
- Gershoff, E. T., Aber, J. L., Raver, C. C. and Lennon, M. C. (2007) 'Income Is Not Enough: Incorporating Material Hardship Into Models of Income Associations With Parenting and Child Development', *Child Development* 78: 70–95.
- Gibbons, R. A., Sprong, S. and Chzhen, Y. (2023) 'Growing Up in the Great Recession: The Effects of Three Dimensions of Economic Well-being on Child Behavioral Difficulties from Ages 3 to 17', *Journal of Youth and Adolescence* 52: 1024–1038.
- Gollenberg, A. L., Lynch, C. D., Jackson, L. W., McGuinness, B. M. and Msall, M. E. (2010) 'Concurrent validity of the parent-completed Ages and Stages Questionnaires, 2nd Ed. with the Bayley Scales of Infant Development II in a low-risk sample', *Child: Care, Health and Development* 36: 485–490.

- Goodin, R. E., Goodin, R. E., Headey, B., Muffels, R. and Dirven, H.-J. (1999). *The real worlds of welfare capitalism*, Cambridge University Press.
- Goodman, A., Lamping, D. L. and Ploubidis, G. B. (2010) 'When to Use Broader Internalising and Externalising Subscales Instead of the Hypothesised Five Subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British Parents, Teachers and Children', *Journal of Abnormal Child Psychology* 38: 1179–1191.
- Goodman, R. (1997) 'The Strengths and Difficulties Questionnaire: a research note', *Journal of child psychology and psychiatry* 38: 581–586.
- Gregg, P., Janke, K. and Propper, C. (2008) *Handedness and Child Development*, Bristol: Centre for Market and Public Organisation, Working Paper No. 08/198.
- Guio, A.-C., Gordon, D., Marlier, E., Najera, H. and Pomati, M. (2018) 'Towards an EU measure of child deprivation', *Child Indicators Research* 11: 835–860.
- Hansen, K. and Joshi, H. (2007) *Millennium Cohort Study second survey A user's guide to initial findings*, Centre for Longitudinal Studies, Institute of Education, University of London.
- Headey, B. (2008) 'Poverty is low consumption and low wealth, not just low income', *Social Indicators Research* 89: 23–39.
- Heckman, J. J. (2006) 'Skill formation and the economics of investing in disadvantaged children', *Science* 312: 1900–1902.
- Hu, L. and Bentler, P. M. (1999) 'Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives', *Structural Equation Modeling: A Multidisciplinary Journal* 6: 1–55.
- Jones, E. M. and Schoon, I. (2008) 'Child cognition and behaviour', in Hansen, K. and Joshi, H., *Millennium Cohort Study Third Survey: A user's guide to initial findings*, London: Centre for Longitudinal Studies, pp. 118-144
- Justice, L. M., Jiang, H., Purtell, K. M., Schmeer, K., Boone, K., Bates, R. and Salsberry, P. J. (2019) 'Conditions of Poverty, Parent–Child Interactions, and Toddlers' Early Language Skills in Low-Income Families', *Maternal and Child Health Journal* 23: 971–978.
- Lareau, A. (2011) *Unequal childhoods: Class, race, and family life*, University of California Press.

- Layte, R. (2017) 'Why do working-class kids do worse in school? An empirical test of two theories of educational disadvantage', *European Sociological Review* 33: 489–503.
- Layte, R. (2022) 'Does Family Economic Strain Reduce Child Educational Achievement? A Longitudinal Assessment Using the Great Recession in Ireland', *European Sociological Review* 38: 408–424.
- Layte, R. and McCrory, C. (2018) 'Fiscal crises and personal troubles: the great recession in Ireland and family processes', *Social Psychiatry and Psychiatric Epidemiology* 53: 987–1001.
- Lea, S. E., Webley, P. and Walker, C. M. (1995) 'Psychological factors in consumer debt: Money management, economic socialization, and credit use', *Journal of economic psychology* 16: 681–701.
- Lister, R. (2004) 'A politics of recognition and respect: Involving people with experience of poverty in decision-making that affects their lives', in J. Andersen and B. Siim (ed.), *The politics of inclusion and empowerment: Gender, class and citizenship*, London: Palgrave Macmillan UK, pp. 116–138.
- Mack, J. and Lansley, S. (1985) *Poor Britain foreword*, London: G. Allen & Unwin.
- Maître, B., Privalko, I. and Watson, D. (2020) *Social transfers and deprivation in Ireland: A study of cash and non-cash payments tied to*. Dublin: ESRI and the Department of Social Protection, Social Inclusion Report No.9.
- Manly, T., Robertson, I. H., Anderson, V. and Nimmo-Smith, I. (1999) *The test of everyday attention (TEA-CH)*. England: Thames Valley Test Company.
- Mari, G. and Keizer, R. (2021) 'Parental job loss and early child development in the Great Recession', *Child Development* 92: 1698–1716.
- Masarik, A. S. and Conger, R. D. (2017) 'Stress and child development: a review of the Family Stress Model', *Current Opinion in Psychology* 13: 85–90.
- McGinnity, F., McMullin, P., Murray, A., Russell, H. and Smyth, E. (2022) 'Understanding differences in children's reading ability by social origin and gender: The role of parental reading and pre- and primary school exposure in Ireland', *Research in Social Stratification and Mobility* 81: 100729.

- McMullin, P., McGinnity, F., Murray, A. and Russell, H. (2020) 'What you do versus who you are: Home-learning activities, social origin and cognitive skills among young children in Ireland', *European Sociological Review* 36: 610–625.
- Mills, M. C. and Tropf, F. C. (2020) 'Sociology, Genetics, and the Coming of Age of Sociogenomics', *Annual Review of Sociology* 46: 553–581.
- Nixon, E., Swords, L. and Murray, A. (2013) *Parenting and infant development: infant cohort*, Dublin: Stationery Office Department of Children and Youth Affairs, Report No 3
- Nolan, B. and Maître, B. (2017) 'Children of the Celtic tiger during the Economic Crisis: Ireland', in Cantillon, B., Chzhen, Y., Handa, S. and Nolan, B. (eds.) *Children of austerity. Impact of the great recession on child poverty in rich countries*, Oxford: Oxford University Press, pp. 146–169.
- Passaretta, G., Skopek, J. and van Huizen, T. (2022) 'Is social inequality in school-age achievement generated before or during schooling? A European perspective', *European Sociological Review* 38: 849–865.
- Ponnet, K. (2014) 'Financial Stress, Parent Functioning and Adolescent Problem Behavior: An Actor–Partner Interdependence Approach to Family Stress Processes in Low-, Middle-, and High-Income Families', *Journal of Youth and Adolescence* 43: 1752–1769.
- Quail, A., O'Reilly, C., Watson, D., McNamara, E., O'Mahony, D. and Murray, A. (2019) *Growing Up in Ireland and a summary guide to cohort '08 at 9 years (wave 5 of the infant cohort at 9 year)*, Dublin: The Economic and Social Research Institute, Report No 10.
- Rees, G. (2019) Poverty and children's wellbeing at 14 years old. *Child Poverty Action Group*, Database, <https://cpag.org.uk/welfare-rights/resources/article/poverty-and-children%E2%80%99s-wellbeing-14-years-old>.
- Reinhard, E., Layte, R., McCrory, C., Panico, L. and Avendano, M. (2018) 'The Great Recession and the health of young children: A fixed-effects analysis in Ireland', *American Journal of Epidemiology* 187: 1438–1448.
- Ridge, T. (2002) *Childhood poverty and social exclusion: from a child's perspective*. Bristol: Policy Press.

- Rowlingson, K. and McKay, S. (2005) 'Lone motherhood and socio-economic disadvantage: insights from quantitative and qualitative evidence', *The Sociological Review* 53: 30–49.
- Schenck-Fontaine, A. and Panico, L. (2019) 'Many kinds of poverty: Three dimensions of economic hardship, their combinations, and children's behavior problems', *Demography* 56: 2279–2305.
- Schoon, I., Cheng, H. and Jones, E. (2010) Resilience in children's development. *Children of the twenty-first century: The first five years*, London: Centre for Longitudinal Studies, Millennium Cohort Study Briefing 4
- Schoon, I., Hope, S., Ross, A. and Duckworth, K. (2010) 'Family hardship and children's development: the early years', *Longitudinal and Life Course Studies* 1: 209–222.
- Selig, J. P. and Little, T. D. (2012) Autoregressive and cross-lagged panel analysis for longitudinal data. in B. Laursen, T. D. Little and N. A. Card (eds.), *Handbook of developmental research methods* (pp. 265–278) *Handbook of developmental research methods*, New York: The Guilford Press, pp. 265–278.
- Skopek, J. and Passaretta, G. (2021) 'Socioeconomic inequality in children's achievement from infancy to adolescence: The case of Germany', *Social Forces* 100: 86–112.
- Sprong, S., Gibbons, R. A. and Chzhen, Y. (2022) 'Divergent trajectories: three dimensions of child poverty during the Great Recession in Ireland', *Longitudinal and Life Course Studies* 1: 1–10.
- Squires, J., Bricker, D. D. and Potter, L. (1999) *The ASQ user's guide*, Baltimore, MD: Paul HBrookes.
- Thornton, M., Williams, J., McCrory, C., Murray, A. and Quail, A. (2013) *Design, instrumentation and procedures for the infant cohort at wave one (9 months)*. Dublin: Department of Children and Youth Affairs, No 107.
- Todd, P. E. and Wolpin, K. I. (2007) 'The production of cognitive achievement in children: Home, school, and racial test score gaps', *Journal of Human Capital* 1: 91–136.
- Townsend, P. (1979) *Poverty in the United Kingdom: a survey of household resources and standards of living*, Univ of California Press.
- Treanor, M. C. (2020) *Child poverty: aspiring to survive*, Bristol: Policy Press.
- Van Lancker, W. and Vinck, J. (2019) The consequences of growing up poor. In *Routledge International Handbook of Poverty*. New York: Routledge.

- VanderWeele, T. (2015) *Explanation in Causal Inference: Methods for Mediation and Interaction*, Oxford University Press.
- VanderWeele, T. and Vansteelandt, S. (2014) 'Mediation Analysis with Multiple Mediators', *Epidemiologic Methods* 2: 95–115.
- Washbrook, E., Gregg, P. and Propper, C. (2014) 'A decomposition analysis of the relationship between parental income and multiple child outcomes', *Journal of the Royal Statistical Society* 177: 757–782.
- Watson, D., Whelan, C. T., Maitre, B. and Williams, J. (2016) 'Socio-economic variation in the impact of the Irish Recession on the experience of economic stress among Families', *The Economic and Social Review* 47: 477–498.
- Wodtke, G. T. and Zhou, X. (2020) 'Effect Decomposition in the Presence of Treatment-induced Confounding: A Regression-with-residuals Approach', *Epidemiology* 31: 369.
- Yeung, W. J., Linver, M. R. and Brooks–Gunn, J. (2008) 'How Money Matters for Young Children's Development: Parental Investment and Family Processes', *Child Development* 73: 1861–1879.

3 Chapter 3

Insecure parental employment and children's behaviour problems in Australia

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Abstract

Although a large body of research has documented the negative effects of insecure employment for adult workers, less is known about the consequences for their children's well-being. Our understanding of the mechanisms through which insecure maternal employment may affect children is particularly limited. This study investigates the relationship between insecure maternal employment and child behaviour difficulties from the age of 4 to 16 using seven waves of data for nearly 5,000 families from Growing Up in Australia: The Longitudinal Study of Australian Children. Employing fixed effects models that accounted for unobserved time-invariant heterogeneity, we found that children whose mothers were casual contract employees or economically inactive had greater behaviour difficulties, on average, than their peers whose mothers were permanent or fixed-term employees. We drew on the Family Investment Model and the Family Stress Model to test hypotheses about the economic and psycho-social processes that may explain maternal employment differences in children's outcomes. It is maternal mental health and intra-family relationships quality, rather than household financial strain, that explained the association between insecure (casual contract) maternal employment and child behaviour difficulties. These family processes also accounted for much but not all the association between mothers' economic inactivity and greater behaviour difficulties in children. These results contribute to the literature on the consequences of maternal employment insecurity for child mental health in industrialised countries by clarifying the mechanisms behind this association.

Key words: child behaviour difficulties, fixed effects analysis, Longitudinal Study of Australian Children (LSAC), insecure employment, maternal employment

3.1 Introduction

A significant body of literature has documented socio-economic inequalities in child well-being. Much of this research focuses on differences in child well-being by household income (Cooper and Stewart 2020), social class (Layte 2017) or parental education (Bradbury et al. 2015b). Large longitudinal studies that follow the same cohort of children as they grow older, collecting a rich set of information about the children themselves and their families, have enabled analyses of the theoretical pathways through which family socio-economic status (SES) may affect child outcomes, such as via financial strain, parental mental health, or parenting practices and intra-family relationships (Counihan et al. 2023). However, with the rise of flexible employment and labour market deregulation in advanced capitalist societies (Barbieri 2009), parental labour force status (i.e. employed, unemployed, or inactive), alongside the nature of employment contract for employees (i.e. permanent, temporary, or casual), is a relatively unexplored aspect of socio-economic inequality in child well-being. We investigate the consequences of changes in maternal labour force status and contract type for children's mental health outcomes. We are particularly interested in the differences between permanent employment and insecure employment. We define insecure employment as temporary or casual employment. We measure children's mental health using the Strengths and Difficulties Questionnaire (R. Goodman 1997). It is a widely used and reliable measure of behaviour difficulties in children and adolescents, with satisfactory psychometric properties (Muris et al. 2003; Stone et al. 2010) and a valid measure of child mental health (A. Goodman and Goodman 2009).

There is a growing literature on the harms of parental job loss for early child development (Mari and Keizer 2021) and a large body of public health research on the negative consequences of both unemployment and insecure employment for adult health and well-being (Kim and von dem Knesebeck 2015). Ervin et al. (2023) identified a consistently robust and adverse relationship between precarious employment and the individuals' mental well-being in the working-age population of Australia. Additionally, women tend to encounter significantly greater exposure to such precarious employment. Unemployment may also indirectly affect one's partner and children (Ström 2003). Taken

together, this research suggests that insecure parental employment may have deleterious consequences for children's well-being as spill-over effects. Yet surprisingly little is known about the role of insecure parental employment in children's outcomes, particularly that of mothers, or the specific family processes behind such a relationship. A notable exception is a US-based study of maternal work patterns and child behaviour and academic progress by Johnson et al. (2012), but it is limited to low-income single mother headed families. They found that children whose mothers were in stable employment had better outcomes than their counterparts with mothers who did not work at all or who were in insecure employment.

To address this research gap, we investigate the role of insecure maternal employment in the development of behaviour difficulties in childhood and adolescence (from the age of 4 until 16) using data from the Longitudinal Study of Australian Children (LSAC). It is a large nationally representative Australian birth cohort study, which allows us to use fixed effects regression models to exploit within-household variation in parental employment and children's outcomes over time, controlling for any unobserved family- or child-specific time-invariant confounders. We draw on two prominent theories of socio-economic inequalities in child well-being, the Family Investment Model and the Family Stress Model, to test hypotheses about the economic and psycho-social processes that may explain maternal employment differences in children's outcomes. In doing so, our study contributes to the inter-disciplinary literature on the societal impacts of insecure employment in industrialised countries by advancing our understanding of when and how it affects children's mental health.

3.2 Literature review

3.2.1 Related research: parental job loss and child well-being

Adverse childhood experiences have long-term costs for children's development and physical well-being (Ben-Shlomo and Kuh 2004). One of the mechanisms through which parental employment insecurity can affect children's outcomes is if it results in job loss. A growing evidence base has shown that parental job loss is negatively associated with

children's and young people's education and behavioural outcomes. Utilising data from the 2008 birth cohort of the Growing Up in Ireland (GUI) study, Mari and Keizer (2021) showed that parental job loss not only increased the risk of child problem behaviour at ages 3 and 5, but it also harmed children's verbal ability at age 3. Using longitudinal data on youth from the Canadian Survey of Labour and Income Dynamics, Coelli (2004) found the immediate and lagged causal impacts of parental job loss on adolescences' increased risks of dropping out of high school and lower rates of pursuing a further degree. Kalil and Ziol-Guest (2008) analysed longitudinal data for children between the ages of 5 and 17 from the 1996 US Survey of Income and Program Participation (SIPP), providing insights into parental involuntary job loss and children's academic progress during childhood and adolescence. They also tested for gender differences through the mother-father pair data and found that only the father's experience of involuntary unemployment was negatively associated with children's academic progress, such as their grade repetition and suspension/expulsion from school. Using the National Evaluation of Welfare-to-Work Studies, Hill et al. (2011) found that maternal job loss when children were of preschool age (ages of 3 and 5) sharply increased problem behaviour in the classroom (at ages of 8 or 10), especially in economically disadvantaged families. Flanagan and Eccles (1993) found that the transition to junior high school was particularly difficult for US adolescents whose parents were experiencing changes in work status.

Another potential mechanism between insecure parental employment and children well-being is through parental irregular working hours. Using longitudinal data from Wisconsin's New Hope Project, Hsueh and Yoshikawa (2007) found an association between parental irregular working time (nonstandard schedules and variable shifts) and their child's lower school performance and higher levels of externalizing behaviour problems in the short-term (2-year follow-up). However, it did not find evidence of nonstandard parental working schedule affecting longer-term children's outcomes (5-year follow-up). Bogen and Joshi (2007) found detrimental associations between maternal nonstandard working hours and preschool-age children's outcomes in low-income families. Yet two other studies failed to find significant effects of nonstandard schedules on child behaviour problems in samples of low-income families in the US (Dunifon et al. 2005; Phillips 2002). Moreover, Hsueh and Yoshikawa (2007) argued that variable shifts

and irregular working schedules actually allowed mothers to maximise quality time with their children, especially if they were lone parents. In that case, voluntarily involvement in nonstandard schedules was not harmful to their children's well-being in the short term if the work schedules were stable.

There is also a gender dimension to these relationships. Bubonya et al. (2017) analysed data on two separate samples (working-age couples and households with adolescents) using an Australian household panel survey and found sizeable spill-over effects on the wife's mental health following the husband being made redundant from his job. Especially when the family was encountering financial strain, women had around two-thirds greater chances experiencing severe depressive symptoms after their husband's job loss. Meanwhile, there was no statistically significant effect of paternal job loss on the child's mental health if the father could find an alternative job before the next survey interview. Meanwhile, the mother's job loss was significantly affecting their child's mental health, especially their young-adult daughters (aged 15 to 20 ages). When mothers lost their jobs, the incidence of depressive symptoms was more than two-thirds higher for adolescent girls compared to boys.

3.2.2 Related research: insecure employment and adult well-being

A large literature exists on the links between job insecurity and adult well-being and health. Casual, agency, and seasonal workers tend to have greater job insecurity than both fixed-term employees and permanent employees (Standing 1997). While non-standard employment can be regarded as superior to unemployment, since it linked to a job, an independent income, and opportunities, several empirical studies show that job insecurity can be worse for an individual's well-being (i.e., symptoms of anxiety and depression) than long-term unemployment (Bubonya et al. 2017; Cobb 1988; Witte 1999). D'Souza et al (2003) discovered an association between job insecurity (defined as temporary or short-term contract work) and poor mental health in Australia. Moreover, Burchell (2011) found continually deteriorating well-being for at least a year for people with insecure jobs, while people in long-term unemployment saw their psychological well-being levelling off or recovering after six months. In addition to relatively low wages and

the lack of fringe benefits, temporary workers were also more likely to face time pressure and physical health risk factors than permanent workers (Lewchuk et al. 2008).

Insecure employment is also associated with poorer physical health outcomes. A series of prospective cohort studies emerging from the British Whitehall II study indicated that moving to less secure employment was associated with worse health indicators (J. E. Ferrie et al. 2002; Jane E. Ferrie et al. 2001; Singh-Manoux et al. 2005). Lewchuk et al. (2008) found less permanent forms of employment in Canada being associated with poorer health. Through a review of 27 studies, Virtanen et al. (2005) found that a trajectory towards stable employment was associated with decreased psychological distress, while a trajectory towards unemployment was associated with poorer general health.

Beyond an individual worker level, there is some literature connecting insecure employment with adverse events and circumstances of their families. In a review of empirical studies on this topic, Ström (2003) documented negative spill-over effects of job loss on other family members' well-being. Using data from the UK British Household Panel Survey, Clark (2003) found that wives' mental health was sensitive to changes in their partners' labour market status. Using data from the same survey, Inanc (2018) found that a husband's experience of temporary work or unemployment had a negative effect on their spouse's psychological well-being and life satisfaction. At the same time, a wife's temporary employment had adverse impacts on their husband's psychological well-being, but it is when men were unemployed or temporarily employed and their wives were involved in permanent jobs that men's well-being was affected most negatively.

At the same time, non-standard employment and unemployment can lead to disadvantage in future labour market outcomes (e.g., lower earnings), with potential spill-over effects for the family. Filandri and Struffolino's (2019) analysis of the 2014 European Survey on Income and Living Conditions documented a positive relationship between female involuntary part-time work and in-work poverty. For the affected worker, significant material hardship could lead to further tensions within the household, such as marital discord, poor physical and mental health for adults in the family, and family stress

and strained parent-child relations (Coelli 2004; Farber et al. 1993; Kalil and Ziol-Guest 2008; Kessler et al. 1987; Price et al. 2002). Price et al (2002) tested the involuntary job separations and the risk of depression via a 2-year longitudinal survey that included 756 recently unemployed job seekers. They found that job loss resulted in depression through two pathways: financial strain and reduction in personal control.

To sum up, there is a substantial literature on the negative health and well-being effects of job insecurity and job loss for adult workers, suggesting that children may be affected indirectly. There is indeed evidence of potential spill-over effects for other family members, including children. Yet, our understanding of the specific family processes through which insecure parental employment may affect children is still limited. Moreover, a lot of the related research investigated job loss, unemployment or insecure contracts separately. In contrast, our study focuses on changes in maternal employment patterns, combining labour force status and contract type.

3.2.3 Theoretical background, research questions and hypotheses

The study addresses three research questions:

RQ1: What are the channels through which differences in maternal employment status are linked with children's well-being over time?

RQ2: Do these channels vary for boys and girls?

RQ3: Do these channels vary in lone mother and couple families?

Parental employment may have consequences for child well-being through economic and psycho-social pathways. We conceptualise parental employment as an indicator of broader family (SES) and draw on two influential models of family resources and child well-being: the Family Investment Model (FIM) and the Family Stress model (FSM).

The FIM postulates that parents influence their children's well-being via economic, social and cultural capital (Bradley and Corwyn 2002b; Heckman 2006; Lareau 2011). Greater

resources enable higher SES parents to provide whatever it is their children need to thrive, including better quality diets, housing, healthcare, schooling, extra-curricular activities, as well as a more nurturing and stimulating environment at home. This implies that if insecure employment and/or unemployment leads to economic hardship via lower or unstable income, there will be fewer resources to devote to children's healthy development. In contrast, stable employment resulting in higher (or at least predictable) income would enable parents to devote more resources to their children's well-being. Thus, the FIM emphasises the financial pathway from employment status to child well-being.

Meanwhile, the FSM posits a link between economic hardship, economic pressure (financial strain), parental psychological distress and compromised parent-child relationships, resulting in poor adjustment in children (Masarik and Conger 2017). The FSM is rooted in research on financial hardships caused by major economic crises. Building on Elder's (1974) pioneering work on family economic hardship and adolescent development during the Great Depression in the United States, the FSM originated from a study of rural Iowa families during an economic downturn in the US Midwest in the 1980s (R. D. Conger and Elder 1994). The FSM has proved relevant in the economic recession in Finland in the 1990s (Solantaus et al., 2004) and the Great Recession in Ireland in 2008-2012 (Layte and McCrory 2018b). Thus, the FSM's key implication is that insecure work and/or unemployment would affect child well-being through household financial strain. However, it also suggests a link via parental psychological distress or compromised parent-child relationships, even independently of financial strain (because of, for instance, perceived job insecurity, even at higher levels of pay).

Our main hypothesis is that child well-being varies with parental employment status (H1). The FIM suggests that the main link between insecure parental employment and children's outcomes is via household financial strain (H1a). In contrast, the FSM predicts that both financial strain and family psychosocial functioning are key (H2b), as more insecure forms of employment would lead to financial strain, which would lead to compromised mental health and relationships, which would result in poorer child well-being. Meanwhile, it

could also be that insecure employment is directly linked to worse family functioning regardless of the level of financial strain (H2c).

However, by focusing on the economic resources of the family rather than individual parents, neither the FIM nor the FSM sheds light on the roles of maternal versus paternal employment status. While the financial pathway implied by both the FIM and FSM can still be evaluated at the level of the family if parents pool their incomes, the psychological pathways could be linked to each parent's employment status separately (in couple families). Mothers tend to devote more time to childcare responsibilities than fathers as well as to hold less "greedy" jobs or to forgo economic activity outside the home entirely (Goldin 2021). Evidence from a UK longitudinal household panel shows that mothers may experience greater mental health improvements around the birth of their first child than fathers (Metzger and Gracia 2023), but transitions from paid employment into maternity leave or family care are associated with worsening maternal mental health, while returning to work is linked with an improvement in mental health (Thomas et al. 2005). This would suggest that maternal employment could be more salient for children in couple families than paternal employment (H1d).

Our second hypothesis is that child well-being differences by parental employment status depend on the child's gender (H2). Gender differences in child and adolescent well-being are well-documented, if not fully explained. Adolescent girls are at a higher risk of anxiety and depression as a response to interpersonal stress than boys (Rudolph 2002). Girls also tend to show more internalised behaviour problems while boys exhibit more externalised problems (Achenbach et al. 2002a). In a modification of hypothesis H1d, it may be that paternal employment is more important for boys (H2a) and maternal employment for girls (H2b). In a Finnish study testing the FSM, Solantaus et al. (2004a) found that boys were more attuned to their father's mental health and parenting, while girls were equally responsive to both parents.

Our third hypothesis is that the effects of maternal employment may depend on whether the father is in the household and whether he is in secure or insecure employment (H3). On the one hand, maternal employment status may matter more in lone mother families

than in couple families, since lone mothers are the only adult in the family (H3a). On the other hand, conditional on stable paternal employment, there may be greater differences in children's outcomes by maternal employment status (H3b). Yet the pattern of these differences is not necessarily clear a priori: it could also be that if mothers (with partners in stable employment) are in insecure employment voluntarily to achieve a better work-life balance, children's outcomes will be better.

3.3 Data and Methods

3.3.1 Data and sample

This study uses data from Growing Up in Australia: The Longitudinal Study of Australian Children (LSAC), a biannual survey that has been following members of a nationally representative sample of children from all parts of Australia since 2003 (Sanson et al. 2002). LSAC collected a broad range of questions about children's development and well-being, such as parenting, significant environments, peers, education, and relationships. In addition to the family background and SES information, LSAC also has a rich set of indicators of parental employment, occupation, and contract type (Srivastava and Trinh 2021). The official LSAC documentation provides a detailed description of the LSAC methodology (Soloff et al. 2005).

The survey follows two cohorts of children: one born during March 1999 – February 2000 (K Cohort), and another born during March 2003 – February 2004 (B Cohort). The informants include parents/caregivers (who are predominantly mothers), the study child, and teachers. We use data from the waves 1 to 7 (i.e., 2003-04 to 2014-15) of the K Cohort. Their families were interviewed for the first time when the study child was four years old ($n=4,983$). The re-interview rates in the subsequent waves have consistently exceeded 87%, with 62% of households participating in all seven waves (until the study children reach the age of 16/17). The LSAC survey continues after Wave 7, but since we focus on children rather than young adults, we did not use Waves 8 and 9 in our analysis. Also, LSAC does not collect information on our outcome variable after Wave 7.

We excluded 17 households where the study child's primary caregiver is anyone other than a biological, adoptive, step, or foster parent or a parent's de facto partner. Households who only participated in one wave are excluded from the sample because we need information on at least two waves to estimate fixed effects regression models. After further excluding participants who had missing values on the outcomes or any of the key covariates, the unweighted analytic sample includes 4,071 children at Wave 1. After applying longitudinal weights that correct for non-random panel attrition, the sample included in the longitudinal analysis amounts to 2783 children and their families.

For some of our analyses, we divided the sample into two-parent and lone parent households. Two-parent households are defined as those where the child's main caregiver is married or cohabiting with a de facto partner of the opposite sex. There are 4,281 (86.2%) two-parent households and 685 (13.8%) lone parent households in the initial wave. In subsequent waves, the share of two-parent households fluctuates around 80%.

3.3.2 Measures

Child well-being outcome: behaviour difficulties

We use child mental health as an indicator of child well-being, measured using the Strengths and Difficulties Questionnaire (SDQ) total difficulties score (R. Goodman 1997), reported by parents in all seven waves. There are 25 statements in total, which are grouped into five scales: (i) pro-social behaviour; (ii) hyperactivity/ inattention, (iii) emotional symptoms; (iv) peer problems; and (v) conduct problems. These statements are rated on a three-point Likert scale, varying from '1=not true', '2=somewhat true' to '3=certainly true'. A high score in the first sub-scale is a strength, which represents high levels of social behavioural development. High scores in the other four sub-scales reflect behaviour difficulties. We add the scores of the four difficulties sub-scales (i.e. based on 20 items), producing the total difficulties scores ranging from 0 to 40.

Insecure parental employment

Employment insecurity is a dimension of precarious employment (Kreshpaj et al. 2020), alongside income inadequacy and a lack of rights and protection. “Contractual temporariness” is the dominant feature of employment insecurity, where both employment contracts of limited duration and self-employment are contrasted with permanent contracts. However, some studies maintain that the nature of the job contract is a poor indicator of employment insecurity. Burchell (2011) argues in favour of subjectively perceived job insecurity: although the feeling is not objective and can be exaggerated, it is strongly linked to anxiety and subjective well-being. Yet if we are concerned with the effects of maternal employment precariousness on children’s well-being, the nature of the job contract may be more important because it is not only related parental perceptions of job insecurity but also to household finances. In a rigorous analysis of longitudinal data from the US, Han and Zhang (2022) found that precarious parental employment was associated with higher risks of poverty.

This study uses contract type combined with labour force status to define insecure employment. Drawing on Standing’s (1997) discussion of labour flexibility and insecurity, Burgess and Campbell (1998) identified eight dimensions of insecurity that characterise precarious employment. Applying their framework to Australia, they observed that casual employment was vulnerable to most forms of insecurity. Therefore, we use casual contracts as a proxy for narrowly defined insecure employment in our descriptive analyses. We analyse changes in employment status (i.e. permanent/fixed term/casual employee, self-employed, unemployed, inactive) to identify the consequences of maternal work insecurity for children’s outcomes over time. Broader insecure employment encompasses casual employment and unemployment.

Information on parental employment is collected in all seven waves using self-completed questionnaires. These include detailed information on employment status, work status and job tenure of the resident parents. Parental employment status has been categorised into three sub-groups: (i) employed, (ii) unemployed but looking for a job and (iii) not in the labour force. For those who are employed, LSAC codes work status as (i) employee,

those who have a contract with their employer (ii) own business and (iii) other or uncertain. The type of employee contract includes: (i) in a permanent ongoing position; (ii) on a fixed-term contract; (iii) on a casual basis; (iv) on some other basis. We consider parents involved in insecure employment if they have a casual or other basis contract or their work status is uncertain.

Parental mental health

We used a measure of parental psychological distress based on the Kessler-6 Mental Health Scale (Kessler et al., 2005). It is a six-item measure rated on a 5-point Likert-type scale of psychological distress that contains items regarding anxiety and depressive symptomology. Parents were asked how often they have had the following six feelings or experiences during the last four weeks: “nervous,” “hopeless,” “restless or fidgety,” “so depressed that nothing could cheer you up,” “that everything was an effort,” and “worthless.” Responses vary from 1 (none of the time) to 5 (all of the time). We used the total score for the scale computed by summing responses to the six questions so that the scale values range from 6 to 30, with higher scores indicative of worse mental health.

Family relationships

To operationalise the parent-child relationship according to the FSM, we use two of the parenting constructs available in LSAC: angry parenting and parenting self-efficacy. Angry parenting was assessed using four items: 1) “Of all the times you talk to this child about his/her behaviour, how often is this praise?” 2) “Of all the times you talk to this child about his/her behaviour, how often is this disapproval?” 3) “How often are you angry when you punish this child?” 4) How often do you feel you are having problems managing this child in general?”. These items are rated on a five-point scale from 1 ‘Never/Almost never’ to 5 ‘All the time’. After reverse-coding item 1, we averaged them to a 5-point scale to represent the level of angry parenting. It captures compromised parent-child relationships. Meanwhile, parenting self-efficacy captures the positive aspect of parenting. It is measured using one question (“Overall, as a parent, do you feel that you

are ...?") rated on a 5-point scale: from 1 'not very good at being a parent' to 5 'a very good parent'.

The quality of the inter-parental relationship is measured using one question ("Which best describes the degree of happiness, all things considered, in your relationship?"). It is marked on a 7-point scale from 1 'Extremely unhappy' to 7 'perfectly happy'.

Household financial strain

To capture the financial strain pathway of the FSM as well as the economic aspect of the FIM, the household's financial situation is measured using the mother's subjective assessments of it. They were asked: "Given your current needs and financial responsibilities, how would you say you and your family are getting on?". Responses vary from 1 'Prosperous' to 6 'Very poor'. Thus, higher values correspond to greater financial strain. We could have used household income instead of or in addition to financial strain, but the way that income information is collected in LSAC has changed after Wave 1 (Redmond and Mullan 2011), thus limiting the comparability of this variable over time. Greater financial strain is a good proxy for household financial situation and may even be a better predictor overall. Financial strain was found to be related to children's behaviour difficulties in a longitudinal study in Ireland even as household income was not (Gibbons et al. 2023).

Other predictors

We control for the number of the study child's siblings and family structure (i.e., lone mother vs two parent). To address the second and third research questions, we estimate separate models for boys and girls, and lone-parent and two-parent families. For two-parent families, we include information about both parents' employment, parenting and mental health.

3.3.3 Method

We first present descriptive statistics separately by wave to explore changes in the means of the key measures over the course of seven waves of the study (Table 1). Then we analyse changes in children's total difficulties scores associated with changes in parental employment status over time, adding the explanatory variables sequentially (Table 2). To do so, we draw on within-household changes using linear regression models with the individual fixed-effects (FE) estimator (Allison 2009). FE regression helps account for time-constant unobserved heterogeneity and omitted variables bias related to time-invariant individual or family characteristics. FE models effectively compare the same child's well-being before and after an exposure (i.e., parental employment change) using each child/family as their or her own control. This deals with confounding arising from observable or unobservable characteristics of the child or the family that are related to children's mental health and may vary between families but are stable over time.

However, the FE model has certain limitations (Hill et al., 2020). First, as our data span 2004–2018, overlapping with the 2008 recession, national economic fluctuations may influence both parental employment and child well-being, potentially biasing estimates. To address this, we conducted robustness checks by running the models separately for younger children (ages 4–10) and adolescents (ages 10–16), covering pre-recession (2004–2010) and post-recession (2010–2016) periods. Second, while the paper focuses on maternal or combined parental employment precariousness, it codes these as categorical variables rather than separately including both parents' work status. Additionally, we conducted robustness checks by running the models separately for boys and girls to account for potential gender differences.

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_i + \epsilon_{it} \quad (1)$$

where Y_{it} is the total difficulties score for the child i in wave t , X_{it} is the parent's employment status, ε_i is the time-invariant unobserved child/family specific error term, and ϵ_{it} is the idiosyncratic error term. Then we subtract the within-family averages from the RE model as per Equation 2.

$$(Y_{it} - \bar{Y}_i) = \beta_1 (X_{it} - \bar{X}_i) + (\varepsilon_i - \bar{\varepsilon}_i) + (\epsilon_{it} - \bar{\epsilon}_i) \quad (2)$$

However, since ε_i is time-invariant, the part $(\varepsilon_i - \bar{\varepsilon}_i)$ is equal to zero, leaving the following FE model to be estimated (Equation 3):

$$\widetilde{Y}_{it} = \beta_1 \widetilde{X}_{it} + \tilde{\varepsilon}_{it} \quad (3)$$

First, we estimated a series of models for the whole sample (i.e., combining two-parent and lone-parent households; boys and girls) using maternal employment as the key predictor and adding explanatory variables sequentially (Table 2). It is important to note that FE models do not allow time-invariant predictors (since these are differenced out in Equation 2). We then re-estimated the model with all the predictors separately by the child's gender (Table 3) and family structure (Table 4). We use longitudinal weights provided in the LSAC database to adjust for non-random attrition.

3.4 Results

Table 1 shows the unweighted means (and standard deviations of continuous scales) for children's total difficulties scores and the key predictors, separately by wave. The mean total difficulties score of the study child was 9 points at baseline (age 4/5) and around 7-8 points in the following waves. The share of mothers who were permanently employed steadily increased from under 30% to over 50% by the time the children were 16/17 years of age. However, very few mothers were on fixed term contracts (between 2% and 5%) during this period, while the share of those on casual contracts was greater and relatively stable at 10%-11%. Very few mothers (under 1%) were employed on 'other basis' contracts or uncertain of their status. Thus, the shares of mothers in narrowly defined insecure employment (i.e. casual or other basis contract, or unsure of their status) fluctuated around 10%-13% during this period. Self-employment was also relatively stable at 14%-15%. Meanwhile, relatively few mothers were unemployed during this period (2%-4%). In contrast, the share of mothers who were not in the labour force decreased from nearly 40% to just over 10% during this period. Thus, the main change over time was increasing permanent employment and decreasing inactivity. This is consistent with

women staying out of the labour force when their children were of pre-school age and then (re-)entering work on permanent contracts as children (and their young siblings, if any) grew older. Yet there was also a non-trivial minority reporting insecure employment (around 10%) or self-employment (around 15%) at each wave, who were not necessarily always the same women.

Table 1 also shows that the share of children in lone-parent households steadily increased from 12% to 17%. The mean number of co-resident siblings (including those with no siblings) peaked when the study children were 10/11 years of age. The mean level of financial strain was relatively stable over the years. Angry parenting reporting by the mothers decreased somewhat as children grew older, while average maternal self-efficacy and mental health scores remained stable throughout. Average levels of happiness in the relationship (reported by mothers in couple families) decreased over time. These are cross-sectional wave-by-wave patterns, which may hide greater fluctuation within families over time.

Table 3.1 Descriptive statistics

	Age 4/5	Age 6/7	Age 8/9	Age 10/11	Age 12/13	Age 14/15	Age 16/17
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Total difficulties score	9.22 (5.25)	7.83 (5.03)	7.47 (5.30)	7.92 (5.58)	7.39 (5.49)	7.09 (5.41)	7.19 (5.50)
Mother's work contract							
Permanent position	0.285	0.360	0.428	0.454	0.499	0.522	0.542
Fixed term contract	0.028	0.033	0.040	0.039	0.040	0.045	0.054
Casual basis	0.111	0.119	0.118	0.114	0.102	0.094	0.102
Some other basis	0.009	0.006	0.006	0.004	0.005	0.006	0.005
Other/uncertain	0.008	0.006	0.004	0.003	0.003	0.005	0.004
Own business	0.142	0.156	0.167	0.157	0.154	0.157	0.146
Unemployed	0.037	0.030	0.022	0.025	0.027	0.022	0.021
Not in labour force	0.381	0.290	0.216	0.205	0.169	0.149	0.126
Lone-parent household	0.122	0.139	0.130	0.150	0.159	0.161	0.172
No. of siblings (0-10)	1.46 (1.00)	1.58 (1.01)	1.60 (1.01)	1.63 (1.06)	1.59 (0.37)	1.50 (1.02)	1.39 (1.02)
Financial Strain (1-6)	3.17 (0.84)	2.95 (0.82)	2.98 (0.83)	2.94 (0.83)	2.99 (0.82)	2.96 (0.83)	2.89 (0.81)
Angry parenting (1-5)	2.18 (0.59)	2.17 (0.59)	2.14 (0.61)	2.15 (0.64)	2.15 (0.67)	2.06 (0.67)	1.97 (0.70)
Parenting self-efficacy (1-6)	3.91 (0.88)	4.07 (0.83)	3.84 (0.86)	3.86 (0.82)	3.83 (0.84)	3.90 (0.82)	3.95 (0.83)
Mother's K-6 depression scale summed score (6-30)	10.08 (3.73)	9.10 (3.40)	9.45 (3.59)	9.35 (3.67)	9.13 (3.76)	9.14 (3.74)	9.54 (4.04)
Happiness in relationship (1-7)	3.53 (0.10)	5 (0.05)	3.73 (0.05)	4.84 (0.10)	4.16 (0.07)	3.59 (0.09)	2.97 (0.10)
N individuals	4071	4176	3,630	4025	3748	3271	2878

Table 2 reports the results of FE models that exploit within-group variation over time and are robust to any omitted or unobservable time-invariant confounders. Model 1 is the initial model without any controls. There were no statistically significant differences in behaviour difficulties between children whose mothers were on fixed term contracts, compared to those on permanent contracts. Mothers' casual and other basis employment were associated with statistically significantly higher child behaviour problems compared with permanent employment. Children whose mothers were on casual contracts scored 0.38 points higher on the total difficulties scale ($p < 0.01$) than those whose mothers were permanently employed. This is nearly one-tenth of a standard deviation of the difficulties scale, which is a non-trivial difference. Children whose mothers were on 'other basis' contracts scored 0.88 points higher ($p < 0.05$) than those whose mothers were in permanent employment. Economic inactivity was also associated with statistically significantly higher difficulty scores: children whose mothers were economically inactive scored 0.73 points higher on the difficulties scale ($p < 0.001$) than those whose mother were permanently employed. Meanwhile, maternal unemployment was not statistically significantly associated with children's total difficulties scores.

Subsequent models add demographic controls (Model 2) and the hypothesised mediating variables (Models 3 – 5). Neither the demographic controls (Model 2) nor household financial strain (Model 3) makes a visible difference to the maternal employment coefficients compared with the baseline model, although the number of siblings and financial strain are themselves associated with children's behaviour difficulties. Having an additional sibling is associated with a 0.29 points lower difficulties score ($p < 0.01$), while a one-point difference in financial strain (measured on the 1-6 scale) is associated with 0.25 points higher difficulties score ($p < 0.001$).

Including maternal parenting and mental health (Model 4) completely attenuates the differences between casual or other basis and permanent maternal employment. Although economic inactivity is still statistically significantly associated with higher SDQ scores at $p < 0.001$, the coefficient is noticeably smaller than in Model 1 (albeit still non-trivial at 0.49 score points). Finally, Model 5 shows that financial strain is no longer

statistically significantly associated with children's SDQ scores when maternal parenting and mental health are included in the model. This suggests that mothers' parenting and mental health, rather than household financial status, mediate the association between insecure maternal employment and children's behaviour difficulties as children grow older. These factors also account for some of the association between maternal labour market inactivity and greater behaviour difficulties in children. Figure 1 shows the differences in the coefficients between Model 1 and Model 5.

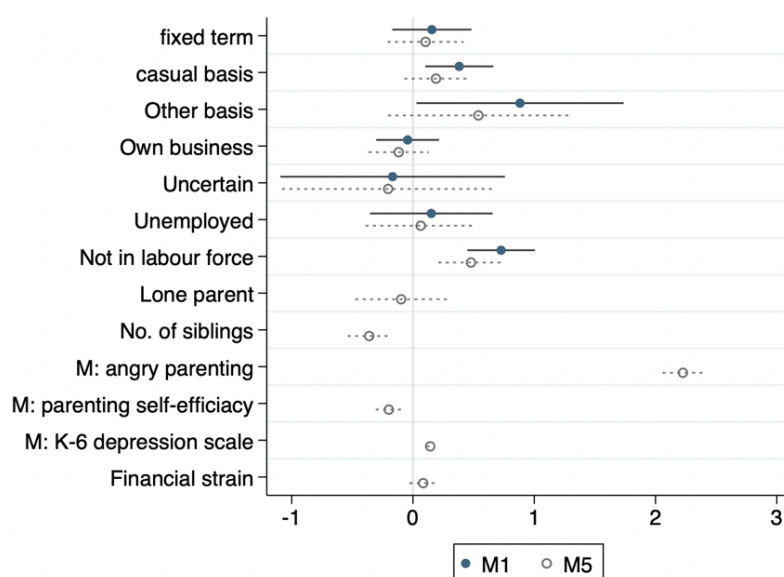
Table 3.2 Fixed effects regression of children's total difficulties scores

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Mother's work contract (ref: Permanent contract)	B With 95%CI	B With 95%CI	B With 95%CI	B With 95%CI	B With 95%CI
Fixed term contract	0.16 [-0.17, 0.48]	0.16 [-0.17, 0.48]	0.15 [-0.17, 0.48]	0.11 [-0.21, 0.42]	0.1 [-0.21, 0.42]
Casual contract	0.38** [0.10, 0.66]	0.38** [0.10, 0.67]	0.34* [0.06, 0.61]	0.22 [-0.04, 0.48]	0.19 [-0.07, 0.45]
Some other basis	0.88* [0.03, 1.74]	0.91* [0.05, 1.76]	0.91* [0.05, 1.76]	0.54 [-0.21, 1.28]	0.54 [-0.21, 1.29]
Own business	-0.04 [-0.30, 0.22]	-0.03 [-0.29, 0.24]	-0.05 [-0.31, 0.21]	-0.11 [-0.36, 0.14]	-0.12 [-0.37, 0.13]
Other/uncertain	-0.17 [-1.09, 0.76]	-0.17 [-1.09, 0.76]	-0.19 [-1.11, 0.73]	-0.2 [-1.08, 0.68]	-0.2 [-1.08, 0.67]
Unemployed	0.15 [-0.35, 0.66]	0.14 [-0.36, 0.65]	0.06 [-0.44, 0.57]	0.09 [-0.36, 0.54]	0.06 [-0.39, 0.52]
Not in labour force	0.73*** [0.45, 1.01]	0.76*** [0.48, 1.04]	0.72*** [0.43, 1.00]	0.49*** [0.22, 0.75]	0.48*** [0.21, 0.75]
Lone-parent household		0.03 [-0.37, 0.42]	-0.04 [-0.43, 0.35]	-0.08 [-0.45, 0.30]	-0.1 [-0.48, 0.28]
Number of siblings		-0.29** [-0.46, -0.11]	-0.29** [-0.47, -0.11]	-0.36*** [-0.54, -0.18]	-0.36*** [-0.54, -0.18]
Mother: angry parenting				2.23*** [2.06, 2.40]	2.23*** [2.06, 2.39]
Mother: parenting self-efficacy rating				-0.20*** [-0.31, -0.09]	-0.20*** [-0.31, -0.09]
Mother's K-6 depression scale summed score				0.15*** [0.11, 0.18]	0.14*** [0.11, 0.17]
Financial strain			0.25*** [0.13, 0.36]		0.08 [-0.03, 0.20]
Constant	7.77*** [7.65, 7.89]	8.20*** [7.89, 8.51]	7.48*** [7.05, 7.92]	3.05*** [2.33, 3.77]	2.84*** [2.06, 3.62]

Observations	18,718	18,715	18,708	18,250	18,243
R-squared					
Within	0.005	0.006	0.008	0.117	0.118
Between	0.025	0.038	0.082	0.386	0.391
Overall	0.014	0.023	0.046	0.280	0.284
N	2,785	2,785	2,785	2,783	2,783

Longitudinal weights used. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 3.1: Fixed effects regression of children's total difficulties scores (Models 1 and 5)



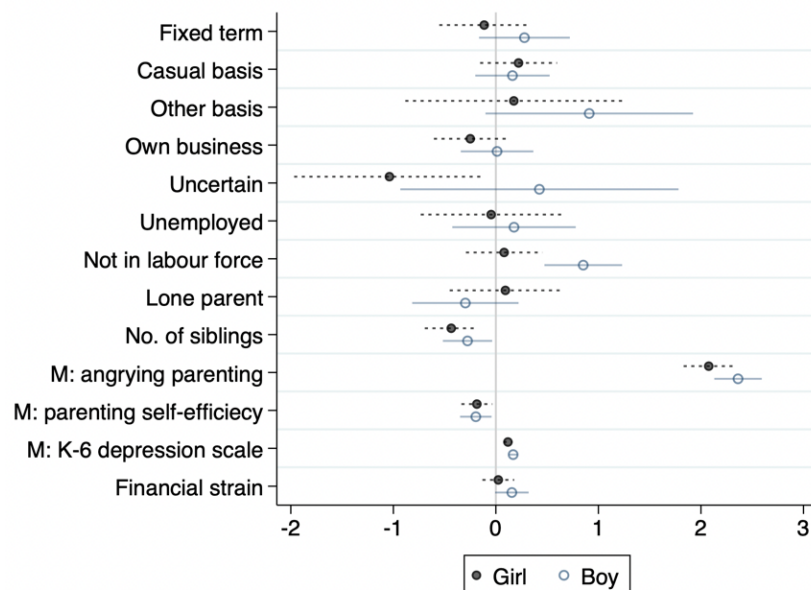
Next, to address our second research question, we investigated if these results (Model 5) varied by the child's gender (Table 3 and Figure 2). The results were broadly similar for boys and girls. Maternal parenting and mental health accounted for the differences between contract types in both sub-samples. However, maternal economic inactivity was only associated with boys' behaviour problems but not girls'. Boys whose mothers were economically inactive scored 0.85 points higher on the total difficulties scale ($p < 0.001$) than those whose mothers were permanently employed, everything else being equal. The corresponding difference was just 0.08 points for girls ($p > 0.05$). Perhaps surprisingly, girls whose mothers were uncertain of their contract type scored an entire point lower on the total difficulties score than those whose mothers were permanently employed, *ceteris paribus*, but this is based on a very small sub-sample and the coefficient is not very precisely estimated ($p < 0.05$).

Table 3.3: Fixed effects regression of children's total difficulties scores, by the child's gender

VARIABLES	Girl		Boy	
	B	With 95%CI	B	With 95%CI
Mother's work contract (ref: Permanent position)				
Fixed term contract	-0.11	[-0.55, 0.32]	0.28	[-0.16, 0.72]
Casual basis	0.22	[-0.15, 0.60]	0.16	[-0.20, 0.52]
Some other bases	0.18	[-0.88, 1.23]	0.91	[-0.10, 1.92]
Own business	-0.25	[-0.60, 0.11]	0.01	[-0.34, 0.37]
Other/uncertain	-1.04*	[-1.97, -0.11]	0.42	[-0.93, 1.78]
Unemployed	-0.05	[-0.73, 0.64]	0.18	[-0.42, 0.78]
Not in labour force	0.08	[-0.29, 0.45]	0.85***	[0.47, 1.23]
Lone-parent household	0.09	[-0.45, 0.64]	-0.3	[-0.82, 0.22]
Number of siblings	-0.44***	[-0.69, -0.18]	-0.28*	[-0.52, -0.04]
Mother: angry parenting	2.08***	[1.83, 2.32]	2.36***	[2.13, 2.59]
Mother: parenting self-efficacy rating	-0.19*	[-0.34, -0.03]	-0.20*	[-0.35, -0.04]
Mother's K-6 depression scale summed score	0.12***	[0.07, 0.16]	0.17***	[0.13, 0.21]
Financial strain	0.02	[-0.13, 0.18]	0.16	[-0.01, 0.32]
Constant		3.30*** [2.23, 4.37]		2.26*** [1.14, 3.37]
Observations		8,998		9,245
R-squared				
Within	0.099		0.140	
Between	0.359		0.396	
Overall	0.254		0.296	
N		1,367		1,416

Longitudinal weights used. *p<0.05, **p<0.01, ***p<0.001.

Figure 3.2: Fixed effects regression of children's total difficulties scores, by the child's gender



To address our third research question, we estimated a model similar to Model 5 in Table 2 just for lone parent families (table 4). There were no statistically differences by maternal employment type (including economic inactivity), everything else being equal. Angry parenting and maternal depressive symptoms were associated with higher difficulties scores in children ($p<0.001$).

Table 3.4: Fixed effects regression of children's total difficulties scores (lone parent families)

VARIABLES	Lone parent	
	B	With 95%CI
Mother's work contract (ref: Permanent position)		
Fixed term contract	-0.39	[-1.02, 0.24]
Casual basis	-0.04	[-0.59, 0.50]
Some other bases	0.4	[-1.42, 2.22]
Own business	-0.29	[-0.80, 0.22]
Other/uncertain	0.17	[-1.52, 1.86]
Unemployed	0.29	[-0.50, 1.08]
Not in labour force	0.24	[-0.34, 0.81]
Number of siblings	-0.21	[-0.53, 0.11]
Mother: angry parenting	2.17***	[1.83, 2.51]
Mother: parenting self-efficacy rating	-0.11	[-0.33, 0.10]
Mother's K-6 depression scale summed score	0.11***	[0.06, 0.15]
Financial strain	0.04	[-0.18, 0.26]
Constant	3.93***	[2.48, 5.39]
Observations	4,480	
R-squared		
within	0.102	
Between	0.358	
Overall	0.242	
N	720	

Longitudinal weights used. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Figure 3.3: Fixed effects regression of children's total difficulties scores (lone parent families)

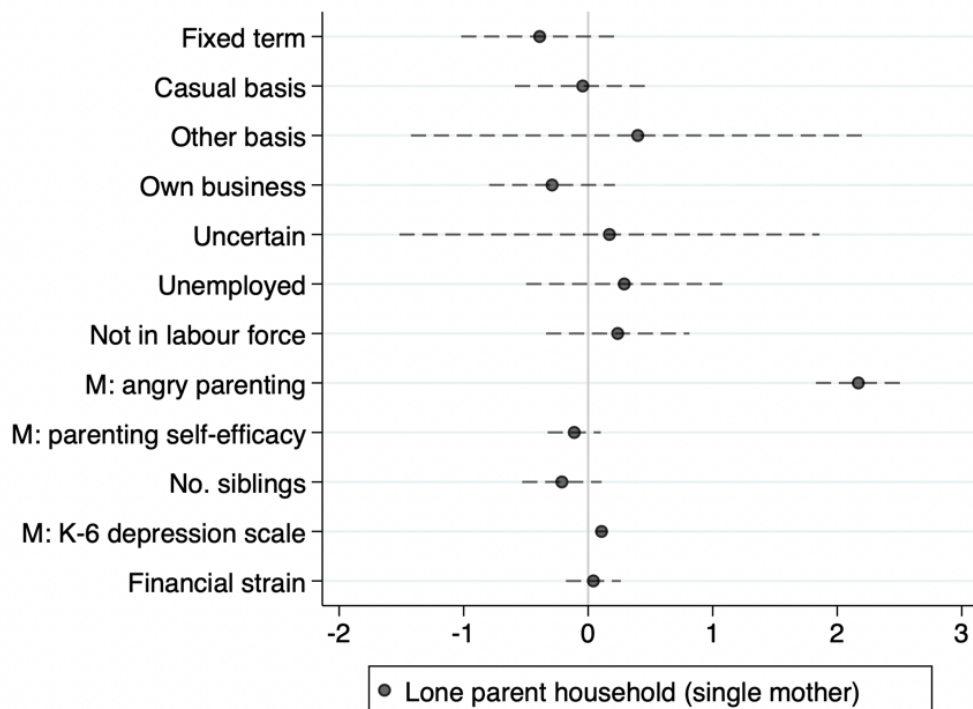


Table 5 and Figure 4 show the estimates corresponding to Model 5 in Table 2 for two-parent families. In addition to other predictors, it also includes fathers' parenting scales. The first column shows the results for boys and girls combined, the second column for girls only and the third column for boys only. Both maternal casual employment and economic inactivity were associated with children's behaviour difficulties in two-parent families. Sub-dividing two-parent families by the child's gender shows that maternal casual employment was associated with higher difficulties scores for both boys and girls, but economic inactivity for boys only. This suggests that parenting and mental health (of both parents) do not fully account for the association between casual maternal employment and poorer child behaviour difficulties.

Now that two-parent models include both mothers' and fathers' parenting information, maternal self-efficacy was no longer statistically significantly associated with children's difficulty scores, while fathers' self-efficacy was associated with lower difficulty scores.

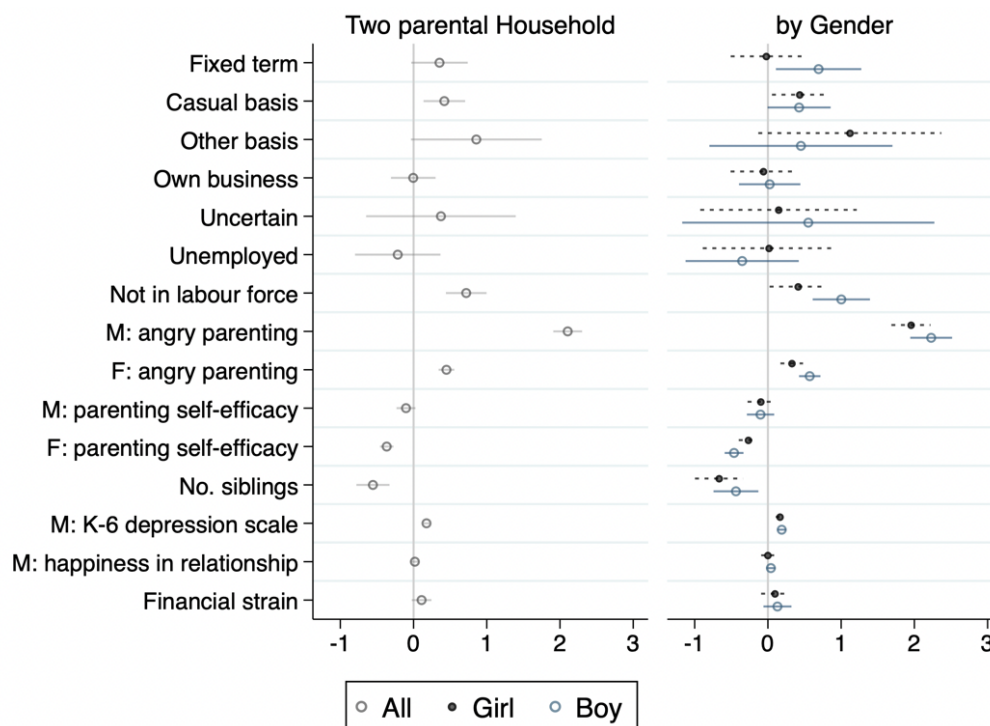
Both mothers' and fathers' angry parenting were associated with child behaviour problems. So were maternal depressive symptoms.

Table 3.5: Fixed effects regression of children's total difficulties scores (two-parent households)

VARIABLES	Two parents		Girl		Boy	
	B	With 95%CI	B	With 95%CI	B	With 95%CI
Mother's work contract (ref: Permanent position)						
Fixed term contract	0.37	[-0.03, 0.74]	-0.04	[-0.51, 0.46]	0.75*	[0.11, 1.28]
Casual basis	0.42**	[0.14, 0.70]	0.40*	[0.05, 0.81]	0.46*	[0.00, 0.86]
Some other bases	0.81	[-0.04, 1.75]	1.08	[-0.13, 2.37]	0.38	[-0.80, 1.70]
Own business	0.01	[-0.31, 0.30]	-0.03	[-0.51, 0.38]	0.02	[-0.39, 0.44]
Other/uncertain	0.42	[-0.65, 1.40]	0.27	[-0.92, 1.21]	0.53	[-1.17, 2.27]
Unemployed	-0.19	[-0.80, 0.37]	0.04	[-0.89, 0.92]	-0.34	[-1.12, 0.42]
Not in labour force	0.72***	[0.44, 1.00]	0.38	[0.02, 0.80]	1.04***	[0.61, 1.39]
Number of siblings	-0.52***	[-0.78, -0.33]	-0.63***	[-1.00, -0.34]	-0.40*	[-0.74, -0.13]
Mother: angry parenting	2.07***	[1.91, 2.30]	1.96***	[1.69, 2.22]	2.16***	[1.94, 2.52]
Father: angry parenting	0.46***	[0.34, 0.56]	0.29***	[0.17, 0.48]	0.62***	[0.42, 0.72]
Mother: parenting self-efficacy rating	-0.12	[-0.23, 0.03]	-0.11	[-0.28, 0.08]	-0.13	[-0.29, 0.09]
Father: parenting self-efficacy rating	-0.36***	[-0.46, -0.28]	-0.32***	[-0.40, -0.14]	-0.40***	[-0.59, -0.33]
Mother's K-6 depression scale summed score	0.18***	[0.13, 0.22]	0.17***	[0.11, 0.22]	0.18***	[0.13, 0.25]
Mother: happiness in the relationship	0.02	[-0.04, 0.07]	0	[-0.09, 0.09]	0.04	[-0.02, 0.10]
Financial strain	0.11	[-0.02, 0.24]	0.1	[-0.09, 0.28]	0.13	[-0.06, 0.32]
Constant		2.61***		2.39**		2.79***
Observations		11,652		5,769		5,883
R-squared						
within		0.140		0.120		0.164
Between		0.397		0.373		0.395
Overall		0.311		0.271		0.328
N		2,061		1,017		1,044

Longitudinal weights used. *p<0.05, **p<0.01, ***p<0.001.

Figure 3.4: Fixed effects regression of children's total difficulties scores (two-parent households)



Finally, Table 6 (Figure 5) reports the results of fixed-effects models that include both maternal and paternal employment information as well as both parents' information on parenting and mental health. When the father has a permanent job, but the mother is in insecure work (i.e., casual, other basis or uncertain tenure) or unemployed/inactive, compared with both parents being in permanent jobs, children's behaviour difficulties scores were statistically significantly higher by half a point, on average, even after accounting for mothers' and father's parenting and mothers' mental health. Similar to the estimates in Tables 2-5, household financial strain was not statistically significantly associated with children's difficulties scores when parenting and maternal mental health are accounted for.

Table 6 (Figure 5) also shows the model 5 estimates separately for boys and girls. The parental employment results for girls are similar to those in the full sample. There is just one additional difference: girls whose fathers are not in work, but mothers are in permanent or fixed term work had lower behaviour difficulty scores than those where both mothers and fathers are in permanent jobs, everything else being equal. Among boys,

behaviour difficulties scores tended to be higher when the father is in a permanent job, but the mother is out of work, or when the father has their own business and the mother is out of work, compared to the situation when both parents are in permanent jobs. Further, when the father is in insecure work but the mother has her own business, boys' difficulties scores were lower on average.

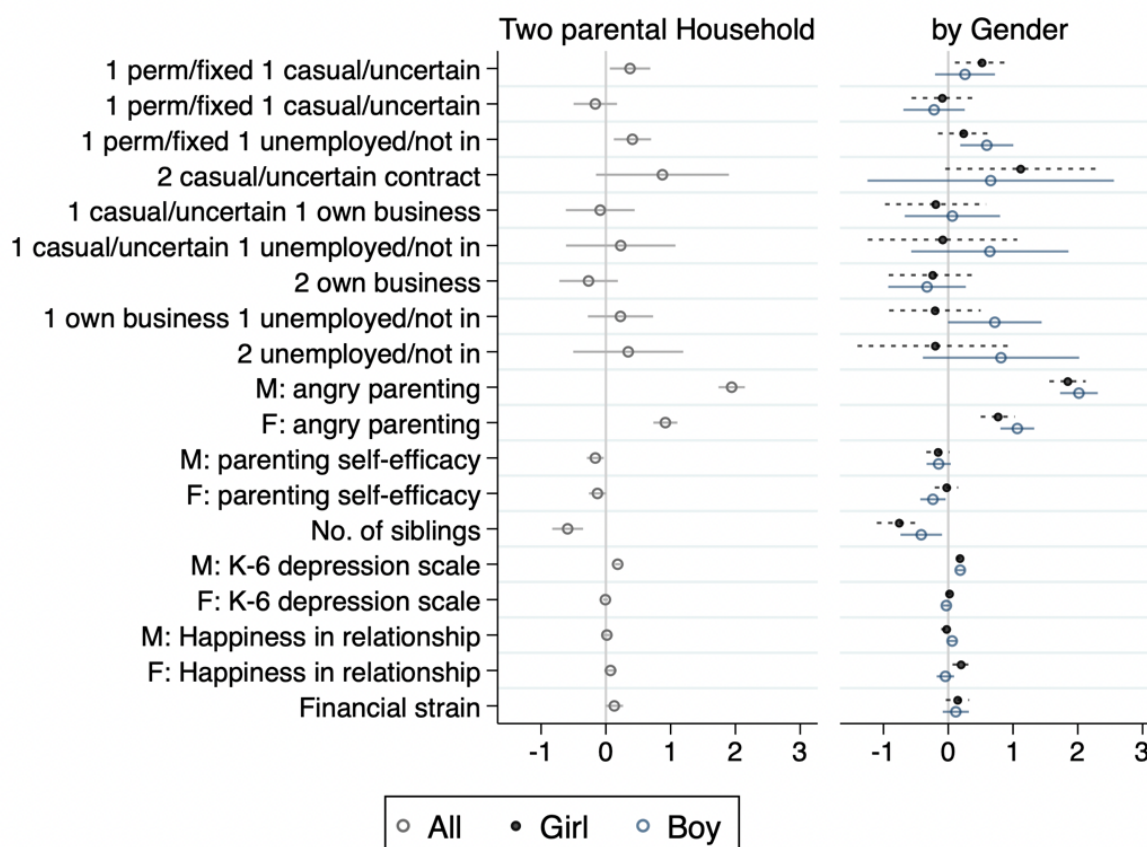
Table 3.6: Fixed effects regression of children's total difficulties scores by maternal and paternal employment status

VARIABLES	All		Girl		Boy	
Parental work (ref. both at Permanent/fixed contract)	B	With 95%CI	B	With 95%CI	B	With 95%CI
F: permanent, M: casual/uncertain	0.47**	[0.13, 0.82]	0.61**	[0.18, 1.07]	0.36	[-0.17, 0.87]
F: permanent, M: own business	-0.06	[-0.52, 0.35]	-0.07	[-0.70, 0.51]	-0.04	[-0.71, 0.55]
F: permanent, m: unemployed/Not in labour force	0.56***	[0.25, 0.86]	0.43*	[0.02, 0.85]	0.69**	[0.24, 1.11]
F: casual/uncertain; M: Permanent/fixed contract	-0.06	[-0.67, 0.55]	0.06	[-0.83, 0.99]	-0.14	[-0.99, 0.65]
Both at casual/uncertain	0.83	[-0.17, 1.89]	1.08	[-0.05, 2.29]	0.59	[-1.28, 2.50]
F: casual/uncertain M: own business	-0.17	[-1.34, 0.86]	1.51	[-0.13, 3.24]	-1.36*	[-2.80, -0.14]
F: casual/uncertain; M: unemployed/Not in labour force	0.26	[-0.81, 1.38]	-0.46	[-1.89, 0.97]	1.31	[-0.19, 2.99]
F: own business; M: Permanent/fixed contract	-0.24	[-0.66, 0.19]	-0.14	[-0.69, 0.47]	-0.33	[-0.96, 0.26]
F: own business; M: casual/uncertain	-0.11	[-0.65, 0.51]	-0.48	[-1.22, 0.46]	0.32	[-0.54, 1.08]
Both at own business	-0.29	[-0.73, 0.19]	-0.27	[-0.94, 0.44]	-0.38	[-0.97, 0.25]
F: own business; M: unemployed/Not in labour force	0.31	[-0.19, 0.86]	-0.1	[-0.81, 0.66]	0.79*	[0.05, 1.55]
F: unemployed/not in labour force; M: Permanent/fixed contract	-0.5	[-1.08, 0.08]	-0.85*	[-1.66, -0.02]	0.01	[-0.78, 0.80]
F: unemployed/not in labour force, M: casual/uncertain	0.02	[-1.19, 1.24]	0.5	[-1.28, 2.29]	-0.62	[-2.13, 0.87]
F: unemployed/Not in labour force, M: own business	-0.94	[-2.45, 0.49]	-1.18	[-3.26, 0.71]	-0.74	[-2.75, 1.28]
Both unemployed/not in labour force	0.28	[-0.58, 1.14]	-0.31	[-1.53, 0.89]	0.69	[-0.54, 1.93]
Number of sibling (ref. no sibling)	-0.57***	[-0.83, -0.36]	-0.75***	[-1.12, -0.44]	-0.39*	[-0.74, -0.10]
Mother: angry parenting	1.93***	[1.72, 2.13]	1.82***	[1.54, 2.11]	2.00***	[1.71, 2.30]
Father: angry parenting	0.92***	[0.74, 1.11]	0.77***	[0.50, 1.03]	1.05***	[0.81, 1.33]
Mother: parenting self-efficacy rating	-0.16*	[-0.30, -0.04]	-0.16	[-0.34, 0.02]	-0.14	[-0.34, 0.04]
Father: parenting self-efficacy rating	-0.14*	[-0.26, 0.01]	-0.03	[-0.20, 0.16]	-0.26**	[-0.43, -0.04]
Mother's K-6 depression scale summed score	0.18***	[0.14, 0.23]	0.18***	[0.12, 0.23]	0.18***	[0.12, 0.25]
Father's K-6 depression scale summed score	0	[-0.04, 0.03]	0.02	[-0.03, 0.07]	-0.03	[-0.08, 0.03]
Mother's Happiness in relationship	0.01	[-0.04, 0.07]	-0.03	[-0.11, 0.05]	0.06	[0.00, 0.12]
Father's Happiness in relationship	0.07	[-0.02, 0.17]	0.20**	[0.07, 0.32]	-0.04	[-0.18, 0.09]
Financial strain	0.13	[0.00, 0.27]	0.14	[-0.03, 0.33]	0.11	[-0.08, 0.33]
Constant	0.86	[-0.50, 2.08]	-0.04	[-1.67, 1.91]	1.74	[-0.46, 3.27]
Observations	11,049		5,466		5,583	
R-squared						

Within	0.143	0.136	0.164
Between	0.381	0.338	0.395
Overall	0.313	0.261	0.328
N	2,017	996	1,021

Longitudinal weights used. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 3.5: Fixed effects regression of children's total difficulties scores by maternal and paternal employment status



We also checked if the results would differ if internalised and externalised symptoms were analysed separately. Tables S2 and S3 in Supplemental Information report the results of a specification equivalent to that in the main model (Table 2) separately for internalised and externalised symptoms, respectively. Mothers' precarious employment and inactivity were associated with higher externalised symptoms scores. So is having their own business, compared with permanent employment, especially for boys. Meanwhile, having one's own business was associated with lower internalised symptoms scores, especially for those in lone parent families. Maternal unemployment is associated with higher externalised symptoms scores but lower scores for internalised symptoms, especially for

boys. Other results are aligned with the main models: angry parenting and maternal depression were positively associated with both internalised and externalised symptoms, and having more siblings was negatively associated with behaviour problems.

In a second series of checks, we re-estimated our main models allowing the coefficients to vary by the child's age (younger and older than 10 years old). Table S B4 shows the results for the earlier waves (age 4-10). The findings are similar to those in the main model (Model 5). Maternal involvement in casual or uncertain tenure employment was associated with higher behaviour problem scores, but only for boys. Meanwhile, maternal economic inactivity was strongly associated with behaviour problems, particularly for boys. Table S B5 shows the results for the later waves (age 10-16). There were no longer any statistically significant differences between casual and permanent maternal employment. Mothers' inactivity is positively associated with higher total difficulties scores for teenage girls but lower scores for teenage boys. However, it is worth to be noted that fixed effects estimation relies on changes in employment status and there is more fluctuation in mothers' work status in the first five waves.

3.5 Discussion

Working mothers and dual-earner families have become the norm in many countries, but the nature of employment has been changing too. The post-industrial global economy is characterised by a decline in open-ended full-time contracts covered by collective agreements and full social security, which used to be the norm for industrial workers from the late 1960s until the 1990s (Castles et al. 2012)s. Employment relations have become increasingly insecure (Kalleberg 2018). Papalexandris and Kramar (1997) argue that flexible work patterns (e.g. part time, casual contracts, irregular hours) redistributed work between the employed and the unemployed. Although this can create new jobs and facilitate a reconciliation between work and family needs for some, it has increased the share of workers who are not fully covered by social security (Eichhorst et al. 2011). This new world of work features a rise in new types of employment, especially in the private sector, with a growing share of flexible contracts, that are often part-time, fixed-term and low paid (Eichhorst et al. 2011; Palier 2010). Although research has highlighted the links between insecure employment and worse employee health and well-being outcomes, as

well as higher risks of poverty, and potential spill-over effects for other family members, relatively little is known about the consequences for children. As a liberal welfare state, Australia is a suitable setting for examining the relationship between insecure parental employment and child well-being. Our analysis of seven waves of data from the Longitudinal Study of Australian Children covers the period from 2003-04 to 2014-15, following one cohort of children from the age of 4/5 to 16/17.

We investigated whether insecure maternal employment was associated with greater child behaviour difficulties. We focused on maternal rather than paternal employment because mothers were predominantly the primary care givers of the study cohort children, all lone parents were mothers and there was more variation in maternal labour market status over time. However, we included information about fathers' work in separate analyses of two-parent families.

Overall, children whose mothers were employed on casual contracts had higher behaviour difficulty scores than their peers whose mothers were permanently employed. Maternal economic inactivity was also associated with greater behaviour difficulties in children. This is in line with our initial hypothesis (H1) that changes in parental employment status are associated with changes in child well-being. This indicates that mothers' insecure employment has negative consequences for children's mental health. Although we do not know if labour market inactivity was voluntary or not, these results also suggest that a broader definition of maternal employment insecurity could include economic inactivity.

Yet we did not observe a statistically significant link between maternal unemployment and child behaviour difficulties (in a fixed effects regression framework). This is in contrast to the findings of negative impacts of parental job loss on child mental health in Ireland (Mari and Keizer 2021), but Australian unemployment rate was much lower during our study period. However, unemployment was associated with higher behaviour difficulties scores in ordinary least squares regressions estimated separately by wave, at all ages except 8/9 (2008) (see Table S1). This suggests that there are differences in children's mental health between families with unemployed mothers vs permanently employed

mothers, even though few mothers reported unemployment in any given wave. However, when focusing only on the very few families that experienced a change in or out of maternal unemployment over time and controlling for any stable unobservable child/family characteristics, we could not detect any statistically significant associations between maternal unemployment and child behaviour difficulties.

Accounting for both household financial strain, and maternal parenting and mental health shows that it is the latter rather than the former that helps explain the association between maternal employment status and children's behaviour scores over time. Therefore, these findings are more in line with the family stress model, which emphasises psycho-social processes, than the family investment model, which centres on economic processes. In particular, these findings are consistent with our hypothesis H1c: insecure work can affect children via maternal mental health and parenting regardless of the level of financial strain. This indicates that insecure employment affects mothers' mental health and parenting, which in turn affect their children's well-being. However, maternal mental health and parenting do not fully account for the adverse effects of maternal economic inactivity. This is perhaps not surprising because economic inactivity may be voluntary and is not necessarily an indicator of broader employment insecurity. However, this raises further questions about why voluntary maternal economic inactivity would be associated with worse mental health in children.

Our findings are broadly similar for boys and girls, but there is some evidence that maternal economic inactivity is more detrimental to boys' well-being, particularly for their externalised behaviour difficulties. This is partially consistent with our hypothesis H2: that differences in child well-being by parental employment status would be moderated by the child's gender. While it is beyond the scope of the present study, future research could explore the reasons behind potentially different impacts of maternal economic inactivity on boys and girls. Meanwhile, it is not necessarily surprising that behaviour difficulties are driven by externalised symptoms in boys, since boys are more likely to externalise their difficulties than girls (Achenbach et al. 2002b).

We also hypothesised that boys' mental health would be more sensitive to paternal employment (H2a) and girls' mental health to maternal employment (H2b) in two-parent families. There is some evidence to support this, but it is not very clear cut. Girls (but not boys) had higher behaviour difficulties scores when their fathers were permanently employed but mothers were on casual contracts (compared to the situation where both parents were permanently employed). Girls (but not boys) had lower difficulties scores when their fathers were out of work and mothers were permanently employed (as opposed to when both were permanent). Meanwhile, boys (but not girls) had lower difficulties scores when the mother had her own business, but the father was casually employed, and higher difficulties scores when the father had his own business, but the mother was out of work. While these results suggest gendered patterns worthy of further investigation, our longitudinal sample was too small to explore this further.

We also examined the role of parental precarious employment, mental health, and parenting for children in lone parent and two-parent families. In lone parent families, there were no statistically significant differences in children's behaviour difficulty scores by maternal employment status when maternal mental health and parenting were controlled for. This could be a function of their small sample size. Among two-parent families, compared to the situation where both parents were permanently employed, children's behaviour difficulty scores were higher when fathers were permanently employed but mothers were either casual employees or are out of work. This is even after accounting for both parents' mental health and parenting. This supports the main findings focusing on maternal employment and suggests that even where mothers are secondary earners in the family, their employment insecurity can have adverse consequences for their children. This is in line with our hypothesis H3b: that conditional on paternal employment, maternal employment status would be more salient in two-parent than lone parent families.

However, our findings are subject to several limitations. First, we did not examine all aspects of employment insecurity. Our main definition is based on a narrow conception of insecurity: the casual nature of employment contract. It does not include other potential aspects of insecurity, such as subjective perceptions of job insecurity,

nonstandard working hours, limited control over one's schedule, or low pay, which could also be a feature of fixed term or even permanent contracts. To fully investigate the role of parental employment insecurity, child cohort studies need to collect more detailed information about parental work, as well as unemployment and inactivity. Second, our findings are not necessarily generalisable to other periods or national contexts, as we focus on a specific cohort of Australian children, those born in 1999/2000. Future research could incorporate child cohort data for different countries, periods and cohorts. However, differences in the type of information collected about parental employment pose a challenge to cross-country comparative analyses of this kind. Third, we rely on fixed effects models which help address an important threat to internal validity of our results, i.e., time-invariant unobserved heterogeneity, but they come with their own limitations. As they rely on within-household changes in the outcomes and predictors, it is more difficult to observe true effects when there is less change over time. This particularly affects our findings for older children, when mothers tend to be more settled in their employment status. Further, when we estimate our models separately by household structure or the child's gender, reduced sub-sample sizes make it difficult to identify statistically significant differences. Meanwhile, the fixed effects estimation does not deal with omitted time-varying confounders. As the study includes pre- and post-recession periods, which could have led to some time-varying observed differences between families, we ran our results separately by age/period (2004-2010 and 2010-2016) as a robustness check. Our findings remain qualitatively the same. Finally, our fixed effects models did not allow us to model mediation pathways directly: we simply add covariates sequentially. Thus, it could be that household financial strain plays a far greater role than our estimates suggest. Despite these limitations, our study is one of the first to shed light on the effects of employment insecurity for both parental and child mental health in a liberal welfare state context.

3.6 Conclusion

In a recent qualitative study of precariousness at work and its consequences for people's family lives in the United States, Pugh (2015) observed that mothers tried to shield their children from the worst effects of instability while bringing them up as flexible, ready for

an uncertain world. However, we found that there is a robust association between maternal insecure employment and greater behaviour problems in children in a nationally representative sample of Australian families. Using two influential frameworks of family resources and child well-being, we examined several alternative pathways from insecure maternal employment to children's outcomes: maternal mental health and parenting, and household financial circumstances. Although the family investment and family stress theories predict that these two pathways can be mutually reinforcing, we found that maternal mental health and parenting perform better at explaining the link between insecure maternal work and child outcomes. This suggests that even when insecure employment is not associated with lower household income (e.g., when there is another earner in more stable employment), the psychological effects of employment insecurity on mothers' well-being may negatively affect their children.

References

- Achenbach, T.M., Dumenci, L., Rescorla, L.A., 2002. Ten-Year Comparisons of Problems and Competencies for National Samples of Youth: Self, Parent, and Teacher Reports. *Journal of Emotional and Behavioral Disorders* 10, 194–203.
<https://doi.org/10.1177/10634266020100040101>
- Allison, P.D., 2009. *Fixed Effects Regression Models*. SAGE Publications.
- Barbieri, P., 2009. Flexible Employment and Inequality in Europe¹. *European Sociological Review* 25, 621–628. <https://doi.org/10.1093/esr/jcp020>
- Ben-Shlomo, Y., Kuh, D., 2004. *A life course approach to chronic disease epidemiology*. Oxford University Press.
- Bradley, R.H., Corwyn, R.F., 2002. Socioeconomic Status and Child Development. *Annual Review of Psychology* 53, 371–399.
<https://doi.org/10.1146/annurev.psych.53.100901.135233>
- Bubonya, M., Cobb-Clark, D.A., Wooden, M., 2017. Job loss and the mental health of spouses and adolescent children. *IZA Journal of Labor Economics* 6, 6.
<https://doi.org/10.1186/s40172-017-0056-1>
- Burchell, B., 2011. A temporal comparison of the effects of unemployment and job insecurity on wellbeing. *Sociological Research Online* 16, 66–78.
- Coelli, M.B., 2004. Farber et al., 1993. unpublished mimeo, University of British Columbia.
- Dunifon, R., Kalil, A., Bajracharya, A., 2005. Maternal Working Conditions and Child Well-Being in Welfare-Leaving Families. *Developmental Psychology* 41, 851–859.
<https://doi.org/10.1037/0012-1649.41.6.851>

- Ervin, J., Taouk, Y., Hewitt, B., King, T., 2023. The gendered associations between precarious employment and mental health in working-age Australians: A longitudinal analysis using 16 waves of the HILDA survey. *Social Science & Medicine* 339, 116382. <https://doi.org/10.1016/j.socscimed.2023.116382>
- Esping-Andersen, G., 1999. *Social foundations of postindustrial economies*. OUP Oxford.
- Flanagan, C.A., Eccles, J.S., 1993. Changes in Parents' Work Status and Adolescents' Adjustment at School. *Child Development* 64, 246–257. <https://doi.org/10.1111/j.1467-8624.1993.tb02907.x>
- Gibbons, R.A., Sprong, S., Chzhen, Y., 2023. Growing Up in the Great Recession: The Effects of Three Dimensions of Economic Well-being on Child Behavioral Difficulties from Ages 3 to 17. *J Youth Adolescence* 52, 1024–1038. <https://doi.org/10.1007/s10964-022-01721-2>
- Goldin, C., 2021. *Career and Family: Women's Century-Long Journey toward Equity*.
- Goodman, A., Goodman, R., 2009. Strengths and Difficulties Questionnaire as a Dimensional Measure of Child Mental Health. *Journal of the American Academy of Child & Adolescent Psychiatry* 48, 400–403. <https://doi.org/10.1097/CHI.0b013e3181985068>
- Goodman, R., 1997. The Strengths and Difficulties Questionnaire: a research note. *Journal of child psychology and psychiatry* 38, 581–586.
- Han, W.-J., Zhang, L., 2022. Precarious Parental Employment Conditions and Family Poverty Experiences in the First Six Years of a Child's Life. *J Child Fam Stud* 31, 1106–1120. <https://doi.org/10.1007/s10826-021-02154-4>
- Heckman, J.J., 2006. Skill formation and the economics of investing in disadvantaged children. *Science* 312, 1900–1902.

- Hill, H.D., Morris, P.A., Castells, N., Walker, J.T., 2011. Getting a job is only half the battle: Maternal job loss and child classroom behavior in low-income families. *Journal of Policy Analysis and Management* 30, 310–333.
<https://doi.org/10.1002/pam.20565>
- Hill, T.D., Davis, A.P., Roos, J.M., French, M.T., 2020. Limitations of Fixed-Effects Models for Panel Data. *Sociological Perspectives* 63, 357–369.
<https://doi.org/10.1177/0731121419863785>
- Hsueh, J., Yoshikawa, H., 2007. Working nonstandard schedules and variable shifts in low-income families: associations with parental psychological well-being, family functioning, and child well-being. *Developmental psychology* 43, 620.
- Johnson, R.C., Kalil, A., Dunifon, R.E., 2012. Employment patterns of less-skilled workers: Links to children’s behavior and academic progress. *Demography* 49, 747–772.
- Joshi, P., Bogen, K., 2007. Nonstandard Schedules and Young Children’s Behavioral Outcomes Among Working Low-Income Families. *Journal of Marriage and Family* 69, 139–156. <https://doi.org/10.1111/j.1741-3737.2006.00350.x>
- Kalil, A., Ziol-Guest, K.M., 2008. Parental employment circumstances and children’s academic progress. *Social Science Research* 37, 500–515.
- Kim, T.J., von dem Knesebeck, O., 2015. Is an insecure job better for health than having no job at all? A systematic review of studies investigating the health-related risks of both job insecurity and unemployment. *BMC Public Health* 15, 985.
<https://doi.org/10.1186/s12889-015-2313-1>
- Kreshpaj, B., Orellana, C., Burström, B., Davis, L., Hemmingsson, T., Johansson, G., Kjellberg, K., Jonsson, J., Wegman, D.H., Bodin, T., 2020. What is precarious employment? A systematic review of definitions and operationalizations from

- quantitative and qualitative studies. *Scandinavian Journal of Work, Environment & Health* 46, 235–247.
- Lareau, A., 2011. *Unequal childhoods: Class, race, and family life*. Univ of California Press.
- Lucas, N., Nicholson, J.M., Maguire, B., 2010. Parenting practices and behaviours, The Longitudinal Study of Australian Children Annual statistical report 2010. Australian Institute of Family Studies.
- Mari, G., Keizer, R., 2021. Parental job loss and early child development in the Great Recession. *Child Development* 92, 1698–1716.
<https://doi.org/10.1111/cdev.13517>
- Masarik, A.S., Conger, R.D., 2017. Stress and child development: a review of the Family Stress Model. *Current Opinion in Psychology* 13, 85–90.
<https://doi.org/10.1016/j.copsyc.2016.05.008>
- Metzger, S., Gracia, P., 2023. Gender differences in mental health following the transition into parenthood: Longitudinal evidence from the UK. *Advances in Life Course Research* 56, 100550. <https://doi.org/10.1016/j.alcr.2023.100550>
- Muris, P., Meesters, C., van den Berg, F., 2003. The strengths and difficulties questionnaire (SDQ). *European child & adolescent psychiatry* 12, 1–8.
- Phillips, K.R., 2002. *Parent Work and Child Well-Being in Low-Income Families*. Occasional Paper. Assessing the New Federalism: An Urban Institute Program To Assess Changing Social Policies. Urban Institute, 2100 M Street, NW, Washington, DC 20037.
- Pugh, A.J., 2015. *The Tumbleweed Society: Working and Caring in an Age of Insecurity*. Oxford University Press.

- Redmond, G., Mullan, K., 2011. Validating Income in the Longitudinal Study of Australian Children.
- Rudolph, K.D., 2002. Gender differences in emotional responses to interpersonal stress during adolescence. *Journal of Adolescent Health* 30, 3–13.
[https://doi.org/10.1016/S1054-139X\(01\)00383-4](https://doi.org/10.1016/S1054-139X(01)00383-4)
- Sanson, A., Nicholson, J., Ungerer, J., Zubrick, S., Wilson, K., 2002. Introducing the Longitudinal Study of Australian Children, LSAC discussion paper. Australian Institute of Family Studies, Melbourne.
- Solantaus, T., Leinonen, J., Punamäki, R.-L., 2004. Children's Mental Health in Times of Economic Recession: Replication and Extension of the Family Economic Stress Model in Finland. *Developmental Psychology* 40, 412–429.
<https://doi.org/10.1037/0012-1649.40.3.412>
- Soloff, C., Lawrence, D., Johnstone, R., 2005. Sample design. Australian Institute of Family Studies Melbourne.
- Srivastava, P., Trinh, T.-A., 2021. The effect of parental smoking on children's cognitive and non-cognitive skills. *Economics & Human Biology* 41, 100978.
<https://doi.org/10.1016/j.ehb.2021.100978>
- Stone, L.L., Otten, R., Engels, R.C.M.E., Vermulst, A.A., Janssens, J.M.A.M., 2010. Psychometric Properties of the Parent and Teacher Versions of the Strengths and Difficulties Questionnaire for 4- to 12-Year-Olds: A Review. *Clin Child Fam Psychol Rev* 13, 254–274. <https://doi.org/10.1007/s10567-010-0071-2>
- Thomas, C., Benzeval, M., Stansfeld, S., 2005. Employment transitions and mental health: an analysis from the British household panel survey. *J Epidemiol Community Health* 59, 243–249. <https://doi.org/10.1136/jech.2004.019778>

4 Chapter 4

Household occupational class and children's educational outcomes in the UK

A slightly different version of this chapter has been submitted to an international peer-reviewed journal as: Mengxuan Li; Yekaterina Chzhen. Household Occupational Class and Children's Graduate Certificate of Secondary Education qualifications: Evidence from UK Millennium Cohort Study (MCS)

Abstract

This paper examines the relationship between parental occupational class and children's educational outcomes in the UK, using data from the Millennium Cohort Study. The results show that parental occupational class is a strong predictor of children's performance in the General Certificate of Secondary Education (GCSE) exams, which mark the end of compulsory schooling. Children from the managerial and professional classes outperform their peers from other classes, even after controlling for parental education, maternal verbal ability test scores and household income. However, children's early cognitive test scores account for a large proportion of the association between occupational class and GCSE results. This suggests that both individual cognitive ability and household socio-economic factors are important in shaping children's educational outcomes.

Key words: Parental occupational class; Cognitive ability; GCSE performance; Millennium cohort study

4.1 Introduction

There is academic and policy consensus on the importance of improving students' educational achievement, as low attainment and poor basic skills in adulthood can affect all aspects of adult life (e.g. Bynner and Parsons, 1997, 2006). Although a large body of research finds an association between household socio-economic status (SES) and children's educational achievement, there remains considerable uncertainty and debate about the specific mechanisms by which SES affects children's educational outcomes. Middle-class parents tend to consciously, and sometimes unconsciously, nurture their children's abilities (Lareau 2011). Research points to differences in household cultural capital (Sullivan 2001) and parental human capital (Dearden et al. 2011; Schoon et al. 2012) across social classes. However, cultural explanations of why working-class children tend to do worse in education are not sufficient on their own because social class differences in standardised tests of cognitive ability emerge as early as age three (Feinstein 2003; Shonkoff and Phillips 2000), before cultural class differences could play a role in children's attitudes to schooling.

This paper aims to address a longstanding question: How does parental social class affect adolescent educational outcomes? Does social class have an independent association with educational achievement, after controlling for other aspects of household SES and the child's early cognitive ability? To do so, we examine variation in children's General Certificates of Secondary Education (GCSEs) results in the UK, which are taken at age 15/16 at the end of compulsory schooling. Our measure of social class is the National Statistics Socio-Economic Classification (NS-SEC), derived from the Erikson-Goldthorpe-Portocarero (EGP) class schema (1979). The NS-SEC framework helps to analyse the role of parental occupation in shaping children's educational outcomes. Occupational class differences are related not only to household income but also to other factors such as pay progression, job security, benefits and future career opportunities.

4.2 Parental socioeconomic status and the intergenerational transmission of educational advantage

4.2.1 Household SES and child development

Household socioeconomic status (SES) is a key determinant of children's development, influencing cognitive skills, educational achievement, and long-term well-being. However, different SES dimensions — income, education, and occupation — may affect child outcomes in distinct ways across different life stages (Thaning, 2021). Previous empirical research found household income to be influential in early childhood, as financial resources determine the quality and quantity of parental investment in educational materials and enriching experiences (Duncan and Brooks-Gunn, 2000; Li and Chzhen, 2023). In the meantime, parental education exerts a more stable influence throughout childhood, providing children with intellectual stimulation (De Graaf et al., 2000) and supportive home learning environment (Bradley and Corwyn, 2002). Parental education is regarded as central in fostering children's academic skills, as it implies the set of embodied skills and traits (Erola et al., 2016), representing familiarity with academical and institutional knowledge (Ball, 2003), and shaping parenting style that encourage educational success. Empirical studies suggest that parental education can independently explain the achievement gradient from infancy to early childhood (Thaning, 2021). However, education and income alone do not fully capture the mechanisms through which SES is transmitted across generations—parental occupation may also play a critical role in shaping children's educational trajectories.

4.2.2 Parental Occupational Class and Educational Outcomes

Household income and parental education are not the only, and perhaps not even the most visible, socioeconomic dimensions that determine offspring's outcomes in adolescence. Occupations structure access to social networks and economic resources for individuals and family (Weeden and Grusky, 2012) and are endowed with distinct personal characteristics, skills, lifestyles, tastes, attitudes, beliefs, and life chances that may shape children's future prospects (Schwartz et al., 2021). Previous research has emphasised the importance of social class and parental characteristics in influencing educational choices during adolescence (Breen and Jonsson, 2005). Parental occupation is important for children's early adulthood, as it provides access to professional networks (Thaning, 2021) and role models (Erola, 2009).

Bukodi and Goldthorpe (2013) analysed data from three British birth cohort studies (i.e. 1946 cohort, 1958 cohort and 1970 cohort) to examine how different aspects of social origins affect children's educational attainment. They found that parental class, status, and education have independent and significant effects on children's education, with these effects varying over time. The impact of parental class has remained relatively stable, while the impact of parental status has decreased, and parental education has become increasingly important in later cohorts.

Similarly, longitudinal research in the US has found that low household income has selective and age-specific effects on child cognitive development (between the ages of 2 and 9/10) (Brooks-Gunn and Duncan, 1997; Duncan and Brooks-Gunn, 2000). Using data from the Wisconsin longitudinal panel, researchers found that the effect of poverty in adolescence on long-term outcomes gets attenuated after controlling for maternal education and family structure (Hauser and Sweeney, 1995; Warren et al., 2002). Moreover, Guo and Harris (2000) found that the effect of low income on children's intellectual development was fully mediated by other household factors such as a cognitive stimulation at home (e.g. access to books; trips to museums), suggesting that poverty alone does not directly affect on children's intellectual development. Parcel & Menaghan (1990) found that mothers who worked in occupations with substantively complex tasks and problem-solving opportunities provided children with more warmth and support at home and a greater number of stimulating materials. Their children showed more advanced verbal skills.

Despite these findings, it remains unclear which aspects of parental occupation drive educational inequalities. In a Danish three-generation study, Jæger (2007) found that the effects of parental class are attenuated by economic capital (income and wealth), cultural capital (education), and social capital (networks), following Bourdieu's (1984) framework. This suggests that occupational class partially subsumes other family resources and processes rather than acting as an independent force. However, some research suggests a more direct influence of parental occupation on children's cognitive and educational development (Parcel and Menaghan, 1990).

4.2.3 Mechanisms Linking Parental SES to Educational Achievement

There is strong evidence that GCSE exam results are socially stratified in the UK. Using data from two large household panel surveys over 22 years, Stopforth et al (2021) found a consistent social class gradient in educational outcomes, with children from higher social classes achieving significantly better GCSE results than those from lower social classes. Their findings suggest that despite overall improvements in educational outcomes over time, social class remains a significant determinant of academic success, with working-class children less likely to achieve good GCSEs, which in turn limits their future educational and labour market opportunities.

Children's Early Cognitive Ability

One of the key mechanisms linking parental SES to later educational outcomes is children's early cognitive ability. Evidence suggests that early cognitive development mediates the effects of household SES on academic performance, meaning that differences in cognitive ability that emerge in childhood persist into adolescence. Using Millennium Cohort Study (MCS) data, Layte (2017) found that cognitive ability at age 5 mediated the relationship between household social class and teachers' assessments of academic performance at age 7. Using more recent MCS data on children's GCSE results, O'Connell and Marks (2022) found that a measure of cognitive ability based on test scores at ages 3, 5, 7, 11 and 15 was a much stronger predictor of GCSE results than any of the measures of household SES (i.e. income, parental education and parental occupational status). This is consistent with findings that cognitive ability is strongly correlated with educational achievement (Deary et al., 2007; Jencks et al., 1979; Mackintosh, 2011; Roth et al., 2015). However, cognitive development itself is shaped by SES-related factors such as family investment in learning resources and exposure to stressors linked to economic hardship (Li and Chzhen, 2023).

Maternal vocabulary score

Beyond the direct effects of SES, parental cognitive and linguistic skills may amplify the advantages of higher SES, thereby further reinforcing social inequalities. Bourdieu's

theory of cultural capital suggests that the role of “linguistic competence” (Bourdieu, 1973; Bourdieu et al., 1996) is a key mechanism through which parents transmit advantages to their children, particularly in the maintenance of educational and social structures. Parental verbal ability and cognitive skills influence the quality of parent-child interactions, shaping language development, problem-solving skills, and school readiness. Using data from the UK MCS, Barg and Klein (2024) investigated whether parental occupation might have “spillover” effects (Greenberger et al., 1994) on child outcomes and found a positive relationship between maternal occupation-specific skills, such as presentation skills, and children’s verbal test scores. Similarly, Sullivan et al (2021) found that parental vocabulary scores mediated the socioeconomic gradient in children’s cognitive ability at age 14, suggesting that parents with stronger verbal skills provide a richer linguistic environment, amplifying the advantages associated with higher socio-economic status (SES) and thereby enhancing their children’s academic performance (Barg and Klein, 2024; Schachner and Sampson, 2020).

This is consistent with Coleman’s (1988) theory of human capital, which argues that parents’ cognitive resources shape the home learning environment and their ability to foster children’s cognitive development. Parental human capital extends beyond formal education, as skills gained through occupational experiences or personal learning can also enhance children’s educational success (Harding et al., 2015). By viewing maternal vocabulary as a moderator, this study investigates whether mothers’ linguistic competence amplifies the relationship between parental occupation and children’s GCSE performance.

4.2.4 research aims and hypotheses

This paper aims to deepen our understanding of the relationship between social class and children’s academic qualifications at the end of compulsory schooling, using data from a nationally representative British birth cohort, the MCS. We use longitudinal data on children between the ages of 7 and 17 to disentangle the contributions of family demographic and socio-economic characteristics, children’s early cognitive ability scores, maternal vocabulary scores and parental education to children’s GCSE results. We not

only document differences in children's GCSE results across parental occupational classes, controlling for household income, financial strain and parental education, but we also model two potential mechanisms through which parental occupational class contributes to the educational achievement gap between the ages of 7 and 17: maternal vocabulary scores and children's early cognitive ability scores.

This study addresses four research questions:

RQ 1: What is the strength of the association between parental occupational class and children's academic qualifications at the end of compulsory schooling in the UK?

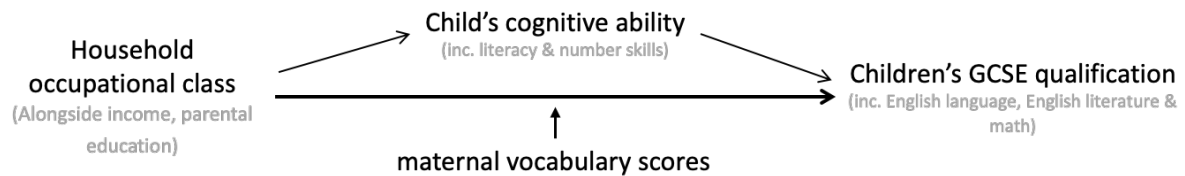
RQ 2: To what extent is this association attenuated when controlling for other family resources, such as household income, parental education and ability to make ends meet?

RQ 3: To what extent is the remaining association between parental occupational class and children's GCSE scores mediated by children's early cognitive ability or moderated by maternal vocabulary scores?

RQ 4: Do these relationships vary by child gender?

We expect household occupational class to predict children's GCSE performance, even after controlling for household income, parental education and family financial situation (H1). At the same time, we expect children's own early cognitive ability, based on test scores, to be a stronger predictor of GCSE results than any of the measures of household SES. We also expect children's early cognitive ability to mediate this relationship (H2). Also, maternal vocabulary can be viewed as a specific skill that enhances the transmission of socio-economic advantages. Mothers with a higher vocabulary test score are likely to engage in more complex and stimulating verbal interactions with their children, thereby promoting language development and cognitive skills essential for academic success. We wonder how maternal vocabulary scores (H3) to moderating this association.

Figure 4.1: Theoretical diagram



4.2 Data and Methods

4.3.1 Data

We use longitudinal data from the UK Millennium Cohort Study (MCS), which follows the lives of nearly 20,000 children born at the turn of the millennium from 9 months to the age of 17. The MCS is the fourth in a series of UK birth cohort studies. It collects a rich set of household demographic and socio-economic indicators as well as child cognitive and educational outcomes. This study uses data from wave 4, wave 6 and wave 7, when children are 7, 14 and 17 years old respectively. Nearly 11,000 children participated in the three waves used in this study and 6,334 reported their GCSE score for all three compulsory school subjects at wave 7. After excluding observations with missing values for any of the variables used in the analysis, the analytic sample comprises 4,453 children. For all analyses, the sampling weights provided with the MCS dataset were used to correct for selective panel attrition (University of London, Institute of Education, Centre for Longitudinal Studies 2020).

We examine the association between parental occupational class and adolescents' educational qualifications by regressing children's GCSE scores at age 17 on their cognitive test scores at age 7 and household income, parental education and parental occupation measured at age 7, as well as parental vocabulary test scores when the child was 14.

4.3.2 Data and methods

The study child's GCSE score is the dependent variable in this analysis, while parental occupational class is the main predictor of interest. We include the child's early cognitive test scores and the mother's vocabulary test score as potential mediators. We include

household income, financial strain and parental education as potential confounders. Table 1 presents descriptive statistics for all variables used in the analysis.

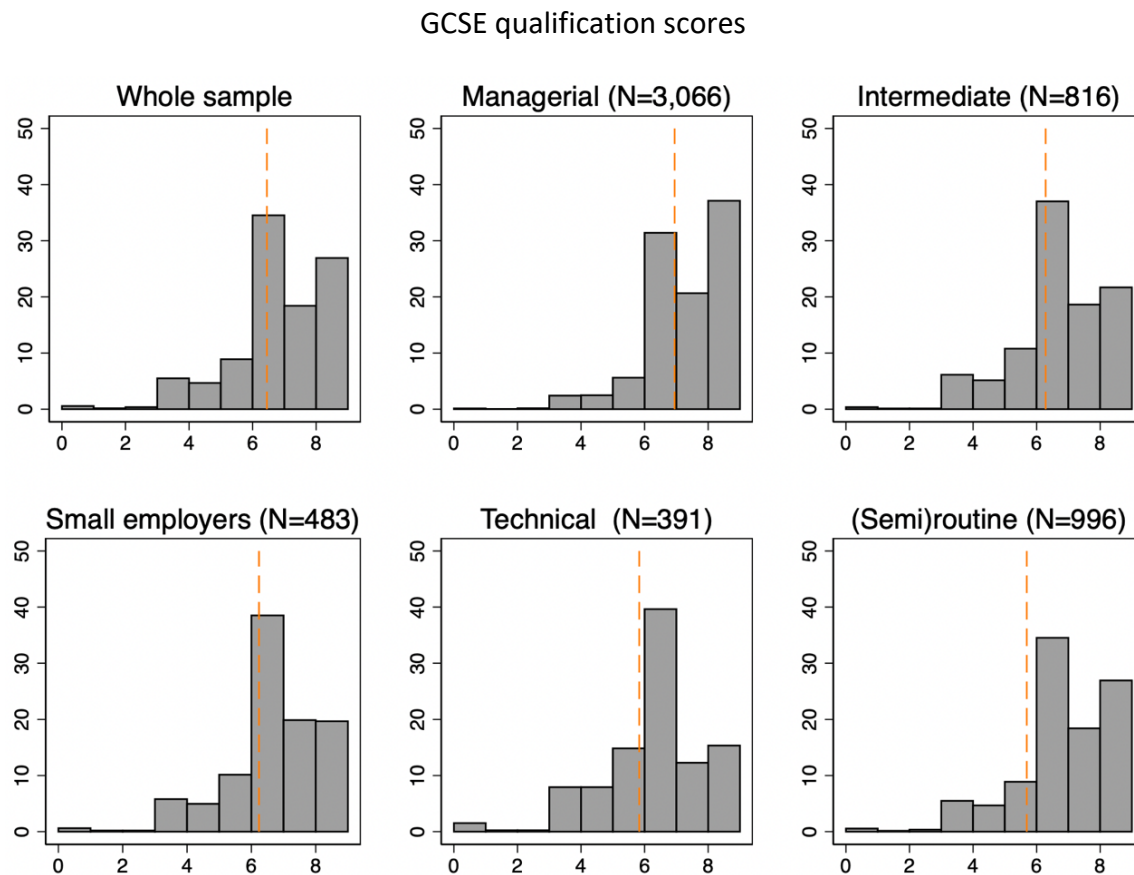
GCSE exam results

GCSEs are state examinations at the end of lower secondary education in England, Wales and Northern Ireland. As Scotland uses alternative qualifications, the Scottish sub-sample is excluded from our analyses. GCSEs were introduced in the late 1980s with grades ranging from A (highest) to G (lowest). An A* grade was introduced in 1994 (Yang and Woodhouse 2001). A numerical grading system (0-9) was introduced for some subjects from 2014. As a result, we have scores based on both the new and old grading systems. Although students take nine GCSEs, we focus on English and Mathematics. There are separate grades for English Language and English Literature. Both the old and the new grading systems were converted to a numerical scale of a 0-3 (0 = U, 1 = Fail, 2 = Pass, 3 = Good), and the total score for each student across these three subjects was calculated. The scores followed a normal distribution, with over 99% falling between 0 and 9. Of the 6,334 students included in the analysis, 2,738 were male and 3,192 were female, with an average GCSE total score of 6.45 (on a scale from 0 to 9). The distribution of the outcome variable by parental occupational class, together with its mean (highlighted in orange), is shown in [Figure 1](#).

Social class

The MCS collected information on the employment status of both parents, either their current job or their last known job. Household occupation was categorised according to the 5-class National Statistics Socio-Economic Classification (NS-SeC), based on the Goldthorpe class schema (Goldthorpe, 2007; ONS, 2005). It includes: 1) managerial, administrative and professional occupations; 2) intermediate occupations; 3) small employers and own account workers; 4) lower supervisory and technical occupations; 5) semi-routine or routine occupations. The highest occupation status of both parents was used. Children from managerial and professional classes score over 2 points higher in GCSEs than their peers from other social classes (Figure 1).

Figure 4.2: Distribution Main Dependent Variables



Note: longitudinal weight applied. Orange dashed line shows the mean value.

Mediator: Early cognitive ability

At wave 4 of the MCS, when the children were 7 years old, they completed three cognitive tests: the Word Reading Standard Score, the Pattern Construction T-Score, and the Maths7 Standardised Age Score. From these three tests, a single unrotated principal component score was derived. The three cognitive test scores loaded onto a latent factor that explained 62% of the total variance. The bivariate relationship between children's cognitive ability at age 7 and their GCSE qualifications at age 17 is shown in [Appendix A1](#).

Moderator: Maternal vocabulary score

At wave 6 of the MCS, when the children were 14 years old, parents completed a 20-item version of the Applied Psychology Unit (APU) Vocabulary Test (Closs and Hutchings 1976). The APU has good psychometric properties and high correlations with other tests of verbal

intelligence (Levy and Goldstein 1984). This test assesses vocabulary knowledge through multiple-choice questions in which participants must match a given word with one of five synonyms. The test usually starts with easier words (e.g. begin) and progresses to more difficult ones (e.g. pusillanimous) (Sullivan et al. 2021). The test score is the sum of correct answers to 20 questions. As most mothers, but not fathers, completed the assessment, we use the mother's test score to represent parental cognitive ability. Baddeley et al. (1985) showed that vocabulary is closely related to other aspects of verbal ability such as comprehension, reading and memory.

Controls:

Parental education

The MCS provides a measure of the highest educational attainment of either parent on a scale from 1 to 5 (lowest to highest): 1) low achievement in lower secondary school; 2) high achievement in lower secondary school; 3) completion of higher secondary school; 4) higher secondary school and some post-secondary qualifications; 5) completion of first degree or higher. We use data on the highest educational attainment of both parents from Wave 4, when children are 7 years old.

Household Income

We use weekly household income after taxes and transfers, adjusted for household size and composition, from Wave 4 of the MCS. We have transformed it to the logarithmic scale to account for potential non-linearity in the association between income and GCSE results.

Financial Strain

We used mothers' reports of the family's ability to make ends meet from Wave 4. Responses range from "living comfortably" (1) to "finding it very difficult" (5).

Demographic variables

We include the study child's gender and family structure (lone parent vs two parent family, measured in Wave 4) as controls.

4.3.3 Method

We estimate the conditional associations between parental occupational class and child GCSE results using OLS regression:

$$Y_{i,17} = \alpha + \beta_j SES_{p(i),17}^j + \beta_c X_{c(i),07} + \beta_m X_{m(i),14} + \delta_h' X_{h(i),17} + e_{i,17} \quad (1)$$

where $Y_{i,17}$ is the GCSE qualification result of study child i collected at age 17. $SES_{p(i),17}^j$ is the parent occupational class from the parents' responses (p) in the same wave about the current or last job and β_j are the parameters of interest. The different in $SES_{p(i),17}^j$ is associated with a variation in GCSE qualification by β_j standard deviations. Importantly, this association is net of child's earlier cognitive ability ($X_{c(i),07}$), mother's cognitive test score ($X_{m(i),14}$) and household characteristics ($X_{h(i),17}$) above. Finally, $e_{i,17}$ is the error term robust to heteroskedasticity.

To examine the role of child early cognitive ability as a mediator in the relationship between household occupational class and GCSE achievement, this study employs causal mediation analysis (CMA) following the framework by Imai et al. (2010) and VanderWeele (2015). Mediation analysis decomposes the total effect of household occupational class into two components: the average causal mediation effect (ACME), which captures the indirect effect operating through child cognitive ability at age 7, and the average direct effect (ADE), which represents the portion of the effect not mediated by early cognitive ability. The total effect (TE) is the sum of these components. To estimate these effects, a regression-based approach is used, where child cognitive ability at age 7 is first regressed on household occupational class, and GCSE achievement at age 17 is subsequently regressed on both occupational class and cognitive ability.

Additionally, we conduct interaction analyses, including an interaction term: parental occupation * maternal vocabulary (as a moderator) to test whether the strength of the relationship between occupational class and GCSE outcomes differs depending on maternal vocabulary levels. This interaction term allows for examine whether children in households with higher occupational status benefit more in terms of GCSE performance

when maternal vocabulary is high. The model controls for household income, financial strain, child previous cognitive score, parental education, large family size, and lone-parent status to account for potential confounding effects. Estimation is conducted using nonparametric bootstrapping to generate confidence intervals for the mediation effects, ensuring robust inference. This analytical approach allows for a nuanced understanding of the pathways through which occupational class shapes children's educational trajectories.

Table 4.1: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	N
GCSE math	2.229	0.630	0	3	4,453
GCSE English literature	2.188	0.617	0	3	4,453
GCSE English language	2.189	0.606	0	3	4,453
GCSE total score	6.572	1.625	0	9	4,453
Parental occupational class (NS-SEC)					
Managerial, administrative and professional	0.559	0.497	0	1	2,489
Intermediate	0.148	0.355	0	1	657
Small employers	0.079	0.270	0	1	352
Lower supervisory and technical	0.066	0.249	0	1	295
Semi-routine or routine	0.148	0.355	0	1	660
Female (Ref.: Male)	0.542	0.498	0	1	4,453
Lone parent (Ref.: two parents' household)	0.141	0.348	0	1	4,453
Latent cognitive scores	104.546	13.383	55.766	141.728	4,453
Maternal vocabulary scores	11.745	4.295	0	20	4,453
Household income (Log)	5.927	0.578	2.956	7.157	4,453

Parental education (NVQ)					
Lower secondary school: low achievement or no NVQ	0.071	0.256	0	1	314
Lower secondary school: high achievement	0.192	0.394	0	1	854
Higher secondary school	0.157	0.364	0	1	698
Post-secondary qualifications	0.444	0.497	0	1	1,976
University or higher	0.137	0.344	0	1	611
Financial strain (diff. ends meet)	2.255	0.994	1	5	4453

4.4 Results

Table 2 shows the relationship between GCSE results and parental occupational class. Model 1 presents the association between each class group and GCSE scores, controlling only for the child's gender and family structure. Compared with children from managerial, administrative, and professional class backgrounds, those from the other four occupational classes have statistically significantly lower GCSE scores ($p < 0.001$). Notably, children from lower working-class groups—those with parents in lower supervisory or technical, and semi-routine or routine occupations—score more than 1 point lower in GCSE qualifications than those from managerial households.

Models 2 to 5 introduce additional covariates separately, one set at a time. Both children's own cognitive ability (Model 2) and maternal cognitive ability (Model 3) are positively related to children's GCSE scores at $p < 0.001$. However, in these models there are still statistically significant social class differences in children's GCSE scores, albeit somewhat attenuated compared to the baseline model. Model 4 instead includes parental education, household income and financial strain. There are all statistically significantly associated with GCSE scores at $p < 0.001$. Finally, Model 5 includes all these predictors at once. Social class differences are substantially attenuated compared to Model 1, but there are still statistically significant differences in mean GCSE scores between children in salariat classes and those in working classes (i.e. lower supervisory and technical; semi-routine

and routine) at $p < 0.001$. This model accounts for 38% of the variation in GCSE scores, compared to 13% in the baseline model. However, Model 2 – with the child’s earlier cognitive test scores – explained 35% of the variation, nearly as much as Model 5.

Table 4.2: OLS regressions of GCSE scores and occupational class

Variable	GCSE Qualifications				
	(1)	(2)	(3)	(4)	(5)
Occupational class (ref managerial position)					
Intermediate	-.615***	-.388***	-.433***	-.240**	-0.115
Small employers	-.836***	-.486***	-.555***	-.331**	-0.124
Lower supervisory and technical	-1.190***	-.822***	-.886***	-.691***	-.444***
Semi-routine or routine	-1.340***	-.866***	-.946***	-.708***	-.420***
Girl (Ref.: Boy)	.381***	.400***	.380***	.396***	.407***
Lone parent (Ref.: two parents’ household)	-0.148	-.162*	-.197*	0.097	-0.035
Child early cognitive ability		.059***			.054***
Maternal vocabulary score			.086***		.029***
Parental education (Ref.: University or higher)					
Lower secondary school: low achieve or no qualification				-.870***	-.402**
Lower secondary school: high achieve				-.878***	-.557***
Higher secondary school				-.671***	-.453***
Post-secondary qualifications				-.359***	-.227***
Household equivalence income (Log)				.317***	.164**
Financial strain				-.158***	-.122***
_cons	6.680***	0.392	5.550***	5.410***	-0.042
R-square	0.130	0.350	0.170	0.184	0.380
N	4453	4453	4453	4453	4453

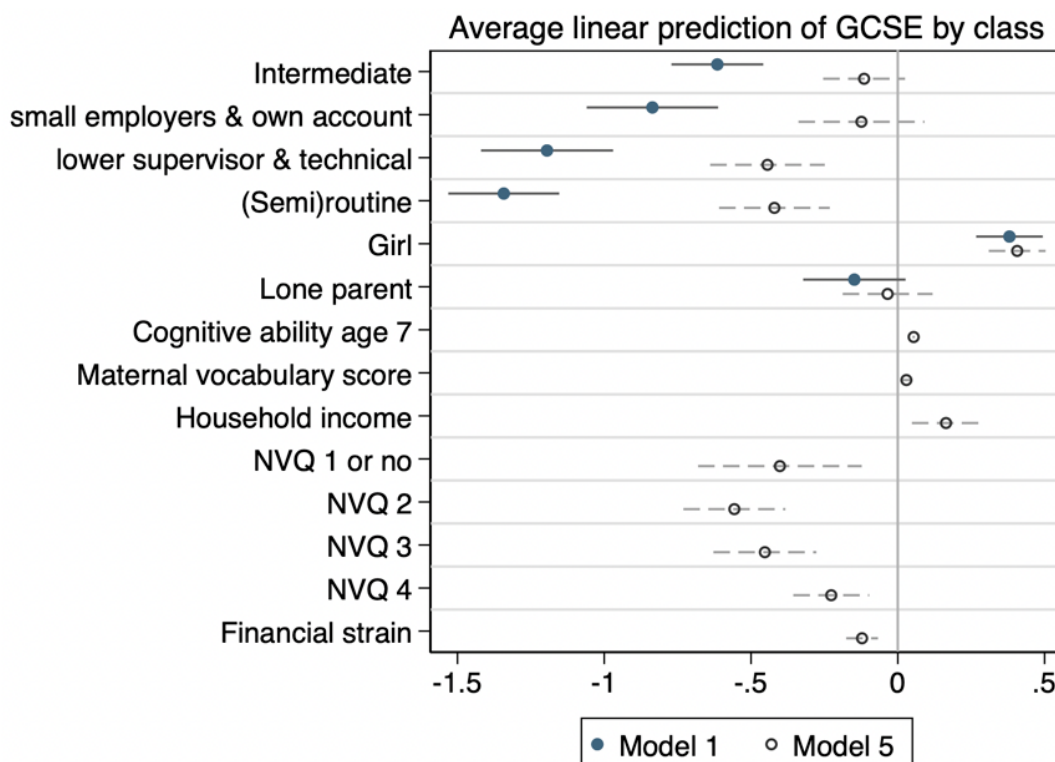
*Note: indicates significance at the 10% level, ** at the 5% level, *** at the 1% level.*

Figure 2 compares the regression estimates from Model 1 and Model 5. The reference line at zero represents children from households in the highest occupational class

(managerial, administrative, and professional occupations). The plotted points show how GCSE performance varies for children from other occupational classes relative to this reference group.

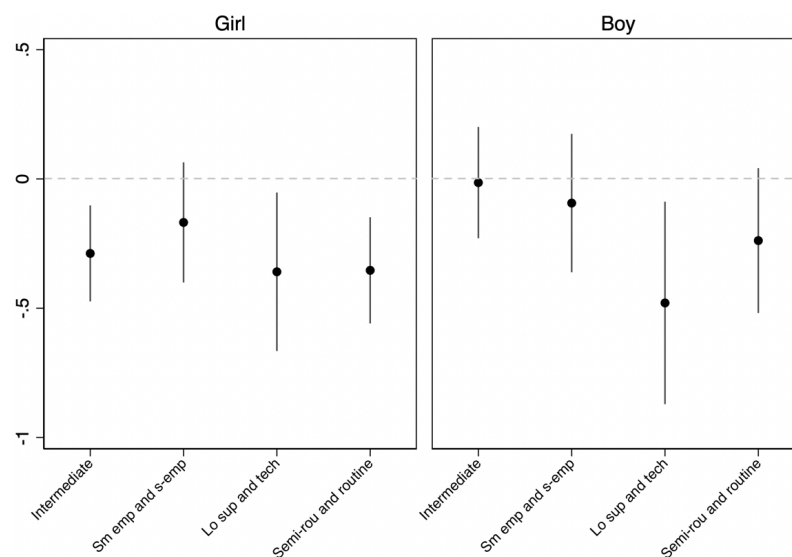
Model 1 indicates that children from households in lower occupational classes (intermediate, small employers, lower supervisory, semi-routine) generally exhibit significantly lower GCSE performance compared to the reference group. After controlling for the child's past cognitive scores, maternal vocabulary scores, and other related household factors such as parental education, household income, and financial strain, parental self-employment was no longer statistically significantly different from salariat classes (Model 5). Children from lower occupational classes (lower supervisory, (semi-) routine) still have significantly lower GCSE scores, although the coefficients are noticeably smaller than in Model 1. Household income remains a powerful predictor of changes in GCSE scores across different social classes. Lower parental education, low income, and financial strain are linked to statistically significantly lower GCSE scores at age 17, all else being equal.

Figure 4.3 reports the associations between household occupational SES and children's GCSE qualifications.



It is important to note that household social class may be associated with GCSE qualifications differently depending on child gender. Figure 3 indicates the results of estimating Model 5 separately for girls and boys, which corresponds to a fully moderated model (Blackwell and Olson 2022). The analysis shows no significant differences in GCSE qualifications between managerial classes and the self-employed for boys and girls. However, other social classes differences are more pronounced for girls than for boys, even after controlling for all variables in Model 5. In contrast, for boys, the only social class difference in GCSE scores is between managerial and the semi-routine/routine occupational categories.

Figure 4.4: Association Between household occupational class and GCSE qualifications: Heterogeneity Analysis by Sex



Note: 95% confidence intervals computed from robust standard errors.

Table 2 presents the mediation analysis of the relationship between parental occupations and children's GCSE qualifications through cognitive ability, based on a simplified path analysis version of the model 2 and 3. The Average Causal Mediation Effect (ACME) is 0.329, with a 95% confidence interval of [0.266, 0.393], indicating that cognitive ability at age 7 significantly mediates the association between parental occupational status and children's educational outcomes. It suggests that part of the effect of parental

occupations on GCSE performance is transmitted through the child's earlier cognitive abilities.

Nearly one third (31%) of the relationship between parental occupational class and children's GCSE qualifications is direct, excluding the mediating role of cognitive ability and other household controls (e.g. household, financial strain, parental cognitive score and degree). Importantly, the percentage of the total effect that is mediated through cognitive ability at age 7 is 32.5%. This highlights that over half of the impact of parental occupation on offspring's GCSE performance can be attributed to cognitive ability, underscoring the significant role that cognitive factors play in the educational advantages associated with higher parental occupational status. It indicates that a large part of the disadvantages in academic achievement by lower occupational SES background during secondary school could be attributed to achievement gaps that already existed before school. Thus, while socio-economic background directly influences educational outcomes, cognitive abilities serve as a crucial pathway in mediating this relationship.

Table 4.3: Mediation of the relationship between parental occupations and offspring GCSE qualifications via *child earlier cognitive ability*

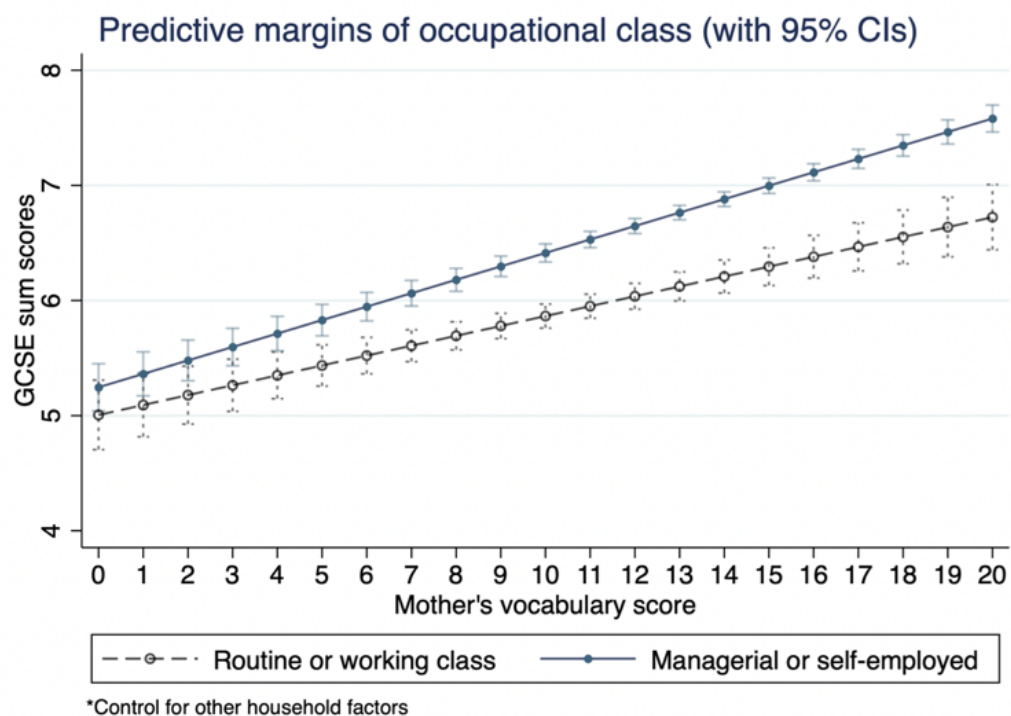
	Mean	[95% Conf. Interval]	
Mediated ACME (via Early cognitive ability)	0.325	0.266	0.383
Direct Effect (Occupational Class on GCSE)	0.306	0.190	0.426
Total Effect (sum of direct and mediated effect)	0.631	0.502	0.756
% of Tot Eff mediated	0.515	0.304	0.648

*Controlling for household income, financial strain, maternal verbal score, parental degree, large family, lone-parent family

Figure 4.5 shows that the relationship between parental occupation and GCSE scores varies by maternal vocabulary levels, indicating a moderation effect. Maternal scores significantly differ among two social class groups, among managerial-class households, higher values of maternal verbal test scores amplify the positive effect of social class on GCSE performance, shows that linguistic resources within the home environment shape the extent to which parental occupation translates into academic success. Whereas there

is no social class difference when the score is lower than 5; the class differences only appear from the score 5 and higher. This suggests that if the mother has a low verbal test score, the child is more likely to perform poorly in the GCSEs, even if the family holds a managerial occupation.

Figure 4.5: Predictive margin between mother's vocabulary score and GCSE qualification by occupational class



4.5 Discussion and conclusion

This paper explored the association between household socioeconomic status (SES), particularly occupational class, and children's educational outcomes in the UK. It showed that parental occupational class is a significant predictor of children's GCSE scores at the end of compulsory schooling, aligning with key sociological theories. Children from higher occupational classes, such as managerial or professional backgrounds, tend to perform significantly better in their GCSEs than those from lower social classes, such as semi-routine or routine occupations. This is consistent with Stopforth et al.(2021)'s research on social class and GCSE outcomes, using British household panel studies linked with linked educational data from administrative records, across two decades. In this paper, we used

longitudinal data from the Millennium Cohort Study. It includes self-reported GCSE results and a rich set of socio-economic variables, allowing us to examine the channels of association between social class and GCSE scores. We found this educational disparity persists even after accounting for other factors like parental education, household income, children's own earlier cognitive ability scores, and maternal cognitive ability. This supports our Hypothesis 1.

A critical part of the study focuses on children's early cognitive abilities, finding that cognitive scores at age 7 are strong mediators in the relationship between parental occupational class and later educational outcomes at age 17. Specifically, approximately 35% of the impact of parental occupational class on children's GCSE performance is mediated through early cognitive ability, demonstrating the long-term effect of early childhood development on academic achievement (Hypothesis 2). This supports the Family Investment Model (FIM), which posits that families with greater economic and social resources are better positioned to invest in their children's cognitive development, thereby enhancing educational success.

Meanwhile, the moderating effect of maternal vocabulary test scores on the relationship between occupational class and GCSE performance in children highlights the intergenerational transmission of cognitive advantages (Hypothesis 3). Our findings are consistent with the studies suggesting that children's vocabulary levels are strongly shaped by their primary caregivers' verbal skills and interactions (Barg and Klein, 2024; Hurtado et al., 2008; Sullivan et al., 2021; Weisleder and Fernald, 2013). The moderating effect of maternal vocabulary highlights the importance of cultural capital as conceptualised by Bourdieu (1984). Mothers with greater language skills can provide a more linguistically rich environment, thereby reinforcing the advantages associated with higher occupational status. This finding aligns with Bourdieu's assertion that cultural capital, such as language proficiency, plays a crucial role in educational attainment (Bourdieu, 1973). It is also consistent with Coleman's (1988) theory of human capital, which emphasises the ability of parents to foster the development of their children. Coleman suggests that human capital is created through changes in individuals that result

in skills and capabilities which enable them to act in new ways. In this context, maternal vocabulary reflects the human capital that mothers can leverage to foster their children's learning and development, thereby influencing educational outcomes.

The study concludes that although household income, financial strain, and parental education also influence children's educational outcomes, occupational class remains a key factor. Earlier research on the same dataset, using multivariate analysis, found the cognitive ability and conscientiousness are more important than family SES (e.g. income and occupational status) (O'Connell and Marks, 2022). However, we show children from lower social classes face more significant challenges, not only due to cognitive differences but also because of economic and social constraints that limit their academic performance. The findings suggest that policy interventions targeting educational inequalities should consider both cognitive development and broader socio-economic factors to reduce the persistent achievement gap.

Overall, this figure highlights the persistent educational inequalities tied to socio-economic background, emphasizing that children from households in higher occupational classes tend to perform better in their GCSEs, regardless of gender. However, the gender differences suggest that girls from lower occupational classes might be at a greater disadvantage compared to boys in similar circumstances.

A key limitation of this study relates to the use of MCS data from Wave 7, where GCSE results were reported using both the old letter grading system and the new numerical system introduced in 2014. These two grading systems are not directly equivalent, and in this study, we converted them into a simplified 0-3 scale for analysis. While this approach allowed for comparison, it reduced the detail of the data, limiting the variation in children's GCSE results. Yet if we used linked data on GCSE results from the National Pupil Database, we would have had to exclude all students who instead sat International GCSEs, predominantly used in private fee-paying schools (Anders et al., 2024). In addition, due to data availability/reliability we were restricted to only analysing English and math scores. Future studies may benefit from using the linked administrative education dataset, which

includes all GCSE results converted to the new grading system, allowing for more detailed and varied analysis. A more general limitation of using data from the MCS is that we are restricted to a single cohort of children born at the turn of the millennium. However, the advantage of the MCS is that it provides a larger sample size of children taking GCSEs than the household panel studies analysed in Stopforth et al (2021).

Furthermore, while this paper attempts to isolate the effects of social class from other parental resources such as education, financial strain and household income, it is important to recognise that these controls may not capture the full extent of parental influence on children's academic ability. There may be underlying processes, such as parental investment in education, that are not fully represented by these measures. Future research could adopt a more comprehensive framework, incorporating factors such as neighbourhood socioeconomic status (e.g., the Index of Multiple Deprivation), housing tenure, or other status indicators to provide a more holistic view of how family and environmental factors influence educational outcomes. Another limitation of our study is that our data do not allow us to identify the role of genetic ability in the relationship between SES and children's educational achievement. Our finding of greater differences by social class at higher levels of maternal verbal test scores is consistent with the hypothesis that more advantaged families are better able to realise children's innate potential (Mönkediek et al., 2019), but a different research design (e.g. a twin study) would be better able to test this.

This paper contributes to a broader understanding of how social class affects educational trajectories and highlights the need for comprehensive educational policies to support children from disadvantaged backgrounds, particularly in promoting early cognitive development. Our findings have important implications for educational policy, particularly in addressing the challenges faced by lower SES families in the context of a rapidly changing demographic landscape due to immigration and population ageing. Moreover, the educational inequalities identified in this paper should not be used to blame individual families, but should be seen as being embedded in the wider system of social stratification.

Policy solutions should therefore pay attention to the broader social structures that reproduce educational inequalities

Reference

- Anders, J., Green, F., Henderson, M., Henseke, G., 2024. Private school pupils' performance in GCSEs (and IGCSEs). *Cambridge Journal of Education* 54, 795–813. <https://doi.org/10.1080/0305764X.2024.2420611>
- Baddeley, A., Logie, R., Nimmo-Smith, I., Brereton, N., 1985. Components of fluent reading. *Journal of Memory and Language* 24, 119–131. [https://doi.org/10.1016/0749-596X\(85\)90019-1](https://doi.org/10.1016/0749-596X(85)90019-1)
- Ball, S.J., 2003. Class Strategies and the Education Market | The Middle Classes and Soc [WWW Document]. URL <https://www.taylorfrancis.com/books/mono/10.4324/9780203218952/class-strategies-education-market-stephen-ball> (accessed 2.12.25).
- Barg, K., Klein, M., 2024. Maternal Occupation-Specific Skills and Children's Cognitive Development. *Sociology* 58, 118–139. <https://doi.org/10.1177/00380385231159005>
- Blackwell, M., Olson, M.P., 2022. Reducing Model Misspecification and Bias in the Estimation of Interactions. *Political Analysis* 30, 495–514. <https://doi.org/10.1017/pan.2021.19>
- Bourdieu, P., 1984. *Distinction: A Social Critique of the Judgement of Taste*.
- Bourdieu, P., 1973. Cultural Reproduction and Social Reproduction, in: *Knowledge, Education, and Cultural Change*. Routledge.
- Bourdieu, P., Passeron, J.-C., Martin, M. de S., 1996. *Academic Discourse: Linguistic Misunderstanding and Professorial Power*. Stanford University Press.

- Bradley, R.H., Corwyn, R.F., 2002. Socioeconomic status and child development. *Annual review of psychology* 53, 371–399.
- Breen, R., Jonsson, J.O., 2005. Inequality of opportunity in comparative perspective: Recent research on educational attainment and social mobility. *Annu. Rev. Sociol.* 31, 223–243.
- Brooks-Gunn, J., Duncan, G.J., 1997. The effects of poverty on children. *The Future of Children* 7, 55. <https://doi.org/10.2307/1602387>
- Bukodi, E., Goldthorpe, J.H., 2013. Decomposing ‘Social Origins’: The Effects of Parents’ Class, Status, and Education on the Educational Attainment of Their Children. *European Sociological Review* 29, 1024–1039. <https://doi.org/10.1093/esr/jcs079>
- Bynner, J., Parsons, S., 2006. New light on literacy and numeracy: Full report. National Research and Development Centre for adult literacy and numeracy, Institute of Education, University of London., London.
- Bynner, J., Parsons, S., 1997. Does Numeracy Matter? Evidence from the National Child Development Study on the Impact of Poor Numeracy on Adult Life. Basic Skills Agency, Commonwealth House, 1-19 New Oxford Street, London WC1A 1NU, England, United Kingdom (6.
- Closs, S.J., Hutchings, M.J., 1976. APU Arithmetic Test [WWW Document]. Hodder and Stoughton. URL (accessed 6.1.24).
- Coleman, J.S., 1988. Social Capital in the Creation of Human Capital. *American Journal of Sociology* 94, S95–S120.
- De Graaf, N.D., De Graaf, P.M., Kraaykamp, G., 2000. Parental Cultural Capital and Educational Attainment in the Netherlands: A Refinement of the Cultural Capital

Perspective. *Sociology of Education* 73, 92–111.

<https://doi.org/10.2307/2673239>

Dearden, L., Sibieta, L., Sylva, K., 2011. The socio-economic gradient in early child outcomes: Evidence from the Millennium Cohort Study (Working Paper No. 11,03). IFS Working Papers.

Deary, I.J., Strand, S., Smith, P., Fernandes, C., 2007. Intelligence and educational achievement. *Intelligence* 35, 13–21.

<https://doi.org/10.1016/j.intell.2006.02.001>

Duncan, G.J., Brooks-Gunn, J., 2000. Family Poverty, Welfare Reform, and Child Development. *Child Development* 71, 188–196.

Erikson, R., Goldthorpe, J.H., Portocarero, L., 1979. Intergenerational Class Mobility in Three Western European Societies: England, France and Sweden. *The British Journal of Sociology* 30, 415–441. <https://doi.org/10.2307/589632>

Erola, J., Jalonen, S., Lehti, H., 2016. Parental education, class and income over early life course and children's achievement. *Research in Social Stratification and Mobility* 44, 33–43. <https://doi.org/10.1016/j.rssm.2016.01.003>

Feinstein, L., 2003. Inequality in the Early Cognitive Development of British Children in the 1970 Cohort. *Economica* 70, 73–97. <https://doi.org/10.1111/1468-0335.t01-1-00272>

Goldthorpe, J.H., 2007. *On Sociology Second Edition Volume Two: Illustration and Retrospect*. Stanford University Press.

Greenberger, E., O'Neil, R., Nagel, S.K., 1994. Linking workplace and homeplace: Relations between the nature of adults' work and their parenting behaviors.

- Developmental Psychology 30, 990–1002. <https://doi.org/10.1037/0012-1649.30.6.990>
- Guo, G., Harris, K.M., 2000. The mechanisms mediating the effects of poverty on children's intellectual development. *Demography* 37, 431–447. <https://doi.org/10.2307/2648070>
- Harding, J.F., Morris, P.A., Hughes, D., 2015. The Relationship Between Maternal Education and Children's Academic Outcomes: A Theoretical Framework. *Journal of Marriage and Family* 77, 60–76. <https://doi.org/10.1111/jomf.12156>
- Hauser, R.M., Sweeney, M.M., 1995. Does poverty in adolescence affect the life chances of high school graduates? Center for Demography and Ecology, University of Wisconsin--Madison., No.95-22 62.
- Hurtado, N., Marchman, V.A., Fernald, A., 2008. Does input influence uptake? Links between maternal talk, processing speed and vocabulary size in Spanish-learning children. *Dev Sci* 11, F31–F39. <https://doi.org/10.1111/j.1467-7687.2008.00768.x>
- Imai, K., Keele, L., Tingley, D., 2010. A general approach to causal mediation analysis. *Psychological Methods* 15, 309–334. <https://doi.org/10.1037/a0020761>
- Jæger, M.M., 2007. Educational Mobility Across Three Generations: The Changing Impact of Parental Social Class, Economic, Cultural and Social Capital. *European Societies* 9, 527–550. <https://doi.org/10.1080/14616690701449568>
- Jencks, C., Bartlett, Susan, Corcoran, Mary, Crouse, James, Eaglesfield, David, Jackson, Gregory, McClelland, Kent, Mueser, Peter, Olneck, Michael, Schwartz, Joseph, Ward, Sherry, Williams, Jill, 1979. *Who Gets Ahead? The Determinants of Economic Success in America*. Basic Books, Publishers, 10 East 53rd Street, New York, NY 01122 (\$17.

- Lareau, A., 2011. *Unequal childhoods: Class, race, and family life*. Univ of California Press.
- Layte, R., 2017. Why do working-class kids do worse in school? An empirical test of two theories of educational disadvantage. *European Sociological Review* 33, 489–503. <https://doi.org/10.1093/esr/jcx054>
- Levy, P., Goldstein, H., 1984. *Tests in Education: A Book of Critical Reviews*. Academic Press.
- Li, M., Chzhen, Y., 2023. Parental investment or parenting stress? Examining the links between poverty and child development in Ireland. *European Societies* 26, 911–951. <https://doi.org/10.1080/14616696.2023.2275592>
- Mackintosh, N., 2011. *IQ and Human Intelligence*. OUP Oxford.
- Mönkediek, B., Lang, V., Weigel, L., Baum, M.A., Eifler, E.F., Hahn, E., Hufer, A., Klatzka, C.H., Kottwitz, A., Krell, K., Nikstat, A., Diwald, M., Riemann, R., Spinath, F.M., 2019. The German Twin Family Panel (TwinLife). *Twin Research and Human Genetics* 22, 540–547. <https://doi.org/10.1017/thg.2019.63>
- O’Connell, M., Marks, G.N., 2022. Cognitive ability and conscientiousness are more important than SES for educational attainment: An analysis of the UK Millennium Cohort Study. *Personality and Individual Differences* 188, 111471. <https://doi.org/10.1016/j.paid.2021.111471>
- Office of National Statistics, 2005. *The National Statistics Socio-Economic Classification: Origins, Development and Use*. Palgrave Macmillan, London.
- Parcel, T.L., Menaghan, E.G., 1990. *Maternal Working Conditions and Children’s Verbal Facility: Studying the Intergenerational Transmission of Inequality from Mothers*

- to Young Children. *Social Psychology Quarterly* 53, 132–147.
<https://doi.org/10.2307/2786675>
- Roth, B., Becker, N., Romeyke, S., Schäfer, S., Domnick, F., Spinath, F.M., 2015.
Intelligence and school grades: A meta-analysis. *Intelligence* 53, 118–137.
<https://doi.org/10.1016/j.intell.2015.09.002>
- Schachner, J.N., Sampson, R.J., 2020. Skill-Based Contextual Sorting: How Parental
Cognition and Residential Mobility Produce Unequal Environments for Children.
Demography 57, 675–703. <https://doi.org/10.1007/s13524-020-00866-8>
- Schoon, I., Jones, E., Cheng, H., Maughan, B., 2012. Family hardship, family instability,
and cognitive development. *J Epidemiol Community Health* 66, 716–722.
<https://doi.org/10.1136/jech.2010.121228>
- Schwartz, C.R., Wang, Y., Mare, R.D., 2021. Opportunity and Change in Occupational
Assortative Mating. *Soc Sci Res* 99, 102600.
<https://doi.org/10.1016/j.ssresearch.2021.102600>
- Shonkoff, J.P., Phillips, D.A. (Eds.), 2000. *From Neurons to Neighborhoods: The Science
of Early Childhood Development*. National Academies Press.
- Stopforth, S., Gayle, V., Boeren, E., 2021. Parental social class and school GCSE
outcomes: two decades of evidence from UK household panel surveys.
Contemporary Social Science 16, 309–324.
<https://doi.org/10.1080/21582041.2020.1792967>
- Sullivan, A., 2001. Cultural Capital and Educational Attainment. *Sociology* 35, 893–912.
<https://doi.org/10.1017/S0038038501008938>

- Sullivan, A., Moulton, V., Fitzsimons, E., 2021. The intergenerational transmission of language skill. *The British Journal of Sociology* 72, 207–232.
<https://doi.org/10.1111/1468-4446.12780>
- Thaning, M., 2021. Resource specificity in intergenerational inequality: The case of education, occupation, and income. *Research in Social Stratification and Mobility* 75, 100644. <https://doi.org/10.1016/j.rssm.2021.100644>
- University of London, Institute of Education, Centre for Longitudinal Studies, 2020. Millennium cohort study: Longitudinal family file, 2001-2018.
<https://doi.org/10.5255/UKDA-SN-8172-4>
- VanderWeele, T., 2015. *Explanation in Causal Inference: Methods for Mediation and Interaction*. Oxford University Press.
- Warren, J.R., Hauser, R.M., Sheridan, J.T., 2002. Occupational Stratification across the Life Course: Evidence from the Wisconsin Longitudinal Study. *Am Sociol Rev* 67, 432–455. <https://doi.org/10.1177/000312240206700306>
- Weeden, K.A., Grusky, D.B., 2012. The Three Worlds of Inequality. *American Journal of Sociology* 117, 1723–1785. <https://doi.org/10.1086/665035>
- Weisleder, A., Fernald, A., 2013. Talking to children matters: Early language experience strengthens processing and builds vocabulary. *Psychol Sci* 24, 2143–2152.
<https://doi.org/10.1177/0956797613488145>
- Yang, M., Woodhouse, G., 2001. Progress from GCSE to A and AS Level: Institutional and gender differences, and trends over time. *British Educational Research Journal* 27, 245–267. <https://doi.org/10.1080/01411920120048296>

5 Chapter 5

Parental migrant status and expectations of children's educational attainment

A slightly different version of this chapter is currently under review at an international peer-reviewed journal as: Mengxuan Li; Yekaterina Chzhen. Immigrant optimism in Ireland: parental expectations of children's educational attainment

Abstract

This study investigates the differences in educational expectations between immigrant and native parents in Ireland, a context known for high tertiary attainment but with limited research on migration-related educational inequalities. Drawing on longitudinal data from the Growing Up in Ireland (GUI) study, we explore how parental expectations align with children's previous academic performance, focusing on families with diverse migration backgrounds. The analysis includes various socio-demographic factors, such as family socio-economic status and cognitive test scores at age 9.

The results reveal generally high educational expectations among immigrant parents compared to their native counterparts, particularly those from Asian, Eastern European, and African origins. However, these immigrant parents' expectations often do not correspond with their children's actual academic performance, highlighting a "paradox of immigrant optimism." In contrast, native Irish parents and those from Western Europe exhibit more realistic expectations aligned with their children's cognitive abilities. Furthermore, the study shows that immigrant parents with higher education levels are more likely to have realistic expectations regarding their children's educational prospects. These findings contribute to our understanding of educational inequalities and the factors influencing educational aspirations in a context of increasing cultural diversity. Future research should investigate the reasons behind this optimism among immigrant families and the cultural and structural factors influencing parental expectations in new migration contexts like Ireland. This study contributes to the broader literature on educational inequality, adding insights specific to Ireland's increasingly multicultural society.

Key words: Immigrant optimism; educational expectation; Growing Up in Ireland; educational inequality.

5.1 Introduction

Although education is key to the economic integration of immigrants and their children, there are substantial inequalities in educational attainment by migration background in Europe (van Tubergen et al. 2004). Even second-generation immigrants tend to have lower levels of educational attainment than their peers (Heath et al. 2008), although the extent of the disadvantage varies by country of origin and destination, and in some cases is reversed in favour of immigrants (Heath and Brinbaum 2007). The immigrant disadvantage in education may reflect socio-economic differences in the perceived costs and benefits of different educational choices, in line with rational action theory (Breen and Goldthorpe 1997; Jonsson and Erikson 1996).

However, contrary to the logic of this structural explanation, immigrants' educational expectations (whether reported by parents or children) are often more ambitious than those of natives, even after accounting for differences in socio-economic status and children's educational test scores. Since Kao and Tienda's (1998) influential paper on minority children in the United States, the educational disadvantage experienced by immigrant children despite their families' high educational aspirations has been referred to as the 'paradox of immigrant optimism' (Raleigh and Kao 2010). A similar pattern has been observed in European countries such as Germany (Salikutluk 2016), France (Brinbaum and Cebolla-Boado 2007) and the United Kingdom (Fernández-Reino 2016). However, less is known about the educational expectations of immigrants in more recent immigration countries.

This study examines migration background differences in parental expectations of the future educational attainment of their secondary school children in the Republic of Ireland. There is little research on educational inequalities by migration background in Ireland because its history as a country of net immigration is relatively short. Positive net migration was recorded in 1996 for the first time since the 1970s, peaking in 2007 (CSO 2023a). Thus, Ireland has become a promising new context for investigating migration background inequalities in education. Around 12% of the Irish population were non-Irish citizens in the 2022 census (CSO 2023b) and 17% of the resident population were foreign-

born in 2016 (Eurostat 2018). Ireland now has one of the highest percentages of foreign-born residents in the European Union: in 2016, only Luxembourg, Cyprus, Estonia, Latvia and Austria had a higher percentage (Eurostat 2018).

Moreover, Ireland is an attractive case study for understanding how immigrant parents perceive opportunity structures for their children because it has a highly skilled immigrant population, predominantly from Eastern Europe and the UK, but also from North and South America (CSO, 2023b). The overall educational attainment level is also very high in Ireland. According to Eurostat (2023), 54.5% of the population aged 25 to 64 years old attained tertiary education. This is the third highest educational attainment level in the EU. Alongside the high rates of tertiary enrolment after completing upper secondary education (Smyth, 2020), this indicates a widespread 'college-for-all' norm (Feliciano & Lanuza, 2016). At the same time, second generation immigrant children tend to perform worse in verbal ability tests at the start of primary school than their non-immigrant peers (Sprong & Skopek, 2023), with social background playing only a minor role in explaining these achievement differences (Sprong & Skopek, 2022). If immigrant parents expect their children to complete tertiary education even though second-generation immigrant children tend to do worse in tests of educational achievement on average, this will be consistent with a paradox of immigrant optimism.

Therefore, the aims of this study are two-fold. First, it examines the differences in educational expectations between migrant and native parents in Ireland, an under-researched setting where tertiary attainment is generally high. Second, it investigates the extent to which parental expectations are related to children's prior performance on standardised tests, controlling for family socio-economic status. In a review of research on parental expectations, Yamamoto and Holloway (2010, p. 191) find that parental expectations are generally defined as "realistic beliefs or judgments that parents have about their children's future achievement as reflected in course grades, highest level of schooling attained, or college attendance". These are not mere aspirations, as they have to be grounded in "an assessment of the child's academic capabilities as well as the resources for supporting a given level of achievement" (Yamamoto & Holloway, 2010, p. 191).

This study uses longitudinal data from a nationally representative birth cohort study Growing Up in Ireland (GUI '08), which follows a cohort of children born in 2008 from the age of 9, with data currently available up to the age of 13. It includes detailed information on family socio-demographic background, measures of children's curriculum-based reading achievement at the age of 9 in 2017/18, and parental (as well as children's own) expectations of children's future educational attainment (measured at the age of 13 in 2021/22). A parallel study, GUI '98, follows a cohort born in 1998 from the age of 9 years, with data now available until the age of 20. While several studies have examined the educational expectations of the GUI '98 cohort age ages 13, 17 or 20 by immigrant background (McGinnity et al., 2023; Smyth, 2020; Sprong & Devitt, 2022), ours is the first, to our knowledge, to focus on the younger cohort.

GUI '08 allows us to follow the same families over time, so we can examine how the relationship between parental expectations and children's prior achievement varies across migrants' region of origin compared to natives. Such variability may shed light on specific cultural or social factors that influence educational outcomes in contemporary Irish society. It also provides valuable insights into the mechanisms of educational inequality.

The study examines parental expectations across seven different immigrant groups, categorised by parents' region of origin. While the Irish migrant population is highly heterogeneous (Fahey et al., 2019), previous studies have looked at only two groups (McGinnity et al., 2023) or four groups (Sprong & Devitt, 2022). Some contrast migrants and non-migrants without distinguishing between different migrant groups (Smyth, 2020). It then investigates which migrant origin groups have more 'realistic' expectations of their children's educational attainment, defined as a positive association between parents' expectations of tertiary education and children's previous reading test scores. Finally, it examines how these associations may vary by the socio-economic status of the household, measured by maternal education.

5.2 Educational expectations based on migrant/ethnic background

A growing body of research has documented ambitious educational aspirations, expectations and post-school pathway choices among second-generation immigrant youths. While aspirations refer to idealistic preferences, expectations are meant to be more realistic reflections of what is possible (McGinnity et al., 2023). A Swedish study showed that both aspirations and expectations to complete university were higher among adolescent children of foreign-born parents, all else being equal (Boguslaw, 2017). Similarly, children of Turkish background in Germany expressed higher expectations than their native-born peers, although no such gap was found for children of immigrants from the former Soviet Union (Salikutluk, 2016). Meanwhile, ethnic minority children in England expressed higher educational expectations at age 14 than White British children, everything else being equal.

Notably, it is Irish studies that contract this pattern. Unlike the present analysis, focusing on GUI '08, they use GUI '98 data for an older cohort that includes both first- and second generation immigrant children. Sprong and Devitt (2022) found no statistically significant differences in educational expectations between white Irish children and those from other ethnic groups at age 13, before or after controlling for prior academic ability and parental social background. McGinnity et al (2023) confirmed this finding for the GUI '98 children at the age of 17 and further established that there were no differences in the rates of university enrolment at age 20. Smyth (2020) found no differences in children's expectations at age 13 and only marginal differences in parents' expectations. The present study uses data for a younger cohort, all of whom were born in Ireland or arrived in early infancy. Since Ireland has seen growth in the numbers and diversity of immigrants between 1998 and 2008, our findings could be different.

There is also evidence that some ethnic minority children tend to opt for more advanced types of secondary schooling compared to their native peers with similar class backgrounds, although this may depend on the type of education system. In a study of ethnic differences in academic and vocational pathways in upper secondary education, Lessard-Philips et al. (2014) found that in Belgium, Germany and the Netherlands, which track early, ethnic minority students were under-represented in the academic pathway. Same results found in second-generation immigrant in Switzerland (Schnell & Fibbi, 2016). However, this was due to their lower socio-economic status (SES) backgrounds and poorer

academic performance . Meanwhile, in the UK, Finland, France and Sweden, which have more comprehensive systems, ethnic minority students were actually more likely to enrol in the academic track after controlling for SES and academic achievement. A Swedish study found that children of non-European immigrants were more likely to choose academic tracks in upper-secondary school than their native-born peers, controlling for prior achievement and socio-economic status (Jonsson & Rudolphi, 2011).

This is consistent with the immigrant optimism hypothesis: immigrants who view education as a route to social mobility may have higher aspirations for their children (Goyette & Xie, 1999). This may be because first-generation immigrants tend to be favourably selected on education, especially if they plan to stay permanently (Chen et al., 2019), or on personality characteristics such as extraversion and openness (Canache et al., 2013) or preferences such as risk seeking (Gibson & McKenzie, 2011). Even if they find it difficult to capitalise on this in the destination country, they would still have high expectations of their children. We would therefore expect immigrants to Ireland from Eastern Europe and Africa to have higher and less 'realistic' expectations of their children's post-school attainment than the native-born or immigrants from the UK or Western Europe.

Immigrant optimism may also be due to a lack of familiarity with the educational system in the destination country, leading some immigrant parents to form unrealistically high aspirations for their children's education (Phalet et al., 2004). However, some studies suggest that a limited understanding of the education system may, in contrast, lead immigrant families to make less ambitious educational choices (Jonsson & Erikson, 1996). It could also be that schools rather than parents play a key role in steering children into different tracks (Van De Werfhorst & Van Tubergen, 2007). An alternative explanation of immigrant optimism is that ethnic minority youths set higher educational goals for themselves in anticipation of labour market discrimination or other challenges (Brinbaum & Cebolla-Boado, 2007; A. Heath et al., 2008; Leslie & Drinkwater, 1999).

However, immigrant optimism may be unwarranted or unrealistic in the context of educational achievement disadvantage among migrant background children. Although this depends on the national context, migrant groups and the outcomes studied,

educational inequalities based on ethnic/immigrant background are well documented (see Van De Werfhorst & Van Tubergen, 2007). If immigrant children express higher educational expectations despite their poorer performance, this is consistent with the paradox of immigrant optimism (Raleigh & Kao, 2010).

5.3 The Irish context

In contrast to Devitt and Sprong (2022) and McGinnity et al (2023) who used data from GUI '98, we use data for a younger cohort of Irish children, born in 2008. All but 1% of the GUI '08 sample were born in Ireland (Darmody et al., 2022, p. 32). Our study, therefore, focuses on second-generation immigrant children, while previous research examined a sample that included many foreign-born children. Furthermore, GUI '08 children were born to a different cohort of immigrants than their counterparts in GUI '98. Ireland fully opened its labour market to workers from the 10 new EU accession states in 2004, while restricting work permits for non-EU nationals in a way that prioritised higher-skilled workers (Devitt, 2016). When immigrants are defined as those whose mother was born outside Ireland, more than one in three immigrant children in GUI '98 were of UK origin, followed by one in five with an African background and one in five with an Eastern European background (Darmody et al., 2022, p. 177). In the GUI '08 cohort, there were more immigrant children whose mothers were born in Eastern Europe than in the UK, almost a third each, while the proportion of those whose mothers were born in Africa fell to about one in seven (Darmody et al., 2022, p. 38).

The shift towards high-skilled non-EU migration is also reflected in the educational attainment of the immigrant population. In 2019, non-Irish nationals working in Ireland were better educated than their Irish counterparts, with 57% of non-Irish workers having a tertiary level qualification compared to 48% of Irish nationals (CSO, 2019). However, this rises to 72% of workers from North America, Australia and Oceania having a tertiary level qualification (CSO, 2019). Thus, our study examines differences in parental expectations in a society where tertiary attainment is generally high, but there are still notable differences between immigrant groups.

There are also differences in the educational performance of immigrant children. Evidence for the 1998 cohort showed that primary school children from immigrant

backgrounds performed less well in tests of English language achievement in primary school, although the size of these gaps varied by region of origin (McGinnity et al., 2015). Sprong and Skopek (2023) found a similar pattern in pre-school English language achievement for the 2008 cohort, which carried over into primary school. Children of African, Polish and other Eastern European immigrants performed worse, while children whose parents immigrated from the UK or other rich English-speaking countries performed at least as well, if not better, than Irish children with no migrant background. This makes Ireland an appropriate setting for investigating the extent to which parental expectations are related to children's actual educational performance at earlier ages, and how this may differ not only between immigrants and natives, but also between different migrant groups.

In contrast to both Devitt and Sprong (2022) and McGinnity et al (2023) who focused on children's own expectations, we examine parents' expectations when children are 13 years old. At this point, Irish children have just moved from primary to lower secondary school. This is two years before they sit their first high-stakes national exam, the Junior Certificate. The three-year lower secondary cycle is not differentiated by track or subject, but the results of the Junior Certificate influence the type and level of subjects students can take at upper secondary level (Banks et al., 2014). Thus, we are observing parents at a crucial time when they have not yet formed expectations based on the results of their children's high-stakes national examination, but should already have an understanding of their children's academic abilities and curriculum-based achievement. Primary schools administer standardised assessments when children are aged 8/9, 10/11 and 12/13, and report the results to parents in a user-friendly format (https://ncca.ie/media/1400/english_tip_sheet_sten.pdf). This allows us to explore whether some immigrant groups have 'unrealistic' expectations of their children's future tertiary attainment based on their school achievement, in line with a paradox of immigrant optimism.

We address three research questions:

- 1) How do parents' expectations of their children's educational attainment vary by immigrant background, before and after controlling for SES?

- 2) Are there differences by migrants' region of origin in the extent to which expectations are realistic, based on children's cognitive test scores at an earlier age?
- 3) How does this vary by parental educational attainment?

Although we expect a high overall level of educational expectations, the literature on immigrant optimism suggests that immigrants would have even higher expectations of their children's tertiary attainment than natives (H1). Coupled with the literature on self-selection into migration, this further suggests that migrants from countries that have a lower standard of living than Ireland may have particularly high expectations for their children to achieve upward intergenerational mobility. Moreover, the idea of a paradox of immigrant optimism suggests that immigrants would have less realistic expectations based on their children's actual performance (H2). We expect this to be particularly the case for Eastern European immigrants, whose children tend to perform worse in primary school. Finally, we expect immigrants with higher levels of education to have more realistic expectations because they would be better aware of what university education entails (H3).

Thus, this article seeks to contribute to the literature on immigrant differences in educational expectations in three ways. First, it does so in a new context, Ireland, a country with a short history of net immigration and a large and heterogeneous immigrant population that is relatively well educated, even compared to the high educational attainment of the native population. Second, it looks at parental rather than child expectations. Third, it explores the paradox of immigrant optimism by relating parents' expectations shortly after their children's transition to secondary school to children's curriculum-based reading achievement reading scores at the end of primary school.

5.4 Methods

5.4.1 Data and sample

This paper uses nationally representative data for Ireland from the Growing Up in Ireland 2008 (GUI '08) birth cohort study (www.growingup.gov.ie). It is based on a random sample of 11,134 children born in 2007-2008. The sample was drawn from the national Child Benefit Register. The children and their families were first visited when the child was 9

months old and followed up at the ages of 3, 5, 9 and 13. We use data collected at 9 months, 9 years and 13 years.

Almost all of the children in the study were born in Ireland: only 114 children out of 11,134 were born abroad (Darmody et al., 2022). As even these children moved to Ireland in infancy, all children with a migrant background can be considered second-generation immigrants on the basis of their parents' origin. In addition to a wealth of socio-demographic information, GUI includes age-appropriate tests of children's cognitive abilities as well as parents' educational expectations. The longitudinal nature of GUI makes it possible to relate parents' expectations of their children's future educational attainment to cognitive test scores at earlier ages.

Of the 11,134 families at the start of the GUI study, 8,032 families completed the survey when the child was 9 years old, 6,655 families participated in the latest wave at age 13, and 6,056 families took part in the last two waves. After further exclusion of cases with missing data on outcome and predictors, the analytic sample consists of 5,042 children. Longitudinal weights provided with the GUI dataset correct for non-random panel attrition.

5.4.2 Measures

In this study, we focus on parents' expectations rather than children's expectations for two reasons. First, we are primarily interested in the educational expectations of parents from different regions of origin. The views of first-generation immigrants are likely to reflect the cultural and social roots of their countries of origin. Second, parents were asked a more detailed question about their expectations question, including a postgraduate option. Given that Ireland has a high tertiary attainment rate (over 62% of the young population (Eurostat, 2023)), it is important to examine the expectation of obtaining a post-graduate degree separately from any university education. It is possible that parental expectations for a postgraduate degree are influenced by different mechanisms than those for an undergraduate degree only.

When the children were 13, their primary caregiver (almost always the mother) was asked how far they expected their child to go in education and training, taking everything into

account. This is a question about expectations rather than aspirations. The response options ranged from “Junior Certificate or equivalent” (a lower secondary qualification) to “degree” (a Bachelor’s) and “postgraduate/higher degree” (a master’s or doctorate). We recoded this into two binary variables for our regression analyses: degree vs below degree and postgraduate degree vs below postgraduate degree.

Meanwhile, children were asked: “What is the highest qualification you expect to get by the time you finish your education?”. Answers ranged from “Junior Certificate” to “Degree or higher degree”. There was a statistically significant positive association between parents’ and children’s expectations, based on a chi-square test ($p < 0.001$). Overall, 81.8% of parents expected their child to achieve at least a college degree, and 76% of children expected themselves to achieve a college degree in the future. Most (85%) of the children whose parents expected them to achieve a degree or higher responded similarly.

Children’s educational performance was measured at age 9 using the Drumcondra Primary Reading Test Revised (DPRT-R). This is a test of reading vocabulary and comprehension based on the Irish primary school curriculum (Educational Research Centre, 2007). We use the derived scores, which adjust for both the difficulty of the questions attempted and the age at the time of the assessment (see Embretson and Reise, 2000). We have standardised the overall sample to facilitate interpretation of differences in scores.

The DPRT-R score at age 9 shows significant positive correlations with the measures of cognitive ability across the ages. The correlations are stronger for language or vocabulary tests, such as Naming Vocabulary (ages 3 and 5; $r = 0.346$ and $r = 0.403$, respectively, $p < 0.001$) than for the non-verbal tests, such as Picture Similarities ($r = 0.218$ at age 3, $r = 0.216$ at age 5, $p < 0.001$) and Selective Attention (Manly et al., 2001) at age 9 ($r = 0.120$, $p < 0.001$). It is also correlated with Verbal Semantic fluency at age 13 ($r = 0.208$, $p < 0.001$). Although the DPRT-R score is clearly related to the child’s cognitive ability, it is also an important indicator of primary school performance. It is similar to the standardised test given at school at age 9, the results of which are reported to parents. This means that when parents are asked about their expectations for their child at the start of secondary school, they know the child’s reading achievement results from primary school.

When the children were 9 months old, the mother and her resident partner reported their country of birth. If the study child had a foreign-born parent in the household, the child was counted as an immigrant. If both parents were foreign born, we used the mother's country of birth. Our definition is broader than the one used in McGinnity et al (2023), who only counted children who had two foreign-born parents as non-native Irish. Our definition is closer to that of Devitt and Sprong (2022), who used the origin of the mother in all cases except when it was unknown or when the mother was Irish white and the father was not (and then the father's origin was assigned to the child). We included a control for having a mixed origin, but it was not statistically significantly associated with parental expectations, *ceteris paribus*, and did not make a difference to our findings.

We used the United Nations Statistics Division classification to group the other 125 countries of origin into regions. This resulted in eight groups of sufficient size for statistical analysis: (1) Republic of Ireland; (2) UK; (3) other Anglo-Saxon countries (4) EU – Western; (5) EU – Eastern; (6) Asia; (7) Africa (8) rest of the world (mainly South America). Ireland and the UK were the two largest groups of country of birth. The 'rest of the world' category is very small, but it is useful to keep it separate from the more homogeneous categories. The region of birth focuses on the experience of immigration rather than ethnicity, but in practice almost all families where both parents were born in Ireland are of White Irish ethnicity.

Parental educational attainment is based on the highest educational qualification of the two resident parents. We use four categories: lower secondary education or less; upper secondary education; further education (non-degree); and degree or higher. In some analyses we use a binary variable indicating degree or higher vs below degree.

We also include socio-demographic predictors, measured when the child was 13 years old, which are potential confounders as they may be correlated with both migrant origin and parental expectations: financial strain, lone parent family status, large family status and mixed origin family (with one Irish-born parent and one immigrant parent). Financial strain is measured by the mother's response to the question about the household's ability to make ends meet. This ranges from 1 'very easy' to 6 'with great difficulty'. Large families are defined as households with three or more dependent children under the age of 18.

Lone parent families are those where the mother has no resident partner, even if there are other adults in the household. We also control for the sex of the child.

Table 1 shows the means of all these variables separately by parental regional of origin and for the full analytic sample.

5.4.3 Estimation

To address Research Question 1, we first examined the unadjusted association between parental region of origin and educational expectations. Then we estimated logistic regression models of parental educational expectations using children's educational performance at age 9 and parental region of origin as the main predictors, controlling for parental education, financial strain, lone parent status, large family status and the sex of the child. To assess the extent to which parental expectations are realistic (Research Question 2), we then interacted children's DPRT-R scores at age 9 with the parental region of origin. To examine if this is moderated by parental education (Research Question 3), we used a three-way interaction between children's scores, parental region of origin and parental education.

We used two separate outcome variables in the logistic regression analysis: degree vs below degree and postgraduate degree vs below postgraduate degree.

5.5 Results

Table 1 shows that children of UK-born parents are the largest immigrant group in the analytic sample, followed by those of Eastern European origin, African origin and Asian origin. Many families with an immigrant background have an Irish father, especially where the mother is from the UK, other Anglo-Saxon country or Western Europe. Mixed families are least common where the mother is from Asia.

The descriptive results paint a picture of generally high educational expectations: three out of four children (76%) in the full sample are expected to achieve a university degree or higher. This ranges from 74% for those of Irish/British origin to 91% for those with an Asian-born mother. Children whose parents are from Eastern Europe (89%) or Africa (88%)

are also over-represented among those expected to complete at least a university degree. The differences between migrant origin groups are even more pronounced when looking at post-graduate qualifications. Only one in five children of Irish/British origin are expected to obtain a post-graduate degree, compared to more than two in five children of Asian, African or “rest of the world” origin. Eastern European immigrants are the most likely of all groups to say they expect their child to have an undergraduate degree (59%), but not the most likely to expect a postgraduate qualification (31%).

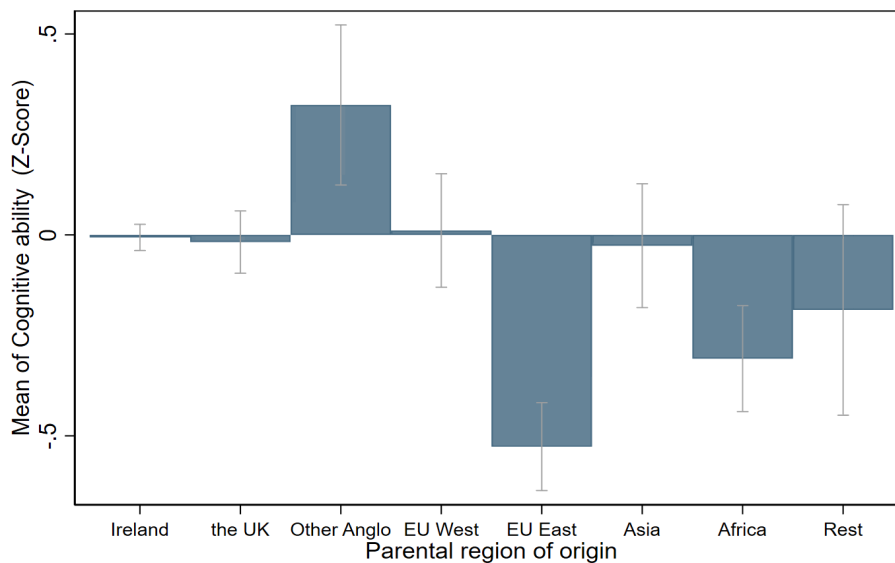
Table 5.1: Descriptive statistics (Mean or %)

Region of origin	Ireland	The UK	Other Anglo-Saxon	EU West	EU East	Asia	Africa	Rest	All
Educational expectation (%)									
Secondary school	9.77	9.14	0	7.06	3.08	4.02	3.38	0	8.71
Further education	16.56	17.33	17.46	10.46	7.48	4.87	8.60	16.61	15.43
Degree	54.46	52.53	50.42	55.39	58.53	46.12	46.26	36.27	53.88
Postgraduate	19.21	20.99	32.12	27.09	30.91	44.99	41.75	47.12	21.98
DPRT-R score (Z-score)	-0.065	-0.005	0.327	-0.088	-0.386	-0.036	-0.186	0.218	-0.075
Maternal degree %	20.40	23.64	39.20	35.60	23.51	26.96	24.40	20.13	21.78
Financial strain (1-6)	3.21	3.24	3.17	2.77	3.41	3.52	3.49	3.26	3.23
Mixed parents' origin %	0	69.92	73.63	73.44	20.31	16.79	20.62	22.20	12.68
Girl %	48.32	52.57	46.42	42.76	48.01	57.23	49.44	53.79	48.90
Lone parent family %	17.44	13.41	19.53	7.86	18.32	14.77	26.75	30.84	17.22
Large family %	38.91	36.20	32.28	28.76	23.66	39.03	46.54	23.48	37.56
N	3,711	536	63	108	303	119	167	33	5,042

Source: Growing Up in Ireland '08 Cohort. Longitudinal weights used.

There are also some differences in children's educational performance at age 9 by migration origin (Table 1 and Figure 1). Children from Eastern European backgrounds scored statistically significantly lower in reading than their peers from Irish, British, other Anglo-Saxon, Western European or Asian backgrounds. Children from African backgrounds also scored lower than most.

Figure 5.1: Differences in child cognitive score at age 9 by parental origin



Source: Growing Up in Ireland '08 Cohort. Longitudinal weights used.

5.5.1 Parental expectations of attaining an undergraduate university degree or higher

Table 5.2 presents binary logistic regression estimates of the associations between parental expectations of their child obtaining a university degree or higher and children's prior educational performance, parental region of origin and other relevant socio-demographic family characteristics. According to Model 1, the child's DPRT-r score at age 9 is statistically significantly associated with a higher likelihood of their parent expecting them to complete a university degree, all else being equal. So are the following characteristics: the child is female, the family has two resident parents, at least one parent has a university degree, and the family has a greater ability to make ends meet.

Notably, statistically significant differences by migrant origin remain even after controlling for these predictors. Parents of Eastern European, Asian and African origin are more likely to expect their children to complete at least an undergraduate degree than native-born parents. These results are in line with the unadjusted estimates in Table 5.1.

Model 2 includes an interaction between parental region of origin and the child's prior educational performance to predict parental educational expectations. Figure 5.2 reports the average marginal effects of the child's DPRT-R score for different migrant origin groups, based on Model 2 in Table 5.2. Prior educational performance is only statistically significantly positively associated with the expectation that the child will complete a university degree for Irish, British and Western European parents. There are no statistically significant associations for any of the other groups. These results suggest that most immigrant parents, including those from Eastern Europe, Asia and Africa, do not base their expectations on the child's actual reading performance at age 9. This suggests that Irish parents, as well as those from the UK and Western Europe, have more 'realistic' expectations of their children's educational attainment than their counterparts from other regions.

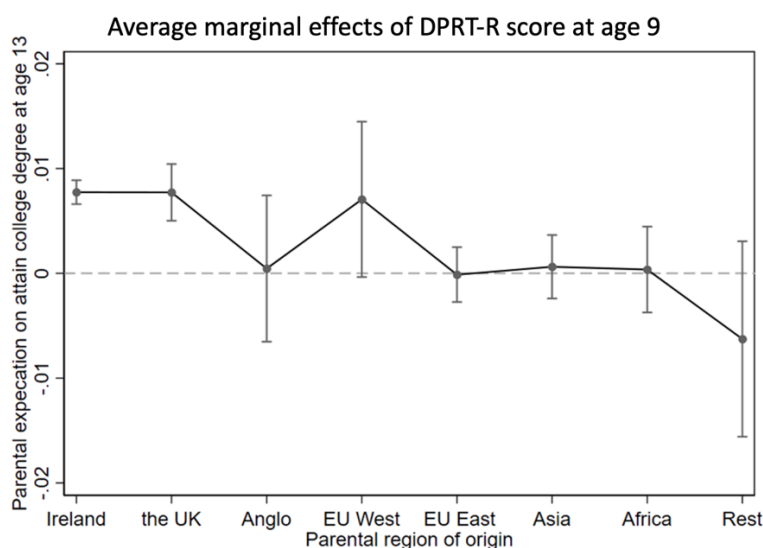
Table 5.2: Logistic regression of parental expectations (degree or higher vs below degree)

	Model 1		Model 2	
	Coeff	SE	Coeff.	SE
DPRT-R score at age 9	0.756***	0.006	0.841***	0.076
Girl	0.791***	0.115	0.803***	0.116
Lone parent family	-0.327*	0.165	-0.302*	0.165
Large family	0.126	0.111	0.125	0.113
At least one parent has a university degree	1.191***	0.128	1.200***	0.129
Mixed parents' origin	0.297	0.275	0.342	0.258
Financial strain	-0.130*	0.058	-0.125*	0.059
Parental origin (ref: Irish)				
UK	-0.333	0.245	-0.385	0.245
Other Anglo-Saxon	-0.0835	0.659	-0.075	0.499
EU West	0.299	0.477	0.315	0.406
EU East	1.407***	0.302	0.845**	0.292
Asia	1.303*	0.604	1.029*	0.564

Africa	1.139**	0.346	0.729*	0.340
Rest	0.461	1.329	0.814	0.817
Parental origin (ref: Irish) * DPRT-R score				
UK			-0.047	0.182
Other Anglo-Saxon			-0.733	0.047
EU West			0.032	0.533
EU East			-0.896**	0.263
Asia			-0.725*	0.323
Africa			-0.812**	0.374
Rest			-1.953***	0.448
N	5,042		5,042	
Pseudo R-squared	0.165		0.173	

Source: Growing Up in Ireland '08 Cohort; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; Longitudinal weights used.

Figure 5.2: Average marginal effects of parental origin (Model 2 in Table 2) on parental expectations of the child attaining a university degree or higher



Notes: The vertical bars represent 95% confidence intervals; average marginal effects are based on Model 2 estimates reported in Table 5.2.

Table 3 compares the average marginal effects for each migrant origin group to that of the native group. There are statistically significant differences between Ireland and Eastern Europe ($\chi^2=8.37, p<0.01$) and between Ireland and Africa ($\chi^2=4.59, p<0.05$). There were no other statistically significant pairwise differences.

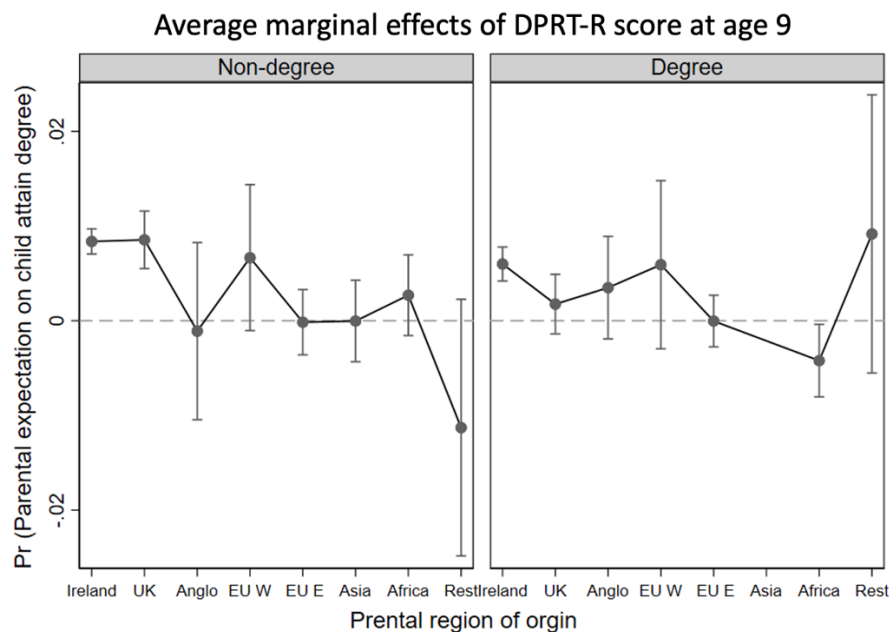
Table 5.3: Pairwise comparisons of marginal effects of cognitive score on parental expectations on achieve college degree, across region groups

Comparison	Chi-squared	p-value
Ireland vs. UK	2.48	0.115
Ireland vs. Other Anglo	0.02	0.880
Ireland vs. EU West	0.60	0.438
Ireland vs. EU East	8.37**	0.004
Ireland vs. Asia	3.33	0.068
Ireland vs. Africa	4.59*	0.032
Ireland vs. Rest	0.99	0.319

Source: Growing Up in Ireland '08 Cohort; *** $p<0.001$, ** $p<0.01$, * $p<0.05$; Longitudinal weights used.

Finally, Figure 3 reports the average marginal effects of the child's DPRT-R score for different immigrant origin groups, separately for mothers with and without a university degree. These estimates are based on a model that is otherwise identical to Model 1 in Table 2 but also includes a three-way interaction between the child's prior educational performance, parental region of origin, and parental educational level (see Table A1 in the online appendix for the full logistic regression coefficient estimates). Among families in which neither parent has a university degree, only those of Irish, British and Western European origin have 'realistic' expectations of their children's future attainment, based on a statistically significant association between the child's prior scores and parental expectations. Meanwhile, among families where at least one parent has a university degree, a statistically significant association is observed for Irish families only.

Figure 5.3: Average marginal effects of parental origin on parental expectations of the child attaining a university degree or higher, separately by parental education



Notes: The vertical bars represent 95% confidence intervals; average marginal effects are based on estimates reported in Table D1 in the appendix.

5.5.2 Parental expectations of attaining a postgraduate degree (master's or doctorate)

Given the high rates of undergraduate degree attainment in Ireland and the widespread parental expectation that children will obtain at least a bachelor's degree (see Table 1), we extended the analysis to examine parental expectations for their child's attainment of a postgraduate degree. This extension is particularly relevant in the Irish context, where a significant proportion of parents expect their children to pursue education beyond a bachelor's degree, and around 74% of child in this study at least have one parents with college degree. The results reveal notable variation in how children's achievement in primary school is associated with parental expectations across different migrant origin groups.

Table 4 (Model 1) shows that parents are more likely to expect their child to attain a postgraduate degree if it is a girl with a higher reading achievement score at age 9, and

the family has at least one university educated parent, it is a two parent family and there are there or more children under 18, all else being equal. However, Model 2 shows that the association between the child's reading achievement and parental expectations may vary by the parental region of origin. For Irish parents, there is a strong positive association between their expectations of their child's postgraduate attainment and their child's prior verbal ability ($p < 0.001$). A one standard deviation difference in the DPRT-R score increases the odds of parental expectations for postgraduate degree attainment by approximately 54%. Figure 4 shows that there is also a statistically significant positive association between children's scores and parental expectations for parents from the UK and other Anglo-Saxon countries.

Table 5.4: Logistic regression of parental expectations (postgraduate degree vs below postgraduate degree)

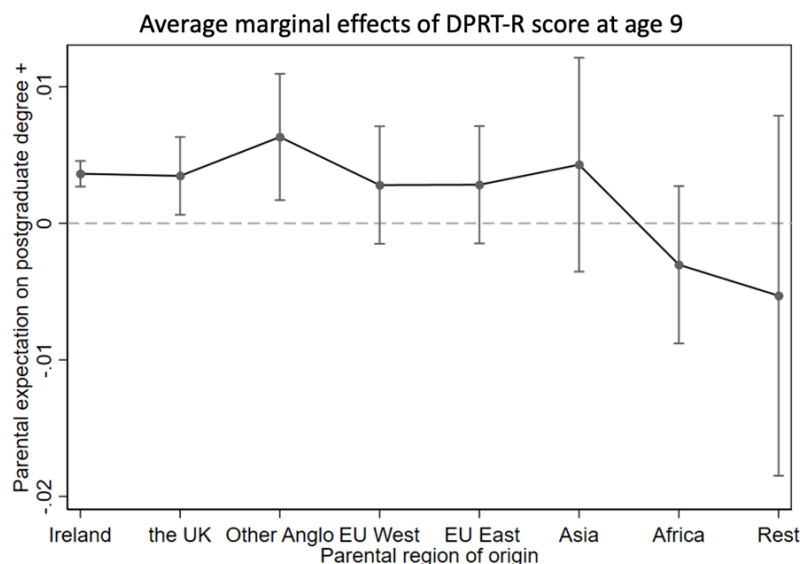
	Model 1		Model 2	
	Coeff	SE	Coeff.	SE
DPRT-R score at age 9	0.372***	0.051	0.430***	0.060
Girl	0.316**	0.092	0.322***	0.092
Lone parent family	-0.442**	0.167	-0.421**	0.165
Large family	0.285**	0.092	0.280**	0.092
At least one parent has a university degree	0.832***	0.088	0.835***	0.088
Mixed parents' origin	-0.097	0.196	0.001	0.201
Financial strain	-0.047	0.051	-0.047	0.051
Parental origin (ref: Irish)				
UK	0.121	0.209	0.056	0.225
Other Anglo	0.548	0.312	0.352	0.330
EU West	0.416	0.329	0.362	0.325
EU East	0.876***	0.206	0.825***	0.213
Asia	1.279***	0.273	1.273***	0.271
Africa	1.275***	0.256	1.156***	0.247

Rest	1.446*	0.566	1.604**	0.557
Parental origin (ref: Irish) * DPRT-R score				
UK			-0.031	0.189
Other Anglo-Saxon			0.217	0.281
EU West			-0.155	0.236
EU East			-0.199	0.189
Asia			-0.106	0.327
Africa			-0.655**	0.227
Rest			-0.816	0.521
N	5042		5042	
Pseudo R square	0.084		0.089	

Source: Growing Up in Ireland '08 Cohort; ***p<0.001, **p<0.01, *p<0.05; Longitudinal weights used.

Figure 5.4 below shows, for Irish parents, a one standard deviation increase in the DPRT-R score was associated with a 6.1 percentage-point increase in the probability of a parent expecting their child to achieve a postgraduate degree. Similarly, the effect was significant for parents from the UK (5.9 percentage points) and Anglo-Saxon countries (10.8 percentage points). There was no such statistically significant association for other regions.

Figure 5.4: Average marginal effects of parental origin (Model 2 in Table 5.4) on parental expectations of the child attaining a postgraduate degree



Notes: The vertical bars represent 95% confidence intervals; average marginal effects are based on Model 2 in Table 5.4.

Pairwise comparisons in Table 5 further highlight these disparities. The association between DPRT-R scores and postgraduate expectations is significantly stronger for Irish parents compared to parents from Eastern Europe, Asia, Africa, and the rest of the world.

Table 5.5: Pairwise comparisons of marginal effects of cognitive score on parental expectations on achieve postgraduate degree, across region groups

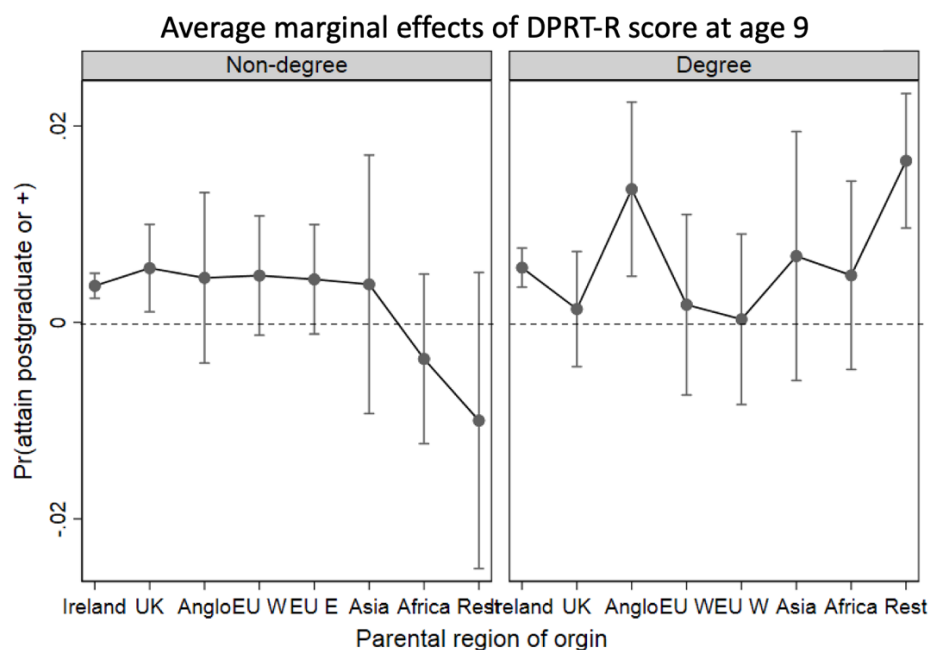
Comparison	Chi-squared (χ^2)	p-value
Ireland vs. UK	0.06	0.802
Ireland vs. Anglo	1.13	0.287
Ireland vs. EU West	1.24	0.265
Ireland vs. EU East	14.99**	0.000
Ireland vs. Asia	22.03***	0.000
Ireland vs. Africa	21.92***	0.000
Ireland vs. Rest	8.29**	0.004

Source: Growing Up in Ireland '08 Cohort; ***p<0.001, **p<0.01, *p<0.05; Longitudinal weights used.

Finally, Figure 5 shows the average marginal effects of the child's prior reading score, based on a model that includes a three-way interaction between immigrant origin, the child's reading score at age 9, and parental education (see Table A2 in the online appendix for full regression estimates). Among families in which neither parent has a university

degree, only those of Irish and British origin exhibit statistically significant associations between the child's prior reading scores and parental expectations for postgraduate attainment. In families where at least one parent has a university degree, this significant association is observed for parents from Ireland, Anglo-Saxon countries other than the UK, and the rest of the world category.

Figure 5.5: Average marginal effects of parental origin on parental expectations of the child attaining a postgraduate degree, by parental education



Notes: The vertical bars represent 95% confidence intervals; average marginal effects are based on estimates reported in Table A1 in the appendix.

5.5.4 Robustness checks

Due to the unbalanced sample size between Irish parents and others at the more detailed immigrant groups (8 groups), we merged some of the regions and re-estimated our models. We merged the categories of the UK, other Anglo-Saxon countries and Western Europe into 'Global North'. We merged the categories of Asia, Africa and the remaining countries into 'Global South'. These labels are only used as a short hand. We still found a large and statistically significant positive association between children's reading

achievement scores and the likelihood of parents expecting postgraduate attainment only in Ireland and the Global North (Figure A4-1)

Using just 4 regions also allows presenting the results differently. Instead of the average marginal effects of the reading achievement score on parental expectations, we can plot the predicted probability of a parent expecting tertiary attainment across the values of the DPRT-R score, separately by region of origin. Figure A5 in the Online Appendix shows that among Irish parents and those from the Global North, there is a clear positive relationship between children's DPRT-R scores and the probability of expecting their child to achieve a college degree. At the highest levels of the children's reading achievement increases, the probability of expecting university attainment approaches the ceiling. In contrast, for parents from Eastern Europe and the Global South, the predicted probability remains consistently high, close to one, regardless of earlier cognitive test scores. This indicates that parents from these regions maintain high expectations for their children's university education, irrespective of the children's prior cognitive performance.

Figure A6 in the Online Appendix shows that Irish parents as well as those from the Global North and Eastern Europe are progressively more likely to expect their children to attain a postgraduate degree as their children's reading scores are higher. Conversely, for parents from the Global South, high expectations for postgraduate education are prevalent regardless of the child's actual score, indicating that factors other than cognitive performance may play a more significant role in shaping these expectations.

5.6 Discussion

Socio-economic inequalities in education stem from differences in achievement (primary effects) and educational choices (secondary effects), net of achievement (Jonsson & Erikson, 1996). This framework also applies to ethnic stratification in education by focusing on both differences in early achievement and later attainment. The present study contributes to our understanding of secondary effects by examining differences in parental expectations of the future educational attainment of their secondary school children in the Republic of Ireland by migration background. This is a fruitful setting for this type of research as Ireland is a new destination country for migrants with a highly

educated population and a policy commitment to widening access to tertiary education (HEA, 2022). Research from other settings suggests that immigrants tend to set high expectations for their children, sometimes unrealistically so, given their children's actual educational achievement (i.e. paradox of immigrant optimism). We use data from a nationally representative longitudinal birth cohort study that tracks children born in 2008 from the age of 9 months to (currently) 13 years of age. We link children's curriculum based reading test scores at age 9 to their parents' educational expectations measured four years later.

The results paint a picture of high parental expectations in general, but particularly among immigrant families. There are also differences between groups of immigrant origin. Eastern European immigrants tend to limit their expectations to undergraduate degrees: they are the most likely of all groups to say that they expect their child to have an undergraduate degree, but not the most likely to expect a postgraduate qualification. Asian families, on the other hand, are the least likely to expect their children to stop at below-degree education and among the most likely to expect a postgraduate degree. This pattern holds even after controlling for socio-economic status, a key confounding factor in studies of ethnic and migrant educational differences. Students from families with lower socio-economic status are indeed under-represented in higher education in Ireland, despite government efforts to widen access (Denny, 2014).

These findings differ from those based on a cohort of Irish children born just 10 years earlier and interviewed at the ages of 9, 13, 17 and 20. Even without controlling for family socio-economic status, Devitt and Sprong (2022) found no differences by migrant background in 13-year-old children's expectations of attaining a university degree, while McGinnity et al (2023) found no differences in expectations at age 17. Moreover, by the age of 20, young people from non-English speaking countries were more likely to attend university than their Irish counterparts, all else being equal (McGinnity et al., 2023). One reason for the discrepancy in our findings may be that we focus on parents' rather than children's expectations. A separate study based on the 1998 cohort found that parents' expectations were more highly socially stratified than children's at age 13, and there was a small positive association ($p < 0.1$) between migration background (defined as both

parents born abroad) and higher expectations for parents but not for children (Smyth, 2020).

However, the marked differences by immigrant background that we observe are likely to reflect the changing size and composition of the Irish immigrant population. The 2008 cohort was born after the 2004 EU enlargement, when citizens of 10 new countries (mostly from Eastern Europe) were allowed to live and work in Ireland without restrictions. There is a significant Eastern European sample in GUI '08. Previous studies have only been able to distinguish between migrants from English-speaking countries and non-English-speaking countries, or between Anglo White, Other White, Black African and Asian immigrants.

We also examined the extent to which parental expectations are 'realistic' by linking them to children's previous achievement in reading tests, after controlling for confounders such as parental education, household financial strain and family structure. For Irish, British and Western European families, there is a positive association between children's reading test scores at the end of primary school and the likelihood that parents expect them to go on to at least a degree when asked four years later. We interpret this as reflecting more 'realistic' expectations: higher achieving children are more likely to be expected to complete university. However, there is no such association for parents of Asian, African or Eastern European origin, suggesting that they have high expectations regardless of their children's actual performance. This is, perhaps, not surprising, if immigrants from these regions come to Ireland in search of upward social mobility for their children. However, as children from Eastern European and African families tend to score significantly lower on average than their Irish peers in reading tests at age 9, this suggests that African and Eastern European parents may be overly optimistic. This is consistent with the paradox of immigrant optimism. However, children from Asian families tend to perform as well as Irish children, so this is more a case of uniformly high expectations, consistent for findings for Asian Americans from the US (Feliciano, 2006; Feliciano & Lanuza, 2016; Lee & Zhou, 2015).

Overall, our most consistent finding is that the expectations of Irish families are strongly linked with their children's prior performance. This is regardless of whether we focus on

degree-level education and above or postgraduate degrees only. This also holds for families with at least one university educated parent and those without. This suggests that familiarity with the educational system is not the driving factor in forming more ‘realistic’ expectations. There could be other explanations, such as migrants’ anticipation of disadvantage in employment or group stereotypes shaping educational expectations (Kao, 2000), that were we unable to test directly.

Our results for postgraduate degrees are in line for those higher education degrees more generally, with one exception. The association between children’s prior reading scores and parental expectations is somewhat weaker for postgraduate degrees. This may be because postgraduate entry is conditioned on high achievement at university, which makes primary school achievement a rather weak signal.

There are several limitations to this study. The analysis of how ‘realistic’ parents’ expectations are is based on two assumptions. First, a reading ability test taken at age 9 is a good measure of children’s overall academic potential. Although the Drumcondra Primary Reading Test – Revised was developed for Irish primary schools and has been found to correlate with various measures of cognitive ability, including the letter/number sequencing tasks (Dempsey et al., 2024), it is not necessarily a comprehensive predictor of future attainment on its own. However, other Drumcondra instruments, such as a mathematics test or a reasoning test, were not administered at age 9. Second, we assume that parents have a reliable understanding of their children’s academic potential, but this is not often the case. Research suggests that the accuracy of parents’ assessments of their children’s academic ability is quite variable and tends to be higher for higher-achieving children (Miller et al., 1991). However, in Irish primary schools, parents are given children’s standardised test scores, including the results of a Drumcondra reading test at age 9, making it difficult to ignore children’s actual performance. Nevertheless, the finding of ‘unrealistic’ expectations is open to interpretation. Parents may not have an accurate assessment of their children’s abilities despite receiving school reports. Or they do, but may be planning extra tuition before the high-stakes exams at the end of lower- and upper- secondary education. Such extra tuition is highly prevalent in Ireland (McCoy & Byrne, 2022) and is shown to improve the performance of students at lower levels of

achievement (Benz et al., 2024). It is also possible that some parents may interpret a survey question about expectations as a question about aspirations.

Furthermore, our findings may not apply to Irish birth cohorts other than those born in 2008 and living in Ireland at the age of 9 months. This limitation applies to any study using GUI 2008 data, but particularly to analyses of ethnic or migration differences, as the composition of the Irish immigrant population is shifting. For example, the proportion of non-Irish nationals from the UK fell from 21% in the 2011 Census to 13% in the 2022 Census, while the proportion from Asian countries increased from 12% to 16% and from the Americas from 5% to 9% (CSO, 2023b). Although a new birth cohort has been added to the GUI study, i.e. those born in 2024, it will take 13 years to obtain data comparable to those used in our analysis.

Despite these limitations, this study contributes to the literature on educational expectations by providing new evidence on immigrant background differences in parental expectations of children's educational attainment in Ireland. This is a country with a short history of migration, and a heterogeneous migrant population that is relatively well educated. Unlike previous studies, it distinguishes between all tertiary degrees and postgraduate degrees. Focusing on first-generation immigrants and their second-generation children, this study shows that immigrants are less likely to form expectations of their children's future attainment based on their children's prior performance. This is particularly the case for those of Eastern European, Asian or African origin, whose expectations tend to bear no relation to their children's actual reading test scores four years earlier. Future research could explore the reasons for this, both by oversampling immigrant families in nationally representative studies and by using qualitative methods.

References

- Banks, J., Byrne, D., McCoy, S., & Smyth, E. (2014). Bottom of the class? The leaving certificate applied programme and track placement in the Republic of Ireland. *Irish Educational Studies*, 33(4), 367–381. <https://doi.org/10.1080/03323315.2014.960148>
- Benz, R., Darmody, M., & Smyth, E. (2024). Participation in shadow education and academic performance: A comparison of upper secondary school students in Ireland and Germany. *International Journal of Comparative Sociology*, 00207152241266791. <https://doi.org/10.1177/00207152241266791>
- Boguslaw, J. (2017). The Aspirations-Attainment Paradox of Immigrant Children: A Social Networks Approach. *Opublicerat Manuskript*.
- Breen, R., & Goldthorpe, J. H. (1997). EXPLAINING EDUCATIONAL DIFFERENTIALS: TOWARDS A FORMAL RATIONAL ACTION THEORY. *Rationality and Society*, 9(3), 275–305.
- Brinbaum, Y., & Cebolla-Boado, H. (2007). The school careers of ethnic minority youth in France: Success or disillusion? *Ethnicities*, 7(3), 445–474. <https://doi.org/10.1177/1468796807080237>
- Canache, D., Hayes, M., Mondak, J. J., & Wals, S. C. (2013). Openness, extraversion and the intention to emigrate. *Journal of Research in Personality*, 47(4), 351–355. <https://doi.org/10.1016/j.jrp.2013.02.008>
- Chen, J. J., Kosec, K., & Mueller, V. (2019). Temporary and permanent migrant selection: Theory and evidence of ability-search cost dynamics. *Review of Development Economics*, 23(4), 1477–1519. <https://doi.org/10.1111/rode.12617>
- CSO. (2019, August 27). *Labour Force Survey (LFS) Quarter 2 2019—CSO - Central Statistics Office*. CSO. <https://www.cso.ie/en/releasesandpublications/er/lfs/labourforcesurvey/lfsquarter2019/>
- CSO. (2023a, October 17). *Migration Society Ireland and the EU at 50—Central Statistics Office*. CSO. <https://www.cso.ie/en/releasesandpublications/ep/p-ieu50/irelandandtheeuat50/society/migration/>
- CSO. (2023b, October 26). *Census 2022 Profile 5—Diversity, Migration, Ethnicity, Irish Travellers & Religion -Citizenship*. CSO. <https://www.cso.ie/en/releasesandpublications/ep/p-cpp5/census2022profile5-diversitymigrationethnicityirishtravellersreligion/citizenship/>
- Darmody, M., McGinnity, F., & Russell, H. (2022). *CHILDREN OF MIGRANTS IN IRELAND: HOW ARE THEY FARING?* ESRI. <https://doi.org/10.26504/rs134>
- Dempsey, C., Devine, R., Symonds, J., Sloan, S., & Hughes, C. (2024). Interacting adult-child relationships and school adjustment: Findings from growing up in Ireland. *Journal of Applied Developmental Psychology*, 92, 101653. <https://doi.org/10.1016/j.appdev.2024.101653>
- Denny, K. (2014). The effect of abolishing university tuition costs: Evidence from Ireland. *Labour Economics*, 26, 26–33. <https://doi.org/10.1016/j.labeco.2013.11.002>
- Devitt, C. (2016). Mothers or Migrants? Labor Supply Policies in Ireland 1997–2007. *Social Politics: International Studies in Gender, State & Society*, 23(2), 214–238. <https://doi.org/10.1093/sp/jxv034>

- Educational Research Centre. (2007). *Drumcondra primary reading test—Revised. Levels 3–6 administration manual and technical manual.*
- Embretson, S. E., & Reise, S. P. (2000). *Item Response Theory for Psychologists.* Psychology Press. <https://doi.org/10.4324/9781410605269>
- Eurostat. (2018, February 21). *Archive:People in the EU - statistics on origin of residents.* https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:People_in_the_EU_-_statistics_on_origin_of_residents
- Eurostat. (2023). *Population by educational attainment level, sex and age (%)* [Dataset]. [object Object]. https://doi.org/10.2908/EDAT_LFS_9903
- Fahey, É., Russell, H., Grotti, R., & McGinnity, F. (2019). *Diverse neighbourhoods: An analysis of the residential distribution of immigrants in Ireland.* Economic and Social Research Institute. <https://doi.org/10.26504/bkmnext376>
- Feliciano, C. (2006, October 6). *Does Selective Migration Matter? Explaining Ethnic Disparities in Educational Attainment among Immigrants' Children1—Feliciano—2005—International Migration Review—Wiley Online Library.* https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1747-7379.2005.tb00291.x?casa_token=JwDzhtxeeJgAAAAA%3AfMMo-y-4DjCLIUdtR4nzaOIU72W7OeFM57igQMpeDV7Hd3vcEWSenBpCqvMQvrn2tTI9i-X9G8NhvsgQ
- Feliciano, C., & Lanuza, Y. R. (2016). The Immigrant Advantage in Adolescent Educational Expectations. *International Migration Review*, 50(3), 758–792. <https://doi.org/10.1111/imre.12183>
- Fernández-Reino, M. (2016). Immigrant optimism or anticipated discrimination? Explaining the first educational transition of ethnic minorities in England. *Research in Social Stratification and Mobility*, 46, 141–156. <https://doi.org/10.1016/j.rssm.2016.08.007>
- Gibson, J., & McKenzie, D. (2011). The microeconomic determinants of emigration and return migration of the best and brightest: Evidence from the Pacific. *Journal of Development Economics*, 95(1), 18–29. <https://doi.org/10.1016/j.jdeveco.2009.11.002>
- Goyette, K., & Xie, Y. (1999). Educational Expectations of Asian American Youths: Determinants and Ethnic Differences. *Sociology of Education*, 72(1), 22–36. <https://doi.org/10.2307/2673184>
- HEA. (2022, August). *National Access Plan 2022-2028.* Higher Education Authority. <https://hea.ie/policy/access-policy/national-access-plan-2022-2028/>
- Heath, A., & Brinbaum, Y. (2007). Guest editorial: Explaining ethnic inequalities in educational attainment. *Ethnicities*, 7(3), 291–304. <https://doi.org/10.1177/1468796807080230>
- Heath, A., Rethon, C., & Kilpi, E. (2008). The Second Generation in Western Europe: Education, Unemployment, and Occupational Attainment. *Annual Review of Sociology*, 34(Volume 34, 2008), 211–235. <https://doi.org/10.1146/annurev.soc.34.040507.134728>
- Jonsson, J. O., & Erikson, R. (Eds.). (1996). *Can Education Be Equalized? The Swedish Case in Comparative Perspective.* Westview Press, Boulder. https://www.academia.edu/15451548/Can_Education_Be_Equalized_The_Swedish_Case_in_Comparative_Perspective

- Jonsson, J. O., & Rudolphi, F. (2011). Weak Performance--Strong Determination: School Achievement and Educational Choice among Children of Immigrants in Sweden. *European Sociological Review*, 27(4), 487–508. <https://doi.org/10.1093/esr/jcq021>
- Kao, G. (2000). Group Images and Possible Selves Among Adolescents: Linking Stereotypes to Expectations by Race and Ethnicity. *Sociological Forum*, 15(3), 407–430. <https://doi.org/10.1023/A:1007572209544>
- Kao, G., & Tienda, M. (1998). Educational Aspirations of Minority Youth. *American Journal of Education*, 106(3), 349–384.
- Lee, J., & Zhou, M. (2015). *The Asian American Achievement Paradox*. Russell Sage Foundation.
- Leslie, D., & Drinkwater, S. (1999). Staying on in Full-Time Education: Reasons for Higher Participation Rates Among Ethnic Minority Males and Females. *Economica*, 66(261), 63–77. <https://doi.org/10.1111/1468-0335.00156>
- Lessard-Phillips, L., Brinbaum, Y., & Heath, A. (2014). Academic and Vocational Tracking in Upper Secondary Education. In A. Heath & Y. Brinbaum (Eds.), *Unequal Attainments: Ethnic educational inequalities in ten Western countries* (p. 0). British Academy. <https://doi.org/10.5871/bacad/9780197265741.003.0005>
- Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The Test of Everyday Attention for Children (TEA-Ch), normative sample and ADHD performance. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 42(8), 1065–1081. <https://doi.org/10.1111/1469-7610.00806>
- McCoy, S., & Byrne, D. (2022). *Shadow education uptake among final year students in Irish secondary schools: Wellbeing in a high stakes context* [Working Paper]. ESRI. <https://esri.ie/publications/shadow-education-uptake-among-final-year-students-in-irish-secondary-schools-wellbeing>
- McGinnity, F., Darmody, M., & Murray, A. (2015). *Academic achievement among immigrant children in Irish primary schools* (ESRI Working Paper No. 512). The Economic and Social Research Institute (ESRI). <http://hdl.handle.net/10419/129412>
- McGinnity, F., Darmody, M., & Smyth, E. (2023). Post-school expectations and outcomes among migrant-origin young people in Ireland. In *Post-school Pathways of Migrant-Origin Youth in Europe*. Routledge.
- Miller, S. A., Manhal, M., & Mee, L. L. (1991). Parental beliefs, parental accuracy, and children's cognitive performance: A search for causal relations. *Developmental Psychology*, 27(2), 267–276. <https://doi.org/10.1037/0012-1649.27.2.267>
- Phalet, K., Andriessen, I., & Lens, W. (2004). How Future Goals Enhance Motivation and Learning in Multicultural Classrooms. *Educational Psychology Review*, 16(1), 59–89. <https://doi.org/10.1023/B:EDPR.0000012345.71645.d4>
- Raleigh, E., & Kao, G. (2010). Do Immigrant Minority Parents Have More Consistent College Aspirations for Their Children?*. *Social Science Quarterly*, 91(4), 1083–1102. <https://doi.org/10.1111/j.1540-6237.2010.00750.x>
- Salikutluk, Z. (2016). Why Do Immigrant Students Aim High? Explaining the Aspiration–Achievement Paradox of Immigrants in Germany. *European Sociological Review*, 32(5), 581–592. <https://doi.org/10.1093/esr/jcw004>

- Schnell, P., & Fibbi, R. (2016). Getting Ahead: Educational and Occupational Trajectories of the 'New' Second-Generation in Switzerland. *Journal of International Migration and Integration*, 17(4), 1085–1107. <https://doi.org/10.1007/s12134-015-0452-y>
- Smyth, E. (2020). Shaping educational expectations: The perspectives of 13-year-olds and their parents. *Educational Review*, 72(2), 173–195. <https://doi.org/10.1080/00131911.2018.1492518>
- Sprong, S., & Devitt, C. (2022). Onwards and upwards? The educational and occupational expectations of Irish teens of migrant descent. *British Journal of Sociology of Education*, 43(7), 1032–1051. <https://doi.org/10.1080/01425692.2022.2092450>
- Sprong, S., & Skopek, J. (2022). Academic achievement gaps by migration background at school starting age in Ireland. *European Societies*, 24(5), 580–604. <https://doi.org/10.1080/14616696.2022.2084558>
- Sprong, S., & Skopek, J. (2023). The development of host language achievement gaps by migration background during primary school: A path model of educational inequalities. *British Educational Research Journal*, 49(6), 1273–1290. <https://doi.org/10.1002/berj.3897>
- Van De Werfhorst, H. G., & Van Tubergen, F. (2007). Ethnicity, schooling, and merit in the Netherlands. *Ethnicities*, 7(3), 416–444. <https://doi.org/10.1177/1468796807080236>
- van Tubergen, F., Maas, I., & Flap, H. (2004). The Economic Incorporation of Immigrants in 18 Western Societies: Origin, Destination, and Community Effects. *American Sociological Review*, 69(5), 704–727. <https://doi.org/10.1177/000312240406900505>
- Yamamoto, Y., & Holloway, S. D. (2010). Parental Expectations and Children's Academic Performance in Sociocultural Context. *Educational Psychology Review*, 22(3), 189–214. <https://doi.org/10.1007/s10648-010-9121-z>

6 Chapter 6

6.1 Summary of the empirical findings

In four empirical papers, this study examined the mechanisms through which household resources are related to children's cognitive, educational or behavioural outcomes over time. Each paper focused on a different type of household resource, taking into account others as far as possible given the available data. Paper 1 (Chapter 2) looked at economic well-being through the lens of multidimensional household poverty. Paper 2 (Chapter 3) highlighted the role of maternal employment stability. Paper 3 (Chapter 4) focused on parental occupational class and Paper 4 (Chapter 5) on migration background. All four papers used recent longitudinal data from large nationally representative ongoing birth cohort studies. All four papers examined theoretically relevant channels through which household resources may influence child outcomes, such as parents' mental health, parenting behaviour, cognitive ability and expectations of their children's future educational attainment.

Chapter 2 focuses on the links between multidimensional poverty and children's cognitive and behavioural development from infancy to age 9, using data from the Growing Up in Ireland (GUI) study. Descriptive results show that even one episode of multidimensional poverty is negatively associated with children's cognitive and behavioural outcomes at age 9, and that persistent poverty is particularly harmful. Estimates from dynamic structural equation models suggested that the mechanisms were twofold: better-off families invested more in children's early cognitive development through activities such as reading, while worse-off parents were more vulnerable to poverty-related stress. The hybrid model tested in this research showed that both parental investment and stress influence children's outcomes. This study underlined the long-term negative effects of poverty on children's cognitive and behavioural development. It highlighted the importance of improving the economic conditions of families, particularly in times of economic crisis.

Chapter 3 examines the role of maternal employment in children's behavioural difficulties. The analysis is based on fixed effects regression models using data from the

Longitudinal Study of Australian Children (LSAC). Insecure employment, characterised by unstable employment contracts, was associated with higher levels of behavioural difficulties in children compared with those whose mothers had stable employment. In addition, maternal economic inactivity was associated with worse behavioural outcomes, suggesting that both job instability and non-participation in the labour force negatively affect children's mental health. Interestingly, maternal unemployment was not associated with children's behavioural difficulties in this study, in contrast to previous research (Kalil and Ziol-Guest, 2008; Hill et al., 2011). The relatively low unemployment rate in Australia during the study period may explain this divergence from previous findings.

Chapter 4 examines the relationship between parental occupational class and children's educational outcomes at the end of compulsory schooling in the UK. Using data from the Millennium Cohort Study (MCS), which follows children born in the early 2000s, the analysis shows that children from higher occupational classes, such as those with managerial or professional parents, achieve significantly better exam results than children from lower occupational classes. This holds true even after controlling for household income, parental education and financial strain. Children's cognitive test scores at the age of 7 and mothers' verbal ability scores when children were 14 acted as important mediators in the relationship between parental occupational class and children's academic achievement at the age of 15/16.

Chapter 5 focuses on differences in educational expectations by immigrant background in Ireland and the extent to which parents' expectations of their children's future educational attainment match their children's actual academic potential (as measured by cognitive ability tests). The analysis is based on the latest wave of the GUI study, when the children were 13 years old. Although parental expectations were generally high, with three-quarters of all parents reporting that they expected their child to obtain a Bachelor's degree or higher, immigrants were more likely to report such expectations than parents born in Ireland, even after controlling for the socio-economic status of the household. Expectations were highest among families of Asian, Eastern European and African origin. However, children of immigrant parents, particularly those from Eastern Europe and Africa, had lower average reading scores at age 9. This chapter highlights how

immigrant parents' educational expectations often remain high, even when their children's academic performance does not support such optimism. It suggests the need for further research into the structural and cultural factors that shape the educational expectations of immigrant families in Ireland.

6.2 Discussion of the main findings

6.2.1 *Multi-dimensional poverty and child development*

Persistent multidimensional poverty is particularly harmful to children's outcomes (Maître *et al.* 2020). In Chapter 2, we contributed to the longitudinal studies literature that draws on both family investment and stress processes to explain socio-economic differences in children's cognitive and behavioural outcomes in early to middle childhood (Layte 2017, 2022), as well as to the body of evidence that operationalises poverty in child outcome as not based solely on household income (Gershoff *et al.* 2007b; Gibbons *et al.* 2023; Schenck-Fontaine and Panico 2019). Similar to previous research (A. Goodman *et al.* 2010), we found that parental activities such as reading to the child had a small but significant effect on cognitive outcomes, particularly in early childhood. However, parental investment alone could not fully explain the cognitive disadvantages faced by children in poverty. At the same time, parental stress had a more substantial and persistent influence on behavioural outcomes, consistent with other studies emphasising the parental stress pathway (Chzhen *et al.* 2021). Mothers experiencing higher stress levels, often due to economic hardship, had children with more significant behavioural problems. Early poverty may indirectly influence later outcomes by affecting parental investments, maternal stress, and earlier child outcomes, leading to a reinforcing cycle of disadvantage. Another key finding is the strong link between behavioural problems and cognitive development. Children with greater behavioural difficulties were more likely to perform worse academically, showing that behavioural issues can impede learning, while cognitive ability was not as strong a predictor of reduced behavioural problems.

6.2.2 *Maternal employment and child behaviour difficulties*

Chapter 3 examines two pathways between maternal employment and child outcomes: 1) economic hardship and 2) maternal psychological well-being. It highlights that the

mental health of mothers, and their parenting styles are crucial mediating factors. Mothers in insecure employment are more likely to report psychological distress, which spills over into their parenting practices. Angry parenting and low parental self-efficacy were significantly associated with worse behavioural outcomes in children. While economic hardship arising from insecure employment was considered as a key pathway (following both the Family Investment Model and the Family Stress Model), the study found that maternal mental health and parenting practices (consistent with the Family Stress Model) were stronger predictors of children's behavioural difficulties than financial strain. These findings contribute to our understanding of the broader social consequences of labour market instability and argue for policies that provide greater employment security and mental health support for working mothers to mitigate negative outcomes for children.

The study also found gender differences in children's behavioural functioning. For example, maternal economic inactivity had a more pronounced effect on boys than girls, particularly in terms of increasing externalised behavioural problems such as aggression or hyperactivity. In contrast, girls were more affected by the psychological and emotional consequences of maternal employment insecurity. This is consistent with previous research in Australia showing that maternal job loss is more likely to affect the mental health of young adult daughters than sons (Bubonya et al., 2017). In two-parent families, mothers' insecure employment was linked with children's behavioural difficulties even when fathers had stable employment. This suggests that maternal employment plays a critical role in shaping children's well-being, regardless of paternal employment status. The findings were less conclusive for lone-parent families, possibly due to a smaller sample size. However, it underlines that the mental health and parenting quality of lone mothers are critical factors influencing their children's outcomes.

6.2.3 Parental occupational class and children's educational outcomes

Chapter 4 provides important empirical evidence on the long-standing relationship between parental occupational class and children's academic performance, using data from the Millennium Cohort Study (MCS). The analysis shows how socio-economic

inequalities are reflected in children's educational outcomes, particularly in the UK, where social class remains a strong determinant of success in secondary school exams (O'Connell and Marks, 2022). The study builds on and extends previous research by examining multiple variables (parental occupation, cognitive ability, maternal verbal ability, and socio-economic conditions) to provide a more comprehensive understanding of the mechanisms driving educational inequality. The results highlight the mediating effect of both child cognitive ability and maternal cognitive ability in the relationship. Differences in cognitive development between social classes emerge early in childhood and contribute to subsequent educational inequalities. Children whose mothers performed well on vocabulary tests exhibited better GCSE results, illustrating the importance of the intergenerational transmission of cognitive skills. These findings reinforce the notion that early test score differences by social class are a key driver of later educational inequalities.

6.2.4 Migrant background and parental expectations of children's educational attainment

Chapter 5 examines differences in parental expectations of children's future attainment by immigrant background in Ireland. It finds that immigrant parents report higher educational expectations for their secondary school children than do native Irish parents. Although controlling for household socio-economic status – a key confounder in studies of inequalities in education by immigrant status – attenuates differences in parental expectations, statistically significant differences by migrant background remain. Moreover, immigrant parents' expectations are not related to their children's performance on verbal ability tests four years earlier, whereas Irish parents' expectations are positively associated with their children's prior performance. These findings are consistent with the "paradox of immigrant optimism", which reflects the mismatch between immigrants' high expectations and their children's actual academic performance (Raleigh and Kao 2010). In Ireland, this paradox is particularly acute for families of Eastern European and African origin.

6.2.5 The context of the study

These four empirical analyses cover the first two decades of the new millennium, including the period leading up to the 2008 financial crisis, the economic recession and its

aftermath. The economic crisis was a period of significant economic hardship for households in the three countries studied here, with increased unemployment and poverty. This temporal focus allows the thesis to examine the real-world impact of economic shocks on families and children, which can inform policy responses in similar situations in the future. However, of the three countries, Ireland was the hardest hit in terms of economic output, government debt, deficit, unemployment, and income poverty, while Australia was the least affected. In the Australian study, the children were born in 1999/2000, with the first wave of data collected in 2004, a period of rapid economic growth. However, the global recession hit Australia when the children were about eight years old. Similarly, in the UK study, the children were around 7-8 years old when the recession began.

The Irish study covers the period from 2008 to 2017, during which the living standards of many Irish families fluctuated due to the recession and subsequent recovery. The children in this study were born around the start of the financial crisis and turned three during the worst of the ensuing recession. Given the considerable variation in income, material deprivation and ability to make ends meet both between families at one point in time and within families over time in the GUI data, this makes Ireland an appropriate setting in which to examine the role of family economic resources in children's cognitive and behavioural development. In addition, Ireland's short history as a country of immigration makes it an under-researched setting for examining differences by immigration background.

6.3 Contributions

This project is innovative in three respects: 1) it is comprehensive in its conceptualisation of both family resources and child development - contrasting the effects of different measures (i.e. household poverty, material deprivation, financial strain, parental work insecurity, parental occupational class, migration background) on key child development outcomes (i.e. cognitive ability and behavioural functioning); 2) it uses three nationally representative birth cohort studies; and 3) it is inter-disciplinary, drawing on the theories, evidence and methods from sociology, psychology, economics and social policy.

One of the key contributions of **Chapter 2** is the integration of the Family Investment Model (FIM) and the Family Stress Model (FSM) into a hybrid framework to examine child development outcomes. While many studies tend to focus on one model (Bradley and Corwyn 2002b; Heckman 2006; Lareau 2011) or the other (Masarik and Conger, 2017), this chapter successfully combines the two, demonstrating how both parental investments in children's cognitive development and parental stress due to economic hardship jointly shape child outcomes. This hybrid model adds nuance to our understanding of how poverty affects children's cognitive and behavioural trajectories.

It also extends the conventional understanding of poverty by operationalising it as a multidimensional construct (including income poverty, material deprivation and financial strain) and emphasises the cumulative effects of poverty. This multidimensional approach recognises that poverty is more than a lack of income; it includes the inability to afford socially perceived necessities and subjective perceptions of ability to make ends meet. This provides a richer analysis of how different dimensions of poverty interact and influence child outcomes over time than studies that use single-item measures of poverty. By focusing on the dynamics of poverty, it shows that even a single episode of poverty can have lasting negative effects on children's cognitive and behavioural outcomes. However, children who experience persistent poverty fare worse than those who experience intermittent poverty. This finding underscores the importance of addressing poverty early in a child's life to mitigate its detrimental effects.

Methodologically, the use of dynamic structural equation modelling allowed the complex relationships between poverty, parental investment, parental stress, and child development to be estimated across multiple waves of the study. This methodology strengthens the causal interpretation of the pathways through which poverty affects child outcomes, providing both direct and indirect effects over time. It highlights not only the immediate effects of poverty, but also its long-term effects through earlier developmental milestones, providing a more complete picture of the mechanisms at play.

Chapter 3 makes an important contribution by focusing on the under-researched relationship between insecure maternal employment and children's behavioural

outcomes in Australia. Insecure employment, characterised by fixed-term or casual employment contracts and instability, has been shown in previous research to negatively affect adult health (Kim and von dem Knesebeck 2015), but its specific effects on children (Flanagan and Eccles, 1993), particularly on their behavioural outcomes, are less well understood. The analysis in Chapter 3 addressed this gap by analysing different types of maternal economic activity and their associations with children's behavioural problems. It distinguished between mothers who are economically inactive, unemployed, in insecure work, and in permanent employment, providing a more nuanced understanding of employment instability and its impact on children. This contributes to the growing literature on precarious employment by emphasising that instability, not just job loss, can affect family well-being. This analysis uses both the Family Investment Model (FIM) and the Family Stress Model (FSM) to examine the pathways through which maternal employment affects child behaviour. This approach allows for a comprehensive examination of both economic and psychosocial mechanisms, highlighting the importance of parental mental health and parenting practices as mediators in the relationship between insecure employment and children's behavioural difficulties.

An important contribution of **chapter 4** is the use of maternal verbal ability as a mediator in the association between parental occupational class and children's examination results at the end of compulsory schooling. It highlights how cognitive advantages can be transmitted intergenerationally, reinforcing the idea that parental cognitive skills, particularly language skills, play a crucial role in shaping children's educational trajectories. By including maternal vocabulary scores as a variable, the study adds a layer of understanding to how parental socio-economic status influences educational outcomes through direct skill transmission. The analysis is also carried out separately for boys and girls. The results suggest that girls from lower socio-economic backgrounds may be particularly disadvantaged, adding a crucial dimension to understanding how social inequalities in education may be gendered. This is important for targeted policy interventions that seek to address educational inequalities in a more nuanced way.

The main contribution of **Chapter 5** is its focus on Ireland, a relatively recent immigration country with a highly educated population. Most previous research on the educational

expectations of immigrant families has focused on countries with a longer history of immigration, such as the US (Kao and Tienda 1998), Germany (Salikutluk 2016), France (Brinbaum and Cebolla-Boado 2007), Sweden (J. O. Jonsson and Rudolphi 2011) and the U.K. (Fernández-Reino 2016). By investigating immigrant optimism in Ireland, this study enriches the broader literature on migration-related educational inequalities in a new and under-explored setting. The study also disaggregates immigrants into different regional groups (e.g., Eastern European, Asian, African), allowing for a more nuanced understanding of how different immigrant communities set expectations for their children. This analysis adds to the literature by demonstrating that not all immigrant groups exhibit the same patterns of educational expectations or performance, suggesting that cultural and regional backgrounds significantly influence parental optimism.

6.4 Limitations

This study inevitably has limitations. Addressing these will open up avenues for further research. For example, the fact that this project relied exclusively on secondary data, albeit of very high quality, suggests that primary qualitative and quantitative data could shed further light on the findings.

Several limitations refer to the entire project.

First, it includes three countries, Australia, Ireland and the UK, with each paper based on one of these countries. The project does not make a direct comparison between these three countries but uses them as separate case studies. Future research could explore how these findings translate to other regions, such as in low- and middle-income countries. For example, findings in Chapter 5 may not be easily generalisable to other countries or contexts, as Ireland has a unique immigration history. Moreover, educational policies, population trends and socio-economic conditions have evolved over time, and these changes could influence the strength of the associations observed. Expanding the analysis to include data from other cohorts or conducting cross-cohort comparisons would offer deeper insights into the stability and change in the effects of household resources on child outcomes.

Second, all analyses are based on data from a single birth cohort of children born around the same year, which limits the generalisability of findings across generations. The specific social, economic and educational conditions of one birth cohort may not fully reflect those of previous or future cohorts.

Third, although all analyses are careful to include as many theoretically relevant predictors as possible, there could still be other unmeasured confounders that affect both parental resources and child outcomes, such as neighbourhood characteristics or individual genetic factors. The exclusion of these factors may limit the explanatory power of the models and introduce bias into the findings.

There are also specific limitations for each chapter.

In **Chapter 2**, while the study uses parental investment and stress as mediators, the measures employed for these variables are somewhat limited. Parental investment is captured mainly through cognitively stimulating activities such as reading to children, but other forms of investment (e.g., emotional support, quality of interaction) are not thoroughly examined. Similarly, parental stress is overwhelmingly relying on mother's self-reported stress. It may not fully capture the breadth of the stress experienced by the family (e.g., paternal stress, family dynamics), and largely excluding the role of fathers or other caregivers in the child's development. Future research should broaden the scope to include more diverse perspectives on family stress and parental investment.

Similarly, another limitation is the reliance on maternal reports for much of the data, particularly regarding children's behaviour and parental stress. While parental perceptions are crucial, they may not always align with children's own experiences. Future research could incorporate child self-reports or observational data to provide a more holistic view of child development and well-being.

Methodologically, although the dynamic SEM approach is robust, there remains the potential issue of endogeneity. For example, cognitive ability and behavioural problems could influence the level of parental investment and stress, creating a feedback loop that is difficult to disentangle. While the longitudinal design helps to mitigate some of these concerns, future research could incorporate additional techniques such as instrumental

variable approaches or randomised control trials to more definitively establish causal pathways.

Chapter 3 focuses primarily on contractual employment insecurity (i.e., casual, fixed-term, and permanent employment), which is a relatively narrow conception of insecure employment. The study does not explore other critical aspects of job insecurity, such as non-standard working hours, low wages, or the subjective perception of job insecurity, all of which could also impact children's well-being. Future research would benefit from a broader operationalization of employment insecurity that includes these dimensions.

Due to data constraints, it was not possible to distinguish between mothers who voluntarily choose casual work and those who are involuntarily in precarious employment. This distinction may be crucial, as voluntary flexible work may offer mothers better a work-life balance and mitigate negative effects on children. Conversely, involuntary precarious employment may be more stressful and harmful for both parents and children. This limitation weakens the ability to fully understand the nuances of the relationship between parental employment and child outcomes.

Methodologically, the fixed effects estimation does not deal with omitted time-varying confounders. As the study includes pre- and post-recession periods, which could have led to some time-varying observed differences between families, we ran our results separately by age/period (2004-2010 and 2010-2016) as a robustness check. Our findings remain qualitatively the same. Furthermore, although the study examines financial strain as a mediator, the reliance on subjective assessments of financial strain may lead to an underestimation of its role. Objective measures such as household income, debt, savings and material deprivation could provide a more comprehensive picture of the economic pathway linking insecure employment to child outcomes. The subjective nature of financial strain assessments may obscure the true economic impact of precarious employment on family well-being.

A limitation of **Chapter 4** is the focus on GCSE qualifications, particularly in English and Mathematics, to represent children's educational outcomes. Although maths and English are mandatory subjects, they do not capture the full range of academic achievement in

different subjects. In addition, the conversion of grades from the old letter-based system to the new numerical system into a simplified 0-3 scale may have reduced the precision and richness of the data. Future studies could benefit from a more comprehensive analysis of educational outcomes across a wider range of subjects and grades, using administrative datasets for greater accuracy. Another limitation in this chapter is that it omits non-cognitive factors, such as motivation, emotional support, and school engagement. By focusing primarily on cognitive factors, the analysis risks underestimating the importance of these broader influences on educational outcomes. Future research could integrate a more balanced exploration of both cognitive and non-cognitive factors to better understand the full range of influences on children's academic performance.

A limitation of **Chapter 5** is the assumption that all parents have an accurate understanding of their children's academic abilities and the Irish education system. However, research suggests that immigrant parents may have limited knowledge about the destination country's educational structure, which could influence their expectations. While the study acknowledges this in its interpretation, it could delve deeper into how knowledge (or lack thereof) of the educational system shapes expectations. Furthermore, the chapter is based on data from a cohort born in 2008, and the composition of Ireland's immigrant population has shifted since then. The analysis might not capture more recent migration trends or the evolving socio-economic characteristics of immigrant groups arriving after 2008. As immigration patterns in Ireland continue to change, the relevance of these findings may diminish over time, necessitating continuous updating of the research to reflect new realities.

6.5 Implications for society and policymakers

Overall, exploring the channels of association between family resources and children's well-being helps to raise public awareness and guide policymakers in implementing family and educational policies for early prevention.

The findings in **Chapter 2** have important implications for society and policymakers, particularly in addressing the lasting effects of poverty on child development. The evidence that even a single experience of multidimensional poverty can have lasting

negative effects on children's cognitive and behavioural outcomes underscores the urgency of early and sustained intervention. For policymakers, this means that strategies to reduce child poverty must go beyond short-term financial assistance and focus on holistic, long-term support. Policies should aim to reduce material deprivation and financial strain while also providing resources that enhance parental investment in children's education and well-being, such as access to affordable childcare, early learning programmes and parental support services. Furthermore, the strong link between poverty and parental stress highlights the need for mental health and stress management resources tailored to families in economic hardship. By addressing both the material and emotional dimensions of poverty, policymakers can create an environment that fosters better developmental outcomes for children, ultimately breaking the cycle of poverty and reducing social inequality over time.

The findings in **Chapter 3** highlight the urgent need to address the hidden cost of maternal employment insecurity on children's mental health. As more women participate in the labour market and as precarious contracts increase, it is crucial to recognise that these employment patterns are not just economic issues, but they may also affect family well-being. Policymakers must prioritise the creation of stable and secure employment opportunities for parents, especially mothers, to ensure that children do not bear the psychological burden of employment instability. This could include expanding access to permanent contracts, improving workplace flexibility and providing mental health support for working parents. In addition, child-focused policies that support early intervention in child mental health, such as access to affordable childcare and healthcare, could mitigate the negative effects of insecure maternal employment. By addressing these issues, societies can promote healthier family environments and contribute to the long-term well-being of future generations.

Chapter 4 highlighted the enduring influence of social class on educational outcomes and the critical role of early cognitive development in shaping future academic success. It emphasises the need for greater investment in early childhood education, particularly for children from lower socio-economic backgrounds, as inequalities in cognitive skills manifest themselves early and have a lasting impact on educational achievement.

Policymakers should prioritise targeted interventions that address both cognitive and socio-economic inequalities. This could include providing high-quality early childhood programmes, increasing parental support and resources, and ensuring equitable access to educational opportunities regardless of social class. In addition, policies that address the wider socio-economic barriers faced by lower-class families, such as income support, housing stability and adult education initiatives, are essential to level the playing field. By tackling these inequalities from multiple angles, society can help break the cycle of disadvantage and foster a more equitable future where a child's academic potential is not limited by their socio-economic status.

Chapter 5 discussed the gap between the high educational expectations of immigrant parents and the actual cognitive test performance of their children. It highlights a critical need for tailored support in the education system (Van De Werfhorst and Van Tubergen 2007). Policymakers should consider initiatives that bridge the information gap for immigrant families, ensuring that they have a realistic understanding of the educational pathways available to their children and the resources needed to succeed. Targeted outreach programmes could provide immigrant parents with clearer guidance on how to align their aspirations with their children's actual academic progress, especially in communities where optimism may overshadow performance. Furthermore, addressing the socio-economic disparities that disproportionately affect immigrant families could help mitigate some of the barriers to educational attainment. By fostering a more inclusive and informed approach to education, these measures could reduce educational inequalities, empower immigrant communities and contribute to more equitable outcomes for future generations in an increasingly diverse society.

6.6 Recommendations for future research

As the chapters in the thesis are single country analyses that are difficult to compare directly, future research could explore these findings in different contexts. Replicating this study in different cultural and economic contexts could test the generalisability of its findings and how the mechanisms found in this project vary across countries.

To build on the contributions of **Chapter 2**, future research could expand in several key areas: 1) incorporating a more comprehensive range of parental investments, including emotional, social, and psychological support; 2) considering a more diverse array of caregivers, including fathers, grandparents, or other guardians; 3) adding longer-term outcomes such as educational attainment, employment and mental health in adulthood.

Building on the findings in **Chapter 3**, future research should explore several important areas to deepen our understanding of how insecure maternal employment affects child development. First, researchers should consider broadening the scope of employment insecurity to include not only casual contracts but also factors like non-standard working hours, low pay, and subjective job insecurity. This more comprehensive view could reveal additional pathways through which employment instability influences family well-being. Second, distinguishing between voluntary and involuntary precarious employment is crucial to understanding whether flexible work arrangements can be beneficial for some families or whether all forms of insecurity have negative consequences for children.

In addition, cross-national research comparing different welfare regimes would also be valuable, as employment insecurity may have different impacts depending on the social safety nets available in various countries. Longitudinal studies that track children into adulthood could provide critical insights into whether the behavioural difficulties associated with maternal employment insecurity have lasting effects on education, employment, and mental health outcomes in later life. Lastly, including more objective measures of financial strain, such as household debt and material deprivation, could better capture the economic pressures that families face and provide a clearer link between employment instability and child development.

Chapter 4 emphasises the importance of early intervention, but more specific policy solutions targeting cognitive development, parental engagement, and socio-economic disparities could be discussed in greater detail. Additionally, the analysis could explore the implications of recent changes in education policy or propose innovative strategies to mitigate the enduring effects of social class on educational achievement.

Building on **Chapter 5**, further research is needed to examine how well immigrant parents understand the education system in their host country and how this affects their expectations for their children's future attainment. This could involve surveys or experiments to assess parental familiarity with key educational milestones and decision points, as well as interventions to improve this understanding. Secondly, future research could examine the role of peer groups, community networks, and schools in shaping the educational aspirations of both immigrant and native-born children. Understanding the broader social influences on expectations could offer a more complete picture of how immigrant children navigate their educational journeys.

6.7 Conclusion

This study used the best available longitudinal data from ongoing birth cohort studies in three countries to examine the channels through which inequality is perpetuated across generations. It found that unequal family resources translate into differences in children's cognitive, educational and behavioural outcomes as they grow older through two important channels: economic hardship and parental stress. Economic hardship itself is associated with child outcomes through two interrelated channels: parental investment in cognitively stimulating activities, such as reading to young children, and hardship-induced parental stress. Overall, these findings highlight the importance of parental mental health, particularly that of children's primary caregivers, who are most often mothers. The study also found that, even controlling for differences in household income and financial strain, parental social class is still associated with children's educational outcomes at the end of compulsory schooling. This is due to social class differences in children's cognitive skills that were already present in primary school. Finally, the study found that migration background is associated with differences in parents' educational expectations for their children even after accounting for differences in socio-economic status. Taken together, these findings show that family resources shape children's life chances in multiple and interrelated ways.

Bibliography

- Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic Status and Child Development. *Annual Review of Psychology*, 53(1), 371–399.
<https://doi.org/10.1146/annurev.psych.53.100901.135233>
- Brinbaum, Y., & Cebolla-Boado, H. (2007). The school careers of ethnic minority youth in France: Success or disillusion? *Ethnicities*, 7(3), 445–474.
<https://doi.org/10.1177/1468796807080237>
- Bubonya, M., Cobb-Clark, D. A., & Wooden, M. (2017). Job loss and the mental health of spouses and adolescent children. *IZA Journal of Labor Economics*, 6(1), 6.
<https://doi.org/10.1186/s40172-017-0056-1>
- Chzhen, Y., Howarth, C., & Main, G. (2021). Deprivation and intra-family conflict: Children as agents in the Family Stress Model. *Journal of Marriage and Family*, 84(1), 121–140. <https://doi.org/10.1111/jomf.12791>
- Fernández-Reino, M. (2016). Immigrant optimism or anticipated discrimination? Explaining the first educational transition of ethnic minorities in England. *Research in Social Stratification and Mobility*, 46, 141–156.
<https://doi.org/10.1016/j.rssm.2016.08.007>
- Flanagan, C. A., & Eccles, J. S. (1993). Changes in Parents' Work Status and Adolescents' Adjustment at School. *Child Development*, 64(1), 246–257.
<https://doi.org/10.1111/j.1467-8624.1993.tb02907.x>
- Gershoff, E. T., Aber, J. L., Raver, C. C., & Lennon, M. C. (2007). Income Is Not Enough: Incorporating Material Hardship Into Models of Income Associations With Parenting and Child Development. *Child Development*, 78(1), 70–95.
<https://doi.org/10.1111/j.1467-8624.2007.00986.x>
- Gibbons, R. A., Sprong, S., & Chzhen, Y. (2023). Growing Up in the Great Recession: The Effects of Three Dimensions of Economic Well-being on Child Behavioral Difficulties from Ages 3 to 17. *Journal of Youth and Adolescence*, 52(5), 1024–1038. <https://doi.org/10.1007/s10964-022-01721-2>
- Goodman, A., Lamping, D. L., & Ploubidis, G. B. (2010). When to Use Broader Internalising and Externalising Subscales Instead of the Hypothesised Five Subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from

- British Parents, Teachers and Children. *Journal of Abnormal Child Psychology*, 38(8), 1179–1191. <https://doi.org/10.1007/s10802-010-9434-x>
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312(5782), 1900–1902.
- Hill, H. D., Morris, P. A., Castells, N., & Walker, J. T. (2011). Getting a job is only half the battle: Maternal job loss and child classroom behavior in low-income families. *Journal of Policy Analysis and Management*, 30(2), 310–333. <https://doi.org/10.1002/pam.20565>
- Jonsson, J. O., & Rudolphi, F. (2011). Weak Performance--Strong Determination: School Achievement and Educational Choice among Children of Immigrants in Sweden. *European Sociological Review*, 27(4), 487–508. <https://doi.org/10.1093/esr/jcq021>
- Kalil, A., & Ziol-Guest, K. M. (2008). Parental employment circumstances and children's academic progress. *Social Science Research*, 37(2), 500–515.
- Kao, G., & Tienda, M. (1998). Educational Aspirations of Minority Youth. *American Journal of Education*, 106(3), 349–384.
- Kim, T. J., & von dem Knesebeck, O. (2015). Is an insecure job better for health than having no job at all? A systematic review of studies investigating the health-related risks of both job insecurity and unemployment. *BMC Public Health*, 15(1), 985. <https://doi.org/10.1186/s12889-015-2313-1>
- Lareau, A. (2011). *Unequal childhoods: Class, race, and family life*. Univ of California Press.
- Layte, R. (2017). Why do working-class kids do worse in school? An empirical test of two theories of educational disadvantage. *European Sociological Review*, 33(4), 489–503. <https://doi.org/10.1093/esr/jcx054>
- Layte, R. (2022). Does Family Economic Strain Reduce Child Educational Achievement? A Longitudinal Assessment Using the Great Recession in Ireland. *European Sociological Review*, 38(3), 408–424. <https://doi.org/10.1093/esr/jcab049>
- Maître, B., Privalko, I., & Watson, D. (2020). *Social transfers and deprivation in Ireland: A study of cash and non-cash payments tied to*. Dublin: ESRI and the Department of Social Protection. https://www.esri.ie/system/files/publications/BKMNEXT401_1.pdf

- Masarik, A. S., & Conger, R. D. (2017). Stress and child development: a review of the Family Stress Model. *Current Opinion in Psychology*, 13, 85–90.
<https://doi.org/10.1016/j.copsyc.2016.05.008>
- O’Connell, M., & Marks, G. N. (2022). Cognitive ability and conscientiousness are more important than SES for educational attainment: An analysis of the UK Millennium Cohort Study. *Personality and Individual Differences*, 188, 111471.
<https://doi.org/10.1016/j.paid.2021.111471>
- Raleigh, E., & Kao, G. (2010). Do Immigrant Minority Parents Have More Consistent College Aspirations for Their Children?*. *Social Science Quarterly*, 91(4), 1083–1102. <https://doi.org/10.1111/j.1540-6237.2010.00750.x>
- Salikutluk, Z. (2016). Why Do Immigrant Students Aim High? Explaining the Aspiration–Achievement Paradox of Immigrants in Germany. *European Sociological Review*, 32(5), 581–592. <https://doi.org/10.1093/esr/jcw004>
- Schenck-Fontaine, A., & Panico, L. (2019). Many kinds of poverty: Three dimensions of economic hardship, their combinations, and children’s behavior problems. *Demography*, 56(6), 2279–2305. <https://doi.org/10.1007/s13524-019-00833-y>
- Van De Werfhorst, H. G., & Van Tubergen, F. (2007). Ethnicity, schooling, and merit in the Netherlands. *Ethnicities*, 7(3), 416–444.
<https://doi.org/10.1177/1468796807080236>

Appendix A - Appendix for Chapter 2

Table A1: Cognitive ability and parental investment

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

		Current wave				Next wave					
		Cognitive ability		Parental investment		Poverty		Cognitive ability		Parental investment	
Wave		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.006	0.030	-0.026	0.027	0.875***	0.022				
	Large family			-0.041**	0.016						
	Lone parent			0.018	0.024						
	Cognitive ability (ASQ)							0.239***	0.024		
	Parental investment							0.036	0.020		
Age 3	Poverty	-0.291***	0.026	-0.069*	0.028	0.915***	0.020				
	Large family			-0.113***	0.018						
	Lone parent			0.056*	0.023						
	Cognitive ability							0.725***	0.021	0.202***	0.028
	Parental investment							0.043*	0.020		
Age 5	Poverty	-0.068**	0.024	-0.218***	0.033	0.877***	0.027				
	Large family			-0.209***	0.021						
	Lone parent			0.039	0.030						
	Cognitive ability							0.835***	0.049		
	Parental investment							0.062	0.033		
Age 9	Poverty	-0.111***	0.030								

N = 7,507; Coefficient of determination (CD) = 0.839. Standardised Root Mean Square Residual (SRMR) = 0.054. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on cognitive ability at 9 years: -0.295*** at 9 months; -0.335*** at 3 years; and -0.167*** at age 9. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table A2: Behaviour problems and maternal stress

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

		Current wave				Next wave					
		Behaviour problems		Maternal stress		Poverty		Behaviour problems		Maternal stress	
Wave		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.028	0.030	0.265***	0.029	0.857***	0.023				
	Large family			0.004	0.017						
	Lone parent			0.036	0.027						
	Behaviour problems (ASQ)							-0.149***	0.023		
	Maternal stress							0.321***	0.025		
Age 3	Poverty	0.210***	0.029	0.218***	0.029	0.914***	0.020				
	Large family			-0.179***	0.015						
	Lone parent			0.079***	0.024						
	Behaviour problems							0.826***	0.022	0.480***	0.030
	Maternal stress							0.016	0.022		
Age 5	Poverty	0.054*	0.026	0.055	0.033	0.863***	0.026				
	Large family			-0.139***	0.015						
	Lone parent			0.068**	0.023						
	Behaviour problems							0.721***	0.021		
	Maternal stress							0.024	0.021		
Age 9	Poverty	0.081***	0.021								

N = 7,507; Coefficient of determination (CD) = 0.828. Standardised Root Mean Square Residual (SRMR) = 0.071. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on behaviour problems at 9 years: 0.252*** at 9 months; 0.230*** at 3 years; and 0.110*** at age 9. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table A3: Cognitive ability and parental investment: separately by maternal education

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

Wave		Maternal education	Current wave				Next wave			
			Cognitive ability		Parental investment		Poverty		Cognitive ability	
			B	SE	B	SE	B	SE	B	SE
Age 9 months	Poverty	non-degree	-0.043	0.035	-0.038	0.031	0.885***	0.025		
		degree	0.028	0.021	0.009	0.030	0.781***	0.045		
	Large family	non-degree			-0.038	0.020				
		degree			-0.056**	0.020				
	Lone parent	non-degree			0.021	0.028				
		degree			-0.012	0.031				
	Cognitive ability (ASQ)	non-degree							0.231***	0.029
		degree							0.238***	0.034
	Parental investment	non-degree							0.032	0.025
		degree							0.076*	0.025
Age 3	Poverty	non-degree	-0.273***	0.032	-0.052	0.032	0.913***	0.024		
		degree	-0.163***	0.034	-0.093**	0.027	0.938***	0.036		
	Large family	non-degree			-0.116***	0.021				
		degree			-0.100***	0.023				
	Lone parent	non-degree			0.070**	0.027				
		degree			-0.018	0.035				
	Cognitive ability	non-degree							0.713***	0.026
		degree							0.728***	0.030
	Parental investment	non-degree							0.055*	0.026
		degree							0.040	0.029
Age 5	Poverty	non-degree	-0.052	0.028	-0.215***	0.037	0.882***	0.031		
		degree	-0.125***	0.030	-0.295***	0.037	0.872***	0.046		

	Large family	non-degree	-0.276***	0.024		
		degree	-0.092**	0.037		
	Lone family	non-degree	0.034	0.034		
		degree	0.020	0.036		
	Cognitive ability	non-degree			0.844***	0.062
		degree			0.905***	0.082
	Parental investment	non-degree			0.102*	0.040
		degree			-0.016	0.047
Age 9	Poverty	non-degree	-0.075*	0.036		
		degree	-0.179***	0.053		

N = 7,507; CD: 0.851 (non-degree) and 0.71 (degree). SRMR: 0.054 (non-degree) and 0.056 (degree).

Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on cognitive ability at 9 years: -0.261*** (non-degree) and -0.276*** (degree) at 9 months; -0.288*** (non-degree) and -0.359*** (degree) at 3 years; and -0.132*** and -0.265*** (degree) at 5 years. Statistically significant differences (at $p < 0.05$) by maternal education are in bold. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table A4: Behaviour problems and maternal stress: separately by maternal education

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

Wave			Current wave				Next wave			
			Behaviour problems		Maternal stress		Poverty		Behaviour problems	
			<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	non-degree	-0.047	0.034	0.305***	0.034	0.871***	0.025		
		degree	0.027	0.021	0.128***	0.027	0.772***	0.042		
	Large family	non-degree			-0.020	0.021				
		degree			0.084***	0.024				
	Lone parent	non-degree			0.028	0.030				
		degree			0.020	0.041				
	Behaviour problems (ASQ)	non-degree							-0.146***	0.030
		degree							-0.212***	0.031
	Maternal stress	non-degree							0.255***	0.030
		degree							0.230***	0.032
Age 3	Poverty	non-degree	0.185***	0.032	0.273***	0.030	0.919***	0.023		
		degree	0.324***	0.028	0.080**	0.030	0.926***	0.037		
	Large family	non-degree			-0.192***	0.018				
		degree			-0.163***	0.021				
	Lone parent	non-degree			0.070*	0.027				
		degree			0.100**	0.034				
	Behaviour problems	non-degree							0.746***	0.024
		degree							0.697***	0.028
	Maternal stress	non-degree							0.099***	0.025
		degree							0.117***	0.029
Age 5	Poverty	non-degree	0.081**	0.029	0.258***	0.037	0.862***	0.029		

		degree	0.091*	0.028	0.088**	0.034	0.856***	0.046
	Large family	non-degree			-0.191***	0.018		
		degree			-0.125***	0.021		
	Lone parent	non-degree			0.083**	0.027		
		degree			0.153***	0.034		
	Behaviour problems	non-degree					0.718***	0.021
		degree					0.695***	0.036
	Maternal stress	non-degree					0.041	0.024
		degree					0.124***	0.030
Age 9	Poverty	non-degree	0.071**	0.026				
		degree	0.083**	0.028				

N = 7,507; CD: 0.84 (non-degree) and 0.73 (degree). SRMR: 0.079 (non-degree) and 0.082 (degree).

Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on cognitive ability at 9 years: 0.252*** (non-degree) and 0.241*** (degree) at 9 months; 0.238*** (non-degree) and 0.298*** (degree) at 3 years; and 0.130*** and 0.146*** (degree) at 5 years. Statistically significant differences (at $p < 0.05$) by maternal education are in bold. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table A5: Cognitive ability and parental investment controlled maternal degree

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

Wave		Current wave				Previous wave			
		Cognitive ability		Parental investment		Poverty		Cognitive ability	
		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.023	0.030	-0.031	0.028	0.882***	0.022		
	Large family			-0.042**	0.016				
	Lone parent			0.016	0.024				
	Maternal degree			-0.020	0.129			0.104***	0.016
	Cognitive ability (ASQ)							0.228***	0.023
	Parental investment							0.034	0.020
Age 3	Poverty	-0.26***	0.027	-0.057	0.029	0.920***	0.020		
	Large family			-0.112***	0.018				
	Lone parent			0.058*	0.023				
	Maternal degree			0.037*	0.016			0.027	0.015
	Cognitive ability							0.719***	0.021
	Parental investment							0.051*	0.020
Age 5	Poverty	-0.061*	0.024	-0.230***	0.033	0.878***	0.027		
	Large family			-0.217***	0.021				
	Lone parent			0.043	0.030				
	Maternal degree			0.174***	0.018			0.173***	0.021
	Cognitive ability							0.837***	0.047
	Parental investment							0.063	0.032
Age 9	Poverty	-0.062*	0.030						

N = 7,507; Coefficient of determination (CD) = .871. Standardised Root Mean Square Residual (SRMR) = .054. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on cognitive ability at 9 years: -0.239*** at 9 months; -0.267*** at 3 years; and -0.120*** at 5 years.

*** $p < .001$. ** $p < .01$. * $p < .05$.

Table A6: Behaviour problems and maternal stress controlled maternal degree

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

		Current wave				Next wave			
		Behaviour problems		Maternal stress		Poverty		Behaviour problems	
Wave		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.027	0.029	0.299***	0.031	0.859***	0.022		
	Large family			0.006	0.018				
	Lone parent			0.033	0.027				
	Maternal degree			0.077***	0.015			-0.130***	0.015
	Behaviour problems (ASQ)							-0.157***	0.024
	Maternal stress							0.252***	0.024
Age 3	Poverty	0.188***	0.029	0.267***	0.031	0.920***	0.02		
	Large family			-0.180***	0.015				
	Lone parent			0.085***	0.024				
	Maternal degree			0.118***	0.015			-0.025	0.014
	Behaviour problems							0.737***	0.021
	Maternal stress							0.106***	0.021
Age 5	Poverty	0.076**	0.026	0.243***	0.032	0.859***	0.026		
	Large family			-0.169***	0.015				
	Lone parent			0.103***	0.024				
	Maternal degree			0.116***	0.015			-0.013	0.012
	Behaviour problems							0.716***	0.018
	Maternal stress							0.060**	0.020
Age 9	Poverty	0.0769**	0.023						

N = 7,507; Coefficient of determination (CD) = 0.847. Standardised Root Mean Square Residual (SRMR) = .084. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on behaviour problems at 9 years: 0.249*** at 9 months; 0.239*** at 3 years; and 0.129*** at 5 years.

***p<.001. **p<.01. *p<.05.

Table A7: internalising symptoms and maternal stress

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

Wave		Current wave				Next wave			
		Internalising Behaviour problems		Maternal stress		Poverty		Internalising Behaviour problems	
		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.029	0.030	0.275***	0.03	0.856***	0.023		
	Large family			0.005	0.017				
	Lone parent			0.027	0.027				
	Behaviour problems (ASQ)							-0.127***	0.031
	Maternal stress							0.241***	0.028
Age 3	Poverty	0.222***	0.030	0.221***	0.029	0.921***	0.020		
	Large family			-0.181***	0.015				
	Lone parent			0.080***	0.023				
	Behaviour problems							0.788***	0.038
	Maternal stress							0.144***	0.026
Age 5	Poverty	0.032	0.034	0.196***	0.031	0.859***	0.026		
	Large family			-0.166***	0.015				
	Lone parent			0.102***	0.023				
	Behaviour problems							0.643***	0.029
	Maternal stress							0.096***	0.024
Age 9	Poverty	0.108***	0.028						

N = 7,507; Coefficient of determination (CD) = 0.830. Standardised Root Mean Square Residual (SRMR) = 0.076. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on behaviour problems at 9 years: 0.254*** at 9 months; 0.255*** at 3 years; and 0.132*** at 5 years. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table A8: Externalising symptoms and maternal stress

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

		Current wave				Next wave			
		Externalising Behaviour problems		Maternal stress		Poverty		Externalising Behaviour problems	
Wave		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.031	0.030	0.275***	0.030	0.858***	0.023		
	Large family			0.0056	0.017				
	Lone parent			0.027	0.027				
	Behaviour problems							-0.151***	0.023
	Maternal stress							0.211***	0.025
Age 3	Poverty	0.192***	0.028	0.227***	0.030	0.918***	0.020		
	Large family			-0.181***	0.015				
	Lone parent			0.077**	0.024				
	Behaviour problems							0.757***	0.022
	Maternal stress							0.086***	0.020
Age 5	Poverty	0.075**	0.025	0.202***	0.031	0.861***	0.026		
	Large family			-0.166***	0.015				
	Lone parent			0.101***	0.024				
	Behaviour problems							0.754***	0.020
	Maternal stress							0.058**	0.019
Age 9	Poverty	0.037	0.025						

N = 7,507; Coefficient of determination (CD) = 0.831. Standardised Root Mean Square Residual (SRMR) = 0.081. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on behaviour problems at 9 years: 0.222*** at 9 months; 0.217*** at 3 years; and 0.101*** at 5 years. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table A9: Behaviour problems and maternal depression

(Standardised coefficients of latent predictors from a structural equation model: alternative specification with dynamic complementarity)

		Current wave		Maternal depression		Next wave		Behaviour problems	
		Behaviour problems				Poverty			
		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Age 9 months	Poverty	-0.027	0.030	0.327***	0.036	0.863***	0.022		
	Large family			-0.076***	0.017				
	Lone parent			0.073*	0.031				
	Behaviour problems (ASQ)							-0.161***	0.024
	Maternal depression							0.194***	0.025
Age 3	Poverty	0.231***	0.026	0.344***	0.034	0.922***	0.019		
	Large family			-0.045**	0.017				
	Lone parent			0.056*	0.026				
	Behaviour problems							0.759***	0.019
	Maternal depression							0.041	0.021
Age 5	Poverty	0.082**	0.026	0.344***	0.028	0.860***	0.026		
	Large family			-0.044**	0.016				
	Lone parent			0.085***	0.024				
	Behaviour problems							0.728***	0.018
	Maternal depression							0.063**	0.020
Age 9	Poverty	0.062*	0.023						

N = 7,507; Coefficient of determination (CD) = 0.825. Standardised Root Mean Square Residual (SRMR) = 0.073. Estimates of control variables coefficients, factor variances, error variances, error covariances, intercept estimates and disturbances are omitted for clarity. Total effects of poverty on behaviour problems at 9 years: 0.264*** at 9 months; 0.262*** at 3 years; and 0.135*** at 5 years. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table A10: Correlation matrixes for teacher- and parent-reported behaviour problems at age 5

		Parent report					Teacher report				
		emotional problems	conduct problems	hyperactivity problems	peer problems	total score	emotional problems	conduct problems	hyperactivity problems	peer problems	total score
Parent report	emotional problems	1									
	conduct problems	0.335***	1								
	hyperactivity problems	0.312***	0.457***	1							
	peer problems	0.410***	0.325***	0.334***	1						
	total score	0.715***	0.683***	0.800***	0.664***	1					
Teacher report	emotional problems	0.288***	0.124***	0.177***	0.237***	0.286***	1				
	conduct problems	0.080***	0.273***	0.289***	0.199***	0.290***	0.238***	1			
	hyperactivity problems	0.131***	0.257***	0.480***	0.225***	0.404***	0.308***	0.524***	1		
	peer problems	0.140***	0.156***	0.222***	0.348***	0.291***	0.462***	0.417***	0.373***	1	
	total score	0.223***	0.276***	0.425***	0.335***	0.446***	0.688***	0.690***	0.819***	0.717***	1

N = 7,507; *** $p < .001$. ** $p < .01$. * $p < .05$.

Table A11: Correlation matrixes for teacher- and parent-reported behaviour problem at age 9

		Parent report					Teacher report				
		emotional problems	conduct problems	hyperactivity problems	peer problems	total score	emotional problems	conduct problems	hyperactivity problems	peer problems	total score
Parent report	emotional problems	1									
	conduct problems	0.266***	1								
	hyperactivity problems	0.220***	0.453***	1							
	peer problems	0.330***	0.263***	0.256***	1						
	total score	0.628***	0.703***	0.793***	0.599***	1					
Teacher report	emotional problems	0.151***	0.052***	0.075***	0.117***	0.138***	1				
	conduct problems	0.010	0.225***	0.224***	0.135***	0.224***	0.182***	1			
	hyperactivity problems	0.021	0.203***	0.348***	0.167***	0.293***	0.184***	0.521***	1		
	peer problems	0.076***	0.133***	0.179***	0.244***	0.225***	0.366***	0.407***	0.357***	1	
	total score	0.085***	0.219***	0.316***	0.229***	0.320***	0.580***	0.703***	0.823***	0.681***	1

N = 7,507; *** $p < .001$. ** $p < .01$. * $p < .05$.

Appendix B - Appendix for Chapter 3

Table B1: Linear regressions of children's SDQ scores by wave

		Age 4/5 (2004)	Age 6/7 (2006)	Age 8/9 (2008)	Age 10/11 (2010)	Age 12/13 (2012)	Age 14/15 (2014)	Age 16/17 (2016)
N	Model 5	4071	4176	3630	4025	3748	3271	2878
Model 1	Maternal work (ref. Permanent position)							
	Employer fixed term contract	0.04	-0.42	-0.60	-0.20	-0.0012	-0.035	0.69
	Employer casual basis	0.59	0.85**	0.88**	1.20***	0.76*	0.58	1.10**
	Employer some other basis	1.87	1.96*	2.15	0.94	-0.32	-0.049	0.65
	Own business	-0.31	-0.31	0.23	-0.25	-0.45	-0.27	-0.50
	Other/uncertain	0.60	0.70	0.15	0.66	1.70	1.60	-0.80
	Unemployed	1.51**	1.46**	0.93	1.39*	1.30*	2.60***	2.20**
	Not in labour force	1.23***	0.96***	1.47***	2.07***	2.30***	2.00***	1.70***
	Maternal work (ref. Permanent position)							
Model 5	Employer fixed term contract	0.26	-0.05	-0.08	0.15	-0.25	-0.24	0.32
	Employer casual basis	-0.09	0.18	0.39	0.38	0.23	0.059	0.24
	Employer some other basis	1.55	1.03	1.50	0.17	-0.67	-0.63	-1.20
	Own business	-0.58*	-0.23	0.27	-0.04	-0.29	-0.26	-0.48
	Other/uncertain	0.21	0.33	0.73	0.77	2.50	0.53	0.44
	Unemployed	0.16	-0.02	-0.42	0.05	-0.21	1.40*	0.55
	Not in labour force	0.31	0.08	0.63**	.087***	1.20***	1.00***	0.94**
	Lone parent (ref. two parent household)	4.11	0.85***	0.54*	0.64**	0.55*	0.22	0.10
	Number of sibling (ref. no siblings)	-0.21**	-0.34***	-0.41***	-0.30***	-0.34***	-0.47***	-0.56***
	Age (in month)	-0.078**	0.05*	0.04	0.02	0.03	0.01	0.00
	Mother: degree	-1.42***	-1.09***	-0.97***	-1.14***	-0.87***	-0.95***	-0.50*
	Mother: angry parenting	3.50***	3.41***	3.38***	3.51***	3.40***	3.40***	3.10***
	Mother: parenting self-efficacy rating	-0.44***	-0.15	-0.31**	-0.45***	-0.49***	-0.37***	-0.50***
	Mother's K-6 depression scale summed score	0.23***	0.31***	0.25***	0.32***	0.25***	0.26***	0.27***
	Log Income (\$ thousands)	-0.58***	-0.32**	-0.49***	-0.24*	-0.08	-0.13	-0.37*
	Financial strain	0.31**	0.31***	0.43***	0.39***	0.52***	0.43***	0.36**
	N (household)	3569	4026	3498	3796	3426	2996	2447

*p<0.05, **p<0.01, ***p<0.001.

Table B2: Internalising symptoms and maternal employment situation

	Int M1	Int M2	Int M3	Int M4	Int M5	Int Girl	Int Boy	Int lone Parents	Int two Parent	Int Girl 2Parents	Int Boy 2Parents
Mother's work contract (ref: Permanent position)											
Fixed term contract	0.15	0.16	0.12	0.13	0.10	0.05	0.19	-0.12	0.32*	0.26	0.40
Casual basis	-0.05	0.07	0.04	0.04	0.02	0.01	0.04	-0.32	0.17	0.10	0.24
Some other bases	0.13	0.29	0.27	0.31	0.30	0.28	0.29	-0.40	0.43	0.87*	-0.10
Own business	-0.29***	-0.17*	-0.18*	-0.20*	-0.20*	-0.23	-0.15	-0.45*	-0.08	0.00	-0.16
Other/uncertain	-0.40	-0.23	-0.37	-0.10	-0.19	-0.54	0.08	-0.13	0.13	0.01	0.26
Unemployed	-0.27	-0.17	-0.36*	-0.19	-0.33*	-0.07	-0.50**	-0.57*	-0.33	-0.05	-0.49*
Not in labour force	-0.11	0.14	0.10	0.09	0.06	-0.06	0.20	-0.11	0.19	0.03	0.31*
Lone-parent household		0.24*	0.30*	0.13	0.22	0.28	0.17				
Number of siblings		-0.10	-0.06	-0.13*	-0.08	-0.04	-0.11	-0.01	-0.20**	-0.28**	-0.09
Age (in month)		-0.01**	-0.01***	-0.01*	-0.01**	-0.02***	0.01	-0.01	-0.01**	-0.02***	0.00
Age ## age		0.00***	0.00***	0.00***	0.00***	0.00***	0.00	0.00	0.00***	0.00***	0.00
Mother: degree		0.38*	0.26	0.41*	0.28	0.19	0.41	-0.03	0.22	0.14	0.29
Father: employment status									-0.08	0.03	-0.24
Mother: angry parenting				0.70***	0.69***	0.73***	0.67***	0.58***	0.69***	0.77***	0.63***
Father: angry parenting									0.11**	0.07	0.14**
Mother: parenting self-efficacy rating				-0.09**	-0.10**	-0.10	-0.11*	-0.06	-0.09	-0.08	-0.09
Father: parenting self-efficacy rating									-0.11***	-0.10*	-0.13**
Mother's K-6 depression scale score				0.08***	0.08***	0.06***	0.09***	0.06***	0.09***	0.09***	0.09***
Happiness in relationship									-0.01	-0.02	0.01
Equivalised income (log; \$thousands)			0.00		0.01	0.07	-0.02	0.00	-0.03	-0.04	-0.01
Financial strain			0.15***		0.08*	0.08	0.08	0.15	0.06	0.05	0.07
Constant	3.55***	3.56***	3.19***	1.54***	1.49***	2.28***	0.71	1.89**	1.66***	1.95**	1.42*
Observations	18,719	18,678	17,422	18,212	17,004	8,370	8,634	3,937	11,178	5,520	5,658
R-squared	Within	0.002	0.018	0.018	0.057	0.055	0.076	0.051	0.052	0.073	0.049
	Between	0.001	0.001	0.029	0.167	0.189	0.192	0.177	0.199	0.212	0.179
	Overall	0.000	0.007	0.020	0.113	0.124	0.129	0.119	0.114	0.138	0.135
N (households)	2,785	2,783	2,781	2,781	2,780	1,366	1,414	719	2,056	1,015	1,041

Fixed effects regression; Longitudinal weights used. *p<0.05, **p<0.01, ***p<0.001.

Table B3: Externalising symptoms and maternal employment situation

	Ext M1	Ext M2	Ext M3	Ext M4	Ext M5	Ext Girl	Ext Boy	Ext lone Parents	Ext two Parent	Ext Girl 2Parent	Ext Boy 2Parent
Mother's work contract (ref: Permanent position)											
Fixed term contract	0.01	-0.04	-0.05	-0.07	-0.08	-0.31*	0.13	-0.42*	-0.01	-0.34*	0.29
Casual basis	0.43***	0.12	0.12	0.04	0.06	0.06	0.06	0.09	0.1	0.14	0.06
Some other bases	0.75*	0.28	0.17	0.01	-0.15	-0.54	0.3	0	0.11	-0.06	0.26
Own business	0.25**	-0.02	-0.05	-0.05	-0.09	-0.13	-0.03	-0.09	-0.11	-0.23	0
Other/uncertain	0.23	-0.38	-0.71*	-0.42	-0.70**	-0.77*	-0.63	-0.99	-0.27	-0.4	-0.16
Unemployed	0.42**	-0.01	-0.14	0.03	-0.02	-0.3	0.25	0.3	-0.13	-0.02	-0.17
Not in labour force	0.84***	0.11	0.05	0.03	0.01	-0.12	0.16	0.01	0.05	-0.09	0.19
Lone-parent household		0.01	0.02	-0.07	-0.03	0.03	-0.09				
Number of siblings		-0.11	-0.08	-0.15**	-0.12*	-0.13	-0.12	-0.03	-0.19*	-0.12	-0.28**
Age (in month)		-0.03***	-0.03***	-0.03***	-0.03***	-0.04***	-0.03***	-0.03***	-0.03***	-0.04***	-0.02***
Age ## age		0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00*
Mother: degree		0.19	0.15	0.17	0.15	-0.08	0.37	0.29	0.07	0.01	0.14
Father: employment status									0.2	0.47*	-0.13
Mother: angry parenting				1.49***	1.47***	1.31***	1.61***	1.54***	1.33***	1.15***	1.47***
Father: angry parenting									0.27***	0.19***	0.35***
Mother: parenting self-efficacy rating				-0.16***	-0.17***	-0.17***	-0.17***	-0.19**	-0.07	-0.06	-0.07
Father: parenting self-efficacy rating									-0.22***	-0.15***	-0.29***
Mother's K-6 depression scale score				0.05***	0.05***	0.04***	0.06***	0.04**	0.06***	0.06***	0.07***
Happiness in relationship									-0.02	-0.03	-0.01
Equivalised income (log; \$thousands)			-0.03		-0.03	0.01	-0.05	-0.08	0.01	0.07	-0.01
Financial strain			0.06		-0.01	-0.02	0.01	-0.05	-0.03	-0.04	-0.02
		0.01	0.02	-0.07	-0.03	0.03	-0.09				
Constant	4.22***	7.28***	7.10***	4.35***	4.46***	4.93***	4.00***	4.98***	4.19***	4.28***	4.24***
Observations	18,721	18,680	17,424	18,215	17,007	8,370	8,637	3,937	11,180	5,520	5,660
R-squared											
Within	0.012	0.107	0.108	0.208	0.209	0.198	0.224	0.192	0.228	0.228	0.238
Between	0.012	0.000	0.003	0.376	0.372	0.353	0.371	0.327	0.384	0.340	0.388
Overall	0.011	0.036	0.039	0.290	0.293	0.271	0.303	0.260	0.317	0.276	0.338
N (households)	2,785	2,783	2,781	2,781	2,780	1,366	1,414	719	2,056	1,015	1,041

Fixed effects regression; Longitudinal weights used. *p<0.05, **p<0.01, ***p<0.001.

Table B4: Behaviour problems and maternal employment situation in early childhood (age 4-10)

	Model 1	Model 2	Model 3	Model 4	Model 5	Girl	Boy	Lone Parents	Two Parent	Girl 2Parent	Boy 2Parent
Mother's work contract (ref. permanent position)											
Fixed term contract											
Casual basis	0.29	0.24	0.29	0.06	0.12	0.02	0.25	0.06	0.19	0.04	0.32
Some other bases	0.52***	0.29*	0.25	0.16	0.14	0.11	0.20	0.06	0.22	0.07	0.38
Own business	1.73***	1.31***	1.23**	0.90**	0.90**	0.83	0.94*	1.32	0.82	1.12	0.45
Other/uncertain	0.14	-0.04	-0.04	-0.08	-0.09	-0.21	0.06	-0.34	-0.11	-0.21	-0.02
Unemployed	-0.05	-0.55	-0.85	-0.48	-0.73	-0.79	-0.58	-2.60**	0.16	-0.52	0.73
Not in labour force	0.32	-0.11	-0.11	-0.22	-0.15	-0.39	0.15	0.30	-0.42	-0.54	-0.25
Lone-parent household	0.92***	0.40**	0.39*	0.22	0.25	-0.07	0.59**	0.26	0.14	0.02	0.27
Number of siblings		0.31	0.34	0.20	0.27	0.17	0.35				
Age (in month)		-0.06	-0.02	-0.10	-0.08	0.00	-0.16	-0.26	0.01	-0.09	0.11
Age ## age		-0.14***	-0.13***	-0.13***	-0.12***	-0.14***	-0.11***	-0.12***	-0.13***	-0.13***	-0.12***
Mother: degree		0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Father: employment status									0.07	0.64	-0.46
Mother: angry parenting				1.99***	1.97***	1.79***	2.13***	2.24***	1.77***	1.60***	1.92***
Father: angry parenting									0.28***	0.23*	0.33***
Mother: parenting self-efficacy rating				-0.13*	-0.12	-0.17	-0.09	-0.21	-0.03	-0.1	0.02
Father: parenting self-efficacy rating										-0.22***	-0.17*
Mother's K-6 depression scale score					0.15***	0.14***	0.14***	0.15***	0.12***	0.13***	0.13***
Happiness in relationship										-0.02	-0.08
Equivalised income (log; \$thousands)			0.01		0.03	0.04	0.03	0.05	0	-0.02	0.02
Financial strain			0.23***	0.25***		0.16*	0.02	0.28**	0.28	0.08	-0.08
Constant	8.11***	15.08***	14.09***	9.38***	8.80***	10.08***	7.59***	9.24***	9.16***	9.84***	8.76***
Observations	14,988	14,982	14,353	14,287	13,682	6,658	7,024	2,688	9,701	4,715	4,986
R-squared Within	0.008	0.047	0.053	0.131	0.134	0.134	0.138	0.136	0.141	0.141	0.143
Between	0.025	0.051	0.090	0.371	0.374	0.313	0.397	0.278	0.373	0.293	0.388
Overall	0.016	0.028	0.045	0.279	0.286	0.236	0.311	0.233	0.289	0.230	0.308
N (household)	3,928	3,928	3,924	3,923	3,910	1,907	2,003	827	3,066	1,488	1,578

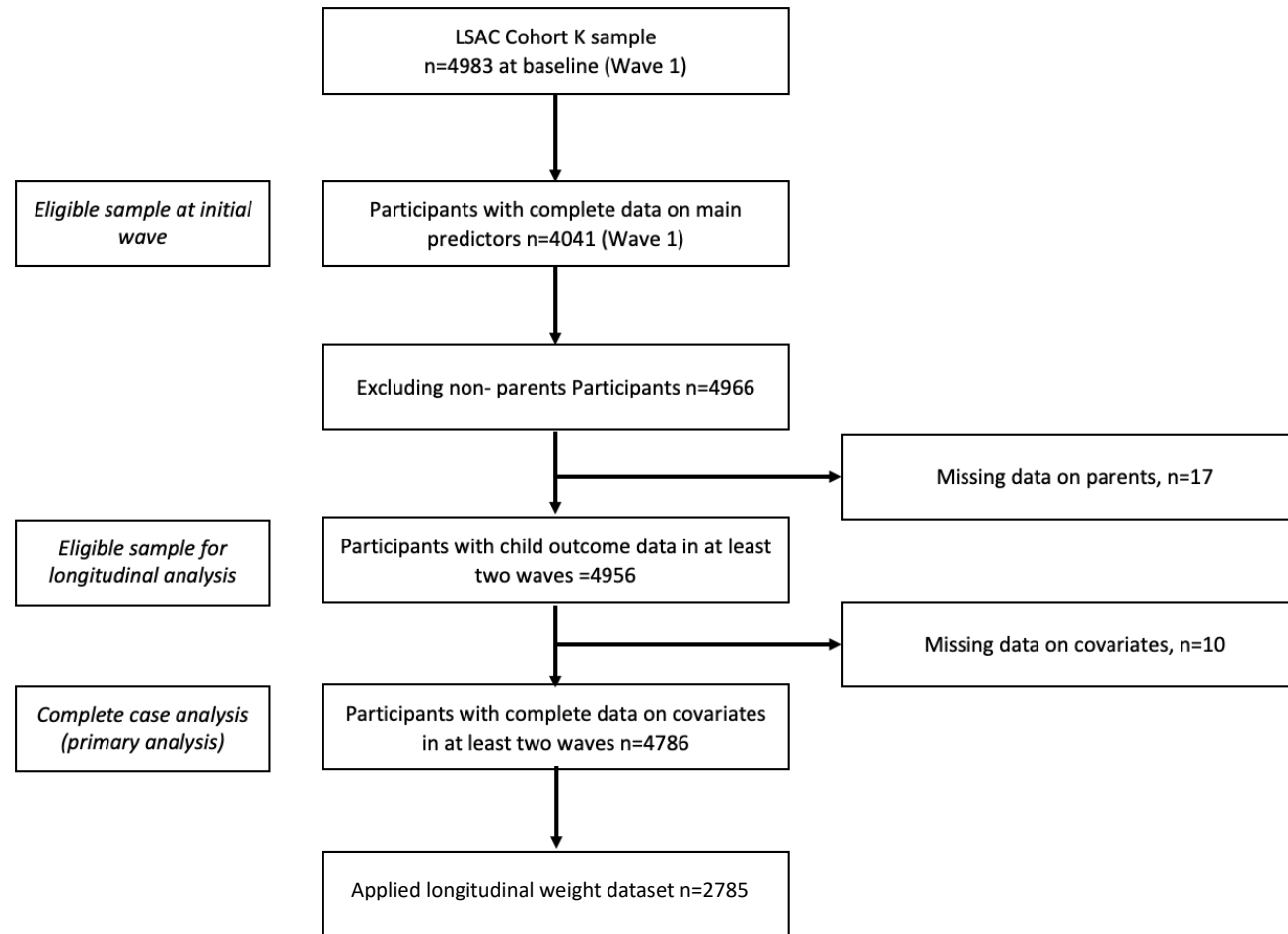
Fixed effects regression; Longitudinal weights used. *p<0.05, **p<0.01, ***p<0.001.

Table B5: Behaviour problems and maternal employment situation in adolescence (age 10-16)

	Model 1	Model 2	Model 3	Model 4	Model 5	Girl	Boy	Lone Parents	Two Parent	Girl 2Parent	Boy 2Parent
Mother's work contract (ref. permanent position)											
Fixed term contract	0.17	0.18	0.03	0.15	-0.01	-0.38	0.41	-0.70	0.15	-0.34	0.65
Casual basis	0.29	0.24	0.17	0.11	0.04	0.02	0.09	-0.03	0.06	0.11	0.07
Some other bases	-0.60	-0.59	-0.88	-0.38	-0.68	-1.3	0.27	-2.26***	-0.19	-0.57	0.43
Own business	-0.19	-0.18	-0.19	-0.24	-0.24	-0.29	-0.11	-0.52	-0.16	-0.34	0.02
Other/uncertain	0.06	0.05	-0.49	-0.14	-0.6	-1.39	0.44	-0.63	0.89	0.82	1.06
Unemployed	0.00	-0.07	-0.39	0.00	-0.15	-0.55	0.13	-0.08	0.29	0.43	0.34
Not in labour force	-0.1	-0.17	-0.21	-0.20	-0.24	-0.32	-0.10	-0.19	0.09	-0.47	0.64
Lone-parent household		0.25	0.19	0.01	-0.01	0.15	-0.17				
Number of siblings		-0.38**	-0.27	-0.34*	-0.21	-0.25	-0.17	0.35	-0.45**	-0.4	-0.50*
Age (in month)		-0.09***	-0.10***	-0.11***	-0.12***	-0.19***	-0.06*	-0.20***	-0.10***	-0.14***	-0.05
Age ## age		0.00***	0.00***	0.00***	0.00***	0.00***	0.00	0.00***	0.00***	0.00***	0.00
Mother: degree		0.68*	0.73*	0.58*	0.56*	-0.10	1.11**	-0.14	0.51	-0.07	1.11*
Father: employment status									-0.13	-0.21	-0.21
Mother: angry parenting				2.11***	2.14***	2.10***	2.14***	2.34***	1.80***	1.77***	1.77***
Father: angry parenting									0.33***	0.26*	0.42***
Mother: parenting self-efficacy rating				-0.31***	-0.32***	-0.37**	-0.27*	-0.32	-0.22*	-0.18	-0.29*
Father: parenting self-efficacy rating									-0.27***	-0.22*	-0.33***
Mother's K-6 depression scale score				0.10***	0.10***	0.06*	0.14***	0.09**	0.10***	0.11**	0.10*
Happiness in relationship									-0.04	-0.10*	0.01
Equivalised income (log; \$thousands)			-0.03		-0.03	-0.02	-0.02	0.16	-0.03	-0.08	0.04
Financial strain			0.14		0.08	0.19	-0.02	0.14	0.01	0.17	-0.13
Constant	7.73***	16.00***	16.09***	13.38***	13.56***	18.41***	9.27***	19.40***	12.54***	15.48***	10.11***
Observations	10,717	10,717	9,842	10,688	9,824	4,839	4,985	1,851	6,655	3,264	3,391
R-squared											
Within	0.013	0.013	0.013	0.118	0.120	0.123	0.151	0.140	0.110	0.112	0.131
Between	0.000	0.000	0.000	0.301	0.309	0.332	0.261	0.252	0.323	0.360	0.263
Overall	0.002	0.001	0.001	0.251	0.262	0.272	0.234	0.226	0.283	0.301	0.246
N (household)	2,767	2,767	2,756	2,765	2,755	1,357	1,398	574	2,160	1,059	1,101

Fixed effects regression; Longitudinal weights used. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure B1: Selection of eligible and analytic samples



Appendix C - Appendix for Chapter 4

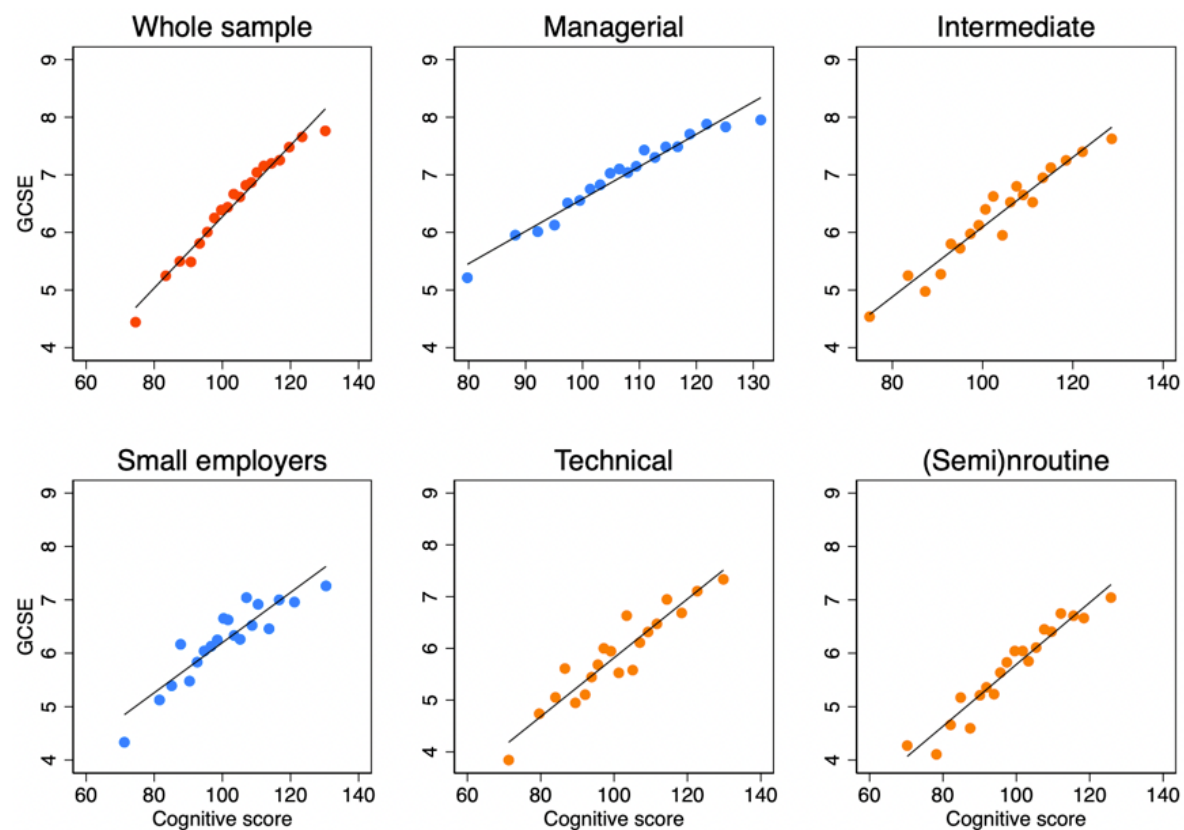
Variables and Descriptive Statistics

A.1 Bivariate Relationships

Before we start with the formal analyses, Figure A1 shows the bivariate relationships between each occupational group's child cognitive score and GCSE qualifications. For this purpose, a binscatter is used in which the red dots indicate the mean level of GCSE qualifications at a given cognitive score level and the dots is colour code for different occupational groups: blue dots used for children from higher occupational class household and orange dots for those from lower occupational class households. The navy lines are the linear fit underlying the data. The main finding of these plots is that GCSE qualifications is positively associated with early cognitive score when the entire sample is considered. When we differentiate by occupational class, the positive association exist for each group although the starting points of the graph not the same, children with managerial parents are in general have a higher cognitive score and higher GCSE score than those with parents working in routine or semi-routine jobs.

Figure C1: Cognitive ability and GCSE score

(Bivariate Associations Between earlier childhood latent cognitive ability at age 7 and GCSE score at age 17: Binscatter|)



Note: Dark navy lines represent linear fit of the underlying data.

Appendix D - Appendix for Chapter 5

Table D1: Parental expectations (degree vs below degree)

	Coeff.	SE
DPRT-R score at age 9	0.817***	0.082
Girl	0.803***	0.116
Lone parent family	-0.301*	0.165
Large family	0.125	0.113
At least one parent has a university degree	1.308***	0.550
Mixed parents' region	0.366	0.260
Financial strain	-0.126*	0.059
Parental origin (ref: Irish)		
the UK	-0.415	0.256
Other Anglo-Saxon	-0.094	0.537
EU West	0.405	0.466
EU East	1.000**	0.352
Asia	0.903	0.575
Africa	1.096*	0.433
Rest	1.040	0.912
Parental degree * DPRT-R score		
Degree	0.236	0.160
Parental degree * Parental origin (ref: Irish)		
Degree * the UK	0.184	0.376
Degree * Other Anglo-Saxon	0.232	0.924
Degree * EU West	-0.561	0.709
Degree * EU East	-0.982	0.562
Degree * Asia	-	-
Degree * Africa	-0.806	0.681
Degree * Rest	-1.028	1.395
Parental origin (ref: Irish) * DPRT-R score		
the UK	0.022	0.204
Other Anglo-Saxon	-0.926*	0.476
EU West	0.067	0.580
EU East	-0.844**	0.317
Asia	-0.822*	0.367
Africa	-0.364	0.384
Rest	-2.285***	0.483
Parental degree * Parental origin (ref: Irish) * DPRT-R score		
Degree * the UK	-0.699	0.408
Degree * Other Anglo-Saxon	0.932	0.707
Degree * EU West	-0.003	0.999
Degree * EU East	-0.216	0.462

Degree * Asia	-	-
Degree * Africa	-1.834***	0.503
Degree * Rest	2.934**	1.044
N	4993	
Pseudo R square	0.1746	

Source: Growing Up in Ireland '08 Cohort; ***p<0.001, **p<0.01, *p<0.05; Longitudinal weights used.

Table D2: parental expectations (postgraduate degree vs below postgraduate degree)

	Coeff.	SE
DPRT-R score at age 9	0.943***	0.112
Girl	0.318**	0.092
Lone parent family	-0.404*	0.165
Large family	0.268**	0.093
At least one parent has a university degree	0.943***	0.112
Mixed parent	0.046	0.201
Financial strain	-0.044	0.051
Parental origin (ref: Irish)		
the UK	0.060	0.274
Other Anglo-Saxon	0.299	0.445
EU West	0.519	0.448
EU East	0.933***	0.260
Asia	1.234***	0.341
Africa	1.390***	0.309
Rest	1.502*	0.660
Parental degree * DPRT-R score		
Degree	-0.034	0.114
Parental degree * Parental origin (ref: Irish)		
Degree * the UK	-0.085	0.332
Degree * Other Anglo-Saxon	-0.084	0.570
Degree * EU West	-0.399	0.533
Degree * EU East	-0.376	0.371
Degree * Asia	0.051	0.496
Degree * Africa	-1.149*	0.479
Degree * Rest	4.689	2.446
the UK	0.152	0.284
Other Anglo-Saxon	-0.039	0.385
EU West	-0.015	0.297
EU East	-0.102	0.237
Asia	-0.198	0.450
Africa	-0.682*	0.296
Rest	-1.161	0.648

Parental degree * Parental origin (ref: Irish) * DPRT-R score

Degree * the UK	-0.461	0.361
Degree * Other Anglo-Saxon	0.621	0.588
Degree * EU West	-0.273	0.448
Degree * EU East	-0.271	0.375
Degree * Asia	0.231	0.638
Degree * Africa	0.582	0.473
Degree * Rest	16.71**	5.374
N	5042	
Pseudo R square	0.093	

Source: Growing Up in Ireland '08 Cohort; ***p<0.001, **p<0.01, *p<0.05; Longitudinal weights used.

Figure D1 -1 Average marginal effects of parental origin on parental expectations of the child attaining a degree, regrouped the region by Global South and North.

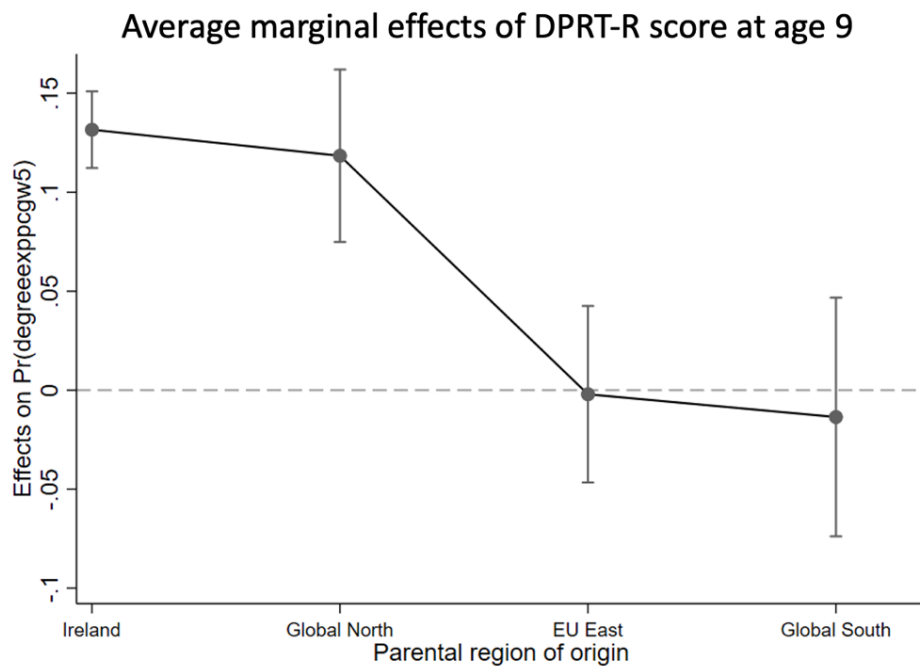


Figure D1 -2 Separate by maternal degree

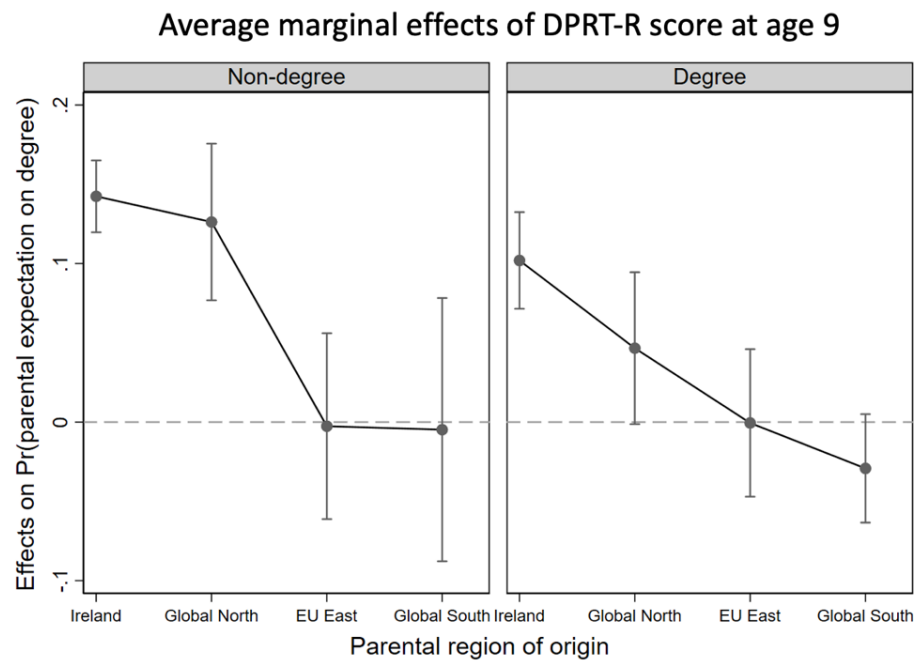


Figure D2-1 Average marginal effects of parental origin on parental expectations of the child attaining a postgraduate degree, regrouped the region by Global South and North.

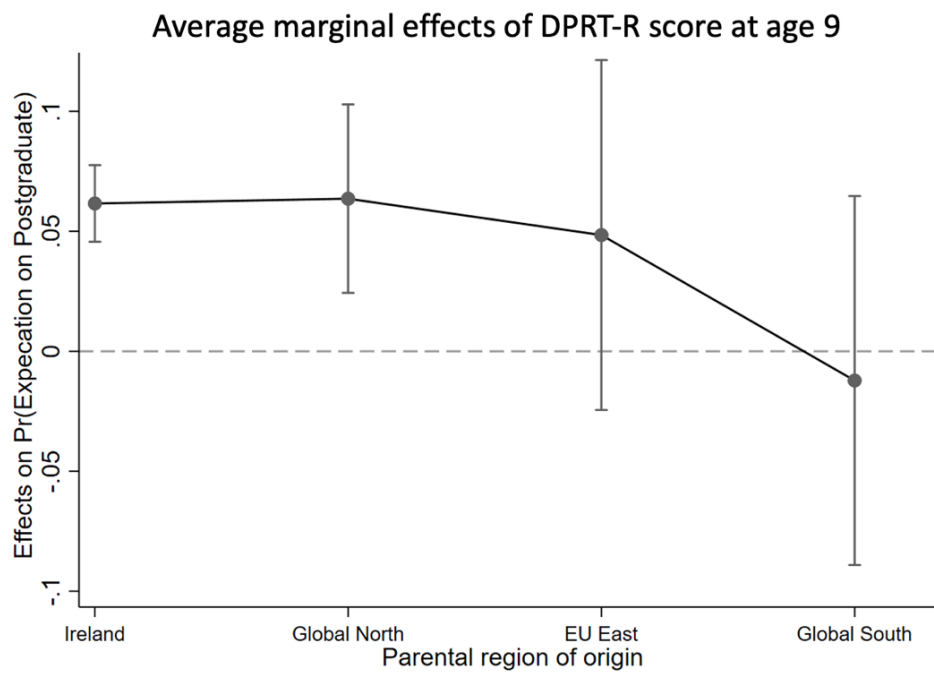


Figure D2-2 Separate by maternal degree

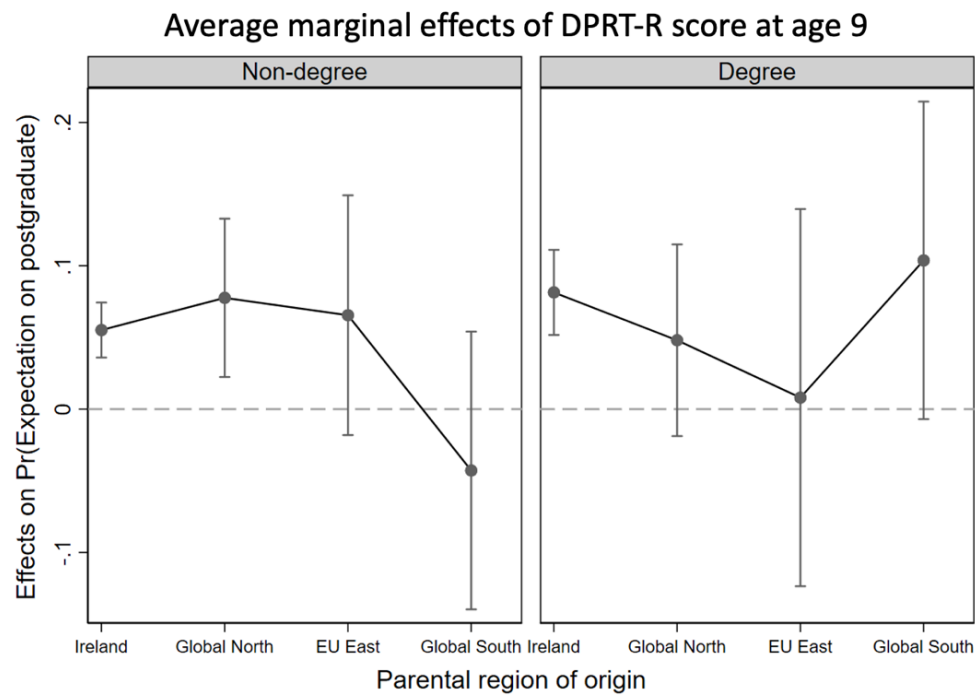


Figure D3 Estimated plot of parental expectation on achieve a college degree across Cognitive ability test by regrouped parental region

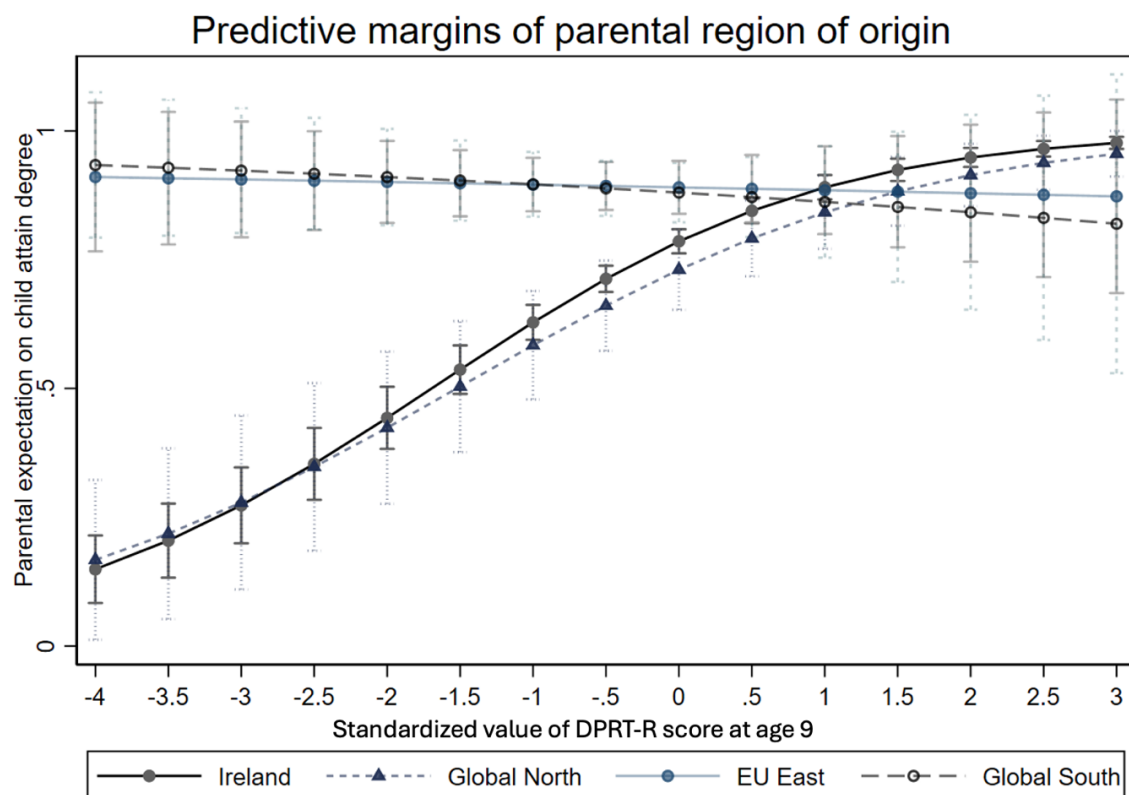


Figure D4 Estimated plot of parental expectation on achieve a postgraduate degree across cognitive ability test by regrouped parental region

